

# Intercultural Understanding

Vol.4 2014

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## PREFACE

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Here is sad news. In August 2013, we received a call from Associate Dean Murat to tell us that Dean Ahmet Eyüce of Faculty of Architecture and Design had suddenly passed away. Dean Ahmet Eyüce was the important key person who paved the way to the cooperation between Bahcesehir University and MWU. The exchange between us started in May 2008, when Dean Ahmet Eyüce visited MWU with Associate Dean Murat and a clerical staff in tow. He was involved in virtually all exchange programs between us playing a primary role. Associate professor Yanagisawa, Research Assistant Hongo and fourteen graduate school students laid a wreath on his grave on October 14 on occasion of their visit to ICSA in Istanbul. The new grave was in the outskirt Istanbul on Asian side surrounded by the trees. We realized how large it was the existence of Dean Ahmet Eyüce and we swear we follow his footstep. May Dean Ahmet Eyüce rest in peace.

#### 1. ICSA in Japan and in Istanbul 2013

**ICSA in Japan 2013:** as usual we had Turkish students with us. Ten students visited MWU led by Associate Dean Murat and Research Assistant Sinem. They stayed from June 25 to July 31 and worked on the architectural design in the studios for the third and fourth grade student side by side with our architecture major students. Meanwhile they experienced Ikebana and other practices during the space design studio I. They also visited Itsukushima Shrine or colony in Ohmi-hachiman

今年は大変悲しいことが起こりました。本学の協定校であるバフチェシヒル大学（トルコ）のアフメット・エユジェ Ahmet Eyüce 建築デザイン学部長が急逝されたという電話が、2013年8月、突然ムラト建築デザイン副学部長からかかってきました。イスタンブールにあるバフチェシヒル大学と本学との出会いを作って下さった大切な方でした。アフメット先生は、ムラト先生と事務担当者を同伴して、2008年5月に本学を訪れました。それから両大学の交流が始まりました。今まで、両学のほとんどすべての交流行事に出席され、その中心的役割を果たされました。本年の ICSA in Istanbul で当地を訪問した柳沢准教授と本郷助手、それに大学院生14名は10月14日に先生の墓前に花束を捧げました。新しい墓地はアジア側の郊外の木々に囲まれた中にありました。先生亡き今、あらためて先生の存在の大きかったことに驚いております。先生の志を引き継ぐとともに、心から先生のご冥福をお祈りします。

#### 1. ICSA in Japan and in Istanbul 2013

**ICSA in Japan 2013:** 今年も例年通りトルコから学生たちがやってきました。ムラト副学部長とシネム助手と10人の学生たちでした。2013年6月25日~7月31日まで滞在しました。その間、本建築学科の3、4年生の各スタジオで、本学建築学科の学生と机を並べて建築設計演習に励みました。同時に空間造形演習Iでは、いけばな等々の実習を体験し、また毎週土曜日にはフィールドワークで建築学科の学生とともに厳島神社や近江八幡などの集落の景観研修旅行を体験しました。

with our students during the field trip to study landscape held on Saturdays.

**ISCA in Istanbul 2013:** our graduate school students also visited Turkey on October 1, 2013 and stayed until October 17. Beforehand, all participants had a class of Turkish language in the first semester. Scholarship was given to students of the excellent performance of Turkish and overall subjects. They were led by Associate Professor Yanagisawa and Research Assistant Hongo. They stayed at a hotel near the Bahcesehir University. From the terrace that seagulls visit, they could overlook the Bosphorus with boats of various sizes crossing it to the backdrop of the towns on Asian side across the strait. Following the courtesy call to President Yalcin and Dean Sema of Faculty of Architecture and Design, students started the practice in Istanbul. The course took place in the group of bottega in Dolmabahce Palace or in Yildiz Palace, or in KUDEB, an organization of Istanbul which mainly engages in the restoration of wooden structures, and in Uskudar, which is known for its many old buildings. Outside Istanbul, students had rich experience of practical training: the tile restoration at the tile manufacturer's atelier in Iznik, observation of landscape and cityscape in Buyukada (island) or old cities of Bursa and Edirne.

## **2. Petra Museum Project 2013 in the Hashemite Kingdom of Jordan**

Our project for the design of the Petra Museum aims to preserve, restore and exhibit the Petra World Heritage Site. Since the planned site for the museum is located close to the boundary of Petra, UNESCO asked us to assess the effect of the museum and its construction on the surrounding landscape. As a member of a research team that included archaeologists, Lecturer Hideaki Tembata, of Mukogawa Women's University's Department of Architecture, visited the site in September to survey the topography and vegetation, and to take pictures of the surrounding area. With this information, we created four designs that consider specific views of the areas that surround the site. We selected nine pictures taken at the important points in the landscape, such as mountain slopes that surround

**ICSA in Istanbul 2013 :** 本学の大学院生も 2013 年 10 月 1 日~17 日までトルコを訪れました。参加者全員が前期のトルコ語の講義を受講しました。トルコ語と全体の成績が優秀な学生に奨学金が支給されました。引率は柳澤准教授と本郷助手でした。バフチェシヒル大学に程近いホテルに泊まりました。カモメが舞い降りてくるホテルのテラスからは毎朝、眼下の町並み、大小の船が行交うボスフォラス海峡、そしてアジア側の町並みを見晴らすことができました。ヤルチン学長とセマ建築デザイン学部長をまず表敬訪問した後、イスタンブルで研修を行いました。ドルマバフチェ宮殿やユルドゥズ宮殿の工房群、イスタンブル市の組織で木造建築を中心に保存修復を手掛けるクデッブ、古い建物が多く残っていることで有名なユスキュダル区などでした。イスタンブルの外では、イズニックのタイル作家のアトリエで陶器の保存修復実習、さらにビュユック島、古都のブルサやエディルネで景観研修を行うなど豪華な研修旅行を堪能しました。

## **2. ヨルダン・ハシェミット王国の世界遺産ペトラ遺跡 のための博物館計画 2013**

昨年から取り組んでいるペトラ博物館の設計は、ヨルダン・ハシェミット王国(Hashemite Kingdom of Jordan)の世界遺産ペトラ遺跡の遺跡保存と修復、展示のためのものでした。博物館の敷地が世界遺産ペトラ遺跡の境界領域に立地することから、博物館の建設がもたらす景観への影響調査をユネスコから要求されました。本学建築学科教員の天島講師が、考古学者などからなる調査チームの一員として、9月に現地を訪問し、敷地周辺の地形や樹木などの測量、さらに現地の写真撮影などを行ってきました。これに基づいて特に博物館の敷地周辺の景観に配慮しながら、景観への影響を検討するため、4つの博物館案を設計しました。撮影した膨大な現地写真の中から、敷地を取り巻く山腹や博物館へのアプローチ道路などの、景観上重要な9か所の地点から、敷地を撮影した写真を選定しました。それぞれの写真

the museum and the road leading to the museum, and then, using computer graphics, created composite images that depict the proposed appearance of the museum for each of the four designs against the selected background pictures. We expressed our views on the issues raised by UNESCO's landscape assessment criteria and proposed including elements of Japanese landscape composition, preserving existing trees, matching the design with the stone ruins, and referencing a form that symbolizes Petra's culture.

### 1) Conservation and creation of landscape

UNESCO's landscape assessment criterion is based on the premise that new building construction can damage the existing landscape. In other words, any constructions of artificial objects have a negative impact. The assessment tries to assign negative points according to how much landscape value is lost. However, no thought has been given to the possibility that creatively designed new construction can actually increase the value of the existing landscape. In fact, introducing a structure with an excellent exterior appearance can create a more distinguished landscape than the conventional landscape. We introduced the Togetsu-kyo Bridge in Arashiyama, Kyoto as an example. Without the accent of the Togetsu-kyo Bridge, the view where the river runs out of the mountains that surround the basin would be commonplace in Japan. However, because of the Togetsu-kyo Bridge, Arashiyama is one of the best scenic places in Kyoto.

## 2) Introduction of Japanese landscape composition

### 2-1) Shiseki-senri

Common image is that incorporating materials from the natural environment in the museum would be pointless since the exhibits could never compete with the abundant actual landscape. China and Japan, however, have found a way of enjoying these natural qualities by introducing them as symbolically prepared miniatures in the daily living space, i.e., the idea of "Shiseki-senri." Bonsai (a miniature potted tree), Bonseki (a small-scale and stone landscape on a tray), stone gardens where mountains or waterfalls are figuratively expressed by blocks of stone, and ink

の中に、4案のコンピューター・グラフィックスによる博物館の外観図を合成し、できあがった景観を提示しました。そして同時に特に以下の設計上の諸点についてコメントし、設計案の中に提示しました。すなわちユネスコが求める景観評価基準の基本的な考え方に関する問題点の提示、文化交流として日本的景観構成を適用すること、そして植栽の保全、石の遺跡に適応する展示方法、ペトラの文化を象徴する形態の引用などの新たな提案を行いました。

### 1) 景観の保存と創造

まず新たな建物の建設は景観を破壊するという前提で環境の景観評価が行われていることが分かりました。建物などの人工物の構築は、すべてが景観上の負の要因で、構築によって全体の景観価値がどれだけ下がるかを、点数を付けて評価しようとしている。そこには創造的なデザインの建物の新たな建設によって、既存の景観の価値が逆に向上することの可能性がまったく視野にないことでした。優れた外観の建物の導入は、既存の景観にはない、既存の景観よりさらに優れた景観を創造することもあるという事実です。そのことを京都の嵐山の渡月橋の例を挙げて説明しました。すなわち渡月橋がなければ嵐山は、盆地を取り巻く山並みの谷間から川が流れ出るという日本全国どこにでもある景観です。ところがそこに渡月橋が架かることにより、嵐山は京都有数の景勝地となりました。

## 2) 日本的景観構成の適用

### 2-1) 咫尺千里

博物館のなかにペトラの風景や自然の素材を導入しても、それは本物の自然には勝てないし、博物館の外には本物があるのだから意味がないという一般的な意見がありました。しかし中国や我が国には咫尺千里という大自然を象徴的に縮小し、住空間の中に導入して鑑賞するという楽しみ方があります。盆栽や盆石、山や滝を石を立てて表現する石庭、広大な山水を描く水墨画にこの手法を見出すことができます。我が国の資金援助によるペトラ博物館ですから、我が国の文化の真髄を紹介する必要があるのではないのでしょうか。ペトラの大自然を、日本人ならこのように楽しみ

paintings that depict the scenic beauty of the vast world are examples of Shiseki-senri. We propose to introduce the essence of Japanese culture into the Petra Museum, which is to be built with financial assistance from Japan. In our designs for the museum, we provide examples of how the Japanese would enjoy Petra's surrounding natural beauty.

### 2-2) Shakkei (borrowed scenery)

Various buildings have already been randomly built in the area planned for the museum's construction, such as a visitor center built by the United States Agency for International Development (USAID), private hotels, and stores. A hotel is situated on a rocky stretch that occupies some of ancient caves. Considering the extent of existing construction in this area, so close to the planned museum, the assessment of the effect on the landscape seems a little too late. However, the surrounding mountain range is beautiful, with overlapping rows of hills of huge rocks. In this regard, in our designs, we plan to build low walls on the museum's roof with a rooftop garden situated along the exterior walls. As a result, the hotels and other buildings around the premises will be hidden, and a view of the mountains as borrowed scenery can be enjoyed from the rooftop. Traditional Japanese landscape composition utilizes the backdrops, such as the view of Mt. Fuji or Higashi-yama. This is called "shakkei" (borrowed scenery). Introducing this traditional landscape composition in Petra will represent a meaningful cultural exchange between Jordan and Japan.

### 3) Preservation of the existing trees

Petra is a ruined nomadic city in a semiarid area near the desert. Unlike Japan, which has an annual precipitation of over 1500 mm, Petra sees rain only during the winter, with an annual rainfall of only 200 mm. A river called *wadi* has running water only in the winter, yet there are clusters of pines and other 10 m high tall trees on the site and its surroundings that would normally be cut down during construction. Architectural designs to preserve positively these existing trees are critical.

ますという一例を博物館の中に実現しています。

### 2-2) 借景

博物館が予定されている敷地一帯には、すでに米国の援助でできたビジターセンターや民間のホテル群、商店などが雑多に立ち並び、さらに岩場の上にまでホテルが建ち、しかも岩場に刻まれた昔の石窟をこのホテルが占有しています。しかし一帯を取り巻く周囲の山並みは巨大な岩が幾重にも続く美しい丘の連なりです。敷地周辺だけを見れば、いまさら博物館の景観評価もないと思われれます。しかし新たな博物館計画では、博物館の外壁にそった屋上に低い壁を立てて、その内部を庭園化し、屋上からはこの敷地周辺のホテル群などは見えなくし、周辺の山並みを屋上の景観の借景として、取り入れるように設計をしました。遠くに見える富士や比叡山や東山などを、庭の景色の中に取り込み、それを、庭を構成する一つの要素とするのは、我が国の伝統的な景観構成の手法「借景」です。この伝統的な「借景」による景観を、このペトラの地に紹介することは、日本とヨルダンの文化交流にとって大変有意義なことです。

### 3) 既存樹木の保存

ペトラは砂漠の近くの半乾燥地帯にある遊牧民の都市遺跡です。我が国では年間 1500mm 以上の雨が降りますが、ペトラでは雨は冬季のみで、年間約 200mm しか降りません。ワディと呼ばれる川もありますが、冬季以外は水のない瓦礫だけの川です。それでも敷地内やその周辺には 10 m 程度の松類の高木が群生しています。この種の樹木は大概、建設の際に伐採されてしまいます。これらを積極的に保存する建築デザインが緊要です。



#### 4) Exhibiting the ruins

The existing Petra Museum houses and conserves many conventional artifacts, including statues and chapters, many of which are currently on exhibit internationally, such as in Switzerland last year and presently in Leiden, Holland. A few are paper and leather items, but the majority are stone figures that should look magnificent when displayed in the sunlight. The current trend in museum design, however, is to install artwork in huge exhibition cases on the interior walls illuminated by artificial light. In our proposal, we designed the space to include a courtyard and galleria, as well as indoor spaces into which outside light can easily be provided when required.

#### 5) Reference form symbolizing the Culture of Petra

The area's mountains produce an undulation of enormous reddish-brown sandstone with tombs cut vertically into the cliff faces of the ravine. Features of these sites include engraved loophole decorations, crowsteps, obelisks, sequential columns, and a theater, and more, dating from the era of the Roman Empire. Making reference to these in the museum will make it possible to produce an environment that befits Petra.

### 3. Bamiyan Museum & Culture Center For People The 12th Expert Working Group Meeting for the Safeguarding of the Cultural Landscape and Archaeological Remains of the Bamiyan Valley World Heritage Property in Orvieto, Italy 2013

Following the expert meeting 2012 on Bamiyan held in RWTH Aachen University in Germany in December, the expert meeting 2013 was held in December in Orvieto, a beautiful medieval Italian city in a mountainous region.

UNESCO had asked us to prepare the relevant designs for the museum for this meeting. We responded by collecting information on landscape of the area surrounding the museum, the design of the systems of water catchment and sewerage, a plan for vegetation, the design of energy management system, and the urban landscape design based on them. Furthermore, we renewed the last year's working design of the Bamiyan Museum with reference to the present comprehensive plan. In the Bamiyan Museum project

#### 4) 遺跡の展示方法

今あるペトラ博物館には当時の彫刻や柱頭などが多数保管されています。それらの多くが、去年はスイスに、いまはオランダのライデンに展示されています。紙や皮製品は少なく、大半は石像なので、できるだけ太陽光のもとに展示する方が、展示品もより美しく見えます。しかし最近の展示は、博物館の壁面にインテリア工事で巨大な展示ケースを造り付け、わざわざ人口照明で照らし出すという傾向にあります。こうすると博物館の内部空間の転用性もなくなり、展示品の真の美しさを鑑賞できなくなってしまいます。われわれは中庭、それを取り巻く回廊、そして自由に外光を導入できる博物館の展示空間を提案しています。

#### 5) ペトラの文化を象徴する形態の引用

ペトラの文化を象徴する形態として、赤茶色の巨大な砂岩のうねりが作るペトラの山並、峡谷の崖面に垂直に削り出した墓、墓にきざまれた銃眼飾りや Crowstep (死者への階段)、オベリスク、ローマ時代の列柱や劇場などがあります。これらを博物館に引用することにより、ペトラらしい景観を造り出すことができます。

### 3. バーミヤン平和博物館/文化センター 第12回 世界遺産バーミヤン渓谷の文化的景観と古代遺跡群の保護のための専門家作業部会会議 イタリア オルヴィエート 2013

昨年 2012 年 12 月、バーミヤンのユネスコ専門家会議 2012 は、ドイツのアーヘン工科大学で開催されました、今年 2013 年 12 月、同会議 2013 はイタリアで一番美しいと言われ、中世の面影を色濃く残す山岳都市オルヴィエートで開催されました。

この会議に向かってわれわれはユネスコより設計を委託されました。まず博物館周辺の広域における景観資料収集、集水と下水処理システム設計、植栽計画、エネルギー管理設計などを行い、それを踏まえて都市景観の設計を行いました。さらにこの全体計画のなかの、昨年設計したバーミヤン平和博物館の設計案を更新しました。このバーミヤン平和博物館では地域の人々のための文化センター、遺跡の展示・収納・補修のための博物館、野外劇場、石窟庭園などを計画しています。

various facilities are planned including a cultural center for the community, a museum to exhibit, store or restore the artifacts, an outdoor amphitheater and a cave garden.

We have created a 3m×2m 1/300<sup>th</sup> scale model of large area that includes great cliff with stone caves which once housed the great images of Buddha (east and west), Bamiyan valley, and the plateau, and the planned premises for the museum. We also presented our working design using moving images from the computer simulation as well as the design drawings.

The meeting had many attendants including government officials and technical engineers from Afghanistan, Director of Kabul Museum, Governor, Mayor, governmental or municipal technical engineers of Bamiyan Governor, and researchers from Afghanistan, as well as those from abroad such as archaeologists, urban planning experts, architects from Germany, Italy or France, and, staff from UNESCO headquarter and its branch in Kabul. In addition, from Japan, the staffs of the Foreign Ministry, National Research Institute for Cultural Properties, Tokyo, and Nara National Research Institute for Cultural Properties, and the archaeologists of the university participated in the meeting.

The meeting saw many presentations and exchanges of opinion on various archaeological questions. Especially, the work to reconstruct the Giant Buddha that had been half-completed using concrete for the feet led to the criticisms of a German archaeologists group and UNESCO's Kabul office. It turned out these questions had been attributable to the political questions expected to be involved in the reconstruction at present and differences of opinions on the validity of using concrete in refurbishment and different views on whether such reconstruction plans be conducted without being opened to other parties.

#### **4. The seminar for the Culture and History of the Silk Road**

The two universities situated on the extreme ends of the Silk Road, MWU and Bahcesehir University, have held an international seminar entitled "Archi-Cultural Translations through the Silk Road". The international seminar aims to promote cultural exchanges between the universities on the Silk Road. The first and the second

東西大仏のあった石窟を含む大崖、バーミヤン溪谷、バーミヤン平和博物館を計画する台地などを含む広い地域の300分の1の、3m×2mの模型を制作しました。これを分解してイタリアに空輸し、オルヴィエートでの国際会議の会場のホールに展示しました。これにより世界遺産の今後の整備に関する時間的、空間的目標を共有できました。さらにコンピューター・シミュレーションによる動画や設計図を使用して設計案のプレゼンテーションを行いました。

会議には多くの人が参加しました。アフガニスタンの政府関係者、政府の技術者、カーブル博物館館長、バーミヤン州知事、バーミヤン市長、州や市の技術者、アフガニスタンの研究者。アフガニスタン以外では、ドイツ、イタリア、フランスなどの考古学者や都市計画家、建築家、ユネスコの本部およびカーブル事務所のスタッフなどでした。また我が国からは外務省の担当者、東京や奈良の文化財研究所のスタッフや大学の考古学者などが多数参加しました。

バーミヤン平和博物館の問題だけではなく、バーミヤンのあらゆる考古学的問題について多数の発表と意見交換が行われました。特に、タリバンによって破壊された大仏の復元を目指して、その足をコンクリートで途中まで再現していたドイツの一部の考古学グループとユネスコのカーブル事務所への批判が起こり、白熱した議論となりました。それは現時点での復元による政治的問題、コンクリートによる復元の正当性、復元が非公開で実施されたことなどの諸問題に対する意見の相違に原因がありました。

#### **4. シルクロードの文化と歴史に関する研究会**

武庫川女子大学とバフチェシヒル大学はシルクロードの両端に位置することから、「シルクロードを通して見た建築と文化」と題する国際会議を開催してきました。この国際会議ではシルクロード沿いにある各国の大学がシルクロードの文化交流を行うというものです。第1回はバフチェシヒル大学で、第2回は武庫川女子大学の甲子園会館で、そして第3回はまたバフチェシヒル大学

meeting were held respectively in Bahcesehir University, Istanbul and MWU's Koshien Hall. And the third seminar is due to be held in Istanbul again. It was reported that China has applied for the Silk Road ruins there to be registered in the World Heritage List and this is about to happen. The Institution of Turkish Culture Studies has held seminars and lecture meetings on the Silk Road every year. This year, in Japan, we held a series of five lectures inviting experts in archaeology and art history entitled "The Culture and History of the Silk Road" as shown below. Three-hour lecture was given on each occasion.

◆The first of five lectures:

"The Latest State of Armenian Cultural Heritage  
—Culture and History of Caucasia"

Dr. Makoto Arimura :  
Associate Professor, Kanazawa University, Japan

◆The second of five lectures:

"Stupa / Hindu goddess / Lingam—Indian world  
of life and death, sex and sacredness"

Dr. Akira Miyaji :  
Professor Emeritus, Nagoya University, Japan  
Director Emeritus, Ryukoku Museum, Japan

◆The third of five lectures:

"Archaeological perspectives on the Achaemenid  
Persian Empire: from the survey around the Bolaghi  
valley and the Pasargadae Plain, Southern Iran"

Dr. Shin'ichi Nishiyama :  
Associate Professor, Chubu University, Japan

◆The fourth of five lectures:

"Xuanzang / Stein / Otani expedition"

Dr. Takashi Irisawa :  
Professor, Ryukoku University, Japan  
Director, Ryukoku Museum, Japan

◆The last of five lectures:

"Ruins in Xinjiang Uyghur Autonomous Region,  
China"

Mr. Kazuya Yamauchi :  
Head, Regional Environment Section  
Japan Center for International Cooperation in  
Conservation, National Research Institute for  
Cultural Properties, Tokyo, Japan

によってイスタンブルで開催しようとしています。また最近のニュースでは中国が自国の遺跡を中心に、シルクロードを世界遺産に登録する提案を行い、それが実現する日も迫っているとのことです。トルコ文化研究センターでも毎年、シルクロードに関する研究会や講演会を開いてきました。今年是我が国の考古学や美術史の専門家を招いて「シルクロードの文化と歴史」と題する研究会を開催しました。講師は以下の先生方でした。研究会は以下のように第1回から第5回まで開かれ、各講師が約3時間の講演を行いました。

◆第1回

「アルメニアの文化遺産最新事情  
—コーカサスの文化と歴史—」  
有村 誠：金沢大学 准教授

◆第2回

「ストゥーバ・女神・リンガ  
—生と死、性と聖のインド世界—」  
宮治 昭：名古屋大学 名誉教授  
龍谷ミュージアム 名誉館長

◆第3回

「ペルシア帝国と考古学 イラン南部の調査から」  
西山 伸一：中部大学 准教授

◆第4回

「玄奘・スタイン・大谷探検隊」  
入澤 崇：龍谷大学 教授  
龍谷ミュージアム 館長

◆第5回 山内和也：

「中国新疆ウイグル自治区の遺跡」  
山内 和也：東京文化財研究所  
文化遺産国際協力センター  
地域環境研究室長





# Results of the Archaeological Project at Ak Beshim (Suyab), Kyrgyz Republic from 2011 to 2013 and a Note on the Site's Abandonment

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**Keywords:** Ak Beshim, Suyab, Kyrgyz, Qara Khan Dynasty, Radiocarbon dating, Excavations

**Abstract:** The National Research Institute for Cultural Properties, Tokyo has been conducting an archaeological project at Ak Beshim (Suyab) in the Chuy Valley, Kyrgyz Republic since 2011. This paper provides preliminary results of the project's first three seasons from 2011 to 2013. The excavations revealed a Qarakhanid main street and several houses along the street in the center of *Shakhristan* of Ak Beshim. This layer is dated by radiocarbon to the late 10th century. According to historical documents, the region was Islamized in the middle of the 10th century, so this layer provides relevant cultural materials for studying Islamization in this region. Radiocarbon dating also suggests that Ak Beshim was abandoned in the late 10th century, 200 years earlier than previously believed. Reasons behind the abandonment of Ak Beshim are considered at the end of this paper.

## 1. Introduction

The National Research Institute for Cultural Properties, Tokyo (hereafter NRICPT) has been conducting an archaeological project at the site of Ak Beshim (ancient name: *Suyab*) in the Chuy Valley, Kyrgyz Republic jointly with the Institute of History and Cultural Heritage of the National Academy of Sciences, Kyrgyz Republic and the Nara National Research Institute for Cultural Properties (hereafter NNRICP) since 2011 (Yamauchi et al. 2012, 2013, 2014). This project is funded by the UNESCO/Japan Funds-in-Trust Project, 'Support for Documentation Standards and Procedures of the Silk Roads World Heritage Serial Transnational Nomination in Central Asia' as well as 'Networking Core Centers for International Cooperation on Conservation of Cultural Heritage Project: Training Workshop for the Protection of Cultural Heritage in Central Asia' from the Agency for Cultural Affairs, Japan.

This paper has two goals. The first is to publish preliminary results of the first three seasons of the project from 2011 to 2013 at Ak Beshim. Results of the excavations suggest that Ak Beshim was abandoned in the late 10th century, 200 years earlier than previously believed. The second goal is to consider reasons for the settlement's abandonment.

## 2. The Site of Ak Beshim (Suyab)

The Chuy Valley is located in the northern Kyrgyz Republic and measures 80 by 200 km (Fig. 1). The basin is surrounded by the Ala-too Mountains in the south and the Chuy-Ili Mountains in the northeast. The Chuy River, which originates from mountain

glaciers, runs from east to west in the center of the valley. Annual precipitation in the valley varies from 270 to 400 mm. Thus, the basin has flourished as an agricultural region since ancient times. The Chuy Valley was a part of the Tian-Shan corridor of the Silk Roads, with over 20 remains of medieval fortified towns there (Kenjeahmet 2009).

The archaeological project at Ak Beshim started in 2011. In 2011, topographical mapping and surface collection of archaeological objects were undertaken. Over the next two seasons in 2012 and 2013, excavations were undertaken at the central part of the *Shakhristan* of Ak Beshim.

The site of Ak Beshim is situated in the eastern part of the Chuy Valley and located 45 km east of Bishkek, the modern capital of the Kyrgyz Republic (Fig. 1). Ak Beshim is also identified as *Suyab*, which is mentioned in Chinese literature.

The history of Ak Beshim (*Suyab*) probably goes back to the 5th century. At that time, many settlements were founded by Sogdian immigrants from the west and it is generally believed that the site was also founded by these groups. Since then, the settlement grew into a center along the Tian-Shan corridor of the Silk Roads (Kenjeahmet 2009).

In the 7th century, Ak Beshim became a political center of the Western Turkic Khaganate. *Suyab* is mentioned in the famous Chinese text, *Da Tang Xiyu Ji* (Great Tang Records on the Western Regions) by Xuanzang. According to the text, Xuanzang, a Chinese monk, stopped over at *Suyab* on the way to India and met Yabghu Qaghan, a qaghan of the Western Turkic Khaganate. It is also argued that Li Po, a famous Chinese poet, was born in *Suyab* (Saito 2011).

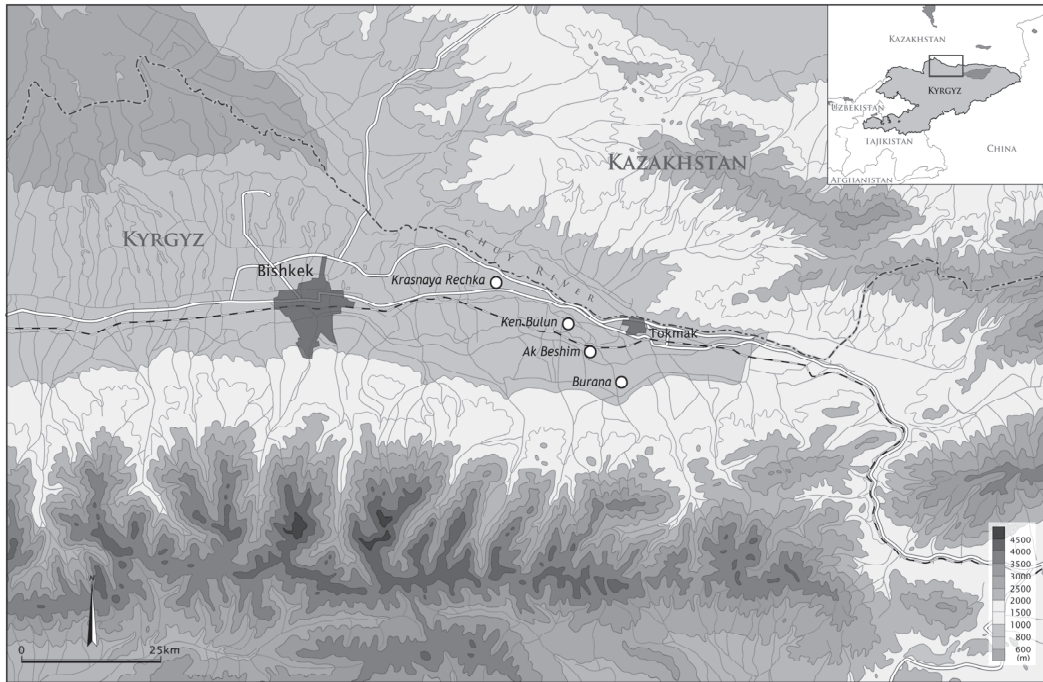


Fig 1. Chuy valley, Kyrgyz Republic

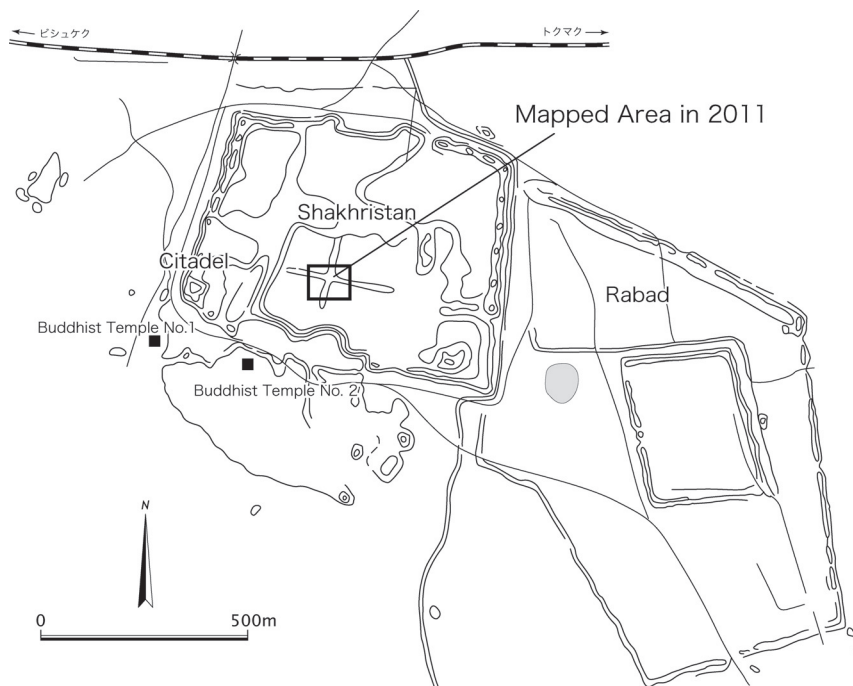


Fig 2. The Site of Ak Beshim

Soon after Xuanzang left *Suyab*, the Tang Dynasty in China sent armies to Central Asia and attacked the Western Turkic Khaganate. One of the main Tang military bases called *Suyab Zhen* was placed at *Suyab*. The Tang and Western Turkic Khaganate battled over *Suyab* many times.

Even after Tang left *Suyab*, it continued to be a main political center of the Qarluq and Qara Khan Dynasties. The latter is the first Turkic Islamic dynasty in Central Asia. It is well known that the Qara Khan Dynasty waged the Holy War against Buddhist states such as Hotan and Kuqa in the Tarim Basin (Maruyama 2008; Kenjeahmet 2009).

### 3. Archaeological Project at the Site of Ak Beshim

Ak Beshim consists of three parts: *Citadel*, *Shakhristan* and *Rabad* (Fig. 2). The size of the *Shakhristan* is approximately 35 ha and the *Citadel*, which was the palace of the governor, was located at its south-western corner. The *Rabad* is located southeast of the *Shakhristan* and reaches over 60 ha in size. In addition, Ak Beshim is protected by 11 km long earthen walls (Kenjeahmet 2009).

Ak Beshim was first researched by V. V. Bartold at the end of the 19th century. Since then, the site was investigated mainly

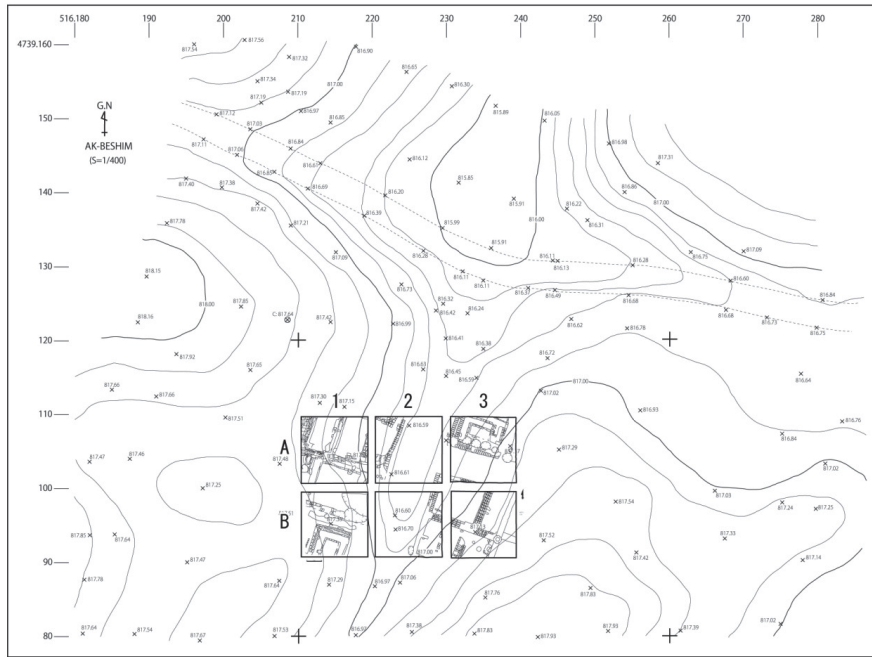


Fig 3. The Central Part of *Shakhristan* and Excavation Squares

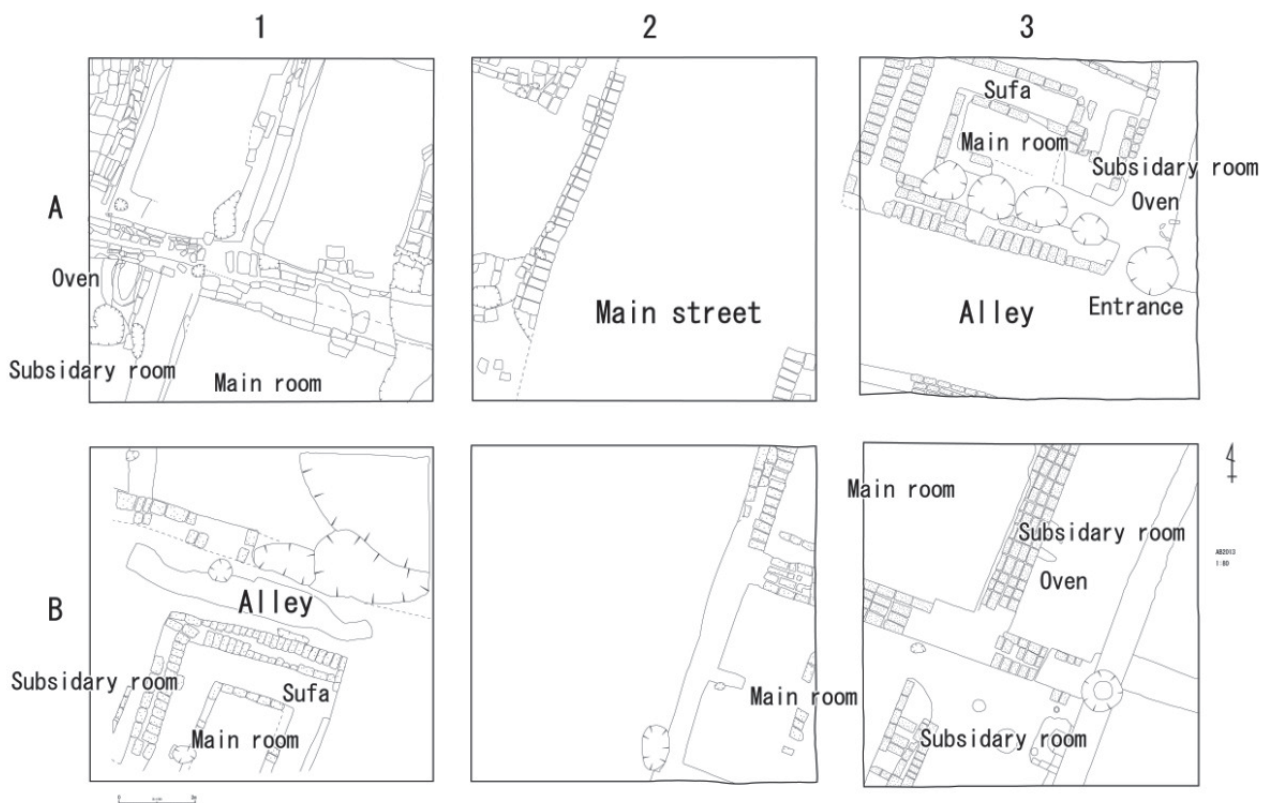


Fig 4. Excavation Squares of A1, A2, A3, B1, B2 and B3

by Russian and Kyrgyz archaeologists. However, most of their excavations focussed on large mounds, representing remains of monumental buildings such as the palace, Nestorian church, and Buddhist temples.

In contrast, residential areas had only been limitedly excavated in the past (Amanbaeva, Kolchenko, and Satev 2013). Therefore, a number of archaeological questions about the ordinary occupants of the site remain unsolved. Therefore,

NRICPT decided to excavate a residential area. So six excavation squares (A1, A2, A3, B1, B2, B3) measuring 20 m x 30 m overall were set up in the center of the *Shakhristan* (Figs. 2 and 3). The squares were excavated over two seasons in 2012 and 2013.

A Qarakhanid main street, that runs from north to south, two alleys and several houses along the street were excavated from the top layer (Fig. 4). As will be discussed in detail below, this

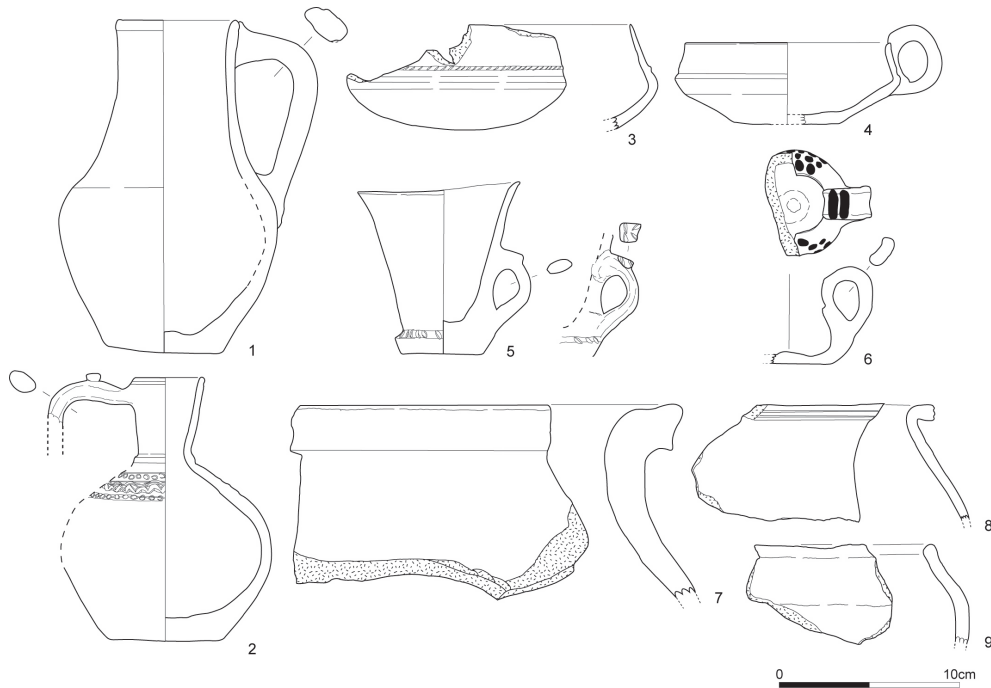


Fig 5. Qarakhanid Pottery Excavated from Ak Beshim (Drawing: Shogo KUME)



Fig 6-1. Fragment of Qarakhanid Pottery with an Inscription



Fig 6-2. Fragment of Qarakhanid Pottery with an Inscription

top layer is dated to the late 10th century (Fig. 7).

The Qara Khan Dynasty was the first Turkish Islamic dynasty in Central Asia. According to historical documents, Islam rapidly spread over the realm of the Qara Khan Dynasty in the middle of the 10th century after the conversion of Satok Bogura Khan (Maruyama 2008).

Therefore, this top layer was created during Islamization period in this region and can provide very important materials for studying this process in the eastern parts of Central Asia.

### 3.1. ARCHITECTURE

During the excavations, several houses were uncovered. These were probably houses belonging to the ordinary people rather than the mansions of rich people. Two seasons of excavations revealed basic characteristics of these Qarakhanid houses, as described below (Fig 4).

i) The house often consists of two rooms: a main room and subsidiary room. The main room measures 3.5-5.0 m x 4.0-5.5 m. Some main rooms have benches (*Sufa*) along the walls. Given that no staircases were discovered during the excavation and the

walls are narrow, it is likely that the house had only one floor. Despite a lack of supporting evidence, it appears that the roof was probably flat.

ii) The main room often has a subsidiary room. In that case, the main room is usually on the main street. The subsidiary room is narrow and measures 1.5-3 m x 5.0-6.5 m. The subsidiary room is often equipped with ovens, indicating that they were probably used as kitchens. Whether the subsidiary room had a roof remains unknown.

iii) In Square A3, the house's entrance was excavated in the house. The entrance was open to a small street rather than the main street. To enter the main room, the inhabitants had to pass through the subsidiary room.

### 3.2. POTTERY

The excavations yielded a number of Qarakhanid pottery. The pottery varies in shape including cooking pots, large, medium, and small sized jars, bowls, cups with a handle and so on. Several fragments of Islamic glazed ware were also excavated (Fig. 5).



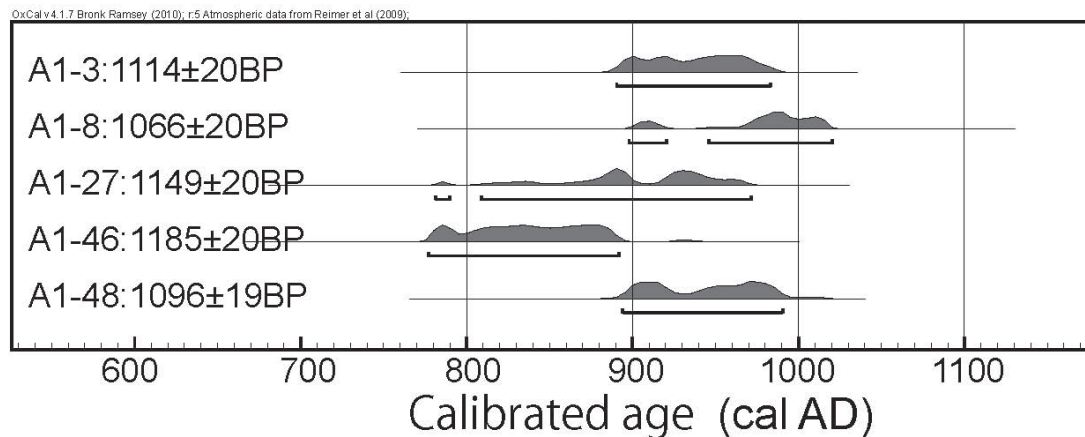


Fig 7. Results of Radiocarbon Dating

One pottery shard is particularly noteworthy (Fig. 6). On the shard, the Islamic phrase, 'There is no god except Allah. Muhammad is the messenger of Allah' is inscribed. The text was apparently inscribed on the pottery before firing. So it is likely that the pottery maker inscribed this Islamic phrase. This suggests that Islam spread among not only elites but also ordinary people such as pottery makers in the late 10th century. Before this example, such pottery shards had not been discovered in the Kyrgyz Republic.

### 3.3. OTHER FINDINGS

Several metal objects were also excavated. These include Qara Khan coins, Turgesh coins, iron scales from an armour, iron knives, iron awls, an iron decoration plaque from a leather belt, and bronze rings.

Several clay objects were found, including animal figurines and spindle whorls. Some ornaments such as pierced pearls and carnelian beads were also discovered.

The excavated animal bones and retrieved botanical samples are still under study. Results will be published in future.

## 4. Results of Radiocarbon Dating and the Decline of Ak Beshim

This session provides results of the new radiocarbon dating series and explains its significance. The reasons for the decline of Ak Beshim will then be considered.

Before our excavations, it was generally argued that Ak Beshim was abandoned in the 12th century or the beginning of the 13th century (Kenjeahmet 2009).

However, the new excavations by NRICPT contradict this theory. As mentioned above, the top layer of the central part of the Shakhristan is dated to the late 10th century (Fig. 7). This strongly suggests that at least the central part of Ak Beshim was probably abandoned in the late 10th century or the beginning of the 11th century at the latest, 200 years earlier than previously believed. These data imply that Ak Beshim (*Suyab*) was abandoned when the region was Islamized.

In contrast, Burana (ancient name: Balasagun) continuously flourished after the late 10th century. The new capital of the Qara Khan Dynasty, Burana was founded in the early 10th century. The site is located just 5 km south of Ak Beshim. A high Islamic *minaret* stands in the center of Burana today. This minaret is one of the oldest *minarets* in Central Asia and is argued to have been constructed in the late 10th century (Amanbaeva, Kolchenko and Sataev 2013). A great *mosque* was probably constructed together

with the *minaret* in Burana although the *mosque* remains unexcavated. This suggests that Ak Beshim was abandoned when Burana was transformed into an Islamic town with its minaret and great mosque. No remains of Islamic minarets and mosques were known at Ak Beshim.

There are probably many factors behind the abandonment of Ak Beshim, but the main ones were political and economic. Ak Beshim lost its central position in the economy and politics when Burana was founded as the new capital of Qara Khan Dynasty in the early 10th century. This is a primary reason why the inhabitants of Ak Beshim left the site.

In addition, religious factors were probably also significant. Islam spread across this region after the mid 10th century. However, the old town of Ak Beshim likely had many problems in transforming the town into an Islamic city. Because the town was founded in the 5th century, there was likely too little space to construct a *minaret* and *mosque* in the center of this highly crowded place. The newly founded town of Burana, which was probably less crowded with buildings, was more suitable for becoming an Islamic center. Islamic monuments were constructed by the Qara Khan Dynasty mainly at Burana rather than Ak Beshim, which probably encouraged the decline of Ak Beshim.

### Acknowledgements

I would like to thank Dr. Djenish Djunushaliev, Dr. Bakit Amanbaeva, Dr. Valery Kolchenko, and Dr. Aidai Sulaimanova of the Institute of History and Cultural Heritage, National Academy of Sciences, Kyrgyz Republic for their help with our project at Ak Beshim.

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## **A Field Survey of Window-Opening Behavior and Thermal Conditions in Apartments of Surabaya, Indonesia**

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**Keywords:** window-opening behaviors, thermal comfort, energy-saving, hot-humid, apartments

**Abstract:** A field survey was conducted in apartments of Surabaya, Indonesia to investigate occupants' window-opening behavior and their thermal conditions. A total of 347 households were interviewed and about 30 houses were covered for measurements of thermal conditions. It was seen that occupants in the naturally ventilated apartments tend to open windows or doors as much as possible at least during daytime for satisfying air flow and ventilation in particular. The average duration of opening windows/doors was 16-17 hours/day in the naturally ventilated apartments, while the corresponding duration in air-conditioned private apartments was less than 5 hours/day. The results of measurement showed that generally indoor air temperatures was about 6°C lower than the outdoors during 11:00 to 19:00, while it was 3°C higher than the outdoors for the rest of the day, i.e. nighttime. The structural cooling effect was evident in these apartments.

### **1. Introduction**

Indoor thermal comfort significantly affects the household energy consumption for HVAC systems. In air-conditioned houses in hot-humid climate, cooling was found to have a significant contribution to the total household energy consumption, unlike in naturally ventilated houses (Surahman and Kubota, 2012, and Kubota et al., 2013). In locations with high thermal stress such as Surabaya, the ownership of air conditioners is becoming less luxurious even in residential buildings (Ekasiwi et al., 2013). This indicates that there is an urgent need for passive-cooling strategies to reduce household energy consumption. In Indonesia, the housing demand for middle class has been growing due to the recent economic growth. Due to the limitation of available land and greenery, the development of apartments especially for the above middle-class is on the rise. Therefore, it is important to find possible energy-saving strategies for the future middle-class apartments.

Occupants' behavior is considered to be one of the adaptations in maintaining their thermal comfort in buildings. Humphreys et al. (2013) stated that: "If a change occurs such as to produce discomfort, people react in ways which tend to restore their comfort". In hot-humid climate, window-opening may be one of the major means for people to adjust their thermal comfort, especially for naturally ventilated houses. This is because those occupants have more opportunities to control their indoor thermal condition. Studies by Rijal et al. in UK and Japan (2007, 2013) showed that the highest usage of window-opening was found in summer and the lowest was in winter. People were most likely to open their windows when indoor and outdoor temperatures are high and tend to close them when the

temperatures are low. In apartments, opening and closing windows can be even more significant since the number and size of openings are more limited compared to landed houses.

Since window-opening behavior significantly affects the thermal comfort, this may have an impact on energy consumption patterns. In fact, Fabi et al. (2012) argued that this behavior itself may have direct effects on energy consumption for cooling by changing air-flow rate inside the buildings. Therefore, the factors affecting people's behavior of opening or closing their windows are continuously studied. By finding these factors, architects may be able to create designs which can motivate people to actively open their windows.

To date, most of the relevant studies tried to relate the window-opening behavior with existing thermal conditions. This is because of assumptions that this behavior is most likely to be stimulated by people's reactions to discomfort for indoor thermal environment. The state of closing windows, on the other hand, is said to be happened only when the room's condition is too cool for people to open windows. When a room is equipped with air conditioners, the frequency and length of opening windows are said to be much less than those in naturally ventilated buildings. (Rijal et al., 2007, and Rijal et al., 2013). Nevertheless, Fabi et al. (2012) stated that the behavior of opening window is caused not only by thermal factors but also by various other factors. The possible factors include physical environmental, contextual, psychological, physiological, and social factors. However, studies involving social and psychological factors are mostly conducted not in the field of building science, but in psychology. Furthermore, most of the studies are focused only on drivers which motivate occupants to open their windows, but put little emphasis on the obstacles or reasons why they close their

windows.

This study aims to investigate patterns of window-opening behavior and their thermal conditions in apartments in the city of Surabaya, Indonesia. Thermal satisfaction and preferences, reasons for opening and closing windows are also discussed.

2. Methods

2.1. CASE STUDY HOUSES

Surabaya is geographically located on 7°9'21" South Latitude and 112°36'-57" East Longitude. It is the capital city of East Java Province and the second biggest city in Indonesia. Surabaya

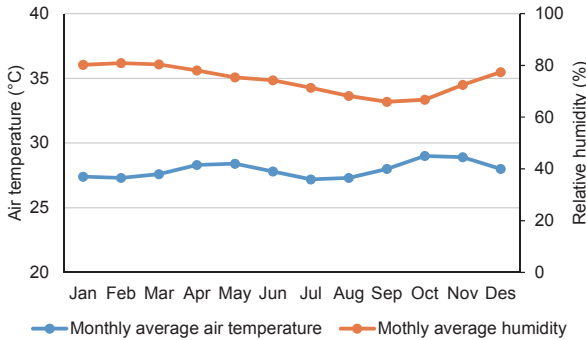


Fig. 1 Monthly average air temperature and humidity in the city of Surabaya (1993-2013)

has a population of more than 3.1 million as of 2012, with density of 8,462 people/km<sup>2</sup>. The city is located in the coastal area with elevation of about 3-6 meters above the sea level. Surabaya has a hot-humid climate, with monthly average temperature ranging from 27.2-29.0°C and monthly average relative humidity ranging from 65.9-80.9% (Fig.1). The city receives monthly average wind speeds of 2.12-3.10 m/s (NCDC, 2014). Although Surabaya has two seasons (dry and wet seasons), the monthly average temperatures and humidity of both seasons do not show significant differences.

Case study houses are apartments in Surabaya which are highly demanded by emerging middle-class market in Indonesia. There are four categories of apartments in Indonesia today. They are: private apartments, public apartments, special apartments, and state apartments (Indonesia, 2011). The first one is constructed and owned by private companies, whereas the rest is owned and managed by the government. Since the third and fourth categories are only built for special purposes, the number and development of those apartments are limited. Therefore, only the first and second categories (i.e. private apartments and public apartments) were addressed in this study (Fig. 2).

Private apartments are normally high-rise buildings and consist of 14-33 floor heights with floor area of 18-38 m<sup>2</sup> (Fig. 2c). Most of the houses in private apartments are equipped with air-conditioners. In this study, only middle-class private apartments are being considered. There are two typical types of unit in the private apartments: single room and family room. The single room contains only one room, functioning bedroom and



Fig. 2 Sample of apartments from each category and the typical unit plan: (a) Old public apartment; (b) New public apartment; and (c) Private apartment



Fig. 3 View of face-to-face interview

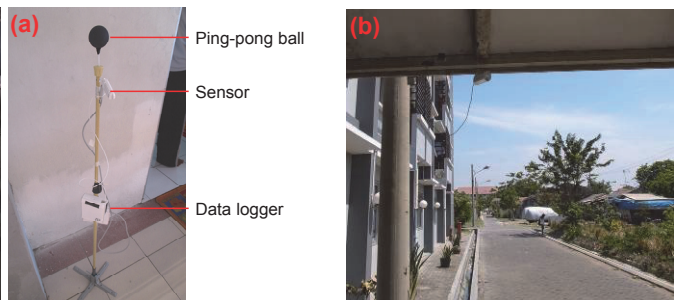


Fig. 4 Instruments for measurements: (a) indoor thermal measurement; (b) outdoor thermal measurement



kitchen, and one private bedroom. The family room has two bedrooms, one private bathroom, and one living room that is connected directly with kitchen and dining room.

On the other hand, public apartments can be broadly classified into two types: old public apartments and new public apartments (Fig. 2ab). The old public apartments were initially built to resettle slum squatters for providing better living environments (hereafter, 'old public apartment'). In the old public apartments, typical unit is one room with the floor areas of 18-21m<sup>2</sup>. More than 70% of the units in those apartments have private bathroom, whereas the rest of units uses shared bathroom. The above purpose remained until 2008, when the government decided to extend the target to wider social classes, especially for low to middle income classes (hereafter, 'new public apartment'). In these new public apartments, we can also find the similar type of unit just like the one in the old public apartments with private bathroom. However, the newest type in these apartments has different room arrangement. The room is slightly larger (24-32m<sup>2</sup>) and divided by functions: a bathroom, a bedroom, a living room, and a kitchen. Both types of public apartments consist of 3-5 floor heights and almost all the houses are naturally ventilated. All of the units in both types of public apartments have one veranda which connects the indoor unit with outdoor environment.

Currently there are approximately a total of 48 housing estates in Surabaya. From these estates, 8 public and 8 private estates were selected through proportional stratified samplings (Table 1). A total of 347 households were chosen, comprising 209 respondents from old public apartments, 101 respondents from new public apartments, and 38 respondents from private apartments.

## 2.2 PROCEDURE OF SURVEY

The field survey was conducted during the hottest months of September to October 2013. The survey is composed of face-to-face interviews and one-week thermal measurements.

Face-to-face interviews were conducted by a number of university students. A group consisted of two students went to each respondent to do the interview using a questionnaire form (Fig. 3). The questionnaire covered: (1) socio-demographic profile of respondents (floor height, year of moving in, income, age, and occupation), (2) duration of occupancy in both weekdays and weekends, (3) thermal sensation and preference, (4) duration of opening and closing windows or doors, (5) reasons for opening and closing windows or doors, and (6) importance, expectation, and satisfaction for existing windows. In the interviews, all typical openings in the living room were considered. In most of the apartments, the front door (facing corridor space) is directly placed on one side of the living room, whereas the back door is normally placed on its rear side adjacent to the balcony. It should be noted that private apartments are not equipped with front window. However, the arrangement of the rest of the openings is similar with those in the public apartments.

One-week thermal measurements were conducted in 30 apartment houses: 11 houses for old public apartments, 9 houses for new public apartments, and 10 houses for private apartments, respectively. Two data-loggers were attached in a stand to measure globe temperature, indoor air temperature, and indoor humidity (Fig. 4a). Globe temperature was measured using TR-52i (T&D Corporation) by inserting the sensor into a black-painted Ping-Pong ball. The Ping-Pong ball was then positioned at 110 cm height. Indoor air temperature and humidity were measured using TR-72ui (T&D Corporation). The above sensor was placed slightly below the Ping-Pong ball. The equipment

was installed in the living room and set to avoid direct sunlight. Outdoor air temperature and humidity were measured using TR-73Ui (T&D Corporation). The outdoor data logger was installed in a large open space at a certain height under the shade to prevent the effect of solar radiation (Fig. 4b).

## 3. Results and Discussion

### 3.1. PROFILE OF RESPONDENTS

The respondents were chosen to represent the residents who live in apartments of Surabaya (Table 1). The average household sizes are 3.5 to 3.6 for the public apartments and 1.9 for the private apartments. Age of respondents ranges from 20 to more than 60. The majority of respondents are housewives aged from 31-40 years old. Almost all of the respondents are Javanese (88.1%), although the respondents in the private apartments are much more diverse. The monthly average household income is the highest in the private apartments. More respondents in the new public apartments have a higher income than those in the old public apartments.

### 3.2 WINDOW-OPENING BEHAVIOR

Figs. 5 and 6 show the details of typical openings in the old and new public apartments, respectively. As previously mentioned, living room in most of the public apartments has two sides of opening: front and rear side. Each of them has one door and one window. For each opening, there is a small slit window (permanently opened) above them which is designed to allow the air to flow all day long. The size of the small windows varies from 20x40 cm to 50x152 cm, while the size of doors is from 80x200 cm to 80x220 cm for the old public apartments and 70x195 cm to 85x220 cm for the new public apartments. The size of the front window ranges from 120x60 cm to 120x116 cm for the old public apartments and 130x75 cm to 152x105 cm for the new public apartments. Back windows measured from

Table 1. Socio-demographic profile of respondents

	Whole sample	Old public	New public	Private
Sample size	347	209	101	38
Household size (persons)	3.5	3.6	3.5	1.9
Age (%)				
20-30 (years)	22.0	13.8	25.3	70.4
31-40	34.6	38.3	32.6	14.8
41-50	25.2	30.0	22.1	3.7
51-60	11.3	11.7	12.6	3.7
>60	7.0	6.6	7.4	7.4
Ethnic group (%)				
Javanese	88.1	92.8	85.7	59.3
Maduranese	6.0	4.8	9.2	3.7
Others	6.0	2.4	5.1	37.0
Monthly income (%)				
<1million (Rup.)	13.3	9.8	10.4	-
1-2million	39.8	50.2	25.0	20.0
2-3million	22.8	22.0	29.2	10.0
3-4million	13.0	11.7	15.6	30.0
>4million	11.1	6.3	19.8	40.0
No. of apartments				
Built before 2008	7	5	-	2
Built after 2008	9	-	3	6
Floor area (m <sup>2</sup> )	18-38	18-21	24-32	18-38

120x50 cm to 120x60 cm for the old public apartments and 50x35 cm to 130x80 cm for the new public apartments. In most of the public apartments, all of the openings are operable.

As shown in Table 2, the respondents in public apartments tend to open their doors (12.8 hours for both old and new) for a longer period than to open windows (7.6 and 10.6 hours for old and new respectively). In contrast, the respondents in private apartments open doors for 1.4 hours and windows for 3.4 hours on average. Unlike those in public apartments, they tend to open

their windows longer by 2 hours than doors. In the whole sample, the back door is used the longest (8.5 hours), whereas the back window is least used (2.9 hours). This tendency is found similarly among the respondents in both old and new public apartments. On the other hand, the respondents in private apartments tend to open their back windows longer than other openings (3.4 hours). The respondents in the old public apartments tend to open their front doors longer by 1.9 hours than the front windows, while those in new public apartments tend to open the front windows longer by 4.0 hours than the front doors.

Fig. 7 shows the percentage of respondents who open each of the windows and doors during a day in old and new public apartments, and private apartments. First of all, the figure clearly shows that the occupants in the public apartments (both old and new) have a relatively high utilization of both front/ back doors and front window particularly during daytime (30-60%), while those in the private apartments rarely open doors or windows (0-30%). In general, most of the respondents in public apartments are likely to open only one opening for one side of units at one time. As indicated, less than 20% of the respondents open both windows and doors even during daytime in both public apartments for both front and back openings. In the case of old public apartments, the usage of front door (40-60%) was higher compared to the front window (30-40%). In contrast, the respondents in the new public apartments tend to open the front window (50-60%) more than the front door (20-40%). The usage patterns of back openings are similar between old and new public apartments. About 40-50% of the respondents open only the back door without opening the back window at the same time. In the nighttime, the respondents in both apartments tend to close their windows, except that 20-30% of the respondents continue to open the back door throughout the night.

As shown in Fig. 8, when analyzing all the opening usages at the same time, it can be seen that approximately 80-90% of respondents in naturally ventilated apartments (i.e. public apartments) open at least one of the windows or doors during daytime (6:00 to 19:00). The percentages decrease after 19:00 and reach its bottom lines between 24:00 and 2:00. In the nighttime, about 30-50% still use their openings.

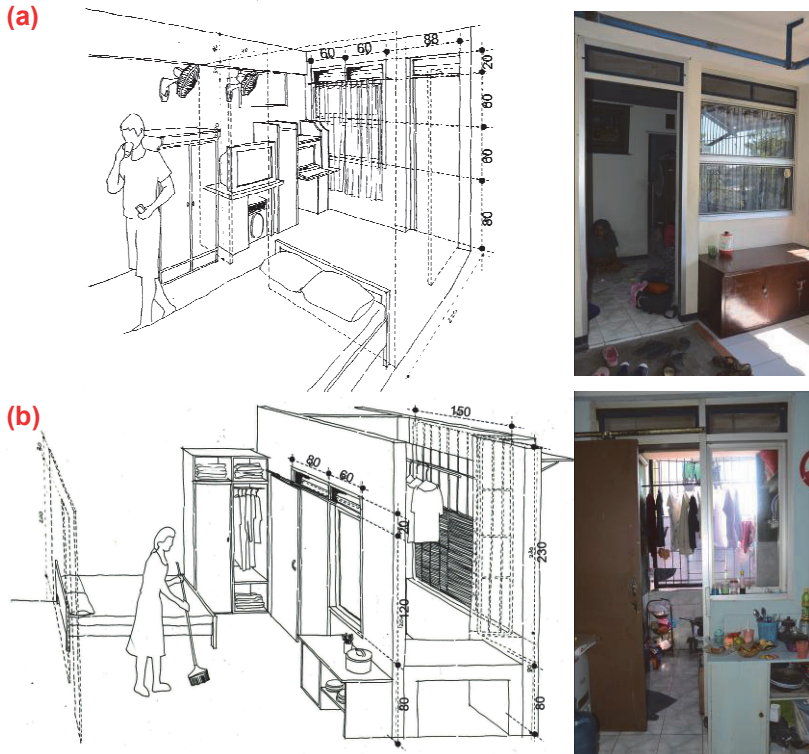


Fig. 5 Typical windows and doors in the old public apartments: (a) front side; (b) rear side

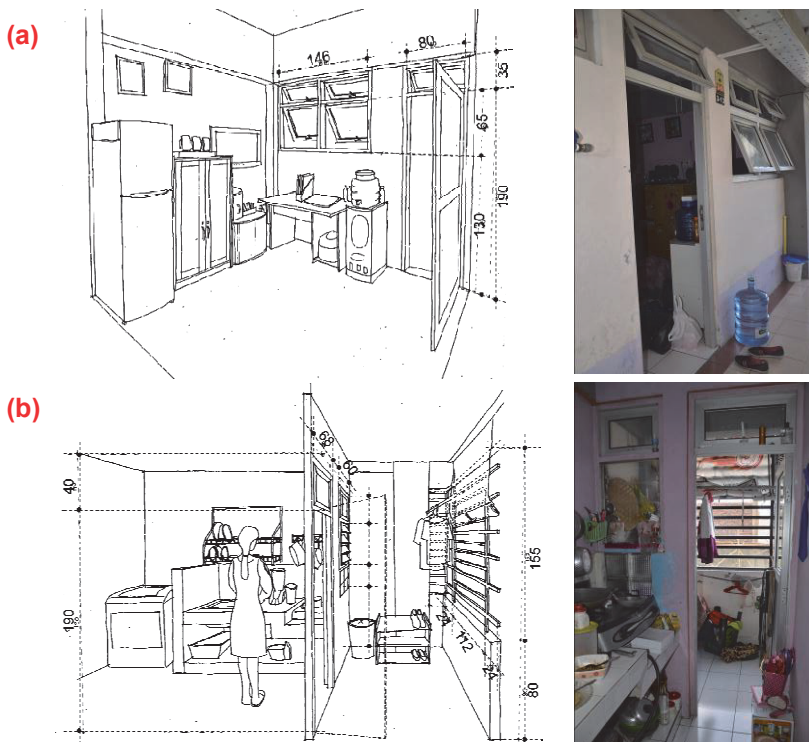


Fig. 6 Typical windows and doors in the new public apartments: (a) front side; (b) rear side

Table 2. Average hours of opening windows or doors

	Whole sample	Old public	New public	Private
All openings	14.8	15.5	17.0	4.8
Day	9.7	10.5	10.4	3.1
Night	5.1	4.9	6.6	1.7
Doors	11.5	12.8	12.8	1.4
Windows	8.1	7.6	10.6	3.4
Front door	5.8	7.5	4.6	0.7
Front window	6.2	5.6	8.6	-
Back door	8.5	9.1	10.2	1.0
Back window	2.9	2.8	3.5	3.4

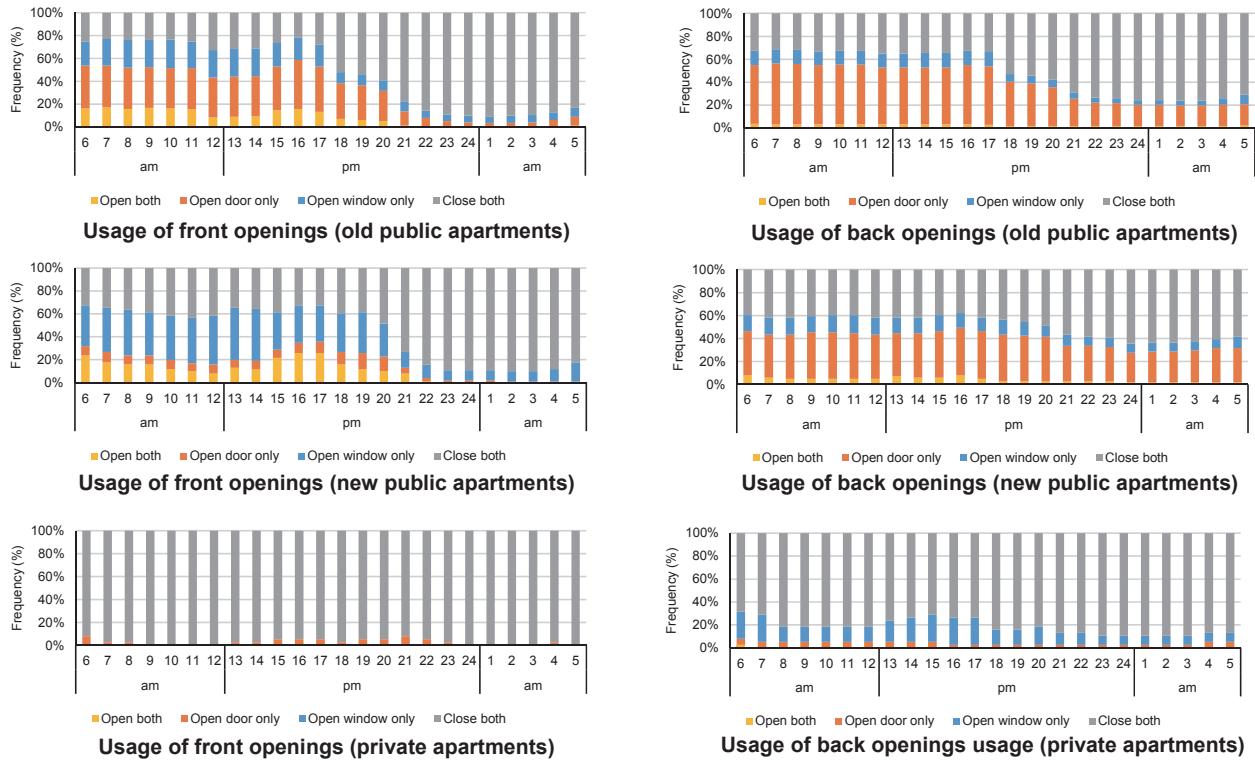


Fig. 7 Daily usage pattern of doors and windows for each category

In contrast, the opening usages are very low in air-conditioned apartments (i.e. private apartments) even during daytime (10-40%). Further, the results show that majority of respondents in the old public apartments open at least one door or window for both front and back sides of the units (40-50% during daytime). During nighttime, 20% of them open only their back opening(s), although majority of them (60-70%) close every opening. Meanwhile, in the new public apartments, about 30-40% of respondents open at least one door or window for both sides of their units during daytime, while 20% of them open a door or window on the front side only. Approximately 30% of the respondents continue to use at least one back opening even during nighttime.

As shown in Table 2, in the whole sample, the respondents use their openings more than half of a day (14.8 hours) on average. The average duration during daytime (6:00 to 18:00) (9.7 hours) was almost two times longer than that of nighttime (5.1 hours). This tendency is seen similarly for all the categories except for private apartments. In the private apartments, the average duration of opening windows or doors is very short, even in daytime (less than 5 hours).

### 3.3 REASONS FOR OPENING/CLOSING WINDOWS

Figs. 9 and 10 illustrate major reasons for respondents to open or close their windows or doors. The highest reasons for opening windows/doors are found to be ‘obtaining fresh air’ (74.3%), ‘letting wind to enter’ (66.2%), and ‘to provide cooling’ (45.4%) for the whole sample (Fig. 9). In each category, the order of the top two reasons remains the same. This implies that the respondents particularly expect ventilation and air flow through opening widows/doors.

On the other hand, the top reasons for not opening windows or doors are ‘privacy’ (43.1%), ‘insects’ (41.0%) and ‘security’ (30.4%) for the whole sample (Fig. 10). In each category, the top reasons for not opening windows are found to be different: ‘AC

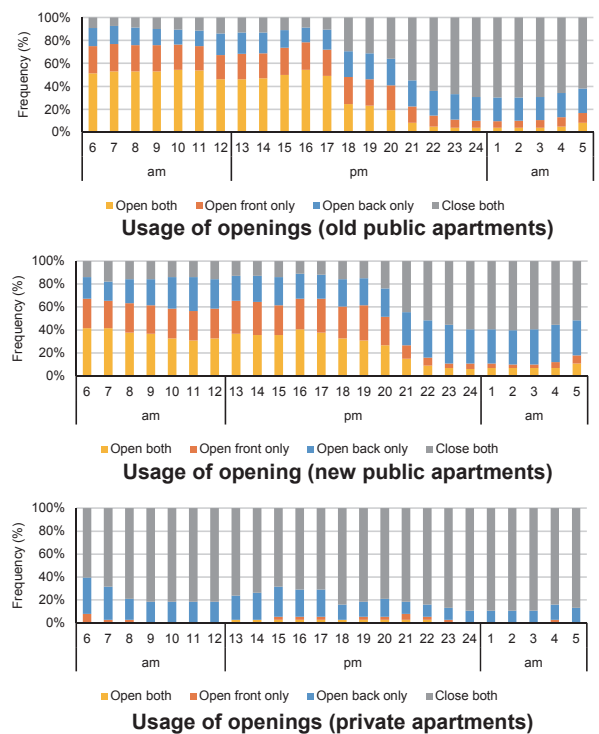


Fig. 8 Daily usage pattern of front and back opening for each category

usage’ (52.6%) and ‘dust/air pollution’ (47.4%) for the private apartments, ‘insects’ (52.9%) and ‘privacy’ (42.8%) for the old public apartments, and ‘privacy’ (57.0%) and ‘security’ (44.0%) for the new public apartments. ‘Security’ reason may especially affect the closing behavior during nighttime. On the other hand, ‘privacy’ may be the major reason for the respondents not to open windows during daytime. As previously discussed, the pattern and average duration of opening front window and door were different between old and new public apartments, unlike the

back door and window (see Fig. 7). Further results showed that the respondents in the old public apartments who open their front door did not open their front windows. In contrast, in the new public apartments, most of them opened only front window but not front door. Fig. 10 implies that the occupants in new public apartments are more concerned about privacy and security than those in old public apartments. This means that when the occupants in the new public apartments cannot open their front door, they compensate it by opening front window instead. In the old public apartments, the concerns of privacy and security should be less because most of the residents were relocated from the same areas. This may be one of the reasons for opening front door more in the old public apartments.

### 3.4 IMPORTANCE, EXPECTATION, AND SATISFACTION FOR WINDOWS

Fig. 11 shows the importance, expectation, and satisfaction for existing windows by the respondents in the apartments. More than 80% of respondents acknowledge the importance of windows at home for all categories ('important' of 54.1% and 'very important' of 37.6% for the whole sample). They said that 'air flow' (73.1%), 'ventilation' (65.6%), and 'natural lighting' (46.5%) are the most important functions of windows. Accordingly, they regard the same functions as their major expectations for windows (52.9% for 'air flow', 47.4% for 'ventilation', and 46.0% for 'natural lighting'). Only the

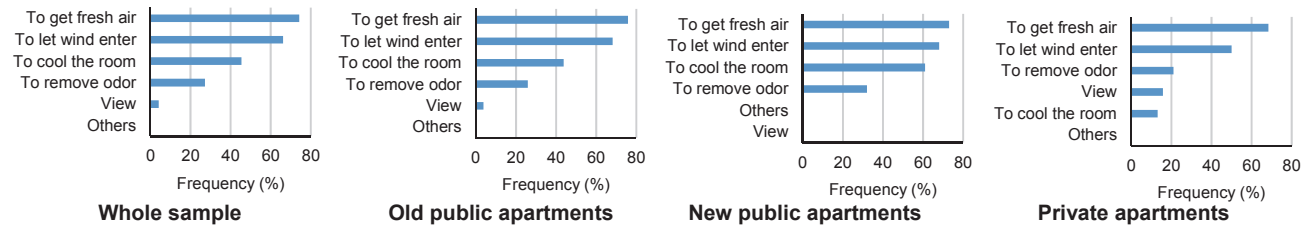


Fig. 9 Reasons for opening windows or doors

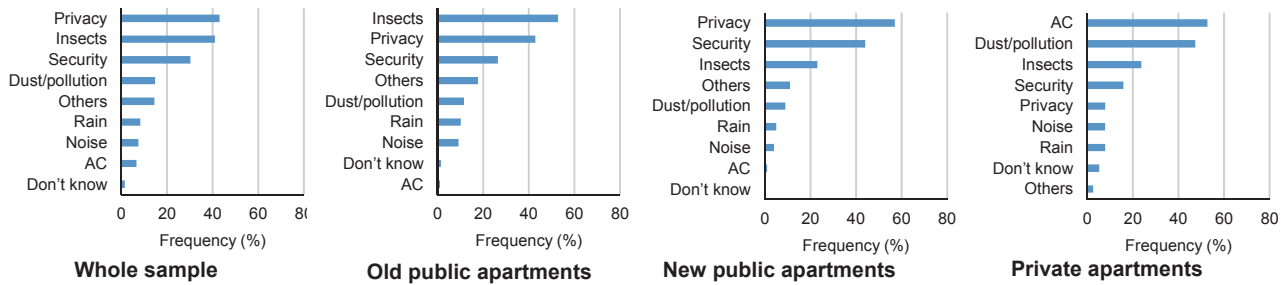


Fig. 10 Reasons for not opening windows or doors

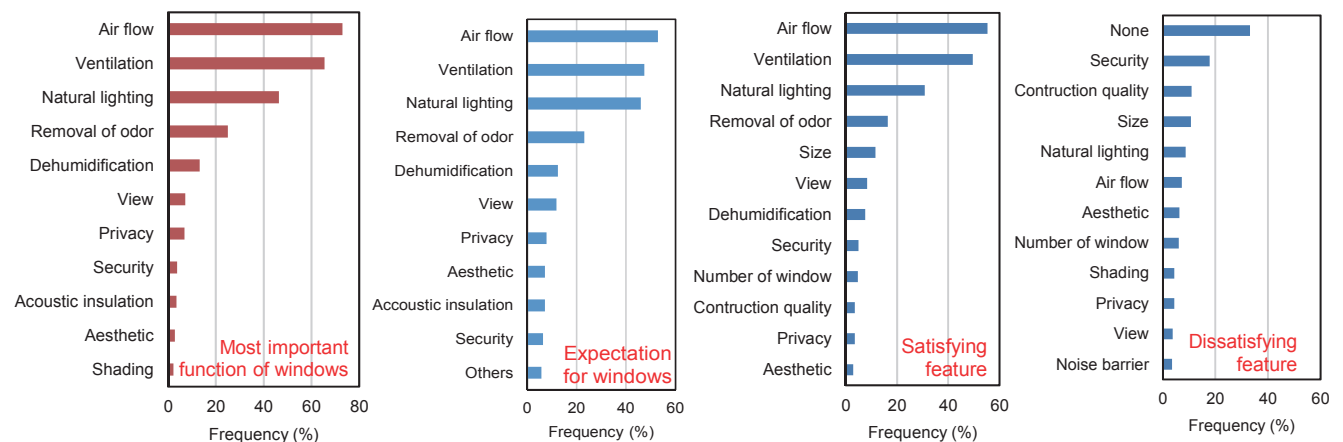
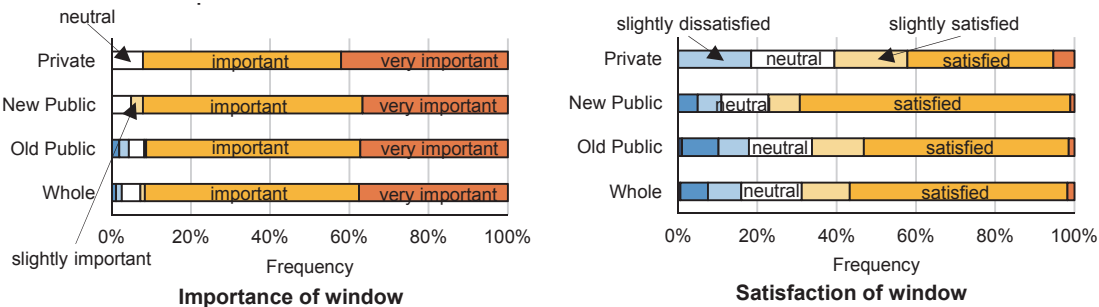


Fig. 11 Importance, expectation, and satisfaction for windows



respondents in the new public apartments chose 'natural lighting' as their top expectation for windows.

In terms of satisfaction level, majority of the respondents said they are 'satisfied' with the existing windows (68.8%), while 15.3% are 'neutral', and less than 15% are 'unsatisfied' for the whole sample. More respondents in the new public apartments are satisfied with their windows (77.2%) than those in the old public apartments (66.2%) and private apartments (60.5%). On average, the most satisfied features of the current windows include 'air flow' (55.5%), 'ventilation' (49.7%), and 'natural lighting' (31.0%). Very few respondents are dissatisfied by their current windows. More than 30% answered 'none' as dissatisfied features of windows, followed by 'security' (17.9%), 'quality of construction' (11.0%), and 'size of windows' (10.7%). It can be seen that occupants in apartments of Surabaya are generally satisfied with their windows particularly for their functions of air flow, ventilation and natural lighting. This result, particularly the priorities for air flow and ventilation, is consistent with their reasons for opening windows or doors that were analyzed in the section 3.3 (see Fig. 9).

### 3.5 ENVIRONMENTAL CONDITIONS

Fig. 12 shows the statistical summary of one-week thermal measurements in the selected houses ( $n=30$ ). Figs. 13 and 14 present examples of one-week temporal variations of air temperature, globe temperature and relative humidity in a public apartment (naturally ventilated) and a private apartment (air-conditioned), respectively. As indicated in Fig. 12, the outdoor air temperature ranges from 25.6-36.7°C whereas the outdoor relative humidity ranges from 27-77% during the measurement periods. The mean globe temperature measured 29.7°C, while mean indoor air temperature is 30.5°C and mean humidity is 56.8% for the whole sample. Due to the use of air-conditioning, indoor air temperature in the private apartments is significantly lower (about 26°C) during its operation (Fig. 14). As a result, the mean indoor air temperature in the private apartments is lower by approximately 1.5°C than that in the public apartments (Fig. 12). Accordingly, the mean relative humidity in the private apartments is found to be slightly higher by 4% than that in the public apartments even though air conditioning was utilized. There are no significant differences for indoor air temperature, globe temperature, and relative humidity between samples in the old and new public apartments.

Even in the naturally ventilated apartments, the diurnal air temperature ranges are smaller than that of the outdoor temperature, though the mean indoor air temperatures in both old and new public apartments (30.9°C and 31.0°C) are slightly higher than the mean outdoor air temperature (30.3°C). As shown in Fig. 13, in general, daytime indoor air temperature is about 6°C lower than the outdoors, while nocturnal indoor air temperature is about 3°C higher than the outdoors in the naturally ventilated public apartments. The peak of indoor air temperature is delayed, which is found around 17:00 to 18:00, compared to the outdoors. Moreover, it is found that the measured globe temperatures are slightly lower than the corresponding air temperatures throughout the day in almost all the apartments. Therefore, it is apparent that indoor air temperature in these public apartments generally maintains lower daytime air temperature with the narrow range of about 28 to 31°C due to the structural cooling effects. Although most of the occupants (80-90%) open windows/doors during daytime (see Fig. 8), indoor air temperature does not follow the outdoor air temperature, except for a few hours during nighttime (24:00 to 9:00) in the private apartments (see Fig. 14). This indicates that air change rates in these public apartments are not necessarily

sufficient to change the indoor air even when windows or doors are opened during daytime.

### 3.6 THERMAL SENSATIONS

Fig. 15 shows the sensation and preference of respondents for thermal comfort, air flow, humidity, natural lighting, and general comfort in the living room during the day. The sensations were measured in 7-point scale while preferences were measured in 5-point scale. More than 57% of the respondents regard the thermal comfort in their living room as 'warm' to 'hot' even for those in the private apartments. Accordingly, the preferences for cooler environments are evident (more than 68%). Despite the use of air-conditioners, more than 97% of respondents in the private apartments prefer cooler indoor conditions. Meanwhile, more than 40% of the respondents found humidity in the living room to be 'slightly humid' to 'very humid'. Consistently, they prefer 'less humid' conditions (38.5%). However, almost 60% of the respondents do not prefer to change the conditions, though only 36% of them answer 'neutral' for their humidity sensation.

As for the indoor air flow, more than 70% of respondents consider it to be 'slightly high' to 'very high'. Despite the 'high' air flow conditions perceived by the respondents, more than half of the respondents do not prefer to change the current conditions, while about 30% prefer even higher air flow. This result also clearly indicates their high preference and priority for air flow conditions in their apartments. Similarly, in the case of natural lighting, although more than 50% of the respondents regard it as 'slightly bright' to 'very bright', about 61.7% of them do not prefer to change the conditions while 30% still prefer brighter condition.

In general, more than 60% of the respondents regard their thermal condition in the apartments as 'comfortable', even though they prefer cooler thermal condition. Only less than 10% of respondents answered 'uncomfortable', and no single answer of 'very uncomfortable' was found. This indicates that the respondents in these apartments already adapted towards the prevailing environmental conditions in their houses.

## 4. Conclusions

A field survey was conducted in apartments of Surabaya, Indonesia to investigate occupants' window-opening behavior and their thermal conditions. A total of 347 households were interviewed and about 30 houses were covered for measurements of thermal conditions. The major findings are summarized as follows:

- (1) In most of the public apartments, the living room has two sizes of opening, i.e. front and rear side. Each of them has one door and one window. The results showed that 80-90% of the respondents open at least one of the windows and doors during daytime (6:00 to 19:00), while 30-50% still open one of the openings at night (19:00-6:00). The average duration of opening windows/doors is 16-17 hours/day in the naturally ventilated public apartments, while the corresponding duration in air-conditioned private apartments is less than 5 hours/day. More respondents in the old public apartments open the front door rather than the front window, while those in the new public apartments open the front window instead of the front door. The respondents in the both old and new public apartments tend to open either window or door on each side of the living room. Less than 20% of them open both door and window simultaneously on the same side.

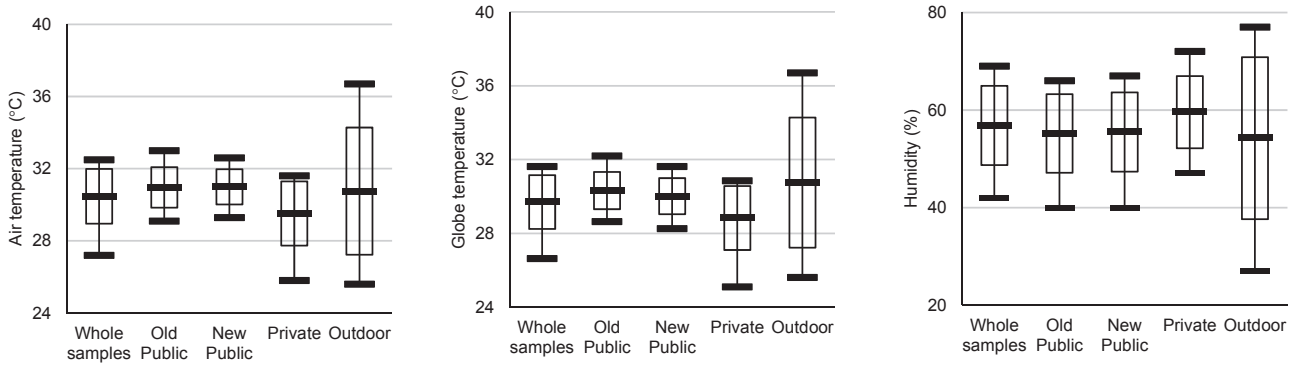


Fig. 12 Statistical summary of air temperature, globe temperature, and humidity (5<sup>th</sup> and 95<sup>th</sup> percentiles, mean and  $\pm$  one standard deviation)

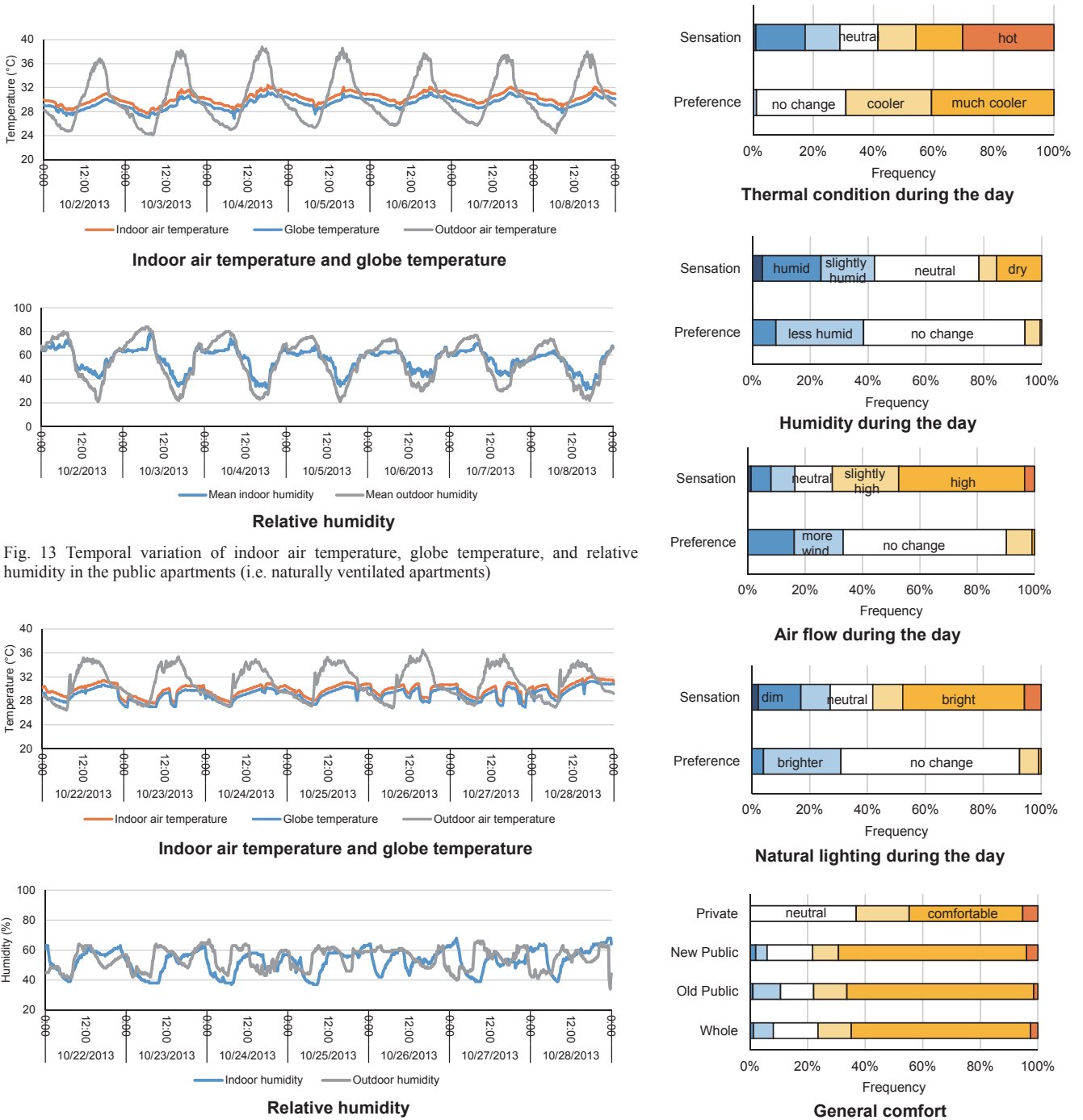


Fig. 13 Temporal variation of indoor air temperature, globe temperature, and relative humidity in the public apartments (i.e. naturally ventilated apartments)

Fig. 14 Temporal variation of indoor air temperature, globe temperature, and relative humidity in the private apartments (i.e. air-conditioned apartments)

Fig. 15 Thermal sensations and preferences

- (2) The survey results indicated that the occupants in new public apartments are more concerned about privacy and security than those in old public apartments. These are probably the main reasons why the occupants in the new public apartments tend to open the front window instead of the front door. Further, it could be seen that occupants in these apartments are generally satisfied with their windows especially for their functions of air flow, ventilation and natural lighting. In particular, air flow and ventilation are found to be the major reasons for them to open windows or doors.
- (3) The results of measurement showed that even in the naturally ventilated apartments, the diurnal indoor air temperature ranges are smaller than that of the outdoor temperature, which is 25.6-36.7°C. In general, indoor air temperatures is about 6°C lower than the outdoors during 11:00 to 19:00, while it is 3°C higher than the outdoors for the rest of the day, i.e. nighttime. It is apparent that indoor air temperature in these public apartments generally maintains lower daytime air temperature with the narrow range due to the structural cooling effects. Although most of the occupants open windows/doors during daytime, indoor air temperature does not follow the outdoor air temperature in most cases. This indicates that air change rates in these public apartments are not necessarily sufficient to change the indoor air even when windows or doors are opened during daytime.
- (4) More than 57% of the respondents regard the thermal comfort in the living room as 'warm' to 'hot', thus prefer cooler environment (more than 68%). As for the indoor air flow, more than 70% of respondents consider it to be 'slightly high' to 'very high', but more than half of the respondents do not prefer to change the current conditions, while about 30% prefer even higher air flow. This result also clearly indicates their high preference and priority for air flow conditions in their apartments.

Based on the above findings, it can be said that occupants in naturally ventilated apartments in hot-humid climate of Surabaya tend to open windows or doors as much as possible at least during daytime for satisfying air flow and ventilation in particular. The air change rates in these houses are, however, not necessarily sufficient to change the indoor air, and therefore the indoor air temperature maintains much lower values during daytime than the outdoors. This implies that a high air flow and a high air change rate that would increase indoor air temperature are not required in these apartments at least during daytime. Reducing indoor air temperature is probably not a trigger for opening windows or doors in the hot-humid climatic regions such as in Surabaya.

### Acknowledgements

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# Significance of the Architectural Space and Mountains in the Christian Art of the Inner Narthex of the Chora Church

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**Keywords:** Chora Church, Byzantine, Christian art, architectural space, mountain

**Abstract:** This paper analyzes the themes and layouts of the Christian art in the domes of the inner narthex of Istanbul's Chora Church, and clarifies the significance of the architectural space and the mountains depicted in the art. The inner narthex's south- and north-domed bays are studied, interior elevations and photomontages of the Christian art are created, and they are analyzed and discussed. This paper focused on the art of the pendentives and lunettes located under the domes that express the relationship of God's world to the terrestrial world, where the angels, acting as intermediaries between the two worlds, and the mountains are drawn. In the Chora Church, the mountains depicted in the Christian art of the domes in the inner narthex reflect a place where one can connect to God. The architectural space containing this artwork configures the lower part of the wall as the terrestrial world and the dome as God's world, and the pendentives and lunettes divide these two worlds.

## 1. Introduction

In Byzantine Christian art, people are historically the main theme, with nature seldom represented. When depicted, nature serves as background or as accompaniment for another subject. What meaning does nature have in Byzantine art? In our study thus far, the Christian art of the Chora Church (Turkey, 14th century) has been analyzed and discussed because they are masterpieces of Late Byzantine art and were created in the center of the Byzantine Christian world (Inomata, Okazaki & Yanagisawa, 2011). We clarified that the mountains<sup>1</sup> connote places with special meaning for connecting with God.

In this paper, we analyze the themes and layouts of the Christian art of the domes in the inner narthex of the Chora Church, and clarify the significance of the architectural space and the mountains in these artworks. Understanding the connection between the architectural space and the Chora Church's mosaics and paintings offers considerable insight into Late Byzantine Christianity's view of the world.

## 2. Related Works and Research Position

There is much historical research on Byzantine Christian art. Underwood (1966, 1975) and Ousterhout (1987, 2002) are well-known works on the Christian artwork of the Chora Church.

Because of the lack of existing churches and historiography of Byzantine history, the relationship between the architectural space and the Christian art of Byzantine churches has not been clearly delineated. Our research clarifies the meaning of the architectural space in relation to the art using interior elevations and photomontages.

## 3. Research Outline

Istanbul's Chora Church was built in the 6th century and was later rebuilt by Isaak Komnenos in the early 12th century. When Theodore Metochites commenced restoration and renovation of the church from 1316-21, the Church was decorated with elaborate mosaics and frescoes. The Chora Church has a cross-in-square plan. After the 15th century, the Church was used as a mosque called "the Kariye Camii" and is now a museum. The Byzantine Institute of America undertook the cleaning and conservation of the mosaics and frescoes in the 1950s (Underwood, 1966, 75). In the Chora Church, mosaics were constructed in the naos and in the inner and outer narthexes. Frescoes were painted in the parekklesion. In the naos, there are only three mosaics, including "Jesus Christ." The cycle of the



Fig 1. Overhead view of the south side of the Chora Church. (Aksit, 2010)

life of the Virgin can be found in the inner narthex and the cycle of the life of Christ can be found in the outer narthex. Other paintings, including the Old Testament or “Christ in Judgment,” are drawn in the parekklesion<sup>2</sup>. Christian art in the Chora Church emphasize the Church dogma of “incarnation” and “salvation” as a whole (Ousterhout, 2002, pp.103-116).

The Chora Church has domes in the naos, the inner narthex, and the parekklesion, which is an independent side chapel. However, almost all of the art of the naos’ dome are lost. We studied the south- and north-domed bays of the Chora Church’s inner narthex, and analyze and discuss interior elevations (Fig. 4, 5, 8, 9) and photomontages (Fig. 6, 7) of the art.

#### 4. Iconographic Program in Byzantine Churches

The iconographic program of Byzantine churches has three hierarchical zones (Demus, 1955, pp.16-29). The first is a dome or an apse. “Christ Pantocrator” is located on domes and “Christ as God” is depicted. “The Virgin and Child” is located on an apse and “Christ as a person” is depicted. The incarnation of the invisible God is expressed by these two images. The second zone is the upper part of a wall, or a pendentive or squinch, and is where narrative images such as the cycle of the life of Christ are found. These narrative images depict the life of Christ visually for the illiterate population and serve the further function of presenting Christian dogma. The third zone is the lower part of a wall, at eye level, and is where depictions of the Saints can be found. The figures of the Saints receive prayers directly from people and convey them to God, thereby connecting God with

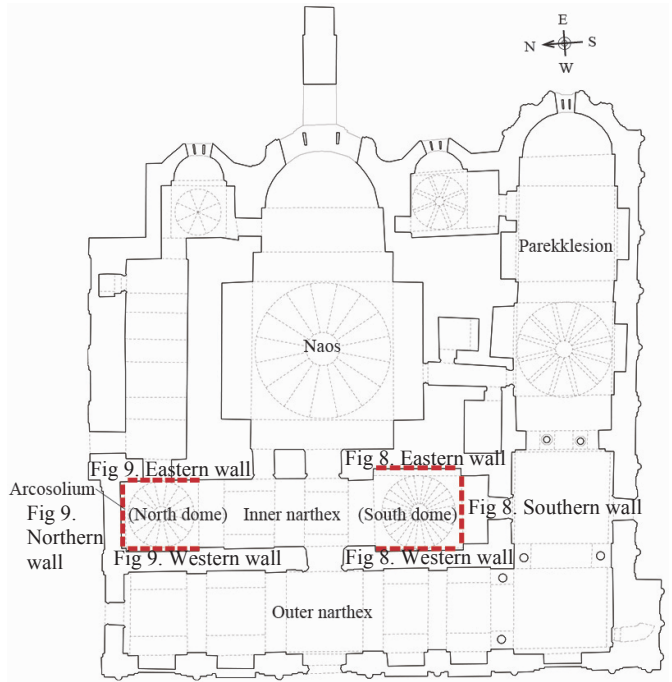


Fig 2. Plan of the Chora Church.

the people (Masuda, 2012, p.310). A dome of the first zone illustrates God’s world and the lower part of a wall of the third

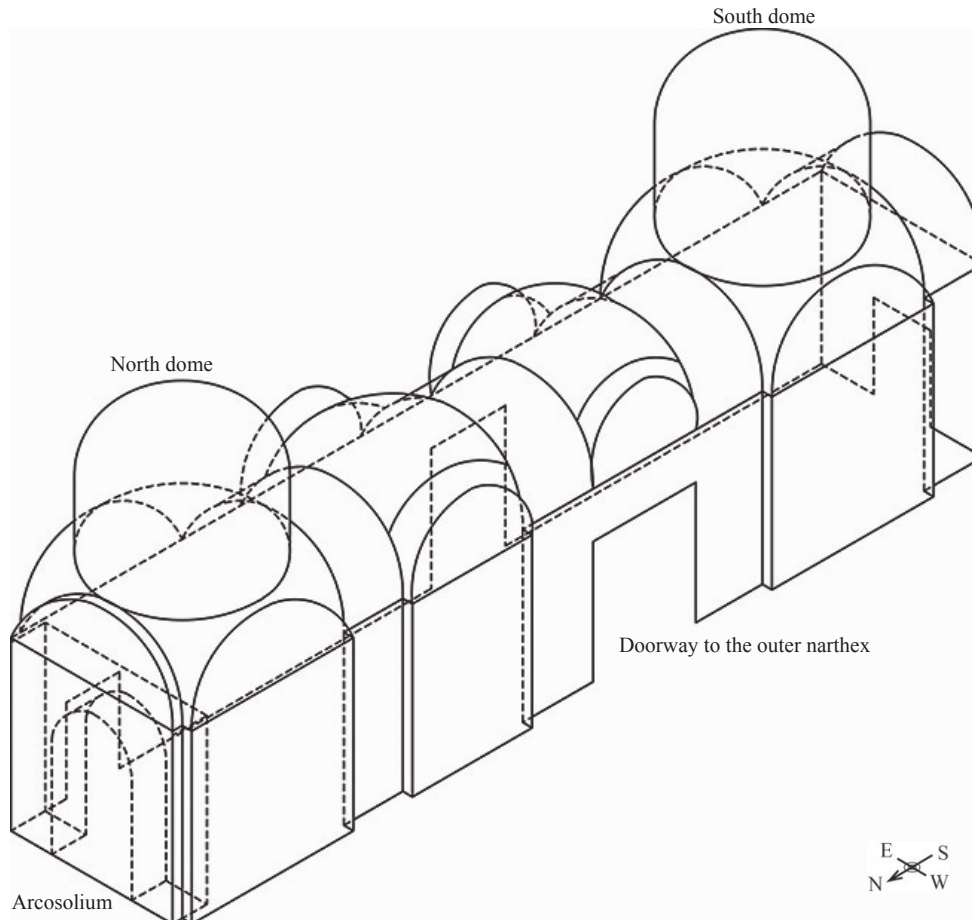


Fig 3. Isometric drawing of the Chora Church’s inner narthex.

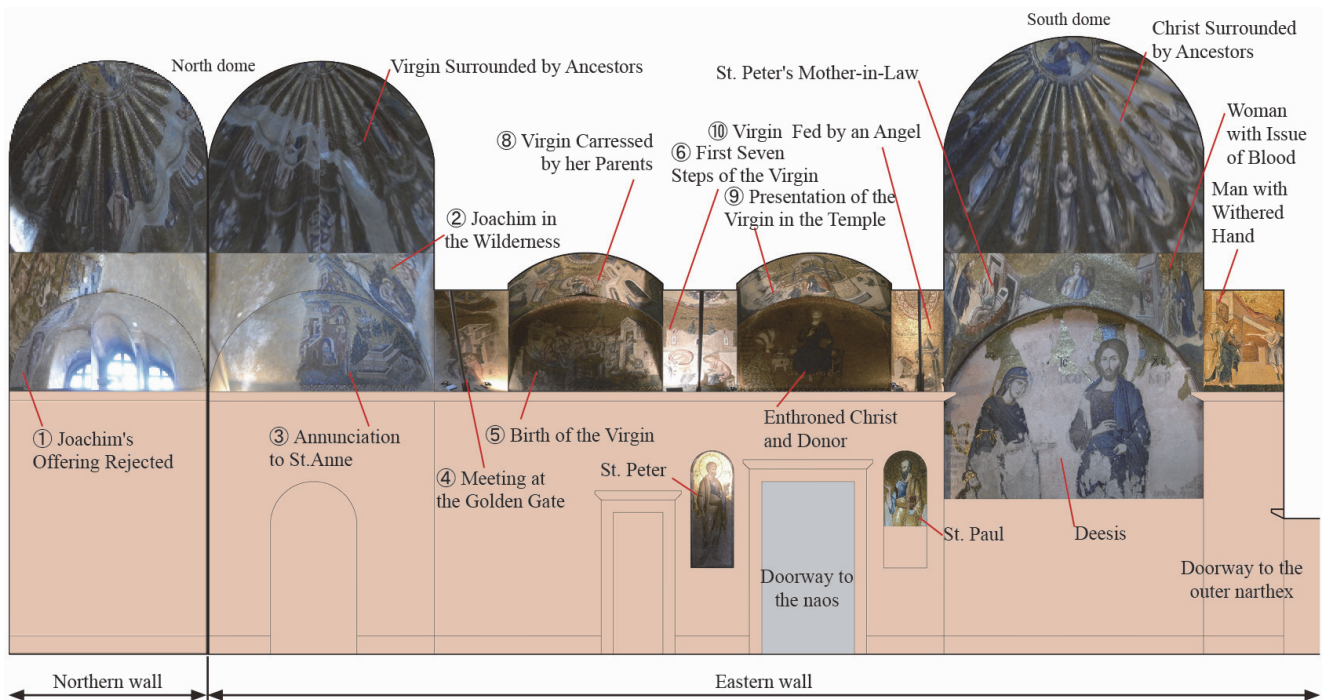


Fig 4. Interior elevation of the eastern and northern walls of the inner narthex of the Chora Church.

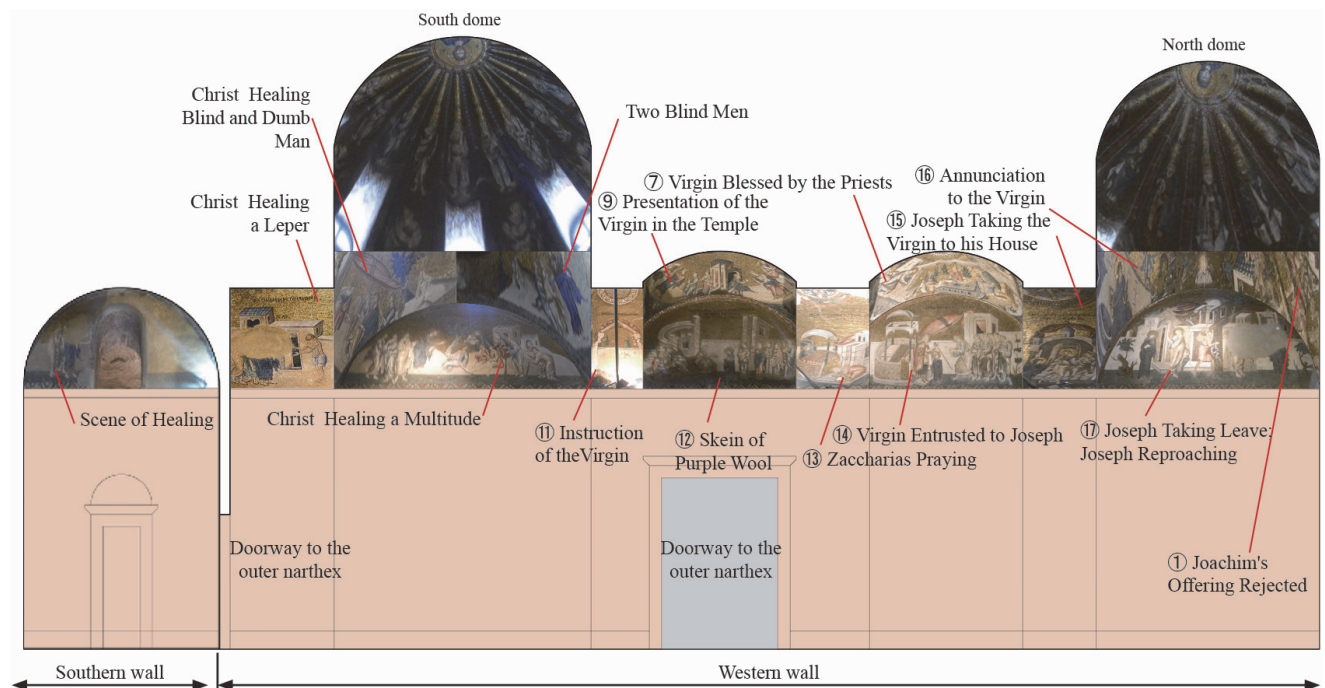


Fig 5. Interior elevation of the western and southern walls of the Chora Church's inner narthex. The cycle of the life of the Virgin is drawn basically clockwise on the northern, eastern, and western walls except for in the south-domed bay. We have numbered the art in serial order from "①" to "⑰." The story begins with an earlier narrative before the birth of the Virgin, and follows with her life in the Temple, marriage to Joseph, and the Annunciation in the inner narthex. The narrative continues with the cycle of the life of Christ in the outer narthex. Mountains are drawn in "Christ Healing a Blind and Dumb Man" and "Two Blind Men" in the south-domed bay, and in "Joachim in the Wilderness" in the north-domed bay.

zone represents the terrestrial world.

Although there is no apse in the Chora Church's inner narthex, there are two domes. Mountains are drawn in the south- and north-domed bays of the inner narthex. In this paper we analyze the three hierarchical zones described above and discuss the vertical composition of these artworks in the architectural space.

## 5. Analysis and Discussion

### 5.1. SOUTH-DOMED BAY

The images of the healing miracle scenes of the cycle of Christ's



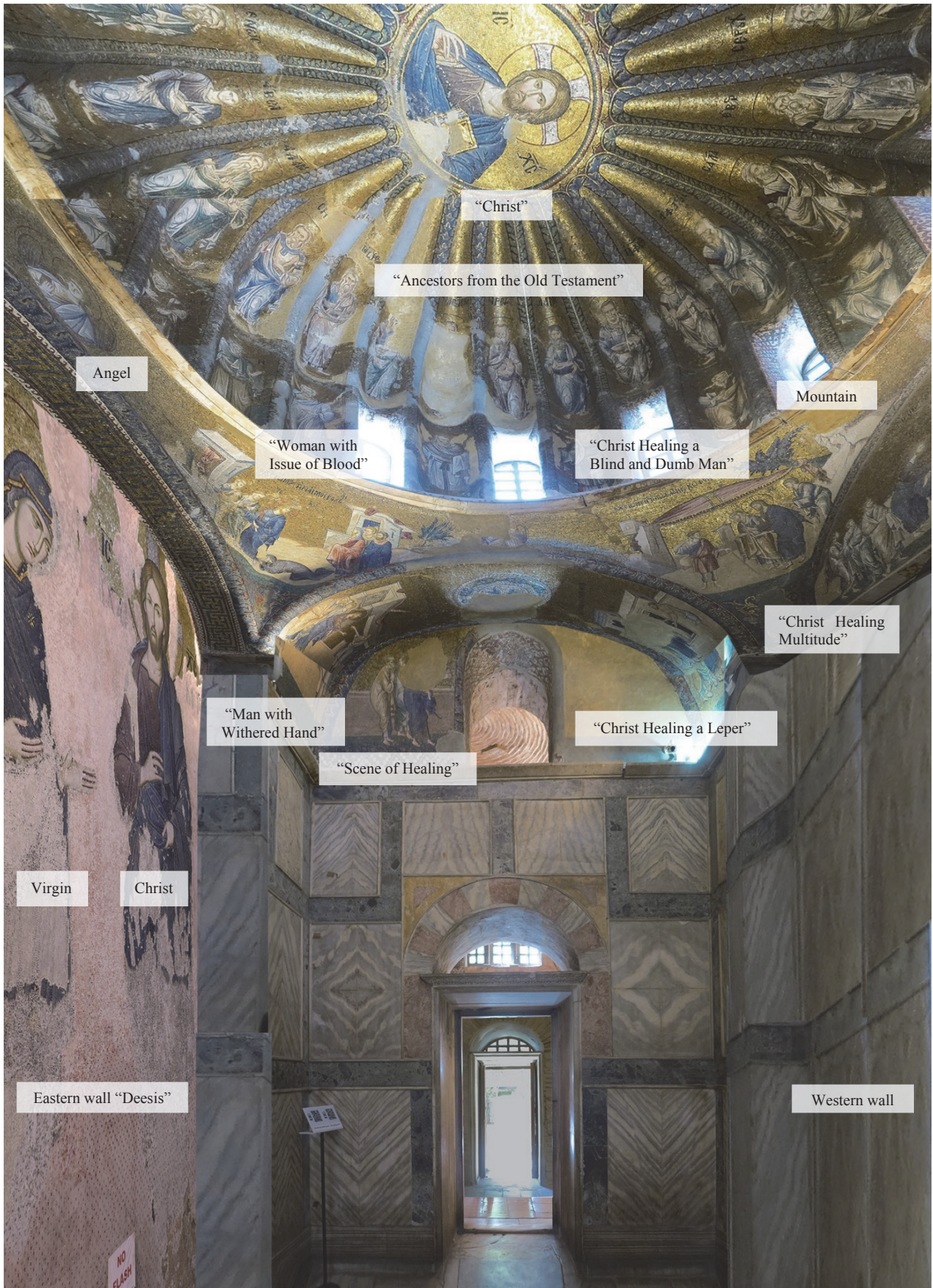


Fig 6. Photomontage of the south-domed bay of the Chora Church's inner narthex. "Christ" is drawn against a gold background, which signifies God's world, and mountains are drawn as the background of the healing miracles on the pendentives under the dome. Furthermore, the "Deesis" of the Virgin imploring Christ for salvation is drawn underneath these on the eastern wall.



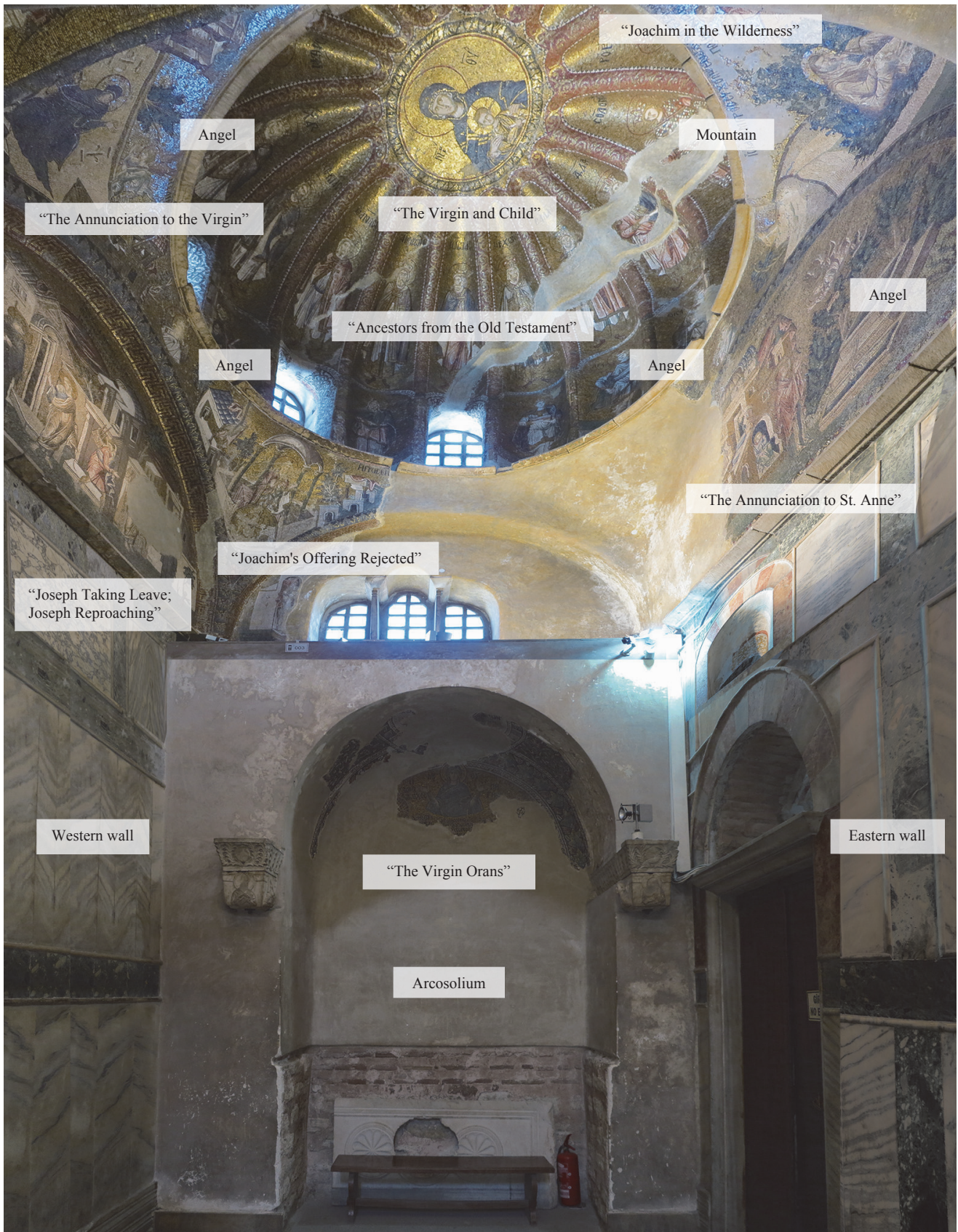


Fig 7. Photomontage of the north-domed bay of the Chora Church's inner narthex. "The Virgin and Child" appears on the dome against a gold background that represents God's world. The pendentive or lunette under the dome is chosen as the location for the "Annunciation," through which the word of God is brought to the terrestrial world, and as where the angel, who connects the two worlds, and the mountain are drawn. In addition, underneath these, there is the arcosolium for Demetrios I Palaiologos, which probably expresses a hope for salvation.



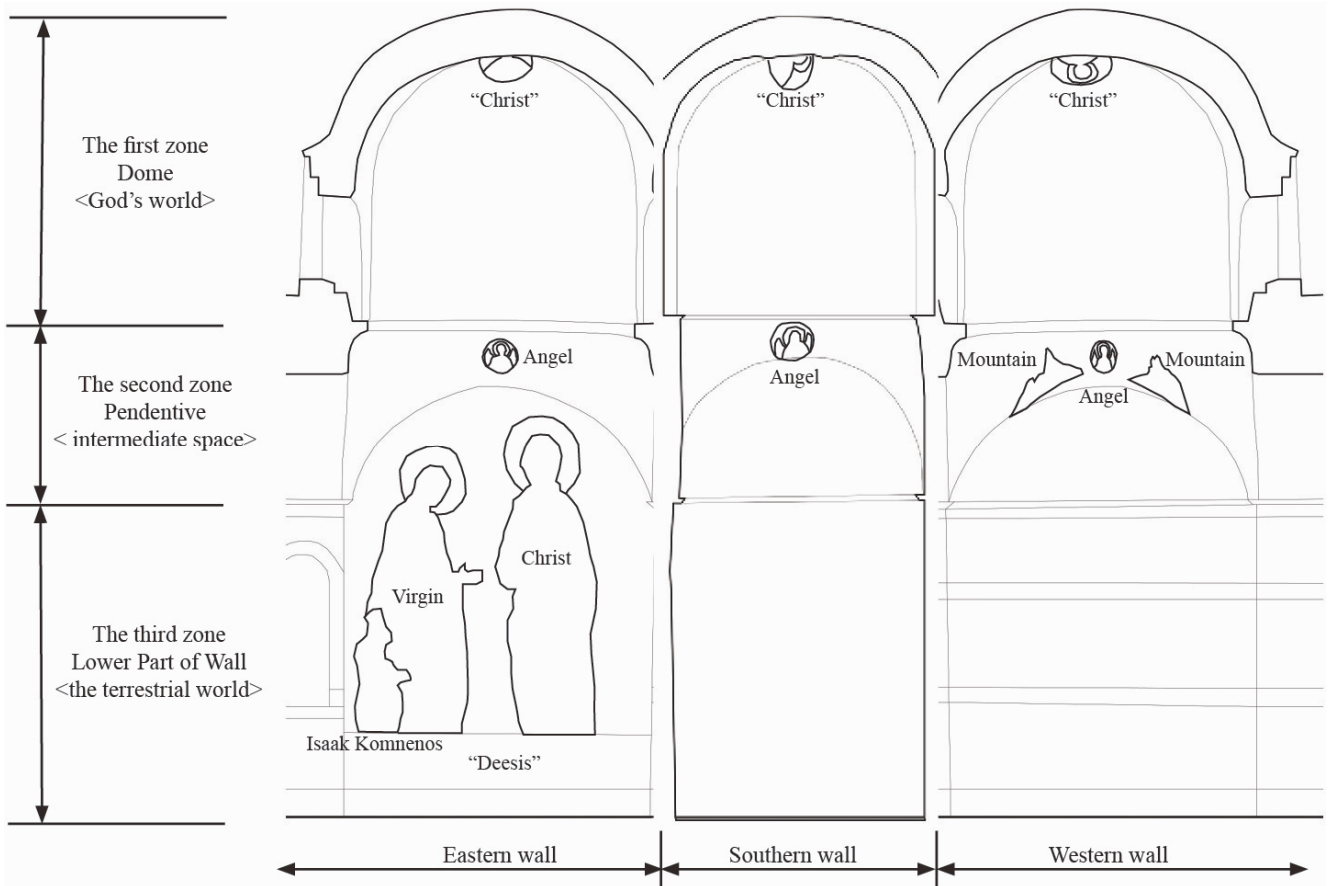


Fig 8. Interior elevation of the south-domed bay of the Chora Church's inner narthex.

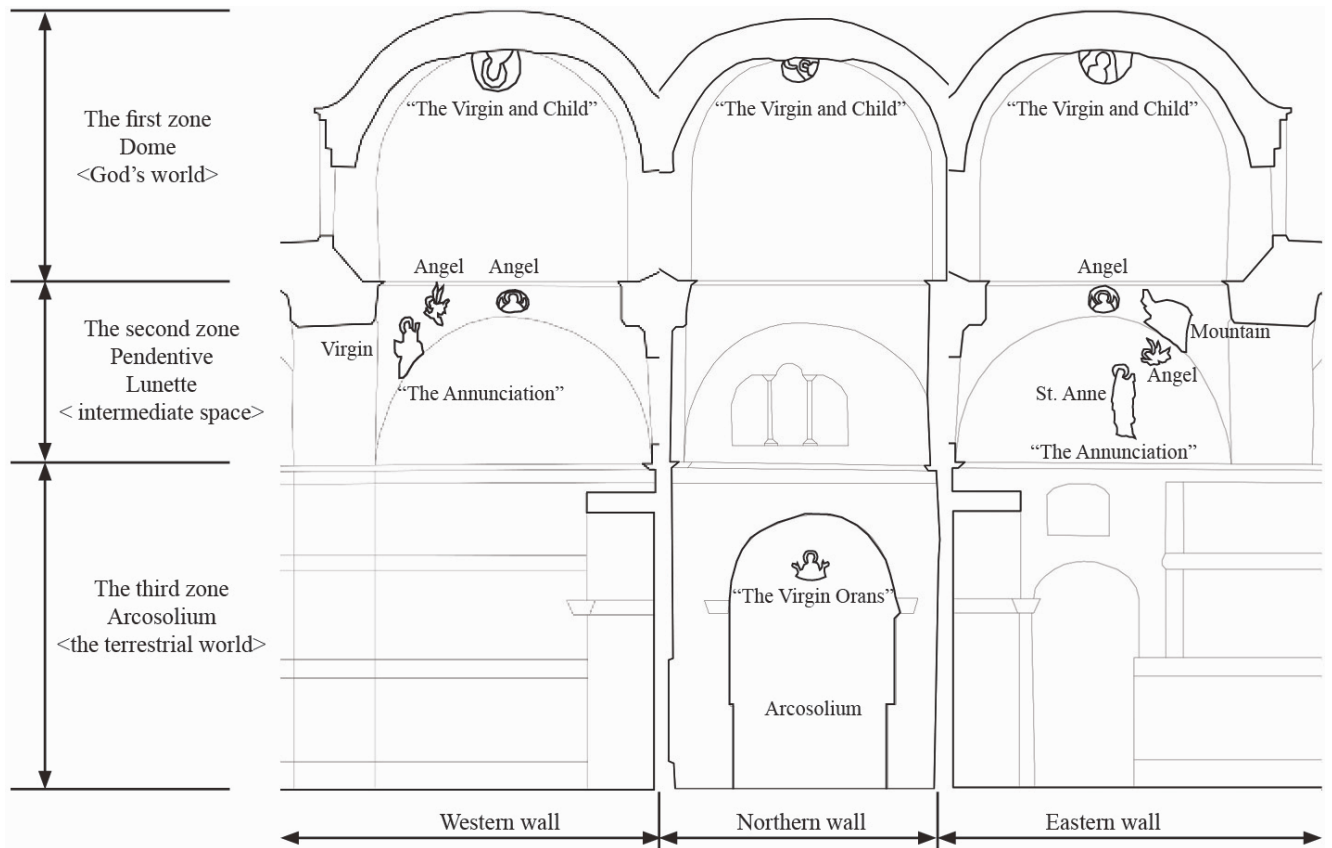


Fig 9. Interior elevation of the north-domed bay of the Chora Church's inner narthex.

Ministry are located mainly in the inner narthex's south-domed bay (Fig. 4, 5). "Christ" is positioned at the center of the dome and the "Ancestors from the Old Testament"<sup>3</sup> are drawn on the circumference (Fig. 10). The healing miracles of "Christ Healing a Blind and Dumb Man" (Fig. 11 left), "Two Blind Men" (Fig. 11 right), and "Christ Healing a Multitude" (Fig. 11 middle) are placed on the upper part of the western wall under the dome. The mountains are drawn symmetrically about the medallion of the angel at the center of each pendentive (Fig. 11). The healing miracle of the "Woman with Issue of Blood" (Fig. 10 lower right) and "St. Peter's Mother-in-Law" (Fig. 10 lower left) are also on the upper part of the eastern wall under the dome. Underneath these, the "Deesis" (Fig. 12) is drawn on the lower part of the eastern wall close to the floor, unlike the other mosaics on the inner narthex's wall. This "Deesis" is an image of the Virgin imploring Christ for the salvation of Isaak Komnenos, a 12<sup>th</sup>-century donor of the Chora Church.

In "Christ Healing a Blind and Dumb Man" and "Two Blind Men," the mountains are placed outside the living space of people (Inomata, Okazaki & Yanagisawa, 2011), in the architectural space, the mountains are drawn on the intermediate space between the dome that shows God's world and the lower part of the wall that shows the terrestrial world.

To summarize, "Christ" is drawn against a gold background on the dome, signifying God's world, and the mountains provide background for the healing miracles on the pendentives under the dome. Furthermore, on the eastern wall under these is the "Deesis," in which the Virgin implores Christ for salvation (Fig. 8). In other words, "salvation," which is one of the overall themes of the Christian art of the Chora Church, and "Christ as God," who relieves people by the miracles of healing, are expressed in the south-domed bay. This can be interpreted as meaning that Christ has come down to the terrestrial world from the dome that is God's world with the donor who seeks salvation.

## 5.2. NORTH-DOMED BAY

The cycle of the life of the Virgin is drawn basically clockwise on the northern, eastern, and western walls except for in the south-domed bay (Fig. 4, 5). The story begins with an earlier narrative before the Virgin's birth, and her life in the Temple, marriage to Joseph, and the Annunciation are drawn in the inner narthex. The story continues with the cycle of the life of Christ in the outer narthex. The alcove on the lower part of the northern wall serves as an arcosolium for Demetrios I Palaiologos (Underwood, V1, 1965, p. 295). "The Virgin and Child" is located at the center of the north dome and the "Royal ancestry of the Old Testament" is drawn on the circumference (Fig. 13). "The Annunciation to St. Anne," who is the Virgin's mother (Fig. 14 middle), and "The Annunciation to the Virgin" (Fig. 16 left) are drawn on the upper part of the western wall under the dome. In each scene, an angel bringing the word of God appears in the terrestrial world and informs the Virgin or St. Anna of the pregnancy. "The Virgin Orans" (Fig. 15), depicting the Virgin imploring Christ for the salvation of the people, is located on the upper part of the arcosolium.

In "Joachim in the Wilderness" (Fig. 14 right) on the eastern wall under the dome, a mountain is drawn in the background. Although the adjacent image of the northeast pendentive (Fig. 14 left) has been lost, we can assume that it had the same composition as the western wall under the south dome described above, and thus mountains may have been drawn symmetrically about the medallion of the angel. In "Joachim in the Wilderness," the mountain is drawn to exist outside the living space of people, in the architectural space, and is situated in the intermediate space between the dome depicting God's world and the lower



Fig 10. The south dome of the Chora Church's inner narthex. "Christ" surrounded by "Ancestors from the Old Testament;" "St. Peter's Mother-in-Law" (lower left, northeast pendentive); and "Woman with Issue of Blood" (lower right, southeast pendentive).



Fig 11. The upper part of the western wall under the south dome of the Chora Church's inner narthex. "Christ Healing a Blind and Dumb Man" (left, southwest pendentive); "Christ Healing a Multitude" (middle, lunette); and "Two Blind Men" (right, northwestern pendentive).



Fig 12. Lower part of the eastern wall under the south dome of the Chora Church's inner narthex. "Deesis."





Fig 13. The north dome of the Chora Church's inner narthex. "The Virgin and Child" surrounded by "Ancestors from the Old Testament."

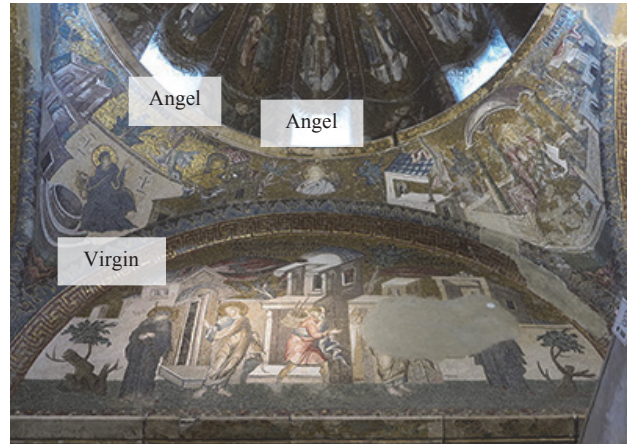


Fig 16. Upper part of the western wall under the north dome of the Chora Church's inner narthex. "The Annunciation the Virgin" (left, southwest pendentive)

part of the wall that represents the terrestrial world, such as the south dome.

In summary, "The Virgin and Child" is placed against a gold background on the dome illustrating God's world. The "Annunciation," in which the word of God is brought to the terrestrial world, is selectively placed on the pendentive or lunette under the dome, where the angel, acting as intermediary to connect the two worlds, and the mountain are drawn. Under these is the arcosolium for Demetrios I Palaiologos, which probably signifies a hope for salvation (Fig. 9). In the north-domed bay, many images of the Virgin can be found, emphasizing the disciple's prayer for the salvation that the Virgin beseeches of Christ.

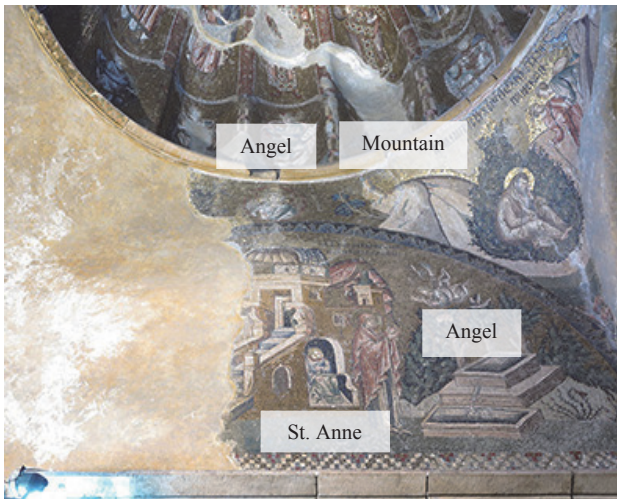


Fig 14. The upper part of the eastern wall under the north dome of the Chora Church's inner narthex. "The Annunciation to St. Anne" (middle, lunette); "Joachim in the Wilderness" (right, southeast pendentive). Although the adjacent image of the northeast pendentive is lost, the same composition as the western wall under the south dome is assumed, and therefore mountains may have been drawn symmetrically about the medallion of the angel.

## 6. Conclusion

We studied the south- and north-domed bays of the Chora Church's inner narthex using interior elevations and photomontages of the Christian art, interpreted the representations of the architectural space and the mountains depicted in the art. Icons that express God's world to the terrestrial world are placed on the pendentives and lunettes under the domes, where angels, acting as intermediaries between the two worlds, and mountains are drawn. Furthermore, located on the wall underneath, is the Virgin imploring Christ for the people's salvation and the arcosolium for the disciple, which likely represents the hope of salvation. In other words, the mountains are drawn on the intermediate space between the dome depicting God's world and the art asking for salvation is located in the terrestrial world or the arcosolium. Furthermore, the mountains are drawn on the closest space to the domes, such as the artworks that express the relationship of God's world to the terrestrial world and the angels acting as intermediaries. We now understand that the mountains in the Christian art of the Chora Church have the special significance of representing a place to connect to God's world. The architectural space of the Chora Church configures the lower part of the wall as the terrestrial world and the dome as God's world, with the pendentives and lunettes dividing the two.

## Endnotes

1. In this paper, we defined mountains as rugged ground consisting of a great incline and excluded smooth ground with only slight rises.
2. The artworks "The Annunciation," "The Nativity of Christ," "The



Fig 15. The arcosolium under the north dome of the Chora Church's inner narthex. "The Virgin Orans."



Baptism of Christ,” “The Transfiguration of Christ,” the “Crucifixion,” and so forth are believed to have been in the naos, but are not longer in existence (Lowden, 2000, p. 416).

3. In this paper, the titles of the artworks are based on “The Art of the Kariye Camii” (Ousterhout, 2002).

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## Sources

The picture in Fig. 1 is by Akşit (2010). The drawings in Figs. 2, 4, and 5 were made by Inomata based on Ousterhout (1987). The remaining pictures in the figures are by Inomata.



# Relationships between the Use and Environment of an *Unagi-no-nedoko*-like Green Space in Downtown Kyoto City

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**Keywords:** small urban space, image evaluation, behavior survey

**Abstract:** It is becoming necessary to consider the effective use of vacant lots that have developed due to the demolition of *Kyo-machiya* (traditional houses) in Kyoto. These long, narrow lots are called *Unagi-no-nedoko* (“beds of eel”). Their spatial characteristics might make them unsuitable as green spaces because there is the possibility of creating a dark, small, exclusive, and dangerous atmosphere. Thus, we investigated the influence of the environment of an *Unagi-no-nedoko*-like green space on user awareness and behavior. The results found that the inner area of the green space was as quiet as an indoor room and was recognized as a “relaxing” environment, which caused users to stay longer. Moreover, users found the whole area “large” and “open.” These findings demonstrate that the spatial characteristics of *Unagi-no-nedoko* do not necessarily make them uncomfortable as green spaces, and it is possible to use such lots as green spaces in downtown Kyoto.

## 1. Introduction

*Kyo-machiya* (traditional houses in Kyoto) are an important component of the old-town atmosphere in Kyoto city. However, they have gradually been demolished: from 1948 to 2000, in the central part of Kyoto city, demolition of about 70% of *Kyo-machiya* was confirmed by an investigation based on aerial photograph interpretation (Kawasumi et al., 2003). Moreover, the results of the second *Kyo-machiya* Community Building Survey (2003) made it clear that 927 out of 7,308 *Kyo-machiya* that existed in 1998 had been demolished in the central parts of Kyoto city (Kamigyō-ku, Nakagyō-ku, Shimogyō-ku, and Higashiyama-ku), and about 20% of those had been replaced with parking or vacant lots. Thus, Kyoto city has two problems: how to prevent the demolition of traditional houses and how to effectively use the vacant lots that have appeared since their demolition.

Although Kyoto city has for many years been known for its beautiful scenery, there is insufficient green space in the city area. In 2008, 861 parks were open in Kyoto city, but their distribution deviated. There are especially few parks in the central city areas of Nakagyō-ku and Shimogyō-ku (Kyoto City, 2010). In response to this, Kyoto city is now carrying out many projects to prompt greening, but the city area contains a lot of private land, so there is little space for greening (Kyoto City, 2010). In order to solve these problems, it is important to study the usefulness of *Kyo-machiya* sites as potential new green spaces.

It is thought that there might be some problems in the use of *Kyo-machiya* sites as green spaces. Due to their spatial characteristics—narrow frontage, close adjacency to houses, and long depth—they are called *Unagi-no-nedoko* (“beds of eel”). These characteristics cause *Kyo-machiya* sites to have the potential to be environments that are dark, small, exclusive, and dangerous, which are considered unsuitable characteristics for

green spaces. Through an analysis of the impressions that subjects acquired from photographs of the approach to open green spaces, the narrowness of the entrances to those spaces and the size of their walls were shown to be negative factors regarding the user’s desire to enter the spaces (Miyazono et al., 2002).

The space patterns of pocket parks all over the country have been typified (Kumano et al., 2002), but no case studies have yet examined the relationship between the use and spatial characteristics of *Unagi-no-nedoko*. Thus, we selected a *Unagi-no-nedoko*-like green space in the central part of Kyoto city as our study area (there were no green spaces that actually used a *Kyo-machiya* site) and examined how its spatial characteristics influenced its users’ awareness and behaviors in order to consider the feasibility of using the same type of space as a green space in the future.

## 2. Methods

### 2.1. STUDY AREA

The study area (hereafter green space (GS), area = 220 m<sup>2</sup>) was part of the exterior space of the F building, which is located on the southeast side of the intersection of Karasuma and Shijo Streets and has *Unagi-no-nedoko*-like spatial characteristics (Fig. 1). We did not include the other section of the exterior space of the F building because it contains no places for people to sit, so people only walk through it. The entrance section of the GS (90.67 m<sup>2</sup>) is called *Naginataboko-Ryokuchi*; it was opened on April 1, 1998, and is owned by Kyoto city. The rest of the exterior space is owned by the proprietary company of the F

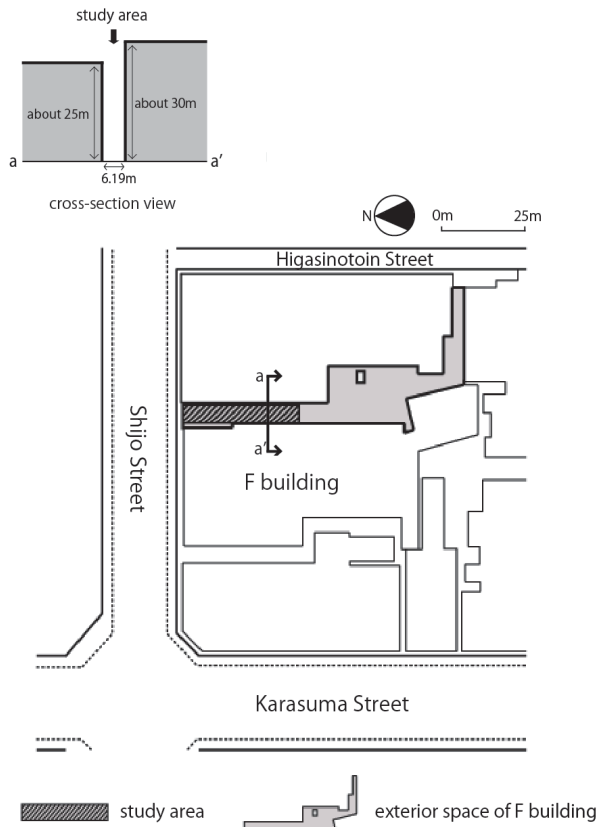


Fig 1. Map of the study area and the surrounding area

building. Routine cleaning, planting management, and security in the GS are performed by the same company. Fig. 2 is a schematic view of the study area, which contains eight benches of four different types, two ashtrays, and a garbage can. The plantings are comprised of Japanese zelkova (*Zelkova serrate*), Japanese spurge (*Pachysandra terminalis*), flowering dogwood (*Cornus florida*), and Mondo grass (*Ophiopogon japonicus*). The space above the entrance to the GS is covered by a canopy of three Japanese zelkovas, and parts of the eastern and western walls of the GS contain reflective glass panels. The GS has the three spatial characteristics of *Unagi-no-nedoko*: its depth is long (39.6 m) from south to east, its frontage is narrow (6.19 m), and its east and west sides are interrupted by walls (cf. cross-section view in Fig. 1). As the GS is clearly distinguished by central

pillar P, we classified it into two areas based on the distance from Shijo Street: area A (0.0 m to 17.6 m) and area B (17.6 m to 39.6 m).

## 2.2. EXAMINATION METHOD

### 2.2.1. Noise Survey

As one of the environmental indicators in the GS, we conducted an attenuation survey of the noise from Shijo Street. We selected four weekend days with good weather for the survey dates and carried out surveys from 11:00 to 15:00 on October 14 and 21, 2012, and November 3 and 18, 2012. We used the noise SD card recorder SD-23SD (manufacturer: Sato Shoji, measuring range: 30 to 130 dB, resolution: 0.1 dB, frequency: 31.5 to 8000 Hz, frequency compensation circuit: A-weighting), which was set on a stand 1 m above the ground and took measurements every two seconds. The points of measurement were one point (a) at the entrance of the GS and five points (b to f) inside the GS, at equal intervals (8.8 m) along the measurement line (Fig. 2). We eliminated the noise values acquired during the time when traffic on Shijo Street increased unusually (due to the stopping of a campaign car or demonstration parade) as abnormal values in their influence on the GS environment.

### 2.2.2. Questionnaire Survey

The questionnaire survey was conducted on four weekdays (November 2, 7, 17, and 19, 2012) and three weekend days (November 3, 4, and 14, 2012) from 11:00 to 15:00 each day. We randomly distributed questionnaires to bench users in the two areas (A and B). We then asked them to answer the questions and collected their surveys on the spot.

First, we had the users evaluate the environment of the area via ten pairs of contrasting adjectives (Fig. 6) on a five-point scale (-2, -1, 0, 1, 2) (Survey 1). Among the questionnaires that we collected, we considered only those that contained effective answers to all questions. We then created an impression evaluation profile showing the average value of the users' impression evaluation of each area's environment and the 95% confidence interval of the average value. In order to compute the confidence interval, we used R version 2.15.2 (R Core Team, 2012) and the BCa bootstrap method by setting the number iterations at 10,000. We also asked all of the respondents if they had visited GS before (Survey 2).

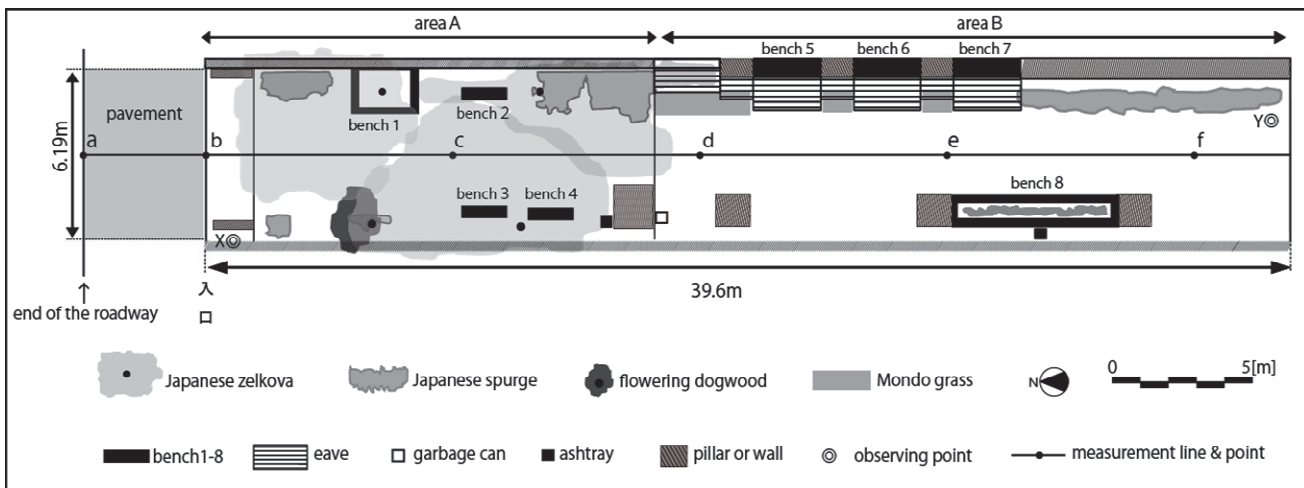


Fig 2. Schematic view of the study area

2.2.3. Behavior Survey

We conducted behavior surveys in areas A and B on September 29, 2012, and October 21 and 24, 2012, from 11:00 to 15:00 each day. Study subjects were bench users who were sitting in the GS within the survey time.

Two investigators observed the users' activity and length of stay and recorded them on the sheet associated with the specific position (cf. Fig. 2, points X and Y) in order to not disturb the users' activity.

We counted the number of occurrences of each activity in each area and classified users' activity based on existing classifications (Shirai et al., 2002). We analyzed the relevance of users' sitting areas and activities through a chi-square test and performed a residual analysis. We also analyzed the differences in length of stay between the two areas using the Mann-Whitney U test (a two-sided test,  $\alpha = 0.05$ ). We excluded the activities that were counted less than five times in the two areas. We used IBM SPSS Statistics19 for all analyses except that of the impression evaluation profile.

3. Results and Discussion

3.1. NOISE SURVEY

The results of the noise survey are shown in Fig. 3. It became clear that the average noise value in the GS changed from 70.3 dB to 58.1 dB from point (a) (-4.4m) to point (f) (35.2 m). This noise value change is equivalent to the experience of moving from a major arterial road in the daytime to a quiet inner room. Thus, although GS is outdoors, its noise environment was found to be equivalent to that of an indoor location. We assume that its narrow entrance and the plantings along both side walls prevented the noise of the main street from entering GS.

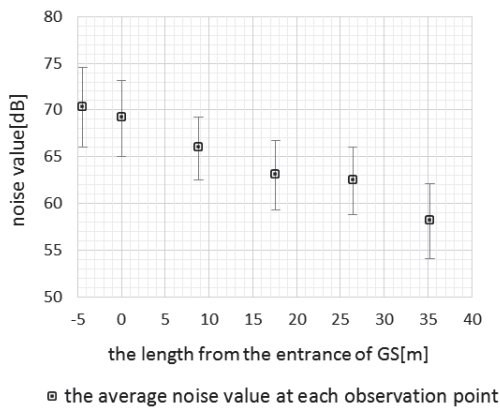


Fig 3. The relevance of noise value and depth in the GS

3.2. QUESTIONNAIRE SURVEY

There were a total of 90 effective answers to the questionnaire surveys: 36 from area A users and 54 from area B users. Figs. 4 and 5 show the respondents' age, gender, and occupation. The impression evaluation profile is shown in Fig. 6.

3.2.1. Survey 1

The results (Fig. 6) show that area A users felt there was more "green" in their area than area B users did. Since trees and groundcover plants are arranged near the GS entrance (Fig. 2),

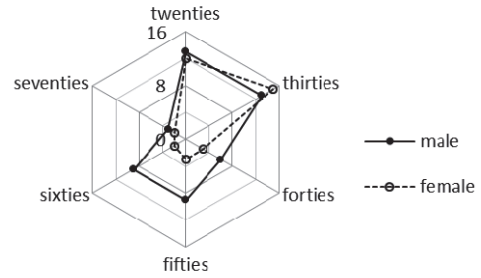


Fig 4. The respondents' age and gender

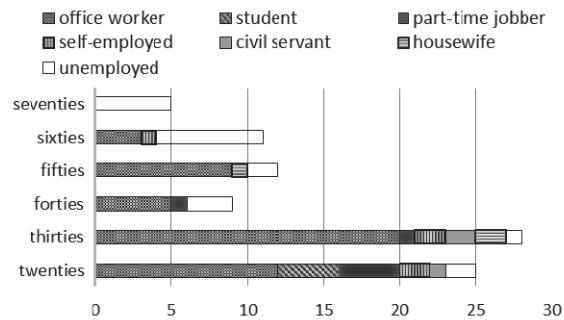


Fig 5. The respondents' age and occupation

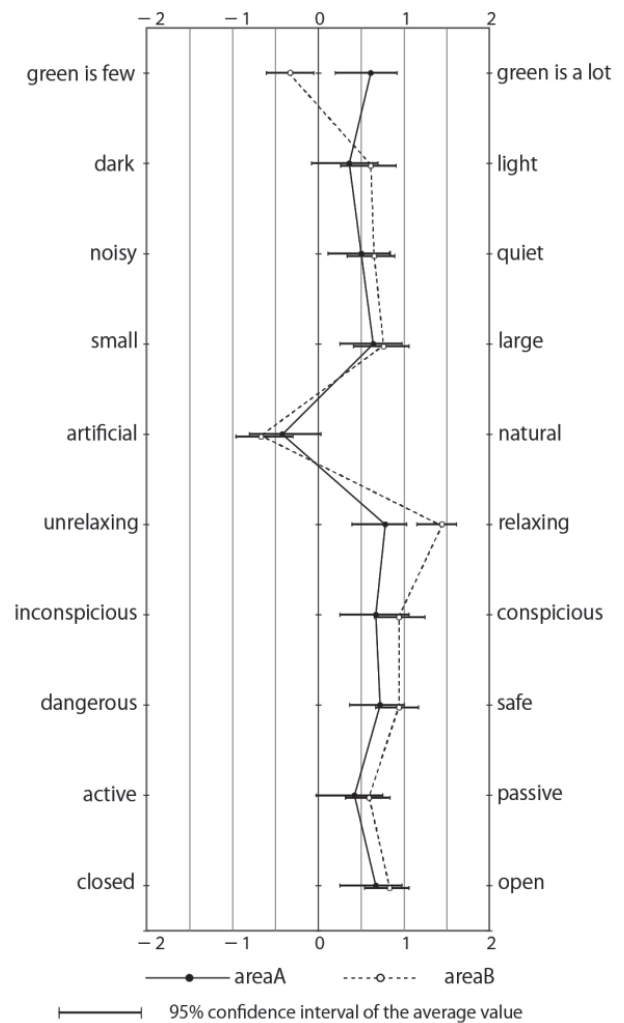


Fig 6. The impression evaluation profile



the users are believed to have evaluated the real green space conditions in the GS. On the other hand, although there are various types of plantings, both areas' users showed a tendency to evaluate their areas as "artificial" spaces. The cause of this is believed to be the fact that the GS is an exterior space united with the F building, which makes it easy for users to have an inorganic impression of the space. Moreover, area B was evaluated as significantly more "relaxed" than area A.

Furthermore, although a significant difference was not observed, area B users showed a tendency to evaluate their environment as more "quiet" and "inconspicuous" than area A users. These results are considered to be compatible with the results of the noise survey and the spatial characteristics of GS.

It also became clear that users of both areas A and B evaluated the environment of each area as "large," "open," and "safe." These factors are considered to have occurred because (1) parts of the eastern and western walls of the GS contain reflective glass panels, so users sensed that the space was larger than it actually is; (2) many office workers use the GS (Fig. 5) and tend to experience feelings of openness while outdoors; and (3) a guard regularly patrols GS.

Users of both areas A and B tended to evaluate their areas as "light." We believe that this occurred because the GS is long in a north-south direction, and there are no tall buildings on the south side, so sunlight is free to enter the space.

### 3.2.2. Survey 2

The results show that 84 of the 90 respondents (about 93%) had visited the GS two or more times (Fig. 7). This result is a higher percentage than that found in previous research that investigated the number of people who repeatedly used an artificial green space (34 of the 58 respondents, about 59%) (Shirai et al., 2002).

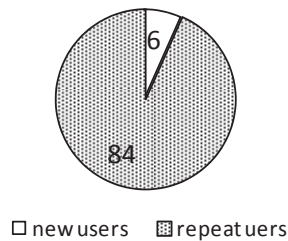


Fig. 7. The percentage of repeat users of GS

Many users called the GS "inconspicuous" in Survey 1, so we believe that one of the reasons why few new users visit GS is that, in spite of facing the main street, its narrow frontage makes the GS hard for pedestrians to find.

## 3.3. BEHAVIOR SURVEY

There were 11 activities observed in GS, which were divided into five groups. Table 1 shows the number of activities and average length of stay. It also shows the statistical test results regarding the differences in activity numbers and length of stay between the two areas.

### 3.3.1. Number of Activities

The most often observed activity was smoking, and the number of activities did not significantly differ between areas A and B. These factors are considered to have occurred because (1) the circumference of the GS is a nonsmoking street area, so GS plays

the role of a smoking space; (2) ashtrays are installed in both areas A and B; and (3) its location between tall buildings means that the GS has good ventilation.

Table 1. Average length of stay and number of activities in each area  
[\*\*:  $P < 0.01$ , \*:  $P < 0.05$ ]

Activity classification	Activity name	Number of activities		Average length of stay	
		area A	area B	area A	area B
(1) Purposeful activity	smoking	199	227	5.2**	6.7**
	eating and drinking	17**	54**	4.2**	9.2**
(2) Interactive activity	talking on cell phone	(13)	(12)	77*	64*
	conversation	(57)	(51)		
	meeting	(7)	(1)		
(3) Recreational activity	listening to music	(9)	(11)	50	67
	playing with cell phone	(41)	(56)		
(4) Concentration activity	reading	(2)	(4)	5**	19**
	studying	(3)	(15)		
(5) Break activity	sleeping	(2)	(4)	19	21
	relaxing	(17)	(17)		

Moreover, (1) purposeful activities and (4) concentration activities were observed significantly more often in area B than in area A. Its distance from the main street, which contains many cars and pedestrians, is thought to make area B more suitable for the people who visit the GS on their lunch breaks, and a quiet space is more suitable for activities such as reading and studying. Thus, it is thought that users generally preferred area B to area A.

On the other hand, (2) interactive activities were observed significantly more often in area A than in area B. The cause of this is thought to be that area A is more visible from the main street than area B and is therefore more suitable for "waiting" activities.

### 3.3.2. Average Length of Stay

The statistical test results regarding the average length of stay for each activity (Table 1) showed that the average length of stay in area B was significantly longer than that of area A. It is likely that the quiet environment of the inner section of the GS caused users to stay longer. Regarding (4) concentration activities, although the difference in the average length of stay between the two areas was large (more than 10 minutes), it was not found to be significant due to the low number of activities ( $p = 0.059$ ).

On the other hand, regarding (3) recreational activities, there was no significant difference in the average length of stay between the two areas. When users play with cellular phones, they concentrate on small screens. When users listen to music, they cover their ears with earphones. These recreational activities intercept outside stimulation, so it is thought that they are less influenced by their users' surrounding environments.

## 4. Conclusion

The results of this investigation showed that, in spite of its outdoor location, the sound environment inside of the GS was equivalent to that of a quiet indoor space, and area B users stayed longer because they felt that their environment was more "relaxed" than area A users did. The cause of this difference is thought to be that the narrow frontage and long depth of the GS induced an environmental change and influenced users' awareness and behavior. These findings show that the GS's depth potentially makes it a comfortable space for its users.

Furthermore, the surveyed users gave positive evaluations of the space, such as “large,” “open,” and “safe,” in both of the study areas. Although the influence of the GS’s internal design and the southern exterior space adjacent to the GS were possible influential factors, this result indicates that the spatial characteristics of *Unagi-no-nedoko* do not necessarily make them unsuitable as urban open spaces, as shown in previous research (Miyazono et al., 2002). In other words, these results show that it is possible to use *Unagi-no-nedoko*-like spaces as urban green spaces.

Although the GS is a somewhat narrow, small space, differences in users’ behavior occurred due to its long depth. These findings indicate that, in order to make use of the unique spatial characteristics of *Unagi-no-nedoko*, it is important to consider compartmentalizing designs that will allow various activities to occur within long, open spaces.

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# Types of Mountains in the Qur'an: With a Focus on the Relationships between God and Man and Mountain

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**Keywords:** Islam, nature, the Qur'an, mountain, type

**Abstract:** This paper is a preliminary study to understand the connections between God, man, and nature. A comparative study of Moslem culture and our world leads to a deeper understanding of the relationships between our own natural world, God, and man. Furthermore, we also believe that this understanding can contribute to building harmony between different cultures. In this paper, we focus on mountains in the Qur'an that is the basis of all facets of Moslem's daily life, classify their features from the perspective of the relationship between God and man, and analyze the relationships between God and man and mountains. The results of our study produced eight types of mountains. We then expressed the schema of each type in a diagram. The diagrams allowed the visualization of the diverse features of the relationships between God, man, and mountains; any of the three could be the subject.

## 1. Introduction

Men<sup>1</sup> are not simply animals born naked into nature. Different peoples each carry the cradle called culture, and they are placed in nature enveloped by culture. Nature also reflects the myriad geographic characteristics of the different regions on earth. Accordingly, culture is nurtured in the midst of different types of nature. Different gods are enshrined at the center of cultures, and different ways of living are devised by different peoples. This paper is a preliminary attempt to understand the connections between nature, God, and man.

The authors of this paper were born and raised in a natural environment rich in water and greenery, characteristic of monsoon climate. Furthermore, this nature is surrounded by the sea, and the unique culture in we were born and raised is shaped by these characteristics. On the other hand, a people of culture where flowers bloom in the midst of semi-arid land surrounded by vast deserts may be a culture that is the polar opposite of ours. Comparing this Islamic culture and our world may lead to a deeper understanding of the connections between our natural world, God, and man. We also believe that this understanding will contribute to building harmony between different cultures.

The Qur'an, the holy scripture of Islam, differs from the scriptures of other religions in that it is said to be God's words dictated to the prophet Mohammed to be transmitted to men. Because of this feature, the Qur'an provides the foundation not only of religious worship, but also the basis for all facets of daily life, such as Islamic law.

There has been research conducted in numerous fields, including religious studies and philosophy, on the view of nature expounded in the Qur'an. Meanwhile, in the field of architectural studies, Fukami has conducted a study in which she examined various concepts related to nature mentioned in a Japanese translation of the Qur'an to seek observations related to water culture in Islam.<sup>2</sup> Fukami extracted not only phrases and phenomena related to nature, but also descriptions of man-made objects and disasters, and observed thoughts toward nature in the

time period when Islam was established. She discerned a strong yearning for water<sup>3</sup> at the root of Islamic thought.

In contrast to such previous research, in this paper we focus on mountains, which were created after the sky and the earth in the Qur'an, and constitute an important element in the formation of nature. On the other hand in Japanese culture, mountains are highly respected as God or the field of God and they are the subjects of faith for example Mount Fuji. As just described, mountain is an important element of nature for us. What kinds of the features do mountains in the Qur'an have? In this paper, we tried to categorize and analyze the features of mountains with a focus on the relationships between God, man, and mountains in order to capture the features of them.

### 1.1. OBJECT OF ANALYSIS AND METHODS

**Object of analysis:** We analyzed *The Meaning of the Holy Qur'an*, is English translation of the Qur'an. The Qur'an is composed of 114 *sura* (chapters), and each *sura* is further divided into verses, which number 6,236 in total.

**Methods of analysis:** (I) All verses in the entire text of the Qur'an containing the noun "mountain(s)" or "mount" or "hill(s)"<sup>4</sup> were extracted. Also, verses in which mountain is used to express "valley," for example in phrases like "between two mountains," and verses in which "mount" is written in parenthesis to aid interpretation were excluded. A total of 63 verses were extracted as a result. When extracting the verses, only when it is difficult to analyze the features of the mountain(s) in the verse alone are preceding and succeeding verses also extracted to aid analysis. (II) The features of mountain(s)/hill(s) in the 63 extracted verses were analyzed, and the types of mountains were extracted with a focus on the relationships between God, man, and mountains.

**2. Results and Discussion**

From the analysis of classifying the types of mountains with a focus on the relationships between God and man and mountains, we extracted the following eight uses of mountains in the Qur'an: (1) Mountains set by God on earth and blessings; (2) Mountains that God crushes, shakes, and raises, resulting in man's fear of God; (3) Mountains of Judgment on the Last Day; (4) Mountains that praise God and bow down in worship to him; (5) Mountains established by men as secure houses and shelters in return for fear of God; (6) Mountains as fixed geographic locations; (7) Mountains as tall and strong objects; and (8) Other types of mountains

Below, we discuss the features of each category of mountains that we extracted by citing the text of the Qur'an.

**2.1. MOUNTAINS SET BY GOD ON EARTH AND BLESSINGS**

Twelve verses belong to this category: 13:3, 15:19, 16:15, 21:31, 27:61, 31:10, 41:10, 50:7, 77:27, 78:7, 79:32, and 88:19 (Table 1). Along with the type of mountains described in Section 2.3 below, this type of mountains appear most frequently in the Qur'an. Thus, (a) we read that God made mountains "as pegs". God "made therein mountains standing firm, lofty," "set on the earth mountains standing firm," and made mountains "immovable." As a result, (b) man could receive the blessings of "Sustenance." Specifically, the blessings include the stabilization of the earth, "sweet water" and "beautiful growth," many "beasts" and "cattle" and "things in due balance," which grow under a suitable equilibrium (Figure 1).

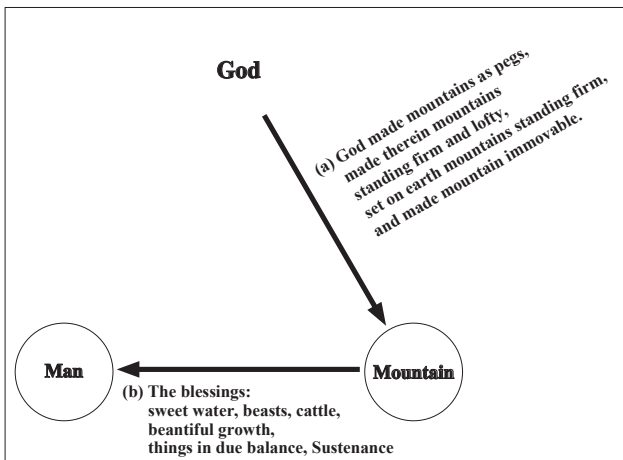


Fig 1. Mountains set by God on earth and blessings

Verses belonging to as (a) include: "Have We not made . . . and the mountains as pegs?" (78:7) and "We . . . made therein mountains standing firm, lofty (in stature)" (77:27). Here, mountains are installed by God (created as "pegs") by God and immobilized on the earth. Other verses include "We . . . set thereon mountains firm and immovable" (15:19) and "the mountains hath He firmly fixed" (79: 32). Here, God affixed mountains firmly on earth. They are also firmly placed. As shown in verses such as "And We have set on the earth mountains standing firm, lest it should shake with them" (21:31) and "He set on the earth mountains standing firm, lest it should shake with you" (31:10), the mountains made the earth immovable by being staked upon it.

Verses categorized as (b) include ". . . provided for you water sweet (and wholesome)?" (77:27), ". . . produced therein all kinds of things in due balance" (15:19), "He scattered through

it beasts of all kinds" (31:10), ". . . measure therein all things to give them nourishment in due proportion, . . . in accordance with (the needs of) those who seek (Sustenance)" (41:10), ". . . produced therein every kind of beautiful growth" (50:7), and "For use and convenience to you and your cattle" (79:33). Here, man could receive the blessing of "sustenance" as a result of the stabilization of earth by God's staking of mountains.

**2.2. MOUNTAINS THAT GOD CRUSHES, SHAKES, AND RAISES, RESULTING IN MAN'S FEAR OF GOD**

Eight verses belong to this category: 2:63, 2:93, 4:154, 7:143, 7:171, 13:31, 19:90, and 59:21 (Table 1). Here, (a) God raises over man's head; God shocks mountain as a canopy; God moves it; God "make(s) it as dust"; and "cleave(s) [them] asunder." As a result, (b) men "reflect" and fear God; Moses "turns in repentance" over their unbelief of God and gives glory to God (Figure 2).

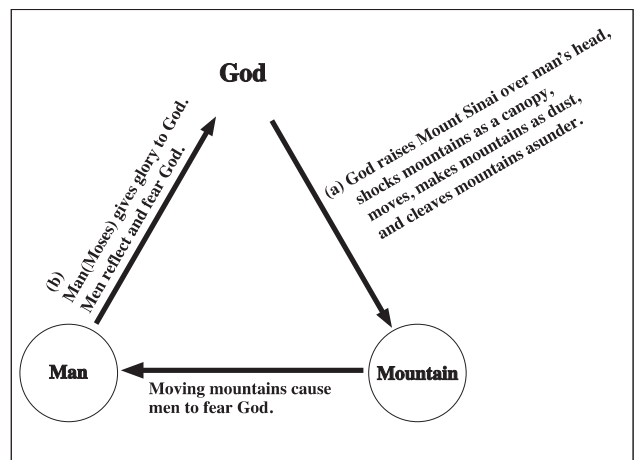


Fig 2. Mountains that God crushes, shakes, and raises, resulting in man's fear of God

Verses that belong to (a) include "And for their covenant we raised over them (the towering height) of Mount (Sinai). . . . And we took from them a solemn covenant" (4:154). In the same manner, 2:93 states that God "raised over" Mount Sinai when he "take from a solemn covenant" with Moses. Also, the mighty power of God is shown by his moving mountains ("If there were a Qur'an with which mountains were moved, or the earth were cloven asunder, or the dead were made to speak, (this would be the one!) But, truly, the command is with Allah in all things!" [13: 31]) and causing it to fall (19:90)

Verses demonstrating (b) include 7:143:

He said: "O my Lord! show (Thyself) to me, that I may look upon Thee." Allah said: "By no means canst thou see Me (direct); But look upon the mount; if it abide in its place, then shalt thou see Me." When his Lord manifested His glory on the Mount, He made it as dust. And Moses fell down in a swoon. When he recovered his senses he said: "Glory be to Thee! to Thee I turn in repentance, and I am the first to believe."

As a result of God's "mak[ing] as dust" "the Mount," Moses feared God and "fell down in a swoon." When he recovered, he turned in repentance and believed. Another verse states: "Had We sent down this Qur'an on a mountain, verily, thou wouldst have seen it humble itself and cleave asunder for fear of Allah. Such are the similitudes which We propound to men, that they



may reflect" (59:21). Here, God "cleave[s] asunder" a mountain, causing men who looked upon this to reflect. Furthermore, God raises Mount Sinai above his head and shook it, "as if it had been a canopy," causing men to fear him.

2.3. MOUNTAINS OF JUDGEMENT ON THE LAST DAY

The following verse describes the Final Judgment:

They ask thee about the (final) Hour – when will be its appointed time? Say: "The knowledge thereof is with my Lord (alone): None but He can reveal as to when it will occur. Heavy were its burden through the heavens and the earth. Only, all of a sudden will it come to you." They ask thee as if thou wert eager in search thereof: Say: "The knowledge thereof is with Allah (alone), but most men know not." (7:187)

Twelve verses belong to this category: 18:47, 20:105, 27:88, 52:10, 56:5, 69:14, 70:9, 73:14, 77:10, 78:20, 81:3, and 101:5 (Table 1). On the Last Day, God uproots and removes mountains. In addition, mountains are "in violent commotion," "fly hither and thither," and are "crushed to powder at one stroke." They "pass away as the clouds," are "scattered as dust," are "like as wool," "vanish like a mirage," are "crumbled to atoms," and are "as a heap of sand poured and flowing down." (Figure 3)

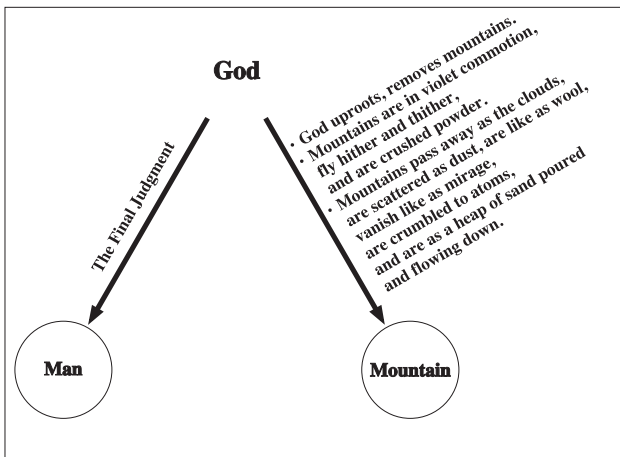


Fig 3. Mountains of Judgment on the Last Day

Verses belonging to this category include "One Day We shall remove the mountains, and thou wilt see the earth as a level stretch, wilt" (18:47), "They ask thee concerning the mountains: say, 'My Lord will uproot them and scatter them as dust'" (20:105), "On the Day. . . the mountains will fly hither and thither" (52:10), "One Day the earth and the mountains will be in violent commotion. And the mountains will be as a heap of sand poured out and flowing down" (73:14), and "mountains . . . are crushed to powder at one stroke" (69:14)." In other words, mountains are leveled and destroyed by God. The crushed mountains are described as "passing away as the clouds" and "scattered as dust"; they become like "heap of sand poured and flowing down" and like wool. In the end they vanish like a mirage.

2.4. MOUNTAINS THAT PRAISE GOD AND BOW DOWN IN WORSHIP TO HIM

Four verses belong to this category: 21:79, 22:18, 34:10, and 38:18 (Table 1). These anthropomorphic mountains "celebrate

praises" to God together with birds and man (David). Together with "all things that are in the heavens and on earth," they "bow down in worship" to God (Figure 4).

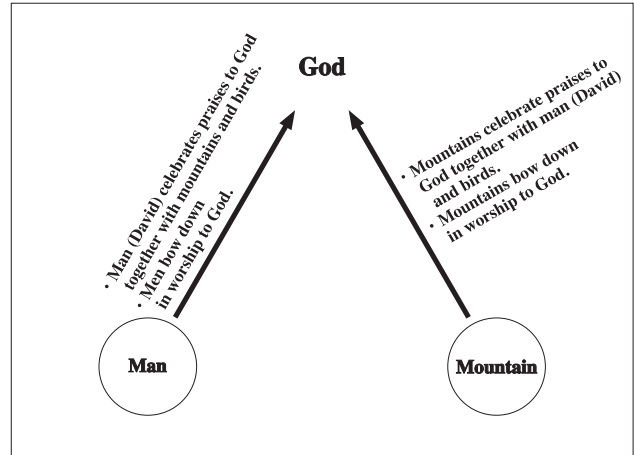


Fig 4. Mountains that praise God and bow down in worship to him

A verse that belongs to this category is "it was Our power that made the hills and the birds celebrate Our praises with David" (21:79). In this verse, "Our" refers to God. The hills praise God together with David and the birds. This behavior is also seen in 34:10 and 38:18.

Furthermore, 22:18 states: "Seest thou not that to Allah bow down in worship all things that are in the heavens and on earth, the sun, the moon, the stars; the hills, the trees, the animals; and a great number among mankind?" Mountains, which are considered the same as hills in Arabic, are part of "all things that are in the heavens and on earth" that "bow down in worship" to God.

2.5. MOUNTAINS ESTABLISHED BY MEN AS SECURE HOUSES AND SHELTERS IN RETURN FOR FEAR OF GOD

Six verses belong to this category: 7:74, 11:43, 15:82, 16:68, 16:81, and 26:149 (Table 1). These mountains are the places where men hew edifices and carve houses, and God provides secure habitations and makes men's shelters. Though, men remember the benefits from God, refrain from evil, bow to God's Will in Islam, fear God and obey God; otherwise, men cannot receive them. Beyond that, man (the Noah's son) try to betake himself to mountain to save from the flood. But he cannot save, because he doesn't have mercy (Figure 5).

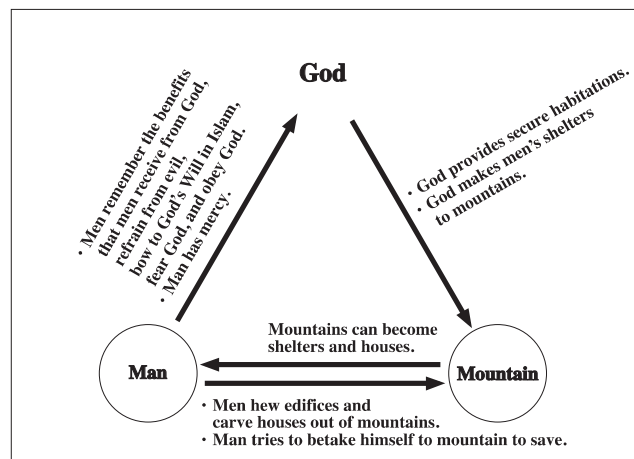


Fig 5. Mountains established by men as secure houses and shelters in return for fear of God

Verses that belong to this category include “Will ye be left secure, in (the enjoyment of) all that ye have here?” (26:146), “And ye carve houses out of (rocky) mountains with great skill” (26:149), and “But fear Allah and obey me” (26:150). Here, men carve houses out of mountains and consider them secure places. However, if they do not fear and obey God, they will not obtain this security. In the same manner, in verse 7:74 and 15:82 men “hew edifices,” which provide habitations that allows them to feel secure. This benefit is given only to those whose “remembrance of the benefit from God” is aroused, who refrain from evil, and who do not turn away from God’s signs. Furthermore, the Qur’an states: “The son replied: ‘I will betake myself to some mountain: it will save me from the water.’ Noah said: ‘This day nothing can save, from the command of Allah, any but those on whom He hath mercy!’ And the waves came between them, and the son was among those overwhelmed in the Flood” (11:43). Here, a mountain is described as a place that saves one from the water. The Noah’s son sought to scape to the mountain on his own strength without recourse to the mercy of God. As a result, he was overwhelmed in the Flood.

Verse 16:81 also states: “It is Allah Who made out of the things He created, some things to give you shade! of the hills He made some for your shelter; . . . Thus does He complete His favours on you, that ye may bow to His Will (in Islam).” Here, the hills were created by God to give men shelter. However, it is first of all a safe place so that men may bow to God’s will. In addition, in the same way that hills are places where homes are secured, they are also the places where honeybees build their cells.

2.6. MOUNTAINS AS FIXED GEOGRAPHICAL LOCATIONS

Eleven verses belong to this category: 2:158, 2:198, 11:44, 19:52, 20:80, 20:83, 23:20, 28:29, 28:46, 52:1, and 95:2 (Table 1). There are five mountains expressing fixed geographical locations: (a) Mount Sinai is a place where God shows his covenant, makes Moses draw near to him, and called Moses, and a tree springs that produce oil and relish for those who use it for food; (b) Safa and Marwa, a place where men (“those who visit”) compass round “in the Season” (of pilgrimages); (c) Mount Arafat, a place men celebrate the praises of God at base of, during pilgrimages; and (d) Mount Judi, where Noah’s ark rest, the moment God’s word made the water (flood) abated (Figure 6).

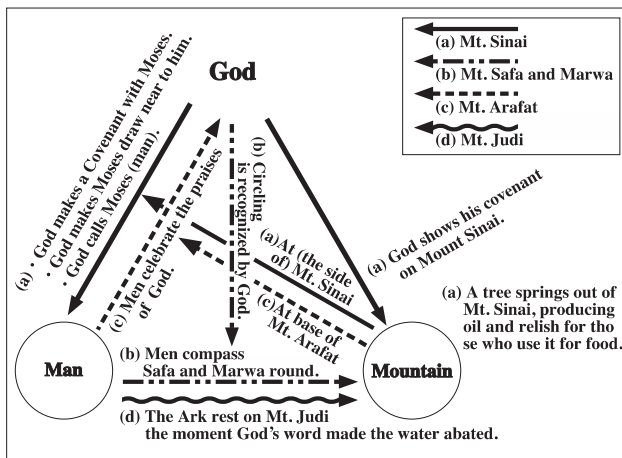


Fig 6. Mountains as fixed geographical locations

Verses that support (a) include “And we called him from the right side of Mount (Sinai), and made him draw near to Us, for mystic (converse)” (19:52). This feature is seen in 20:80,

28:29, 28:46. Furthermore, “by the Mount (of Revelation)” (52:1), God showed his covenant on Mount Sinai. Verse 23:20 also states, “Also a tree springing out of Mount Sinai, which produces oil, and relish for those who use it for food,” showing the special characteristics of Mount Sinai itself.

Verses supporting (b) include “Behold! Safa and Marwa are among the Symbols of Allah. So if those who visit the House in the Season or at other times, should compass them round, it is no sin in them. And if any one obeyeth his own impulse to good, - be sure that Allah is He Who recogniseth and knoweth” (2:158). Safa and Marwa are symbols of God. Circling (“compassing round”) them is recognized by God as an act of virtue.

Verses supporting (c) include “It is no crime in you if ye seek of the bounty of your Lord (during pilgrimage). Then when ye pour down from (Mount) Arafat, celebrate the praises of Allah at the Sacred Monument, and celebrate His praises as He has directed you” (2:198). During pilgrimages, people convene upon Mount Arafat and celebrate the praises of Allah at the sacred site.

Verses belonging to (d) include “Then the word went forth: ‘O earth! Swallow up thy water, and O sky! Withhold (thy rain)!’ and the water abated, and the matter was ended. The Ark rested on Mount Judi” (11:44). Mount Judi was the place where Noah’s Ark rested after God abated the water.

2.7. MOUNTAINS AS TALL AND STRONG OBJECTS

Seven verses belong to this category: 11:42, 14:46, 17:37, 24:43, 26:63, 42:32, and 55:24 (Table 1). Here, mountains are used as similes. (a) Mountains are described as objects that men cannot shake by their power, and objects that men cannot reach in height. Also, (b) because the salient feature of mountains is that they are extremely tall, they are used to express the appearance of waves, clouds, ships’ masts, and separated parts of sea as simile (Figure 7).

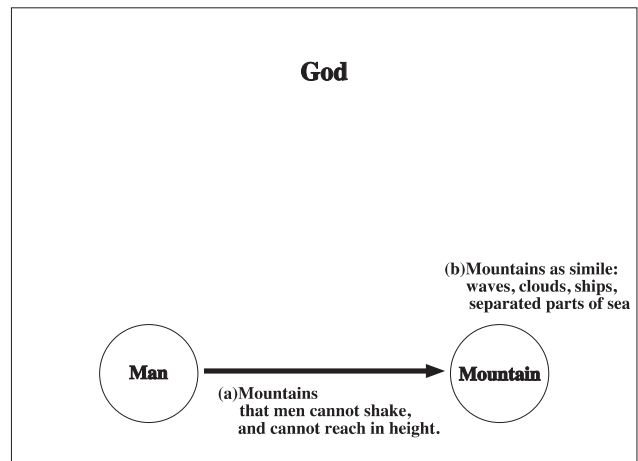


Fig 7. Mountains as tall and strong objects

Verses falling under (a) include “Mighty indeed were the plots which they made, but their plots were (well) within the sight of Allah, even though they were such as to shake the hills!” (14:46). The hills are described as objects that men cannot move with their strength. Furthermore, verse 17:37 states: “Nor walk on the earth with insolence: for thou canst not rend the earth asunder, nor reach the mountains in height.” The mountains are described as objects that exceed men’s height.

Verses categorized as (b) include “So the Ark floated with them on the waves (towering) like mountains” (11:42), “He sends down from the sky mountain masses (of clouds) wherein is hail: He strikes therewith whom He pleases and He turns it away

from whom He pleases" (24:43), "Then We told Moses by inspiration: 'Strike the sea with thy rod.' So divided, and each separate part become like the huge, firm mass of a mountain" (26:63). Waves and clouds are likened to mountains. Mountains are also used to describe the height and grandeur of the parts of the sea divided by Moses. Also, as in 43:32, mountains are used in 55:24 to describe extremely tall objects: "And His are the Ships sailing smoothly through the seas, lofty as mountains."

## 2.8. MOUNTAINS OF OTHER TYPE

Four verses belong to this category: 2:260, 21:96, 33:62, and 35:27 (Table 1). These depictions of mountains do not belong to any of the seven categories described above. The mountains depicted show (a) places where God's might shows, and places where Gog and Magog "swiftly swarm" (b) God offered the Trust to mountains and men, but mountains "refused to undertake" it and men undertook it, also (c) Mountains appear in various color. (Figure 8).

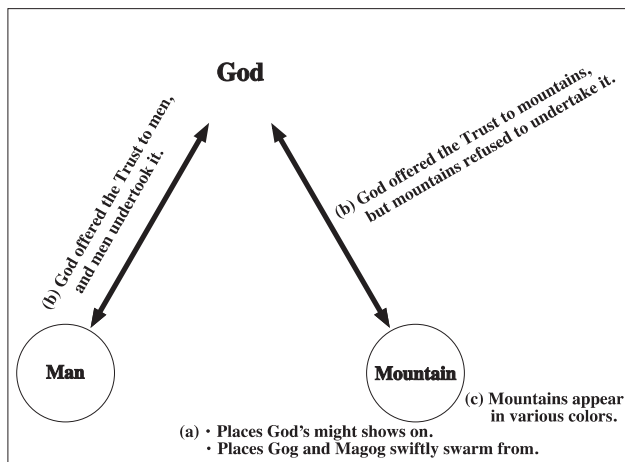


Fig. 8 Other types of mountains

Verses that belong to (a) include: "Abraham said: 'My Lord! Show me how Thou givest life to the dead.' He said: 'Dost thou not then believe?' He said: 'Yea! but to satisfy My own understanding.' He said: 'Take four birds; Tame them to turn to thee; put a portion of them on every hill and call to them: They will come to thee (Flying) with speed'" (2:260). Here, hills are places where God's might is displayed. Furthermore, verse 21:96 states: "Until the Gog and Magog (people) are let through (their barrier), and they swiftly swarm from every hill." The hill here is a place where Gog and Magog, who overwhelms the land with great evil, originate.<sup>5</sup>

Verses that belong to (b) include "We did indeed offer the Trust to the Heavens and the Earth and the Mountains; but they refused to undertake it, being afraid thereof but man undertook it" (33:72). Here, mountains were offered trust by God, but were afraid and refused to accept it.

Verses belonging to (c) include "And in the mountains are tracts white and red, of various shades of colour, and black intense in hue" (35:27).

## 3. Conclusion

The purpose of this paper was to clarify the uses of mountains in the Qur'an. We focused especially on and analyzed the relationships between God, man, and mountains.

The results revealed eight types of mountains: (1) Mountains set by God on earth and blessings; (2) Mountains that God

crushes, shakes, and raises, resulting in man's fear of God; (3) Mountains of Judgment on the Last Day; (4) Mountains that praise God and bow down in worship to him; (5) Mountains established by men as secure houses and shelters in return for fear of God; (6) Mountains as fixed geographic locations; (7) Mountains as tall and strong objects; and (8) Other types of mountains

By expressing the schema of each type in diagrams, we could visualize the diverse features of the relationships between God, man, and mountains. In addition, each of the three independently makes impacts. The types include God influencing men by manipulating mountains, mountains praising God along with man, and mountains as refuge because men fear God.

## Endnotes

1. "Man" means human being in this paper. That conforms to expression of "The Meaning of the Holy Qur'an".
2. Fukami, pp. 19-33.
3. Fukami, p33.
4. According to A Concordance of the Qur'an, "*jabal*" in Arabic means both "mountain" and "hill." Verses that include "*jabal*" are translated by Yusuf Ali as either "mountain(s)" or "hill(s)."
5. "They said: 'O Zul-qarnain! The Gog and Magog (people) do great mischief on the earth'" (18:94)

## References

- Fukami, N. (2006). Conception of Nature viewed from Definition of Qur'an -a consideration of Islamic aquatic culture. Holy Water-Comparative Study of Christian World and Islamic World, Laboratory of Regional Design with Ecology, Hosei University History Project. pp.20-33 (In Japanese)
- Kassis, H. E. (1983). A Concordance Of The Qur'an. University of California.
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Table1: Verses (including their chapters and verse number) belonging to each type

Yusuf Ali, Abdullah 「THE MEANING OF THE HOLY QUR'AN」		Type	
Number	Text		
13:3	And it is He who spread out the earth, and set thereon mountains standing firm and (flowing) rivers: and fruit of every kind He made in pairs, two and two: He draweth the night as a veil o'er the Day. Behold, verily in these things there are signs for those who consider!	2.1: Mountains set by God on earth and blessings	
15:19	And the earth We have spread out (like a carpet); set thereon mountains firm and immovable; and produced therein all kinds of things in due balance.		
16:15	And He has set up on the earth mountains standing firm, lest it should shake with you; and rivers and roads; that ye may guide yourselves;		
21:31	And We have set on the earth mountains standing firm, lest it should shake with them, and We have made therein broad highways (between mountains) for them to pass through: that they may receive Guidance.		
27:61	Or, Who has made the earth firm to live in; made rivers in its midst; set thereon mountains immovable; and made a separating bar between the two bodies of flowing water? (can there be another) god besides Allah. Nay, most of them know not.		
31:10	He created the heavens without any pillars that ye can see.' He set on the earth mountains standing firm, lest it should shake with you; and He scattered through it beasts of all kinds. We send down rain from the sky, and produce on the earth every kind of noble creature, in pairs.		
41:10	He set on the (earth), mountains standing firm, high above it, and bestowed blessings on the earth, and measure therein all things to give them nourishment in due proportion, in four Days, in accordance with (the needs of) those who seek (Sustenance).		
50:7	7. And the earth- We have spread it out, and set thereon mountains standing firm, and produced therein every kind of beautiful growth (in pairs)-		
77:27	5. Have We not made the earth (as a place) to draw together, 26. The living and the dead, 27. And made therein mountains standing firm, lofty (in stature); and provided for you water sweet (and wholesome)?		
78:7	6. Have We not made the earth as a wide expanse, 7. And the mountains as pegs?		
79:32	32. And the mountains hath He firmly fixed;-33. For use and convenience to you and your cattle.		
88:19	18. And at the Sky, how it is raised high?-19. And at the Mountains, how they are fixed firm?-20. And at the Earth, how it is spread out?21. Therefore do thou give admonition, for thou art one to admonish. 22. Thou art not one to manage (men's) affairs. 23. But if any turn away and reject Allah,- 24. Allah will punish him with a mighty Punishment,	2.2: Mountains that God crushes, shakes, and raises, resulting in man's fear of God	
2:63	And remember We took your covenant and We raised above you (The towering height) of Mount (Sinai): (Saying): "Hold firmly to what We have given you and bring (ever) to remembrance what is therein: Perchance ye may fear Allah."		
2:93	And remember We took your covenant and We raised above you (the towering height) of Mount (Sinai):(Saying): "Hold firmly to what We have given you, and hearken (to the Law) "; They said:" We hear, and we disobey:" And they had to drink into their hearts (of the taint) of the calf because of their Faithlessness. Say: "Vile indeed are the behests of your Faith if ye have any faith!"		
4:154	And for their covenant we raised over them (the towering height) of Mount (Sinai); and (on another occasion) we said: "Enter the gate with humility"; and (once again) we commanded them: "Transgress not in the matter of the sabbath." And we took from them a solemn covenant.		
7:143	When Moses came to the place appointed by Us, and his Lord addressed him, He said: "O my Lord! show (Thyself) to me, that I may look upon Thee." Allah said: "By no means canst thou see Me (direct); But look upon the mount; if it abide in its place, then shalt thou see Me." When his Lord manifested His glory on the Mount, He made it as dust. And Moses fell down in a swoon. When he recovered his senses he said: "Glory be to Thee! to Thee I turn in repentance, and I am the first to believe."		
7:171	When We shook the Mount over them, as if it had been a canopy, and they thought it was going to fall on them (We said): "Hold firmly to what We have given you, and bring (ever) to remembrance what is therein; perchance ye may fear Allah."		
13:31	If there were a Qur'an with which mountains were moved, or the earth were cloven asunder, or the dead were made to speak, (this would be the one!) But, truly, the command is with Allah in all things! Do not the Believers know, that, had Allah (so) willed, He could have guided all mankind (to the right)? But the Unbelievers,- never will disaster cease to seize them for their (ill) deeds, or to settle close to their homes, until the promise of Allah come to pass, for, verily, Allah will not fail in His promise.		
19:90	88.They say: "(Allah) Most Gracious has begotten a son!" 89 .Indeed ye have put forth a thing most monstrous! 90. At it the skies are ready to burst, the earth to split asunder, and the mountains to fall down in utter ruin, 91. That they should invoke a son for (Allah) Most Gracious.		
59:21	Had We sent down this Qur'an on a mountain, verily, thou wouldst have seen it humble itself and cleave asunder for fear of Allah. Such are the similitudes which We propound to men, that they may reflect.		
18:47	One Day We shall remove the mountains, and thou wilt see the earth as a level stretch, and We shall gather them, all together, nor shall We leave out any one of them.		2.3: Mountains of Judgment on the Last Day
20:105	They ask thee concerning the Mountains: say, "My Lord will uproot them and scatter them as dust;106. "He will leave them as plains smooth and level; 107. "Nothing crooked or curved wilt thou see in their place." 108. On that Day will they follow the Caller (straight): no crookedness (can they show) him: all sounds shall humble themselves in the Presence of (Allah) Most Gracious: nothing shalt thou hear but the tramp of their feet (as they march).		
27:88	87. And the Day that the Trumpet will be sounded - then will be smitten with terror those who are in the heavens, and those who are on earth, except such as Allah will please (to exempt) to and all shall come to His (Presence) as beings conscious of their lowliness. 88. Thou seest the mountains and thinkest them firmly fixed: but they shall pass away as the clouds pass away: (such is) the artistry of Allah, who disposes of all things in perfect order: for he is well acquainted with all that ye do.		
52:10	9. On the Day when the firmament will be in dreadful commotion. 10. And the mountains will fly hither and thither.		
56:5	1. When the Event Inevitable cometh to pass, 2. Then will no (soul) entertain falsehood concerning its coming. 3. (Many) will it bring low; (many) will it exalt; 4. When the earth shall be shaken to its depths, 5. And the mountains shall be crumbled to atoms, 6. Becoming dust scattered abroad,		
69:14	And the earth is moved, and its mountains, and they are crushed to powder at one stroke,-		
70:9	1. A questioner asked about a Penalty to befall- 2. The Unbelievers, the which there is none to ward off,- 3. (A Penalty) from Allah, Lord of the Ways of Ascent.4. The angels and the Spirit ascend unto him in a Day the measure whereof is (as) fifty thousand years: 5. Therefore do thou hold Patience,- a Patience of beautiful (contentment).6. They see the (Day) indeed as a far-off (event): 7. But We see it (quite) near. 8. The Day that the sky will be like molten brass, 9. And the mountains will be like wool, 10. And no friend will ask after a friend,		
73:14	One Day the earth and the mountains will be in violent commotion. And the mountains will be as a heap of sand poured out and flowing down.		
77:10	6. Whether of Justification or of Warning;- 7. Assuredly, what ye are promised must come to pass. 8. Then when the stars become dim.' 9. When the heaven is cleft asunder; 10. When the mountains are scattered (to the winds) as dust; 11. And when the messengers are (all) appointed a time (to collect);-12. For what Day are these (portents) deferred?		
78:20	17. Verily the Day of Sorting Out is a thing appointed, 18. The Day that the Trumpet shall be sounded, 19. And the heavens shall be opened as if there were doors, 20. And the mountains shall vanish, as if they were a mirage.		
81:3	1. When the sun (with its specious light) is folded up; 2. When the stars fall, losing their lustre! 3. When the mountains vanish (like a mirage); 4. When the she-camels, ten months with young, are left untended; 5. When the wild beasts are herded together (in the human habitations)J6. When the oceans boil over with a swell;7. When the souls are sorted out, (being joined, like with like);8. When the female (infant), buried alive, is questioned - 9. For what crime she was killed; 10. When the scrolls are laid open; 11. When the world on High is unveiled; 12. When the Blazing Fire is kindled to fierce heat; 13. And when the Garden is brought near.-14. (Then) shall each soul know what it has put forward.		
101:5	3. And what will explain to thee what the (Day) of Noise and Clamour is? 4. (It is) a Day whereon men will be like moths scattered about, 5. And the mountains will be like carded wool. 6. Then, he whose balance (of good deeds)(6254) will be (found) heavy, 7. Will be in a life of good pleasure and Satisfaction.		



Types of Mountains in the Qur'an

21 : 79	To Solomon We inspired the (right) understanding of the matter: to each (of them) We gave Judgment and Knowledge; it was Our power that made the hills and the birds celebrate Our praises with David: it was We Who did (all these things).	2.4: Mountains that praise God and bow down in worship to him
22 : 18	Seest thou not that to Allah bow down in worship all things that are in the heavens and on earth,- the sun, the moon, the stars; the hills, the trees, the animals; and a great number among mankind? But a great number are (also) such as are fit for Punishment: and such as Allah shall disgrace,- None can raise to honour: for Allah carries out all that He wills.	
34 : 10	10. We bestowed Grace aforetime on David from Ourselves: "O ye Mountains! Sing ye back the Praises of Allah with him! and ye birds (also)! And We made the iron soft for him:- 11. (Commanding), "Make thou coast of mail, balancing well the rings of chain armour, and work ye righteousness; for be sure I see (clearly) all that ye do."	
38 : 18	17. Have patience at what they say, and remember our servant David, the man of strength: for he ever turned (to Allah). 18. It was We that made the hills declare, in unison with him, Our Praises, at eventide and at break of day, 19. And the birds gathered (in assemblies): all with him did turn (to Allah)	
7 : 74	And remember how He made you inheritors after the 'Ad people and gave you habitations in the land: ye build for yourselves palaces and castles in (open) plains, and carve out homes in the mountains; so bring to remembrance the benefits (ye have received) from Allah, and refrain from evil and mischief on the earth."	2.5: Mountains established by men as secure houses and shelters in return for fear of God
11 : 43	The son replied: "I will betake myself to some mountain: it will save me from the water." Noah said: "This day nothing can save, from the command of Allah, any but those on whom He hath mercy!" And the waves came between them, and the son was among those overwhelmed in the Flood.	
15 : 82	81. We sent them Our Sings, but they persisted in turning away from them. 82. Out of the mountains did they hew (their) edifices, (feeling themselves) secure. 83. But the (mighty) Blast seized them of a morning, 84. And of no avail to them was all that they did (with such art and care)!	
16 : 68	And thy Lord taught the Bee to build its cells in hills, on trees, and in (men's) habitations;	
16 : 81	It is Allah Who made out of the things He created, some things to give you shade! of the hills He made some for your shelter; He made you garments to protect you from heat, and coats of mail to protect you from your (mutual) violence. Thus does He complete His favours on you, that ye may bow to His Will (in Islam).	
26 : 149	141. The Thamud (people) rejected the messengers. 142. Behold, their brother Salih said to them: "Will you not fear ((Allah))? 143. "I am to you a messenger worthy of all trust. 144. "So fear Allah, and obey me. 145. "No reward do I ask of you for it: my reward is only from the Lord of the Worlds. 146. "Will ye be left secure, in (the enjoyment of) all that ye have here?- 147. "Gardens and Springs, 148. "And corn-fields and date-palms with spathes near breaking (with the weight of fruit)? 149. "And ye carve houses out of (rocky) mountains with great skill. 150. "But fear Allah and obey me;	
2 : 158	Behold! Safa and Marwa are among the Symbols of Allah. So if those who visit the House in the Season or at other times, should compass them round, it is no sin in them. And if any one obeyeth his own impulse to good,- be sure that Allah is He Who recogniseth and knoweth.	2.6: Mountains as fixed geographical locations
2 : 198	It is no crime in you if ye seek of the bounty of your Lord (during pilgrimage). Then when ye pour down from (Mount) Arafat, celebrate the praises of Allah at the Sacred Monument, and celebrate His praises as He has directed you, even though, before this, ye went astray.	
11 : 44	Then the word went forth: "O earth! Swallow up thy water, and O sky! Withhold (thy rain)!" and the water abated, and the matter was ended. The Ark rested on Mount Judi, and the word went forth: "Away with those who go wrong!"	
19 : 52	51. Also mention in the Book (the story of) Moses: for he was specially chosen, and he was a messenger (and) a prophet. 52. And we called him from the right side of Mount (Sinai), and made him draw near to Us, for mystic (converse).	
20 : 80	O ye Children of Israel! We delivered you from your enemy, and We made a Covenant with you on the right side of Mount (Sinai), and We sent down to you Manna and quails:	
23 : 20	Also a tree springing out of Mount Sinai, which produces oil, and relish for those who use it for food.	
28 : 29	29. Now when Moses had fulfilled the term, and was travelling with his family, he perceived a fire in the direction of Mount Tur. He said to his family: "Tarry ye; I perceive a fire; I hope to bring you from there some information, or a burning firebrand, that ye may warm yourselves." 30. But when he came to the (fire), a voice was heard from the right bank of the valley, from a tree in hallowed ground: "O Moses! Verily I am Allah, the Lord of the Worlds.... 31. "Now do thou throw thy rod!" but when he saw it moving (of its own accord) as if it had been a snake, he turned back in retreat, and retraced not his steps. O Moses!" (It was said), "Draw near, and fear not. Forthou art of those who are secure. 32. "Move thy hand into thy bosom, and it will come forth white without stain (or harm), and draw thy hand close to thy side (to guard) against fear. Those are the two credentials from thy Lord to Pharaoh and his Chiefs: for truly they are a people rebellious and wicked."	
28 : 46	Nor wast thou at the side of (the Mountain of) Tur when we called (to Moses). Yet (art thou sent) as Mercy from thy Lord, to give warning to a people to whom no warner had come before thee: in order that they may receive admonition.	
52 : 1	By the Mount (of Revelation)	
95 : 2	1. By the Fig and the Olive, 2. And the Mount of Sinai, 3. And this City of security,- 4. We have indeed created man in the best of moulds, 5. Then do We abase him (to be) the lowest of the low,- 6. Except such as believe and do righteous deeds: For they shall have a reward unailing. 7. Then what can, after this, contradict thee, as to the judgment (to come)? 8. Is not Allah the wisest of Judges?	
11 : 42	So the Ark floated with them on the waves (towering) like mountains, and Noah called out to his son, who had separated himself (from the rest): "Q my son! embark with us, and be not with the unbelievers!"	2.7: Mountains as tall and strong objects
14 : 46	Mighty indeed were the plots which they made, but their plots were (well) within the sight of Allah, even though they were such as to shake the hills!	
17 : 37	Nor walk on the earth with insolence: for thou canst not rend the earth asunder, nor reach the mountains in height.	
24 : 43	Seest thou not that Allah makes the clouds move gently, then joins them together, then makes them into a heap? then wilt thou see rain issue forth from their midst. And He sends down from the sky mountain masses (of clouds) wherein is hail: He strikes therewith whom He pleases and He turns it away from whom He pleases, the vivid flash of His lightning well-nigh blinds the sight.	
26 : 63	Then We told Moses by inspiration: "Strike the sea with thy rod." So divided, and each separate part become like the huge, firm mass of a mountain.	
42 : 32	And among His Signs are the ships, smooth-running through the ocean, (tall) as mountains.	
55 : 24	And His are the Ships sailing smoothly through the seas, lofty as mountains:	2.8: Other types of mountains
2 : 260	Behold! Abraham said: "My Lord! Show me how Thou givest life to the dead." He said: "Dost thou not then believe?" He said: "Yea! but to satisfy My own understanding." He said: "Take four birds; Tame them to turn to thee; put a portion of them on every hill and call to them: They will come to thee (Flying) with speed. Then know that Allah is Exalted in Power, Wise."	
21 : 96	Until the Gog and Magog (people) are let through (their barrier), and they swiftly swarm from every hill.	
33 : 72	We did indeed offer the Trust to the Heavens and the Earth and the Mountains; but they refused to undertake it, being afraid thereof but man undertook it;- He was indeed unjust and foolish;-	
35 : 27	Seest thou not that Allah sends down rain from the sky? With it We then bring out produce of various colours. And in the mountains are tracts white and red, of various shades of colour, and black intense in hue.	



## ACTIVITY REPORTS OF THE INSTITUTE OF TURKISH CULTURE STUDIES

### Design of Bamiyan Museum & Culture Center for People, June 2013 - January 2014

#### Background of the project of the Bamiyan Museum

The Department of Architecture of Mukogawa Women's University (MWU) is providing the basic design of the Bamiyan Museum & Culture Center (the Bamiyan Museum & Culture Center for People), planned for the Bamiyan World Heritage site in Afghanistan. The Architectural Design Studio at MWU (the office of registered architects in the Department of Architecture) has taken the lead on this project.

The Bamiyan region is located 200 km west of the Afghanistan capital of Kabul, where Buddhist art prospered during the 5th through 9th century. In 2001, the two Giant Buddhas of Bamiyan and many other cultural artifacts were destroyed by the Taliban regime. Bamiyan was then listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as a World Heritage Site and the "Cultural Landscape and Archaeological Remains of the Bamiyan Valley" as a World Heritage in Danger. To the present, international experts under the initiative of UNESCO have carried out several safeguarding projects at the Bamiyan site.

The necessity of the Bamiyan Museum was conceived and discussed at the 10th Expert Working Group Meeting for the Safeguarding of the Cultural Landscape and Archaeological Remains of the Bamiyan Valley World Heritage Property (Bamiyan Expert Working Group Meeting) in Tokyo in December 2011. It was determined that construction of the Bamiyan Museum was necessary to conserve Bamiyan's historical cultural properties and unite it with Afghanistan through cultural activities at the museum.

MWU's Department of Architecture offered to cooperate on the design of the Bamiyan Museum with the National Research Institute for Cultural Properties, Tokyo (NRICT), which is leading the safeguarding project for the Bamiyan site. In December 2012, at the 11th Bamiyan Expert Working Group Meeting

「自然、仏教、ペルシャ。全てを含めたものをつくるところが面白いんです」  
イタリヤで昨年12月に開かれた、アフガニスタンの世界遺産バミヤン遺跡の修復保存を考える専門家会議で、考古的遺物を展示するだけでなく、現地の人々が共に学べる博物館の建設構想を発表した。

出発点は2011年、東京での専門家会議。前バミヤン州知事が「文化遺産保護に対する意識を高め、住民同士の絆を強める場がない」と発言したことを機に、博物館構

アフガニスタン・バミヤンの博物館構想を発表した武庫川女子大教授

おかざき 岡崎 さん  
しげゆき 甚幸 さん

建築学科長を務める武庫川女子大（西宮市）の建築・都市デザインスタジオが中心となり、基本設計を担当。自然景観との融合を考慮し、ペルシャ文化の影響を受けたさまざまな様式の仏教石窟や、現

想が具体化していく。博物館に加え、バミヤンの文化を学ぶ文化センター、遺跡を背景にした野外劇場、崖に石窟を復元した庭園…。

在のイスラム教文化も踏まえた「異文化の合体」を表現した。

から空輸した500分の1の模型を展示した。03年の世界遺産登録以来、博物館建設を切望しているアフガン政府も構想を歓迎した。

構想発表に合わせるように、韓国政府が博物館の建設費用として約5千万円の提供を表明した。「私たちの案に基づいて建設を始め、その後、日本や他の国の支援で続きを実現できれば」。まだ見ぬバミヤンを思い描きつつ、博物館への熱い思いがほとぼしる。岡山市出身、74



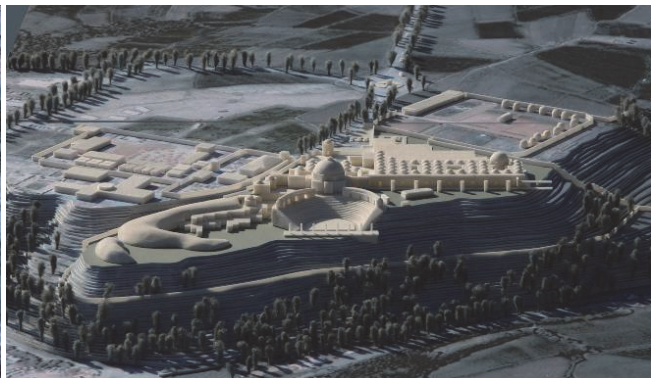
The Kobe Shimbun and Kyoto Shimbun reported on Prof. Okazaki and the Bamiyan Museum project on February 6, 2014. In these articles, Prof. Okazaki spoke of the "amalgamation of different cultures" at the heart of the museum's design and expressed how interesting it was to incorporate the natural landscape, elements of Buddhism, and other cultures.



co-organized by UNESCO in Aachen, Germany, Prof. Okazaki presented the conceptual design of the Bamiyan Museum. Following this, MWU received the UNESCO/Japanese Funds-in-Trust for Cultural Heritage (25,000 USD) in July of 2013 to develop this project. MWU later updated the basic design, including the museum and culture center and the exhibition plans for the museum, based on the results of a survey of the area surrounding the planned site conducted by NRICPT in September 2013. In December of that year, Prof. Okazaki presented the second basic design of the Bamiyan Museum at the 12th Bamiyan Expert Working Group Meeting in Orvieto, Italy, receiving great praise and high acclaim from specialists and authorities in Afghanistan. The project for the design of the Bamiyan Museum was featured on the web and in newspapers.



Right: Prof. Okazaki using film footage to explain the design concept of the Bamiyan Museum & Culture Center to the delegates. Left: Prof. Okazaki exchanging views with the Bamiyan governor (right), mayor (center rearward) and a staff member (left) on the plans for the building and its environment.



Left: One-500th scale model of the Bamiyan Museum & Culture Center and its surrounding area (width: 2m, depth: 3m). Right: Bird's-eye view of the model from the north. The model was transported by air to Orvieto, Italy, to be displayed in the Orvieto city hall, the venue of 12th Bamiyan Expert Working Group Meeting.

## Report of the Bamiyan Museum & Culture Center for People on 2013

### 1. Necessary of the Bamiyan Museum & Culture Center and its principal concept

The Bamiyan Museum at the Bamiyan site was first conceived and discussed at the 10th Bamiyan Expert Working Group Meeting in December 2011 in Tokyo. Habiba Sarabi, the then governor of Bamiyan Province, Afghanistan, intended the significance of the construction of the Bamiyan Museum for the people of Bamiyan Province, where its people has no facility to learn their culture and preserve their cultural heritage and to enhance the ties between peoples. Omar Said Sultan, the Deputy Minister of Information and Culture of the Islamic Republic of Afghanistan at that time, added the importance for the peaceful unification of Afghanistan and the recovery of its wealthy national identity, through the activities to understand their culture in the Bamiyan Museum.

Inspired by their compelling endorsement, MWU has developed the principal concept of the

Bamiyan Museum, including consideration of building design and harmony with surrounding landscapes and facilities, as well as the results of preservation efforts during the past decade at the Bamiyan site by the UNESCO/Japanese Funds-in-Trust (FiT).

The followings are basic concepts:

First, the Bamiyan Museum will not only provide a place for people to gather, strengthen their bonds, develop respect for their culture, and strengthen their generous spirit, but also serve as a model for the capacity buildings of the future generation. Furthermore, it will act as a foundation for the promotion of peace throughout Afghanistan.

Second, in addition to showcasing the impressive history of the region as a World Heritage Site and the results of the international preservation work accomplished since 2003, the Bamiyan Museum should be a center that provides the people of Afghanistan with a deep understanding of current Islamic culture, protects their intangible heritage, and establishes tourism facilities and comprehensive facilities to enhance their life.

Third, the Bamiyan Museum should serve as a venue to disseminate the rich international aspects of the Bamiyan region to reflect its unique history as a center of eastern and western cultural exchange.

Lastly, the budget for the construction of the Bamiyan Museum should be arranged and financed through transparent, multiple international funds.

## 2. Design concept of the Bamiyan Museum & Culture Center

The Bamiyan Valley is located 2500 meters above sea level and is approximately 1000-m wide. It is surrounded by the 120-m-high Bamiyan Great Cliff on its north side and a 50-m-high plateau on its south side. The planned area for the Bamiyan Museum is located on this plateau. Many caves including the caves that formerly housed the West and East Giant Buddhas stand on the Bamiyan Great Cliff. There are local farms throughout the Bamiyan Valley with long stretches of potato fields. The Bamiyan River runs through the center of the valley. New local bazaars have appeared along the Bamiyan River and become busier each year. An old bazaar street also runs in front of the Bamiyan Great Cliff.

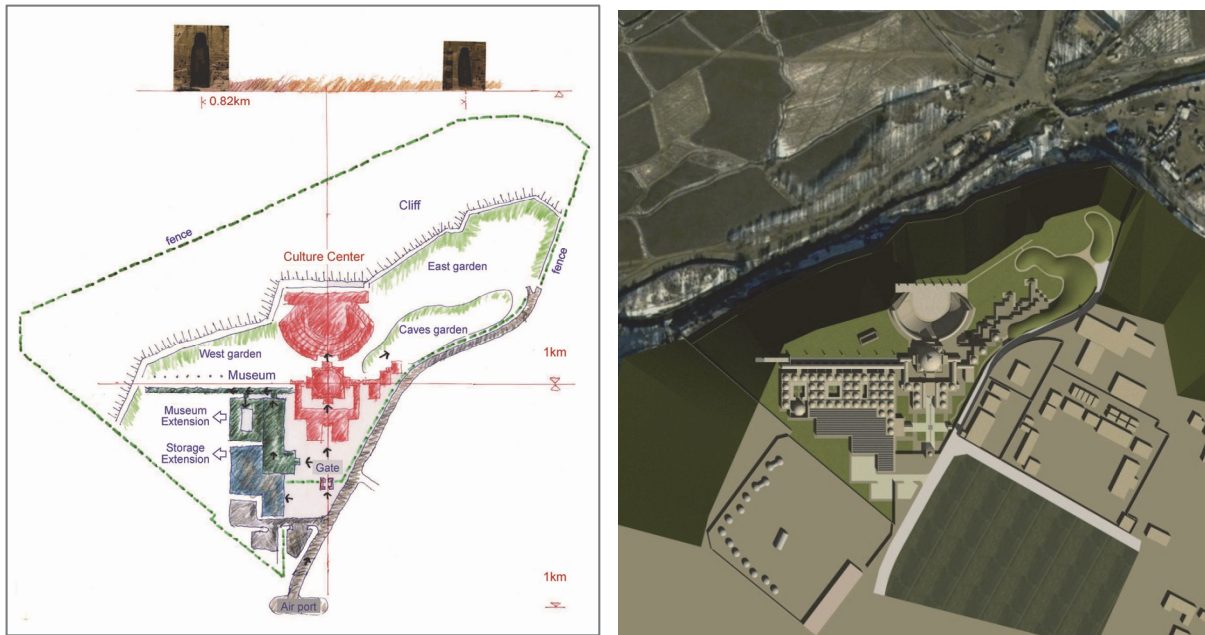
The Bamiyan Great Cliff is backed by the 4400-m-high *Kuh-i Sangichaspan* Mountains, and the 4800-m-high *Kuh-i Baba* Mountains with Mount Foladi, the highest peak at 5143 m, span the back side of the plateau. Both mountain ranges are covered with snow in the winter and snowmelt water from the mountains flows into the valley throughout the year. The plateau, with scarps of over 45 degrees, provides exceptional views of the Bamiyan Great Cliff spreading a distance of 1300 m, as well as the landscape of the Bamiyan Valley. The airport is located on the back side of the plateau. The planned area for the museum is located on the tip of the plateau only one km north of the airport.



Left: Satellite image of the planned site on the plateau (outlined in dotted line) [Image: National Research Institute for Cultural Properties, Tokyo]. To the north side of the planned area is the Bamiyan Valley. The north and west sides plunge steeply. The Bamiyan Education and Culture Center is located on the west side of the planned area. Right: Sketch of the planned site. The channels follow the palisade on the north side of the planned area.



The planned area stretches east to west and is divided into two parts at the 10-m uneven part at its center. The west side is 2550 m high, and 10 m higher than that of the east. An amphitheater which will utilize these level differences is planned for this uneven part. An assembly hall will be constructed that will provide views down upon the Bamiyan Great Cliff through the amphitheater. The entrance gate of the Bamiyan Museum will be located on the back side of the assembly hall. The axis line connecting the entrance gate, the assembly hall, and the amphitheater will intersect at a right angle to the cliff line centered between the West and East Giant Buddha niches.



Left: Diagram of the Bamiyan Museum and Culture Center. The main axis is parallel to the Bamiyan Great Cliff, as the symbol of peace. The culture center faces to the Bamiyan Great Cliff. The area should be enclosed for the safety. The dome and *Laternen-decke* ceiling are on the main rooms. Left: Roof plan.

The museum's long corridor will extend toward the west from the domed assembly hall and lie parallel to the cliffs. Visitors can thus enjoy the landscape of the Bamiyan Great Cliff while walking through the museum corridor. The east side of the planned area will be developed in accordance with the land's shape and a Cave Garden will be established. Caves that are inaccessible will be reconstructed here. Visitors will experience the vast space of the caves in the Cave Garden. A library, meeting rooms, and more will be arranged around the assembly hall. These will serve as a culture center.

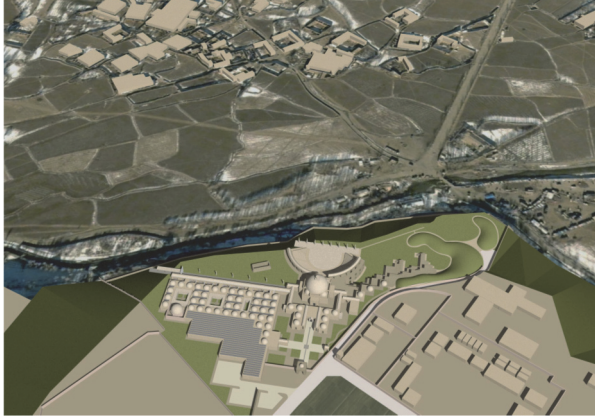
### 3. Overall Images

The plans call for an outdoor amphitheater, assembly hall, entrance piazza, and gate to be set on the central axis that intersects at right angles the line between the East and West Giant Buddhas. The museum and storage facilities are placed on the west side of the central axis and the reconstructed caves of the Cave Garden are on the east side.

Through the Bamiyan Museum & Culture Center's entrance gate, there is an assembly hall, that includes a library and meeting rooms at the front, and an outdoor amphitheater beyond the assembly hall. The museum is to the left of this entrance gate. Several exhibition rooms are arranged along the corridor extending from the west to the east. The main building will have dome-shaped roofs, and solar panels will be placed on the storage and laboratory sections south of the galleries.

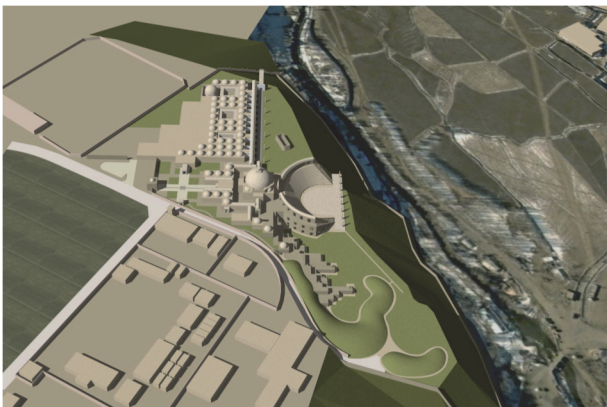
### 3-1 Image by CAD

#### (1) View from outside of the site



Left: Bird's-eye View from the South. Through the entrance gate, the outdoor amphitheater is seen over the assembly hall containing library and meeting rooms. On the left side is the museum with various exhibition spaces having dome-shape roofs along the east-west corridor. In front of these dome roofs, looking from the south, are the collections storages and research facility with the solar-paneled roofs. On the right side of the axis is the Cave Garden with reconstruction of caves.

Right: Bird's-eye View from the North. The outdoor amphitheater, assembly hall, entrance plaza, and gate lie on the central axis. The museum is located on the right side, with collection storages and a research facility fitted with roofs equipped with antireflective solar panels. The Cave Garden is situated on the left.



Bird's-eye views. Top-left: The view from the south. Top-right: The view from the south at the lowest point. The axis running through the gate, dome of the assembly hall, and outdoor amphitheater hits the cliff at right angles in the middle of the East and West Buddha niches on the Bamiyan Great Cliff. Below-left: The view from the east. Below-right: The view from the West.





Left: View of the outdoor amphitheater and the assembly hall from the tree-lined street on the Bamiyan Valley. The plateau rises 40 to 50 m above the Bamiyan Valley.



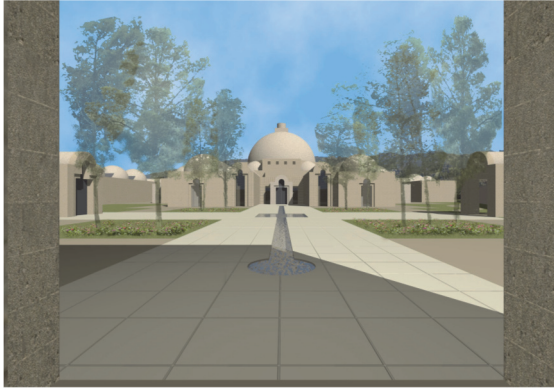
Frontal view of the outdoor amphitheater as seen from the bottom of the Bamiyan Valley. The outdoor amphitheater and the dome of the assembly hall rising at the center of the outdoor amphitheater appear as a symbol of peace.



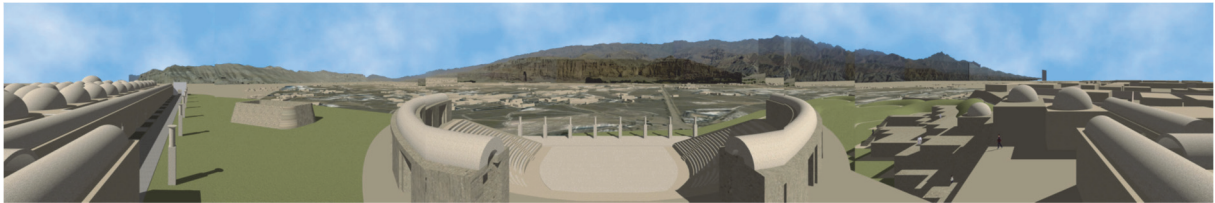
Night scene of the Bamiyan Museum. The lights of the outdoor amphitheater and the assembly hall symbolize peace during evening events. These lights are visible from many parts of the valley. At night, shining lights of peace blink over the outdoor amphitheater and assembly hall to signal the start of feasts. The scene is visible to the Bamiyan people from far and wide.

## (2) Design of Exterior

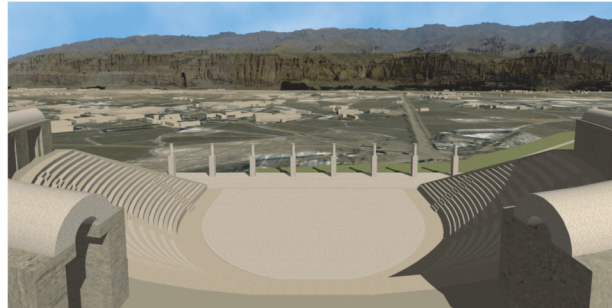
People gathering in the outdoor amphitheater will be rewarded with a glorious view of the Bamiyan Valley and Bamiyan Great Cliff. The caves, which cannot be accessed, will be restored in the Cave Garden on the Bamiyan Museum's east side. Exhibitions will be assembled along the corridor and Cave XI will be reconstructed in the courtyard of the museum section. The exhibition rooms and assembly hall will be adorned with the characteristic domes and *Laternen-decke* ceilings.



Left: View of the assembly hall from the entrance gate. Right: The stage and seats of the outdoor amphitheater and the assembly hall



Panoramic view from the assembly hall with the outdoor amphitheater in the center, the museum on the left, the Cave Garden on the right, and the Great Cliff on the far side.

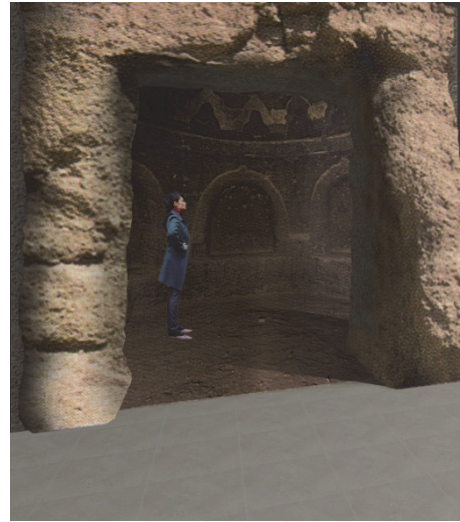


Left: Bird's-eye view the Bamiyan Valley and the Great Cliff from the outdoor amphitheater. Right: View of the outdoor amphitheater and the assembly hall from the cave garden. There are cave garden on the left.



Left: Pedestrian mall of the west garden to the left of the museum corridor. It is reminiscent of paradises. Right: Museum corridor: The left side is the pedestrian mall with the museum located on the right.





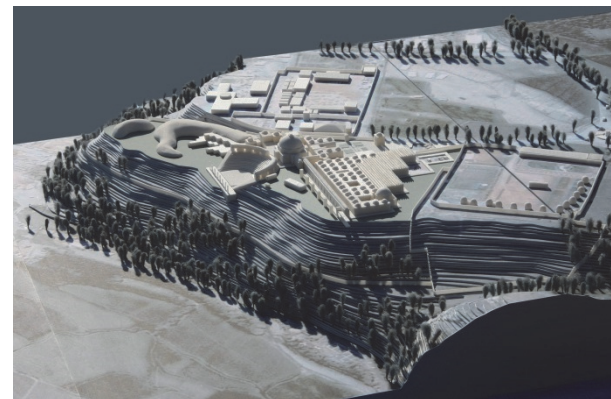
Left: Landscape of the courtyard. The Cave XI will be reconstructed in the courtyard. Right: Inside of the Cave XI. The inaccessible caves will be reconstructed. Visitors can feel the structure and carvings through the reconstruction.



Left: Museum exhibition room, with *Laternen-decke* ceiling, containing the Buddhism collections. Right: Inside view of the assembly hall. Squinch arches decorate the corners.

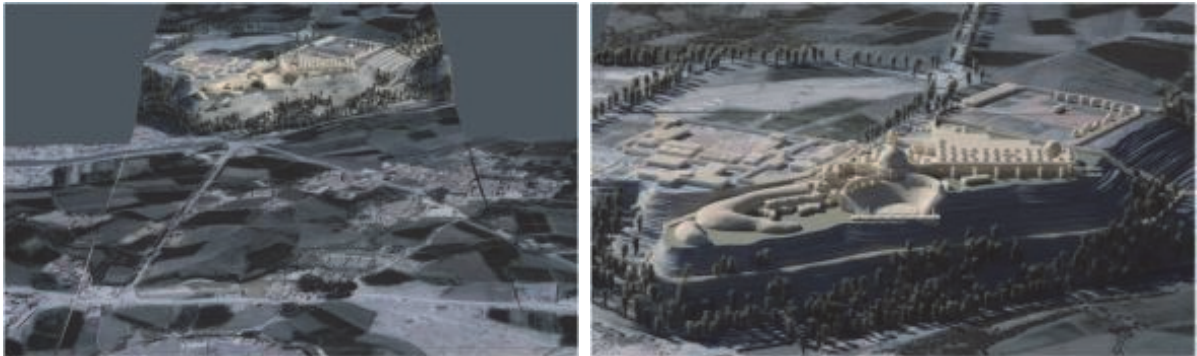
### 3-3 Architectural Model Images

The images and relationship among the Bamiyan Museum, the Bamiyan Valley and the Great Cliff can be understood by the architectural model, which is one-500th scale model of the Bamiyan Museum & Culture Center and its surrounding area (width:2m, depth:3m).

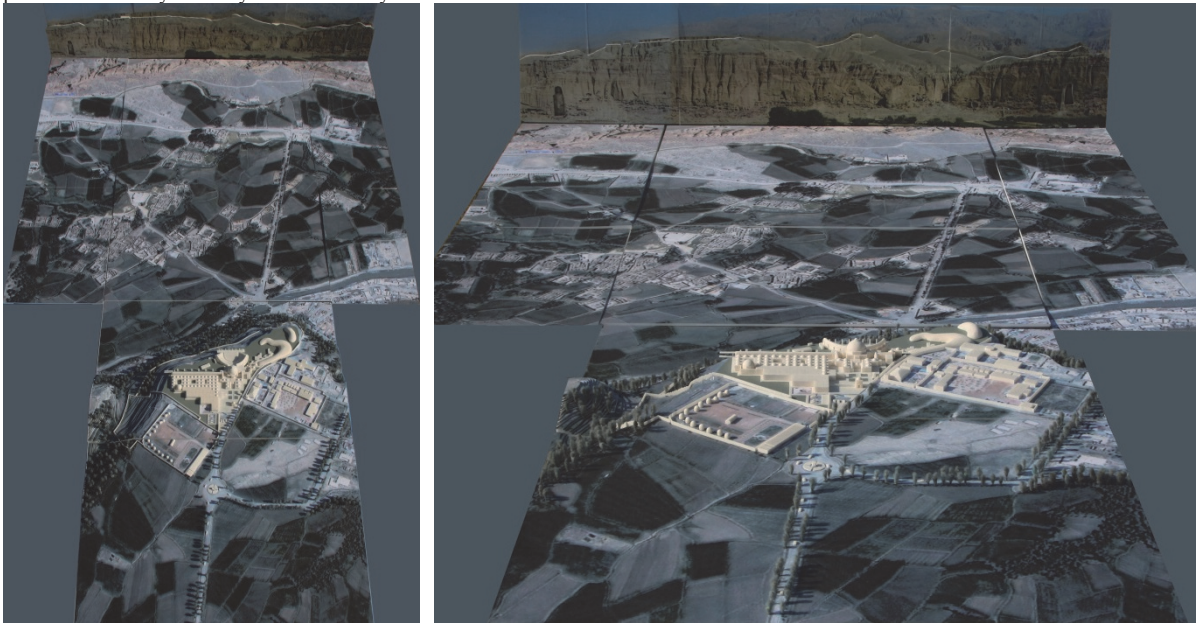


Left: Bird's-eye view of the proposed plan from the east. The cave garden, outdoor amphitheater, assembly hall are arranged from the front side. Right: Bird's-eye view of the proposed plan from the west.

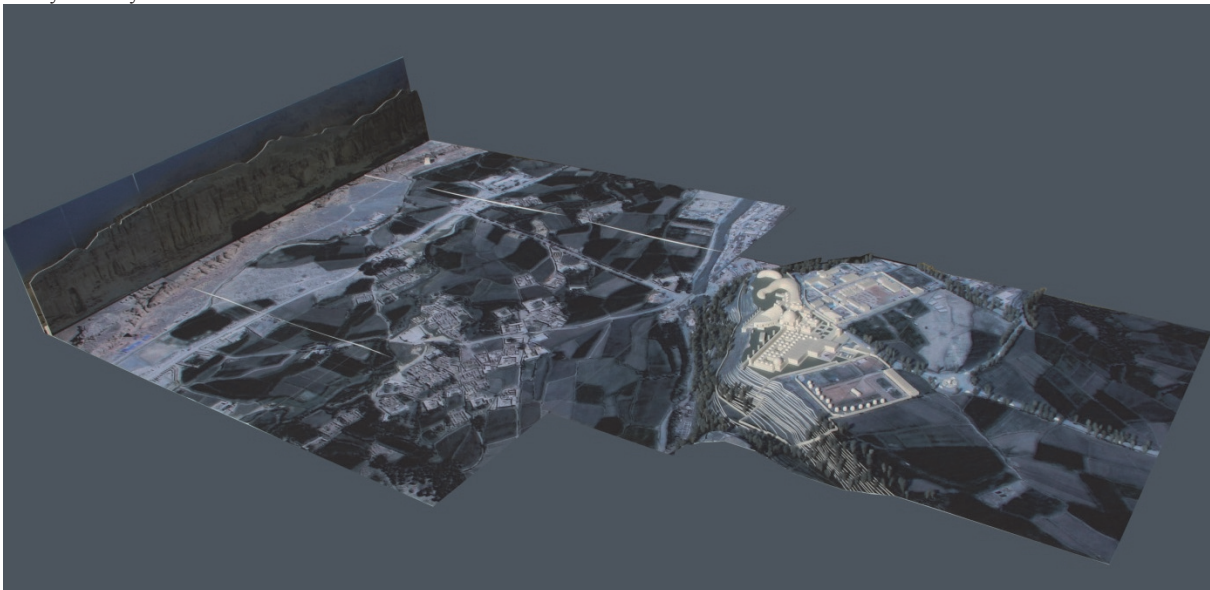




Left: Bird's-eye view of the proposed plan and the Bamiyan Valley from the Bamiyan Great Cliff. Right: Bird's-eye view of the proposed plan and the Bamiyan Valley from the Bamiyan Great Cliff.



Left: Bird's-eye view of the proposed plan, the Bamiyan Valley and the Great Cliff from the south. Right: View of the proposed plan, the Bamiyan Valley and the Great Cliff from the south.



Bird's-eye view of the proposed plan, the Bamiyan Valley and the Bamiyan Great Cliff from the west.

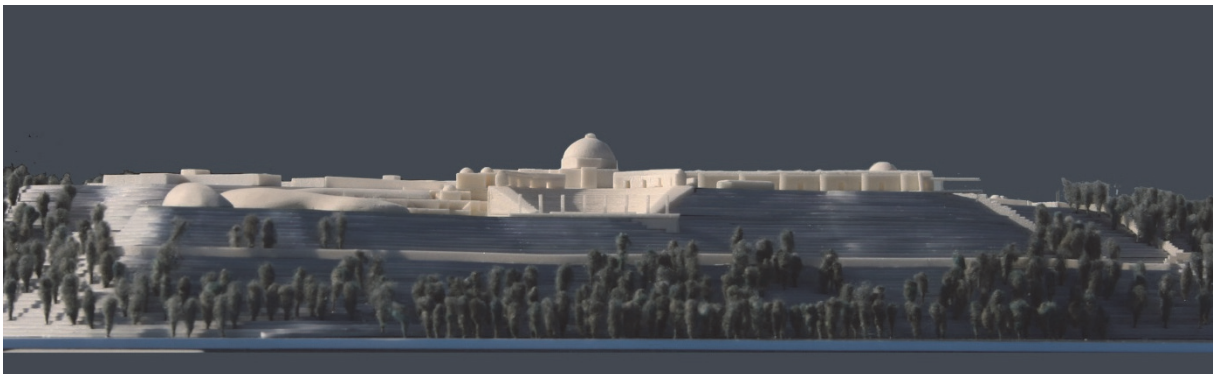




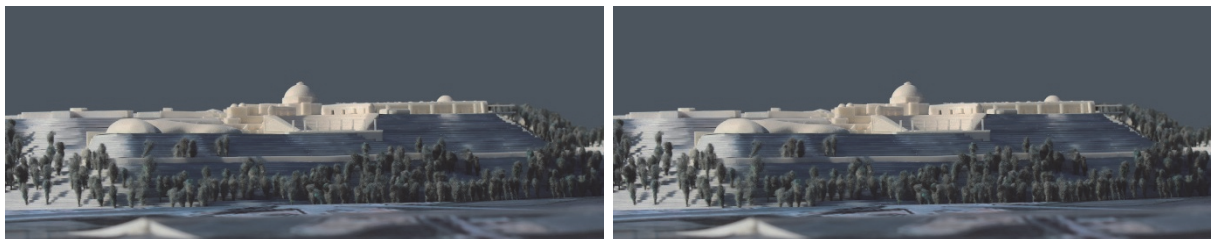
View of the proposed plan from above.



View of the proposed plan, the Bamiyan Valley and the Great Cliff from the south



View of the proposed plan from the valley plain



Views of the proposed plan from the East Giant Buddha's niche (Left) and the West Giant Buddha's niche (Right).



#### 4. Investigation of Existing Site

NRICPT conducted a land survey during their mission in Bamiyan in September 2013. The landscape, land surface configuration, plantings, water system, and more were investigated.



Sketch of the planned area and photograph points for investigation of the current site conditions conducted in September 2013. Panoramic photos of the numbered points were obtained.



Point 38, East side view of the planned area. The planned area is divided into east and west terraces. The incomplete building is on the east terrace. There is a difference in levels between the planned area and the location of the Bamiyan Education and Culture Center.



Left: Point 2, Approach to the site from the airport. The planned site is on the left of the road. The Great Cliff and the East Giant Buddha are seen on the center. Right: Point 16, View of the west terrace from the east side.





Left: Point 3, View of the Great Cliff with the East Giant Buddha from near the planned gate of the Bamiyan Museum. Right: Point 71, Buildings located on the east side of the west terrace.



Left: Point 70, South view of the west terrace. Right: Point 74, Retaining wall on the south boundary of the planned area. Retaining walls are made by adobes.



Point 42, View of the planned area from the rooftop of the Bamiyan Education and Culture Center located on the east side of the planned area. The uncompleted building is seen in the front ground.



Point 11, View of the Bamiyan Education and Culture Center from the rooftop of the uncompleted building which will be removed.





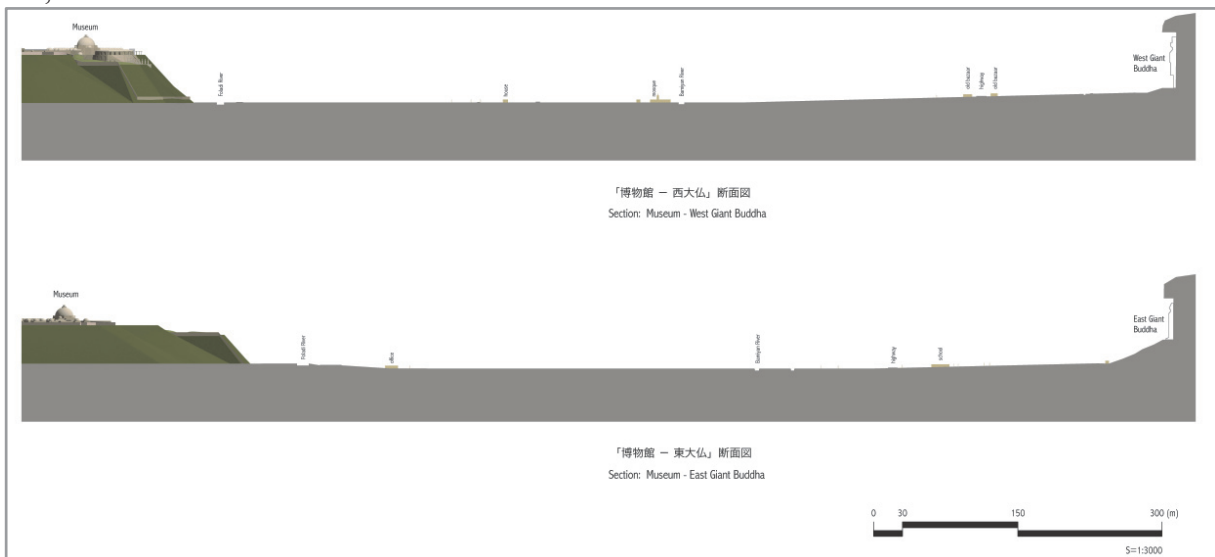
Point 11, South view from the rooftop of the uncompleted building.



Left: Point 21, Waterway along the slope on the north side of the planned area. Right: Point 37, Stream along with the slope on the north side of the planned area.

### 5. Cross Sections of the Bamiyan Valley

The distance from the planned area's terrace, seen on the left side of the figure, to the Bamiyan Great Cliff on the right side of the figure is about 1000 m. The terrace rises 40 - 50 m above the bottom of the Bamiyan Valley. The height of the Bamiyan Great Cliff at the area of the East and West Buddha niches is 100 - 120 m. The Bamiyan River flows through the center of the Bamiyan Valley. The bazaar runs along the river. The top figure is the cross section between the West Buddha and the site, and the bottom is between the East Buddha and the site.

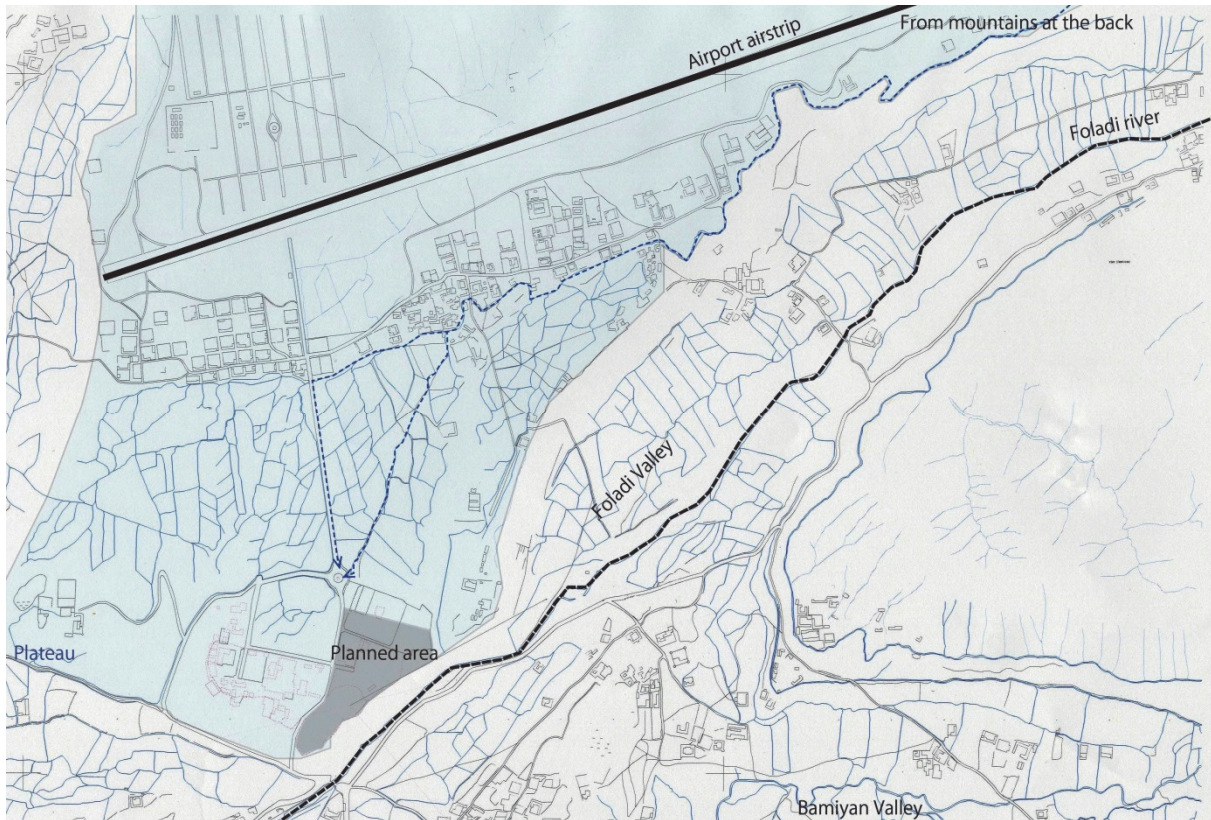


North-south cross section of the Bamiyan Valley. Top: The section between the West Giant Buddha niche and the Bamiyan Museum. Bottom: The section between the East Giant Buddha niche and the Bamiyan Museum.



## 6. Water System Surrounding of the Site

Snowmelt water flow from the south mountains at the back continues to the west side of the Bamiyan Airport airstrip, travels through the north side of the airport, and then flows to the east at the rotary. Currently, the water from the airport flows to the east of the rotary; therefore, several channels from the rotary to the planned area will be necessary. Plantings are placed along the waterway on the slopes on the west and north sides of the plateau.



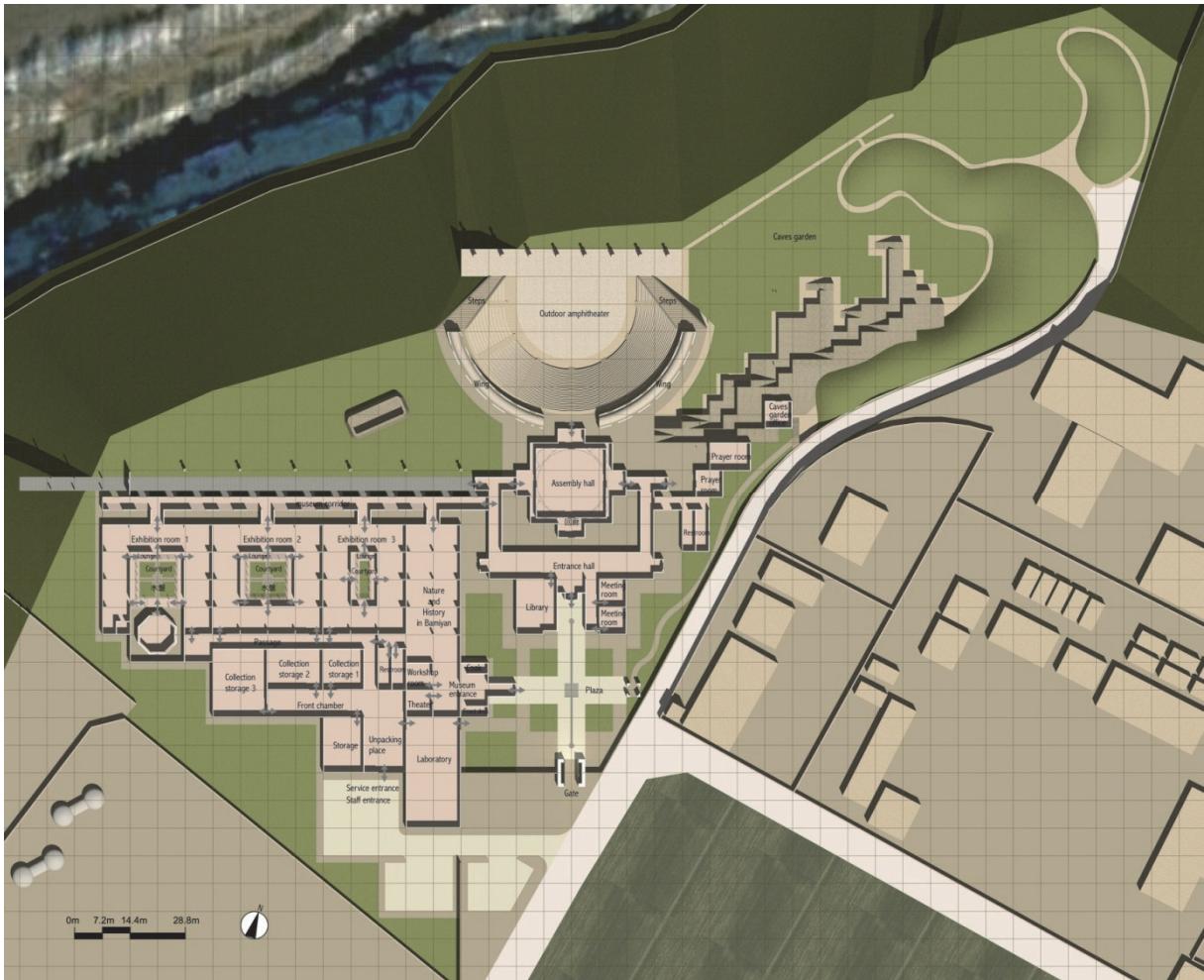
Water system surrounding of the site: Google Earth Image (This image is obtained from Google earth on 10 April 2013). The water goes along with the south side of the airstrip of the Bamiyan Airport



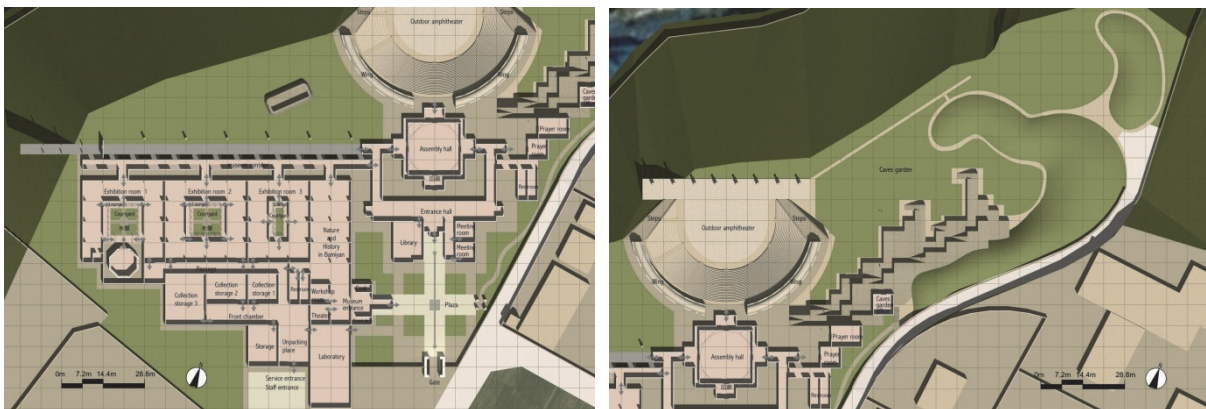
Waterway along the slope on the north side of the planned area (Left: waterway, Right: slope)



## 7. Design of the Bamiyan Museum 7-1 Plans

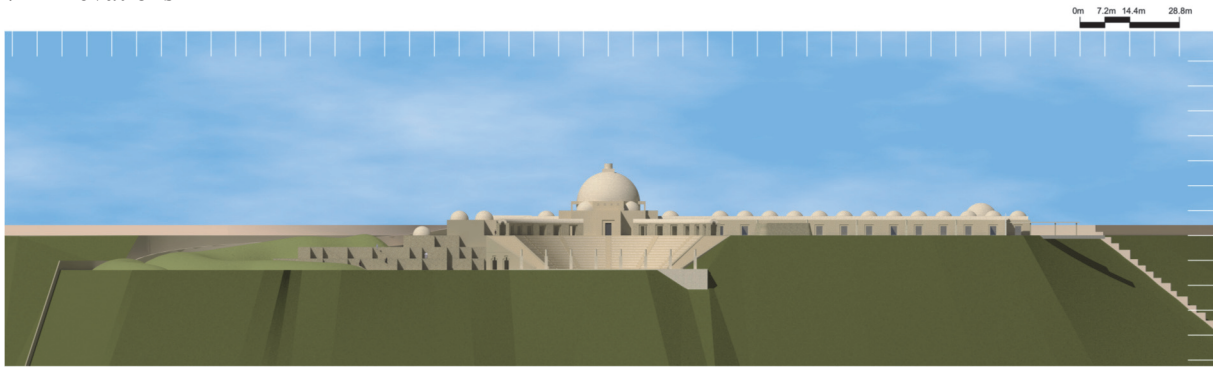


Overall plan. The gate, entrance plaza, entrance hall, assembly hall, and outdoor amphitheater are arranged in a straight line. The Cave Garden will be situated on the right side of the outdoor amphitheater. The museum and management office will be constructed on the left side.

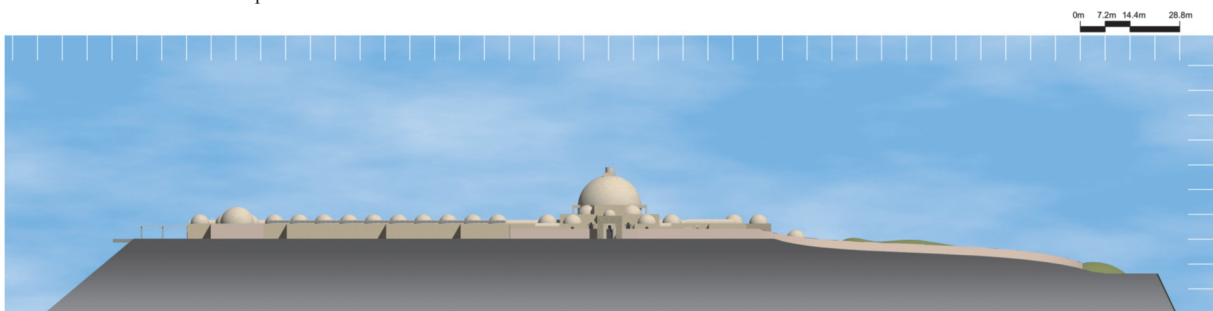


Left: This part of the museum is accessible from the entrance plaza and the entrance hall. There will be four exhibition rooms. The first exhibition hall is scheduled to showcase Bamiyan's nature and history. The north corridor of the museum will contain the exhibits. Workshop rooms and theaters are arranged behind the museum entrance. Backyard services, such as laboratories, collection storages, and storage facilities are arranged on the south side of the galleries. Right: The plan for the Cave Garden. The Bamiyan Cliff's inaccessible caves will be reconstructed in this garden.

## 7-2 Elevations

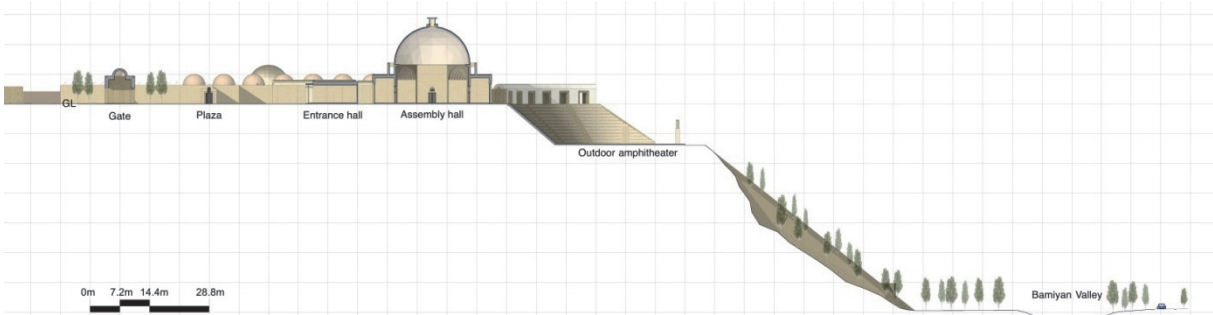


Elevation: North side. This part of the museum is to the right of the outdoor amphitheater with the Cave Garden on the left. There is a 10-m level difference between this part of the museum and the area of the Cave Garden.

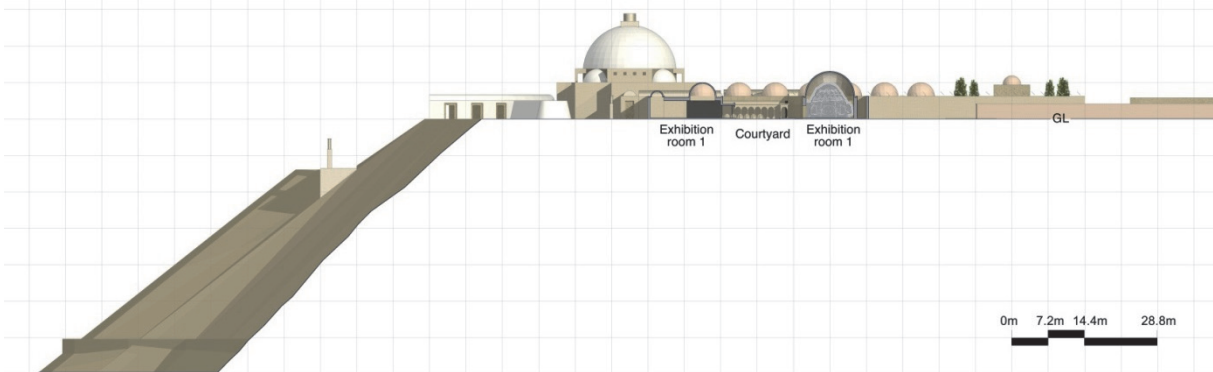


Elevation: South side. The dome-shaped roof of the assembly hall is seen in the center of this area. The domed rooftop of the museum is on the left side of the assembly hall.

## 7-3 Sections



Section: Axis between entrance gate, assembly hall, and outdoor amphitheater. The plantings are designed on the slope on the right side.

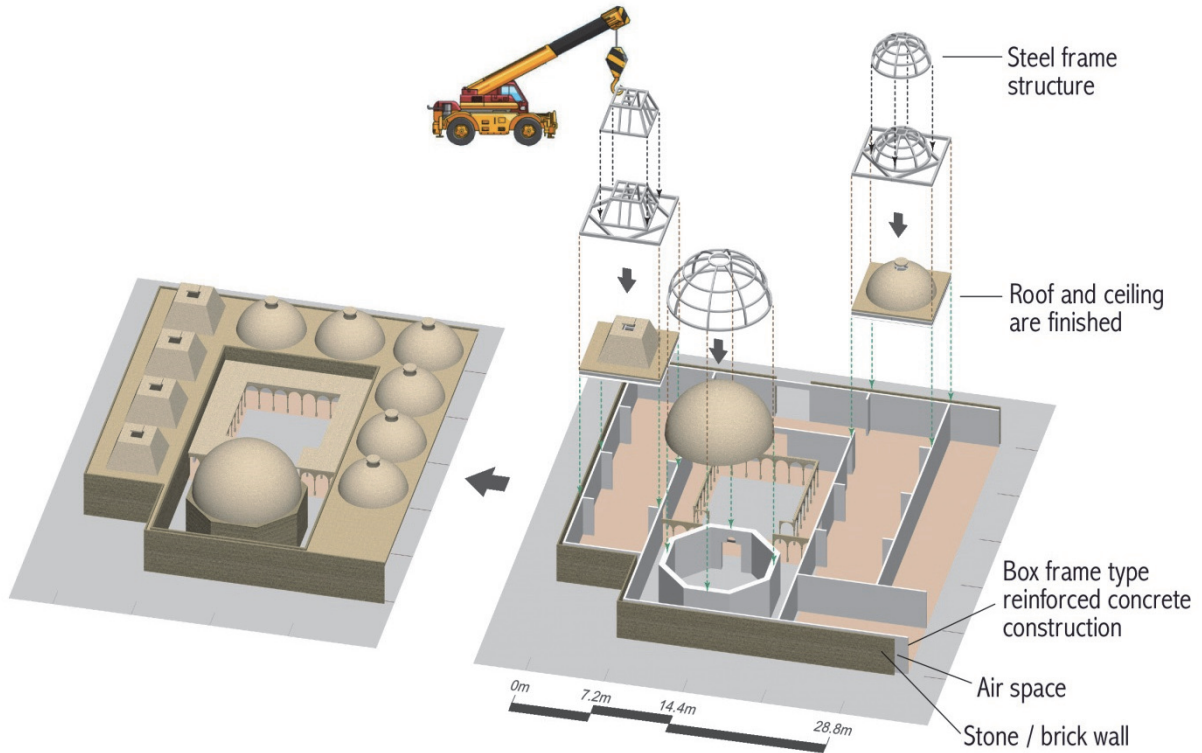


Section: Buddhism gallery including the reconstruction of the Cave XI, courtyard and museum corridor

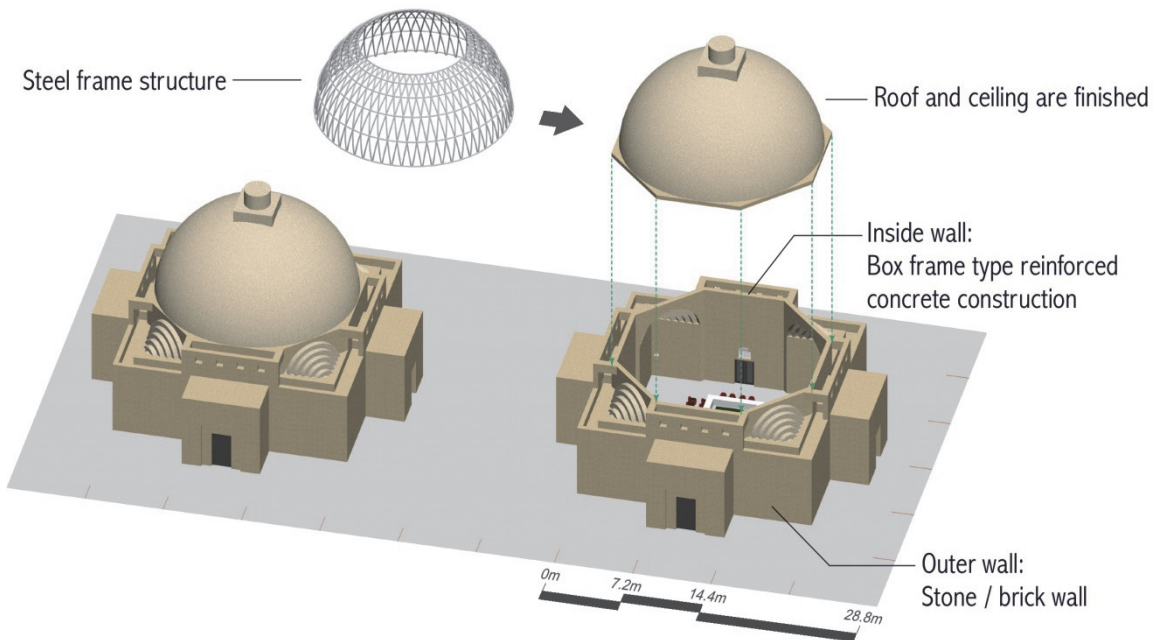


### 7-4 Structural Design

Box-frame-type reinforced concrete construction is used. The domed or *Laternen-decke* ceilings of the assembly hall and museum are constructed of steel. The interior steel frames of the roofs are preformed and placed on reinforced concrete walls. Local rocks are used for the exterior wall facing. Openings for top lights and ventilation are designed on the top of the domes as necessary.



Structural design and construction of the museum. The steel frame structures and interior ceiling and exterior roof are finished on the ground, lifted by crane, and placed on the reinforced concrete walls.



Structural design of the assembly hall. The steel frame structures and interior and exterior of the dome are performed on ground same as the other roofs, and placed on reinforced concrete walls.

## 7-5 Facility Design

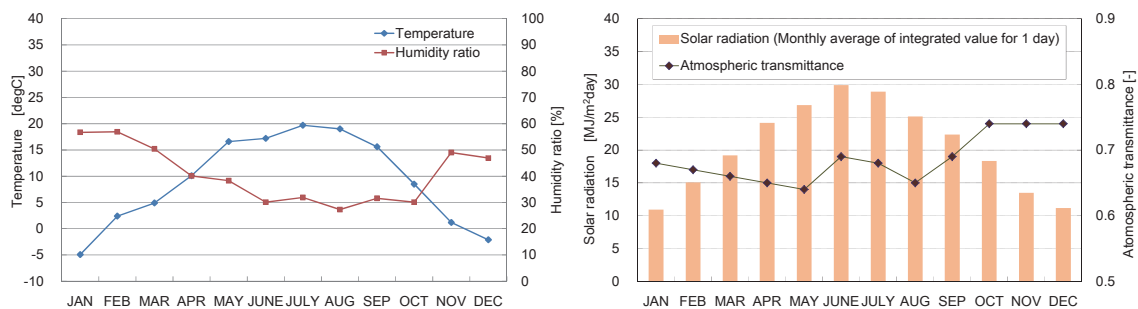
### (1) Concept for facility design

In recognition of the global warming and extreme weather caused by increasing CO<sub>2</sub> emission, as demonstrated by the 5th assessment report published by the IPCC\*<sup>1</sup> (Intergovernmental Panel on Climate Change), it is important to establish an environmentally conscious system and facilities.

\*1. IPCC (Intergovernmental Panel on Climate Change) was established by WMO (World Meteorological Organization) and UNEP (United Nations Environment Programme) in 1988 to provide comprehensive evaluation of climate change due to human activities and its impact on the environment, and to establish mitigating or adaptation strategies from a scientific, technical, and social point of view. According to the IPCC's 5th assessment, global warming is a true phenomenon that is caused by human activities. The IPCC recognized that ground and ocean temperatures are rising, and that global warming causes frequent unusual weather patterns and events, such as extreme rainfall and drought. The IPCC noted that the increase in ground temperature is commensurate with cumulative emissions of CO<sub>2</sub> and thus confirmed the impact of CO<sub>2</sub> emission on climate change.

### (2) Site Condition

The Bamiyan site is located at 2500 m. The climate is dry with little rainfall. The yearly average temperature is 8 deg C. The maximum summer temperature is 30 deg C and the minimum winter temperature is - 20 deg C. Thus, heating systems are necessary, but air conditioning is not. The atmospheric transmittance of solar radiation is high, with especially strong sunshine during the summer. This solar energy can be utilized. The wind direction is mainly from the SSN in the area planned for the construction of the Bamiyan Museum and the wind speed is constant at 2 m/s with blast. The wind direction and speed should be taken into account in the design of the natural ventilation system.



Left: Monthly average values of air temperature and relative humidity. Right: Daily average values of air temperature and relative humidity. Both figures are based on monitoring data from August 2005 to September 2006.

### (3) Infrastructure

Primary infrastructures, such as public electricity, water, sewerage systems, and gas, are not available. Therefore, the museum's infrastructure system should be self-sustained. It should be reliable and robust based on the local maintenance management system, which must be investigated and explored.

### (4) Electric system

**Electricity:** Generating systems are necessary because it is not available from a public electric supply. Thus, a private electric generator must be installed. In addition, in order to reduce electricity use, required maintenance, and costs, the capacity of the generator should be minimized.

**Lighting system:** An LED (light emitting diode) lighting system is recommended because of its long operating life and low energy consumption. The maximum electrical consumption for lighting is estimated at about 10 W/m<sup>2</sup>.

**Telecommunication system:** Telecommunication will consist of personal computers and control instruments. The maximum electrical consumption for telecommunication is 5 W/m<sup>2</sup>.

**Others:** Additional requirements will consist of ventilation fans and pumps for drainage and water supply, and induction heating (IH) cooking heaters. Maximum electrical consumption for these units is 5 W/m<sup>2</sup>. If a cooking system is necessary, heaters other than IH heaters should not be used because they have low energy efficiency and require a large capacity generator.

**Electricity capacity:** Required electricity is estimated at 20 W/m<sup>2</sup>. The planned area of the Bamiyan Museum is 8000 m<sup>2</sup> and has an estimated use of 160 kW of the electricity capacity. There will be two sets of 80-kW capacity generators or three sets of 50-60-kW capacity generators. Procurable oil at the site will be used as generator fuel. Renewable energy, such as photovoltaic, should be adopted. If wind power generation is considered, local sandstorms and dust should be evaluated.

Because the generator will be operating full time, it should be reliable and robust. Local procurement of maintenance and support must be investigated and considered. A cogeneration system\*<sup>2</sup>, which uses exhaust heat to supply hot water, should be investigated

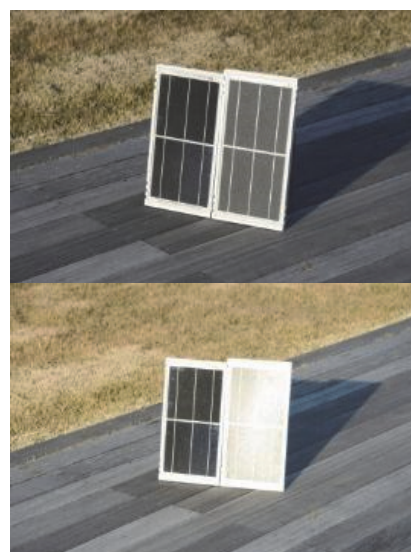
\*2. A cogeneration system is a comprehensive energy-efficient system that utilizes unused energy, such as exhaust heat from the electric generation of a hot water supply.

#### (5) Photovoltaic

The necessary energy supply should be covered by photovoltaic. The maximum system capacity is 90 kW. The area necessary for the solar panel is 1120 m<sup>2</sup> (= 160 kW x 7 m<sup>2</sup>/kW)\*<sup>3</sup> based on preliminary calculations. The angle of the solar panel and its construction should be determined with careful consideration of generating efficiency depending on the local climate, construction costs, and local maintenance and cleaning systems. Antireflective-type solar panels may be a better choice; however, any decrease in the generation efficiency should be examined. Generator power should be controlled depending on the output generation of the solar panel. A storage battery must be considered.

\*3. The solar panel generating efficiency in Japan is 7kW/m<sup>2</sup>. Because the solar radiation in Bamiyan is larger than that in Japan, it may prove to be more efficient.

**Lightning hazard system:** Lightning hazard system should be considered depending on the local condition.



Condition of reflecting solar light of the panels. Left is an antireflective type panel and right is a normal type panel. The top figure is the case of the panel reflecting solar light, and below one does non-reflecting.

#### (6) Air-conditioning system

A refrigerator air conditioning system is basically unnecessary. Air conditioners may be installed in rooms where there is a large amount of inside heat generation, such as a communications equipment room.

While a heating system is necessary. The heating systems will be oil-fired boilers and fan coil units or hot water radiators. Electric heaters are not appropriate because of the lack of electricity. Heaters might be installed in locations where humidification is needed during the winter months.

To reduce the energy used for cooling air conditioning, ventilation and, if possible, natural ventilation must be considered. Therefore, the insulation and thermal capacity of the buildings should be utilized. Natural ventilation must be designed after investigation of local wind direction and speed. Measures such as filters for fine sand due to dust storms should also be examined.

#### (7) Water and hot-water supply apparatus

Well water will be utilized. Based on investigation of the amount of water available, the capacity of the water receiving tank and other necessary systems will be determined.

Facilities that require water, such as toilets, lavatories, showers, and kitchens, should be constructed in close proximity. Water supply piping must be installed inside the building or buried at a frost penetration depth in order to avoid freezing.

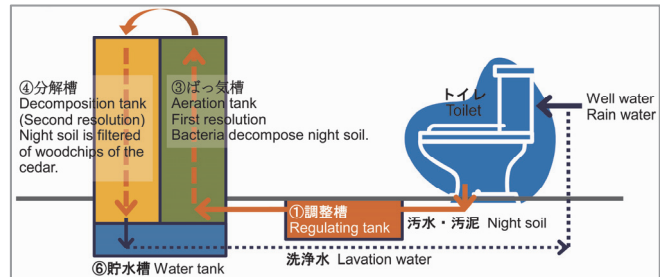
Hot water will be provided by an oil-fired boiler where necessary.



## (8) Drain facilities

Recycling systems for the drainage facilities and water supply are desirable. Sustainability and local maintenance for these systems should be considered. Basically, a water-purifier tank will have to be installed, and the treated water will be penetrated and sprinkled. If it is difficult to adopt this system because of local conditions, composting toilets\*4 or a natural penetration and evaporation system should be considered. Biotechnology restrooms using cedar woodchips have many merits, including high performance of the night-soil treatment plant, high environmental sustainability because sewage water and sludge is not diverted to the outside, and installation site flexibility.

\*4. A composting toilet is a dry toilet system using aerobic microorganisms which does not require water or uses less water. Excreta is decomposed and recycled as compost.



Composting toilet system. The composting toilets use well water and rainwater for drainage. The night soil is stored in a regulating tank and is decomposed by bacteria at the first resolution tank. The night soil is then filtered with wooden chips in the second resolution tank. Composting toilets have been installed at the top of Mt. Fuji, at a height of 3000 m.

## (9) Exhibition environment

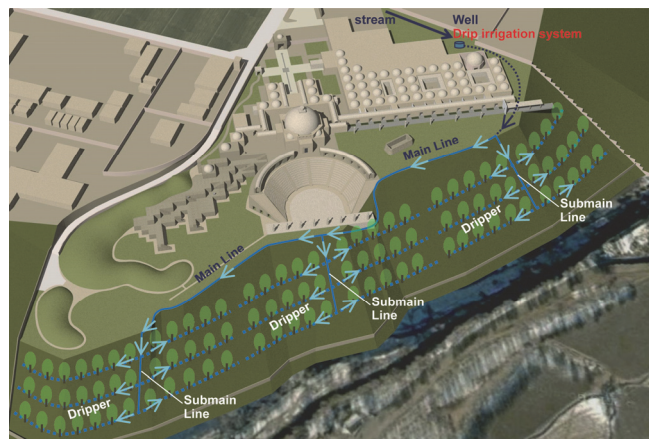
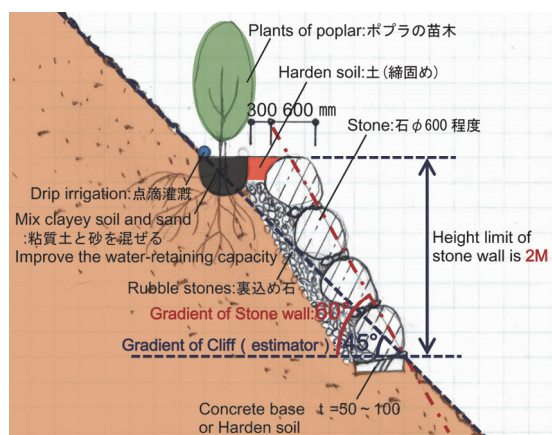
To create the appropriate environment for the exhibited objects, architectural measures, such as insulation, thermal capacity provided by thick walls, and natural lighting for the buildings should be studied and utilized where possible. Mechanical climate control, such as by air conditioning systems, would be ancillary.

The architectural design must also consider zoning depending on the different exhibition environments and need for humidity control the objects' materials. Where natural lighting is adopted, ultraviolet light and its potential effect on the objects must be taken into account.

## 8. Exterior Design

### 8-1 Protection of Slope and Planting Design

The local geological condition consists of stone mingling with a sandy silt layer. In order to consolidate the slope of the ground, 2-m-height stone walls limited less than 2 m with an angle of 60 degrees are constructed in the shape of stairs. For drainage, crushed stones are packed on the back side of the stone walls with 300-mm thick. Optionally, for planting seedlings, it will be necessary to mix clay soil and sand to improve the water-retaining capacity of the soil.

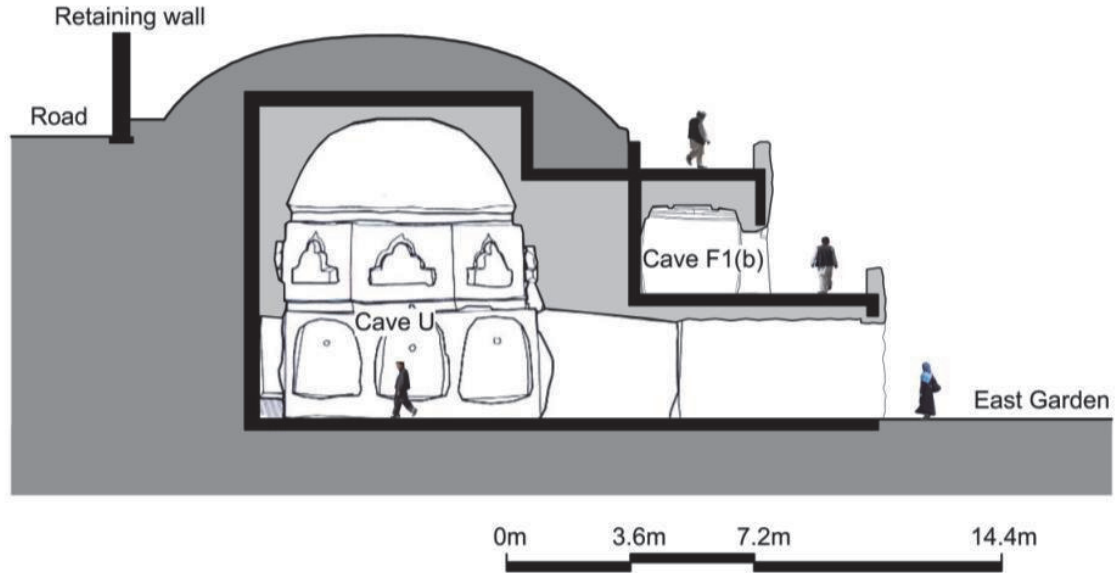


Left: Water channel and stone wall for planting on the north-side slope (Construction of the retaining wall). Right: Planting design and water supply system. A drip irrigation system is utilized. The main lines run beneath the planned area. A dripper is placed along the plant lines.



## 8-2 Cave Garden

The Cave Garden will be situated in the northern area of the Bamiyan museum. The existing caves, which are typical of Bamiyan and difficult to access, will be reconstructed in this garden. Several types of caves, such as Caves U, T, F(c), M, B(a), B(d), A lower (a), L, C(a), D, K3, J(d) and (g), O(a), and XV(b) in the Bamiyan Valley and Cave 4 in the Foladi Valley are recommended for reconstruction.



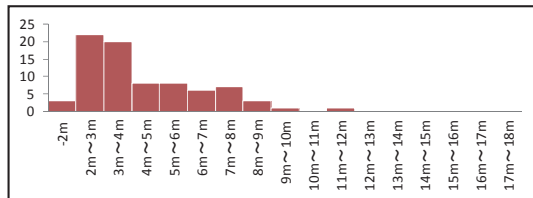
Section of reconstruction of caves.

### 8-2-1 Size of Caves in the Bamiyan

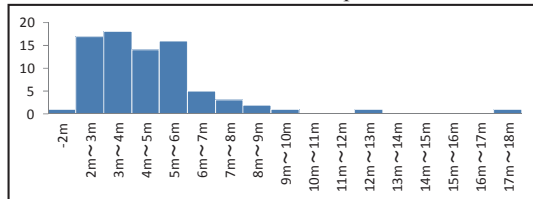
The sizes of the 79 caves were surveyed. Over half of the caves are from 2-4 m in width and 2-5 m in depth, and a third of the caves are between 2 and 3 m in height.

Caves	Width (m)	Depth(m)	Height(m)	Caves	Width (m)	Depth(m)	Height(m)
East VII(a)	3.6	3.6	4.7	S(d)	2.3	2.3	2.5
East VI(a)	2.5	2.5	2.3	S(a)	2.8	2.8	2.8
East IV(a)	7	7.5	5.7	S(f)	2.6	3.3	2.9
East III	3.7	3.7	3.8	S(g)	3.4	2.5	3
East II	3.5	3	3.3	E(c)	6.4	3	8
East II(a)	4	4.5	3.4	E(a)	3	3	3.3
U	7.4	7.4	8.6	E(f)	6.1	6	6
T	8.8	9.3	8.6	K3	2.8	5.2	2.6
V(c)	2.4	2.4	2.6	K(331)	2.6	5.6	2.6
V(d)	3.5	5.5	2.6	K(333)	2.6	3.5	2
G	6	6	6	J(a)	3.8	5.6	3.8
F(a)	7.7	7	6.5	J(b)	3.7	3.7	3.7
F(c)	3	3.1	2.8	J(c)	2.4	2.4	2.1
F1(a)	3.8	3.8	3.6	J(d)	2.4	2.4	2.1
F1(b)	3	3	2.6	J(e)	2	2.4	1.8
F3(f)	2.8	2.9	2.3	J(f)	2	2	1.7
F3(g)	3.4	3.4	2.9	J(g)	2.8	2.8	2.8
M	5.4	4.6	2.3	H(a)	11.7	4	13
118	6	6	4.8	H(b)	3	3.3	2.6
L	5.4	5.4	4.6	N(a)	2.5	2.5	2
A upper (a)	4.6	4.5	3.5	N(b)	3	3.4	1.8
A upper (c)	4.6	5	4.7	N(c)	2	3.5	2
124	3.6	3.6	3.4	N(d)	3	5	2
A lower(a)	5.1	5	5.4	N(f)	3.5	5.7	1.9
A lower(b)	3.2	3.2	3.8	N(h)	5.3	13	2.6
137	7.1	6.3	4.7	N(i)	2.5	4.8	2
B(a)	5.5	5.3	5.8	O(a)	3.8	3.3	2.8
B(d)	3.4	5	4.7	O(b)	4.7	7.5	2.7
B1(c)	7.5	5.9	5.5	I	7	3	5.3
35-I	4.6	4.9	4.2	Z1	3.9	4	4
35-II	4.8	5.4	4.3	Z(c)	4.2	4.4	4
35-III	4	3.6	3.8	XI	9.3	8.2	6.8
35-IV	6.8	4.2	4.6	53-V	6.6	6.5	6.6
C(a)	8	6.5	5	53-VII	6	5.6	6
C(b)	5	5.5	5	XV(b)	6.8	5.3	5.3
D	7.8	7	6.2	XIV(a)	8	17.8	7.4
D1	9	9	7.8	XIII(c)	5	5	4.6
S(a)	2.9	3	2.5	XIII 1(a)	3.5	4.8	2.4
S(b)	3.1	3.2	3.6	XIII 1(b)	3.6	5.5	2
S(c)	2.3	5	2.5				

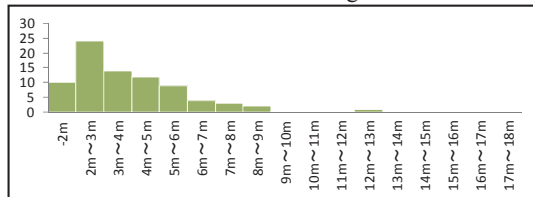
Distribution of width



Distribution of depth



Distribution of height



## 9. Exhibition Plan

The exhibition of the Bamiyan Museum is divided into following four categories; nature and history, life, Islam and Buddhism.

At the gallery of Nature and History of Bamiyan, nature and history of the Bamiyan are exhibited. The first room is for the introduction of the Bamiyan Museum, where the general information of the Bamiyan region will be introduced, and is connected the exhibitions of the other three categories. The visitors learn diversity of nature in the Bamiyan, and relation between people and nature such as climate with short summer and long winter there.

At the gallery of Life in Bamiyan, goods, such as clothes, carpets and kitchen tools, which show current life such as clothing, food and housing of the people in Bamiyan, and production tools such as farm implement, transportation tools such as house cart, tools for cultural activities such as music instruments will be exhibited will be exhibited.

At the Islamic gallery, Ceramics and metallic objects excavated from Shahr-i Gholghola and Shahr-i Zohak will be exhibited which show the Islamic culture in Bamiyan site. Buddhism has gone into a gradual decline from 8th and 9th century in Bamiyan, then Islam has been penetrated deeply to the people. After that, until when Bamiyan had been invaded by Mongol and damaged catastrophically, Bamiyan had prospered as the center of this district and Islam culture and arts had been flourished in the Ghaznaid dynasty, and following the Ghurid dynasty.

Buddhism was introduced to Bamiyan during the 2nd century, with Buddhist art and culture reaching its golden age between the 5th and 9th centuries. The East and West Giant Buddhas, the seated Buddha, and the hundreds of caves decorated with brilliant mural paintings were spread across the Bamiyan Great Cliff and the Bamiyan Valley. The reconstructed caves, mural paintings and decoration, replicas of the Giant Buddhas, manuscripts, and excavated results are exhibited. The details of the Buddhism collection are introduced.



Fragments of Islamic pottery assemblage collected by NRICPT. [NRICPT 2007: 66]

### 9-1 Exhibition design of the Buddhism collection in Bamiyan Museum

#### 9-1-1 Reconstruction of Caves

Cave N(a) has a square plan and *Laternen-decke* ceiling. The mural paintings remain on the ceiling and walls. This cave has high academic value because NRICPT investigated the materials and techniques used to create the mural paintings. Cave N(a) will be reconstructed at full scale and the ceilings will be built using the materials and painting techniques of that time. The ceiling will be completed by the Tokyo National University of Fine Arts and Music.

The Cave XI has an octagonal plan and a domed ceiling, which is typical of the Bamiyan caves. It has a niche and tambour that contained statues of Buddha. The molding is highly decorative with an arabesque design around the niche. The Cave XI will be reconstructed at full scale.

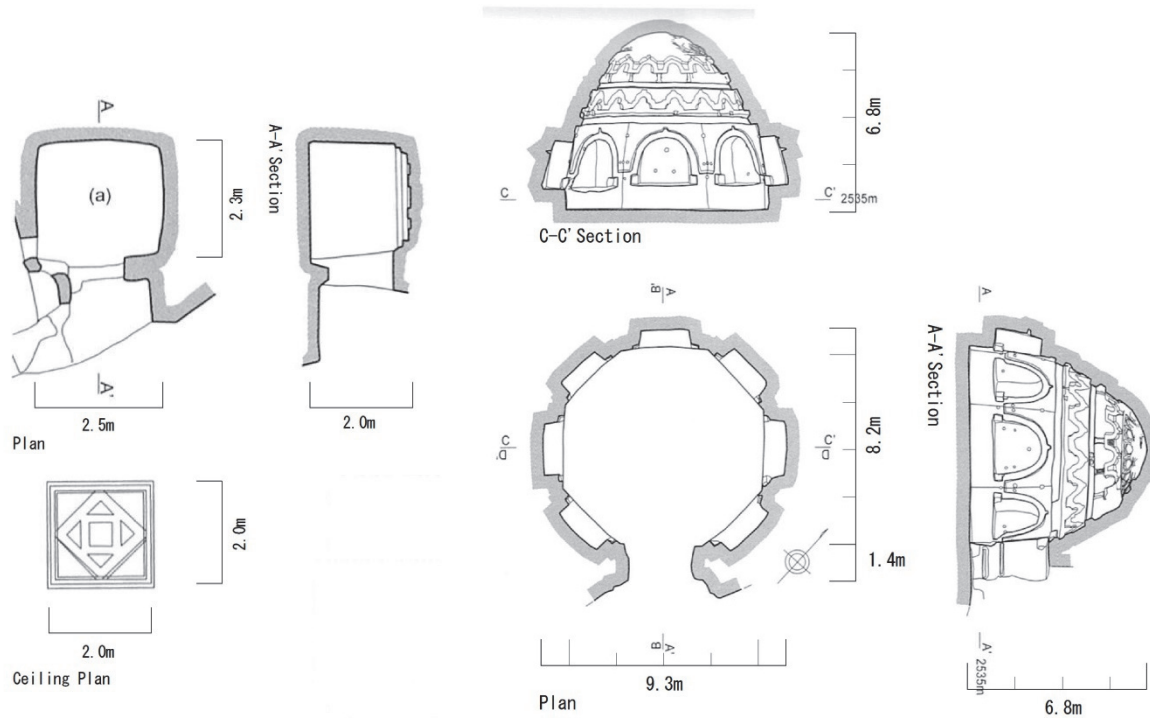


Left: Current condition of the ceiling of Cave N(a) [NRICPT 2013: 167]. Right: Reconstruction of the ceiling of Cave N(a) [Reconstruction and photograph: Yuki Watanuki]

### 9-1-2 Mural Paintings

The Bamiyan mural paintings were destroyed and looted during the civil war. Some of mural paintings looted during the civil war are safeguarded by the Japan Committee for the Protection of Displaced Cultural Properties as missing treasures in Japan. The NRICP collected fragments of these mural paintings as part of their mission.

The Kabul Museum has several collections related to Bamiyan. Some mural paintings and *stuccos* are possible exhibits.



Left: Plan, section, and ceiling of Cave N(a). Right: The plan and sections of the Cave XI. Right: The inside of the Cave XI [NRICPT 2013: 166, 178].



Top: left: Southern side of the inside Cave XI, middle: Northern side of the inside cave, right: ceiling. Bottom: left: Tambour, middle: three-dimensional designs at the tambour, right: hexagonal design at ceiling [NRICPT 2013: 178-179].





482 × 532 × 116

462 × 482 × 94

462 × 482 × 116

482 × 462 × 94

Left 4 figures are the displaced cultural properties [Photographs: Japan Committee for the Protection of Displaced Cultural Property]. Right figure is a fragment of mural painting corrected by NRICPT [NRICPT 2006].



Collections of Kabul Museum: Left: Medallion with two birds holding a string of pearls, Bamiyan Group D, Middle: Thousand Buddhas arranged in a circle, Kakrak, Right: Panel with a griffin, Bamiyan Cave V [Mizuno 1964: plates 8, 34, 183].

### 9-2-3 East and West Giant Buddha

ICOMOS (the International Council on Monuments and Sites) Germany investigated and collected fragments of the Giant Buddhas from the Buddha niches. They also found objects such as wooden pegs that provide information as to the Giant Buddhas' construction. Replicas of the East and West Giant Buddhas as they appeared before their destruction will be constructed. The East and West Giant Buddha replicas and artifacts involved in the creation of the Giant Buddhas will be exhibited and a description of their construction process provided.

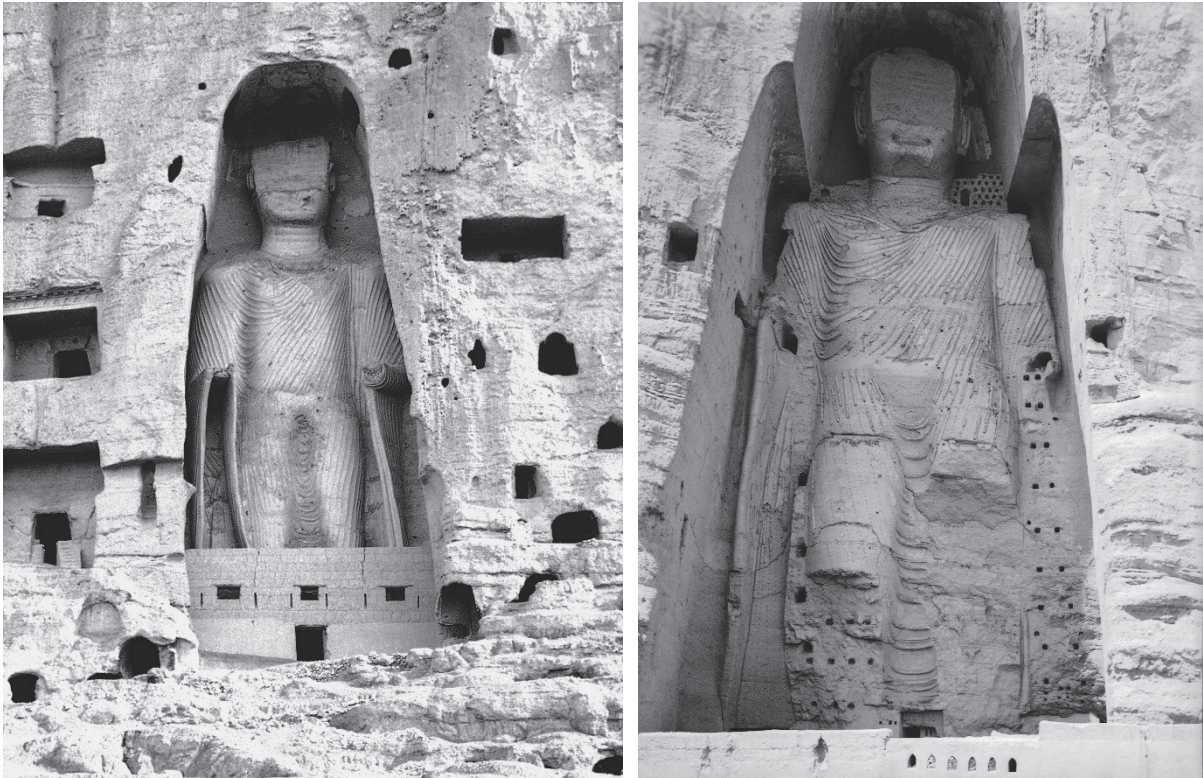
### 9-2-4 Excavated objects of *stupa site*

The collections excavated by Prof. Zemaryalai Tarzi will be exhibited in a dedicated space. Several Buddha clay heads, a seated Buddha, and other excavated objects will be displayed.



Left: A fragment of West Giant Buddha. This fragment is 2m wide, 2.3 m depth, and 1.8 m height. Middle: Pegs found from the West Giant Buddha. Right: Textiles collected from the West Giant Buddha. [Petzet 2009: 150, 205, 217]





East and West Giant Buddha at that time. Left is West Giant Buddha and right is East Giant Buddha [Photographs: National Research Institute for Cultural Properties, Tokyo]



Clay heads of a Buddha and seated Buddha excavated at Gazni [Ducoeur 2012: 134-136]. The size of the heads of Buddha is around 140mm wide and 210 mm height. The height of the seated Buddha is 680 mm.

Notes: This report has been revised to include additional information obtained from the report submitted at the end of the Bamiyan Museum Project in 2013 [S. Okazaki 2013].

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## References

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- Sigeyuki Okazaki et al. 2013: *Bamiyan Museum and Culture Center for People*, report for 12th Bamiyan Expert Working Group Meeting, Department of Architecture, Mukogawa Women's University.
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Appendix 1  
Floor area and accumulation



Museum	Entrance hall	778
	Workshop	52
	Theater	52
	Exhibition room 1	852
	Exhibition room 2	748
	Exhibition room 3	583
	Gallery	415
	Restroom	78
	Staff room, laboratory, library	416
	Unpacking place	233
	Passage	246
	Front chamber	181
	Collection storage 1	117
	Collection storage 2	156
	Collection storage 3	259
<b>Storage</b>	<b>156</b>	
<b>Subtotal</b>	<b>5,322</b>	
Culture Center	Entrance hall and corridor	656
	Assembly hall	570
	Library	152
	Meeting room 1	52
	Meeting room 2	52
	Prayer room	130
	Restroom	78
<b>Subtotal</b>	<b>1,690</b>	
Entrance gate	52	
Cave Garden office	52	
<b>Ground total</b>	<b>7,116</b>	

## Petra Museum Project 2013 in the Hashemite Kingdom of Jordan

### ヨルダン・ハシエミット王国の世界遺産ペトラ遺跡のための博物館計画 2013

Our project for the design of the Petra Museum aims to preserve, restore and exhibit the Petra World Heritage Site. Since the planned site for the museum is located close to the boundary of Petra, UNESCO asked us to assess the effect of the museum and its construction on the surrounding landscape. As a member of a research team that included archaeologists, Lecturer Hideaki Tembata, of Mukogawa Women's University's Department of Architecture, visited the site in September to survey the topography and vegetation, and to take pictures of the surrounding area. With this information, we created four designs that consider specific views of the areas that surround the site. We selected nine pictures taken at the important points in the landscape, such as mountain slopes that surround the museum and the road leading to the museum, and then, using computer graphics, created composite images that depict the proposed appearance of the museum for each of the four designs against the selected background pictures. We expressed our views on the issues raised by UNESCO's landscape assessment criteria and proposed including elements of Japanese landscape composition, preserving existing trees, matching the design with the stone ruins, and referencing a form that symbolizes Petra's culture.

昨年から取り組んでいるペトラ博物館の設計は、ヨルダン・ハシエミット王国(Hashemite Kingdom of Jordan)の世界遺産ペトラ遺跡の遺跡保存と修復、展示のためのものでした。博物館の敷地が世界遺産ペトラ遺跡の境界領域に立地することから、博物館の建設がもたらす景観への影響調査をユネスコから要求されました。本学建築学科教員の天島講師が、考古学者などからなる調査チームの一員として、9月に現地を訪問し、敷地周辺の地形や樹木などの測量、さらに現地の写真撮影などを行ってきました。これに基づいて特に博物館の敷地周辺の景観に配慮しながら、景観への影響を検討するため、4つの博物館案を設計しました。撮影した膨大な現地写真の中から、敷地を取り巻く山腹や博物館へのアプローチ道路などの、景観上重要な9か所の地点から、敷地を撮影した写真を選定しました。それぞれの写真の中に、4案のコンピューター・グラフィックスによる博物館の外観図を合成し、できあがった景観を提示しました。そして同時に特に以下の設計上の諸点についてコメントし、設計案の中に提示しました。すなわちユネスコが求める景観評価基準の基本的な考え方に関する問題点の提示、文化交流として日本的景観構成を適用すること、そして植栽の保全、石の遺跡に適応する展示方法、ペトラの文化を象徴する形態の引用などの新たな提案を行いました。

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Design 1: Hideaki Tembata, Junko Morimoto  
Design 2: Yuna Hongo, Hideaki Tembata, Toshitomo Suzuki, Keisuke Inomata  
Design 3: Aya Yamaguchi, Keisuke Inomata  
Design 4: Ayane Ise, Noritoshi Sugiura

**デザイン** 統括: 岡崎 甚幸  
案 1: 天島 秀秋、森本 順子  
案 2: 本郷 佑奈、天島 秀秋、鈴木 利友、猪股 圭佑  
案 3: 山口 彩、猪股 圭佑  
案 4: 伊勢 文音、杉浦 徳利



## 1) Conservation and creation of landscape

UNESCO's landscape assessment criterion is based on the premise that new building construction can damage the existing landscape. In other words, any constructions of artificial objects have a negative impact. The assessment tries to assign negative points according to how much landscape value is lost. However, no thought has been given to the possibility that creatively designed new construction can actually increase the value of the existing landscape. In fact, introducing a structure with an excellent exterior appearance can create a more distinguished landscape than the conventional landscape. We introduced the Togetsu-kyo Bridge in Arashiyama, Kyoto as an example. Without the accent of the Togetsu-kyo Bridge, the view where the river runs out of the mountains that surround the basin would be commonplace in Japan. However, because of the Togetsu-kyo Bridge, Arashiyama is one of the best scenic places in Kyoto.



Togetsu-kyo Bridge

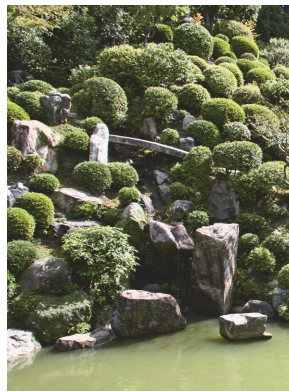
## 2) Introduction of Japanese landscape composition

### 2-1) Shiseki-senri

Common image is that incorporating materials from the natural environment in the museum would be pointless since the exhibits could never compete with the abundant actual landscape. China and Japan, however, have found a way of enjoying these natural qualities by introducing them as symbolically prepared miniatures in the daily living space, i.e., the idea of "Shiseki-senri." Bonsai (a miniature potted tree), Bonseki (a small-scale and and stone landscape on a tray), stone gardens where mountains or waterfalls are figuratively expressed by blocks of stone, and ink paintings that depict the scenic beauty of the vast world are examples of Shiseki-senri. We propose to introduce the essence of Japanese culture into the Petra Museum, which is to be built with financial assistance from Japan. In our designs for the museum, we provide examples of how the Japanese would enjoy Petra's surrounding natural beauty.



Daisen-in garden, Daitoku-ji (photo by Kazuhiko Yanagisawa)



Chishaku-in garden expressing Mt. Lu



Lofty Mt. Lu by Shen Zhou, 1467 (National Palace Museum)



## 2-2) Shakkei (borrowed scenery)

Various buildings have already been randomly built in the area planned for the museum's construction, such as a visitor center built by the United States Agency for International Development (USAID), private hotels, and stores. A hotel is situated on a rocky stretch that occupies some of ancient caves. Considering the extent of existing construction in this area, so close to the planned museum, the assessment of the effect on the landscape seems a little too late. However, the surrounding mountain range is beautiful, with overlapping rows of hills of huge rocks. In this regard, in our designs, we plan to build low walls on the museum's roof with a rooftop garden situated along the exterior walls. As a result, the hotels and other buildings around the premises will be hidden, and a view of the mountains as borrowed scenery can be enjoyed from the rooftop. Traditional Japanese landscape composition utilizes the backdrops, such as the view of Mt. Fuji or Higashi-yama. This is called "shakkei" (borrowed scenery). Introducing this traditional landscape composition in Petra will represent a meaningful cultural exchange between Jordan and Japan.



The beautiful surrounding mountain range with overlapping rows of hills of huge rocks



Shakkei (borrowed scenery) of Entsu-ji: Mt. Hiei view from Entsu-ji

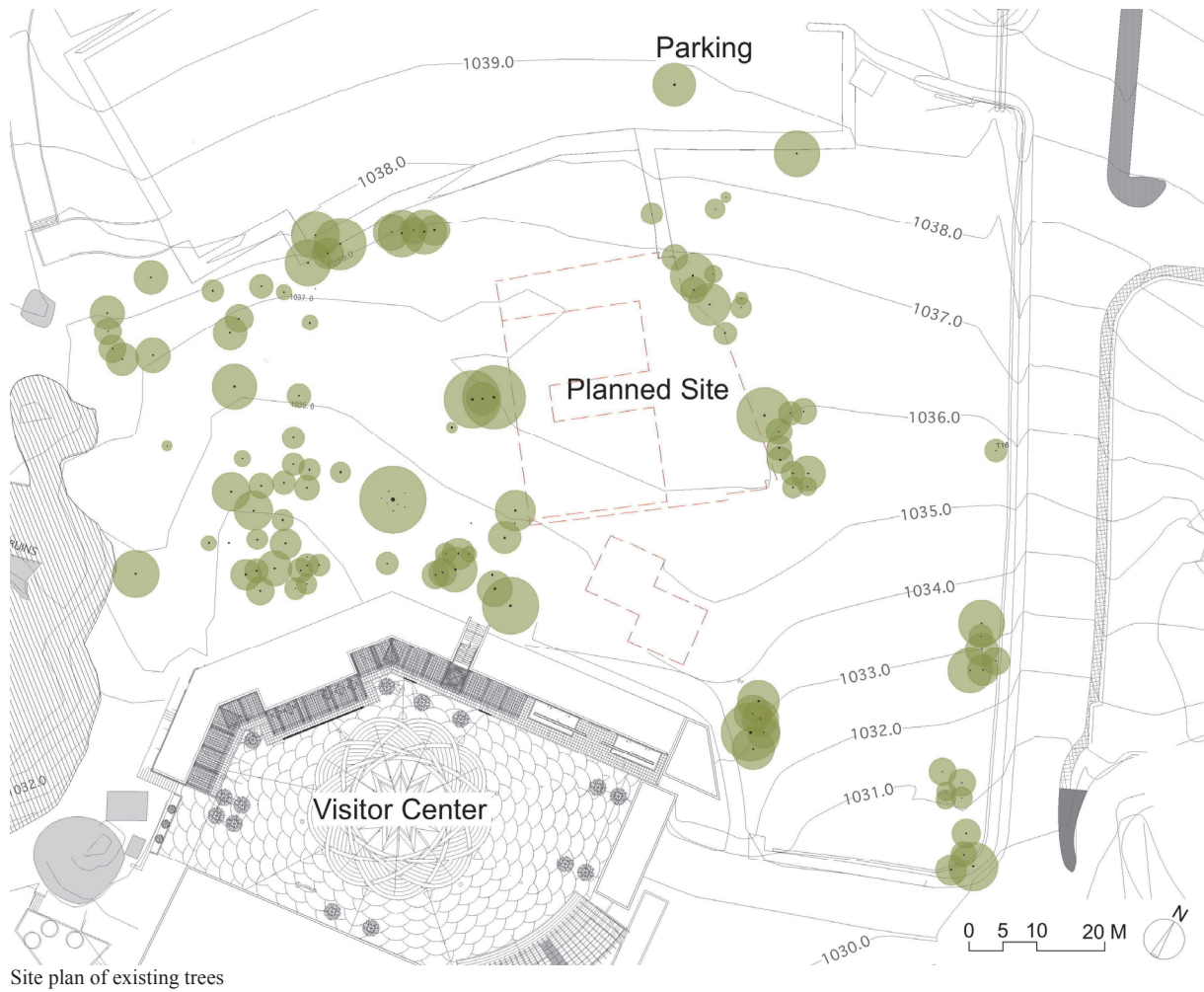


Design 3: Single-story building with standardized walls

The Petra Museum's rooftop garden, using the landscape of the surrounding mountains, with the courtyard reflecting an image of paradise.

### 3) Preservation of existing trees

Petra is a ruined nomadic city in a semi-arid area near the desert. Unlike Japan, which has an annual precipitation of over 1500 mm, Petra sees rain only during the winter, with an annual rainfall of only 200 mm. A river called *wadi* has running water only in the winter, yet there are clusters of pines and other 10 m high tall trees on the site and its surroundings that would normally be cut down during construction. Architectural designs to preserve positively these existing trees are critical.



Site plan of existing trees



Trees on the planned site



Trees on the west side of the planned site



#### 4) Exhibiting the ruins

The existing Petra Museum houses and conserves many conventional artifacts, including statues and chapters, many of which are currently on exhibit internationally, such as in Switzerland last year and presently in Leiden, Holland. A few are paper and leather items, but the majority are stone figures that should look magnificent when displayed in the sunlight. The current trend in museum design, however, is to install artwork in huge exhibition cases on the interior walls illuminated by artificial light. In our proposal, we designed the space to include a courtyard and galleria, as well as indoor spaces into which outside light can easily be provided when required.



Design 4: Single-story building with complex curved walls  
Exhibition room with irregular curved walls and sunlight

#### 5) Reference form symbolizing Petra's Culture

The area's mountains produce an undulation of enormous reddish-brown sandstone with tombs cut vertically into the cliff faces of the ravine. Features of these sites include engraved loopholes, decorations, crowsteps, obelisks, sequential columns, and a theater, and more, dating from the era of the Roman Empire. Making reference to these in the museum will make it possible to produce an environment that befits Petra.



Tomb with a crowstep (a staircase for the deceased that symbolizes the ancient Nabatean culture)



Tomb with stone pillar obelisks



Theater



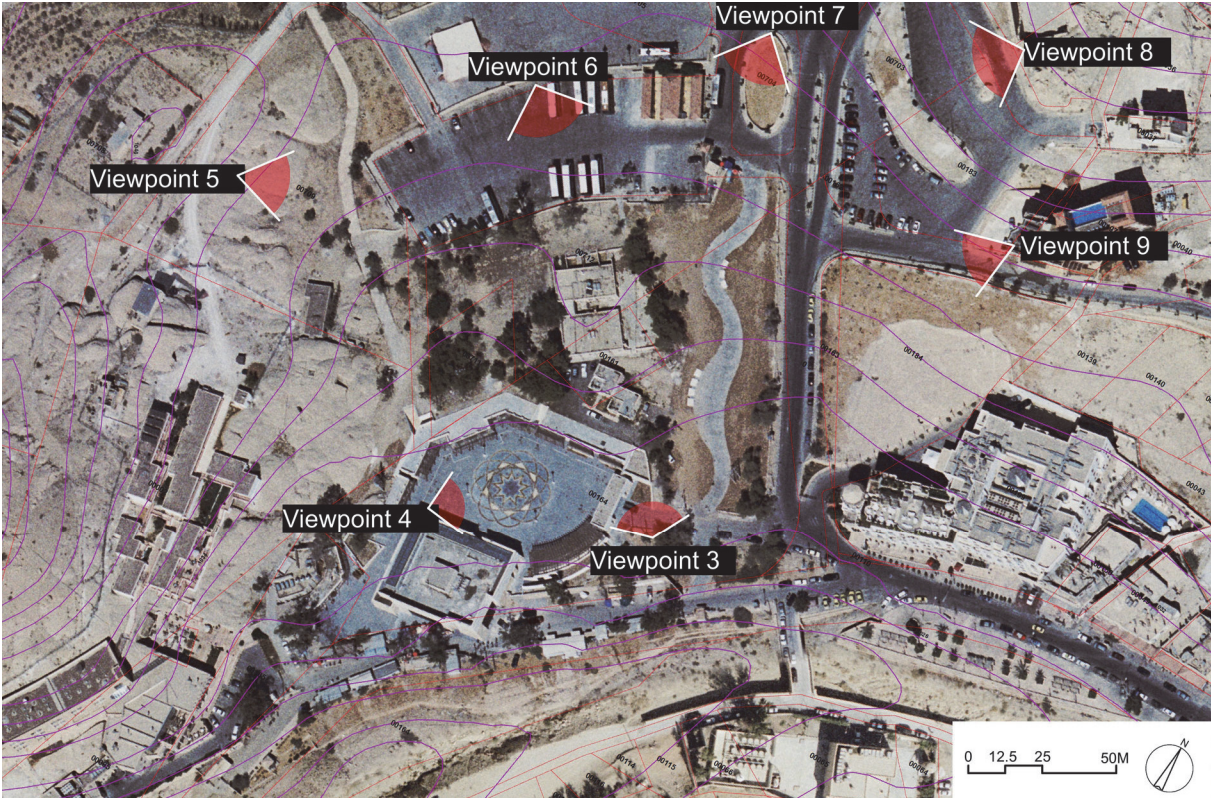
Temple with sequential columns



**Location map of viewpoints for landscape simulation**



Middle-range landscape (Image ©2013 Digital Globe, Map ©2013 Google, ORION-ME)



Close-range landscape



**Photographs of present condition from each viewpoint**



Viewpoint 1: From the roof of the PDTRA office



Viewpoint 2: From the entrance to the Al-Hussein Bin Talal University



Viewpoint 3: From the entrance to the Visitor Center's Plaza



Viewpoint 5: From the rocky stretch on the west side of the



Viewpoint 4: From the Visitor Center's plaza



Viewpoint 6: From the parking lot on the north side of the site



Viewpoint 7: From the rotary on the north side of the site



Viewpoint 8: From the parking lot on the east side of the site



Viewpoint 9: From the Petra Moon Hotel's roof on the east side of the site



### Comparison of four designs

		Design 1: Partly two-story building with walls referencing tomb elevations	Design 2: Partly two-story building with simple curved walls	Design 3: Single-story building with standardized walls	Design 4: Single-story building with complex curved walls
Outer Wall	Curved wall	N/A	Simple 2-D curved surfaces	N/A	Irregular curved surfaces Base of wall: Curved surface similar to tree roots
	Flat wall	Referencing tomb elevations	N/A	Standardized walls	N/A
Roof		Flat surfaces	Simple 3-D curved surfaces	Flat surfaces	Complex 3-D curved surfaces
No. of floors	Two-story building	2 <sup>nd</sup> floor exhibition rooms Same floor level	2 <sup>nd</sup> floor exhibition rooms Same floor level	N/A	N/A
	Single-story building	N/A	N/A	Exhibition rooms on different levels connected by sloping corridor	Exhibition rooms on different levels connected by sloping corridor
Court-yard	Views of forest on west side	N/A	Views from rooftop passage and exhibition room corridors	N/A	N/A
	Preservation of existing arbor	Courtyard	Courtyard	Courtyard	Courtyard
	Flower and water	Flowerbeds	Flowerbeds Cascade	Flowerbeds	Flowerbeds
Exhibition room		Rectangle	Curved surface exhibition rooms and ceilings	Rectangle	Curved surface exhibition rooms and ceilings
Rooftop garden		Same floor level Borrowed scenery Crowstep (Staircase for the deceased)	Same floor level Borrowed scenery Curved roof	Different floor level Borrowed scenery Crowstep (Staircase for the deceased)	Different floor level Borrowed scenery Curved roof

### **Design 1: Partly two-story building with walls referencing tomb elevations**

This design includes a courtyard that preserves existing trees and is distinguished by referencing an image of the tomb elevations on the outer walls. There is an entrance hall with an atrium on the first floor that leads up to the exhibition rooms on the second floor. All exhibition rooms will be located on the second floor. The northern extremity of the building is a single-story construction due to the sloping land.



Viewpoint 1: From the roof of the PDTRA office  
The color of the museum reflects the color of the local sandstone.



Viewpoint 3: From the entrance to the Visitor Center's plaza  
The color of the museum reflects the color of the local sandstone. Demonstrating the contrast between the geometric roof and the form symbolizing Petra's culture.





Viewpoint 4: From the Visitor Center's plaza



Viewpoint 9: From the Petra Moon Hotel's roof on the east side of the site  
The appearance is divided into small scale.

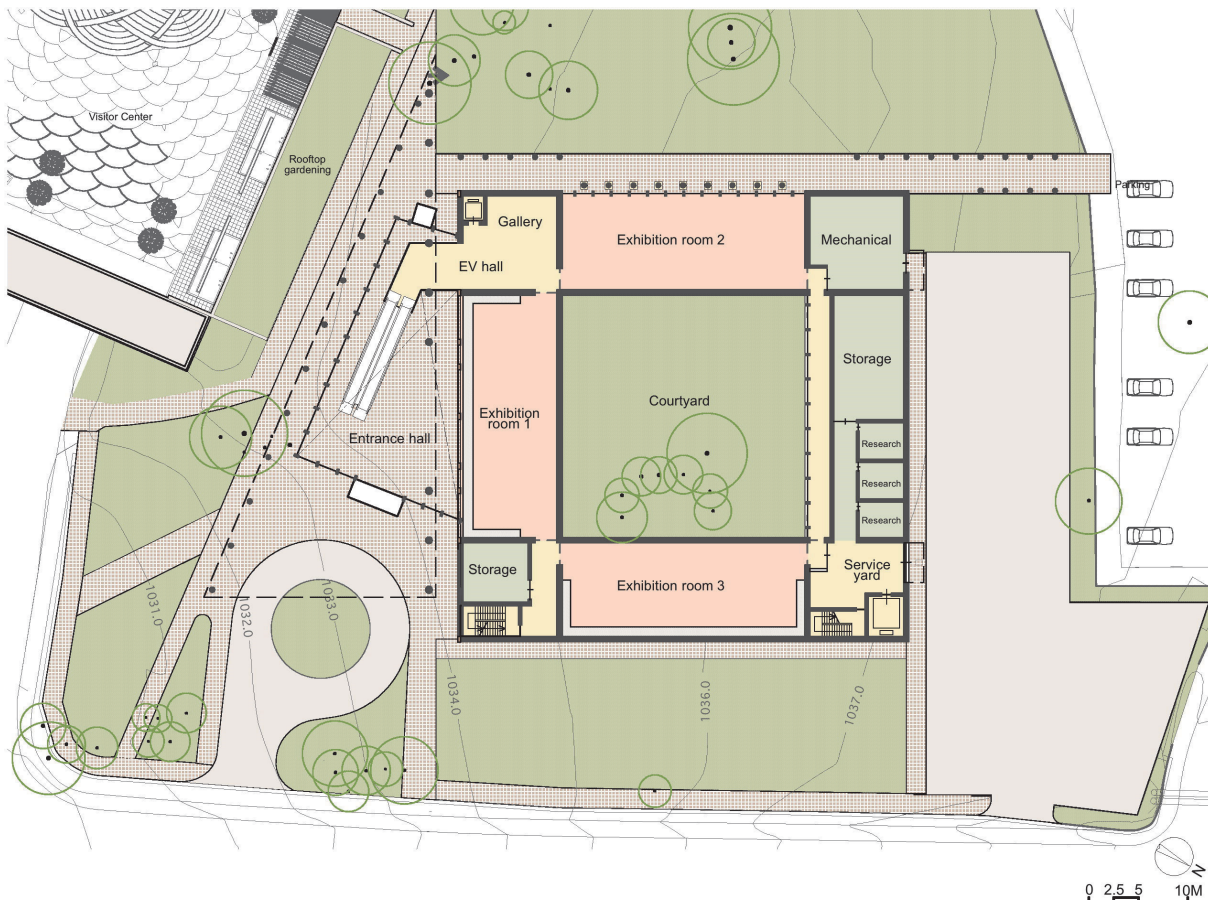


Viewpoint 5: From the rocky stretch on the west side of the site

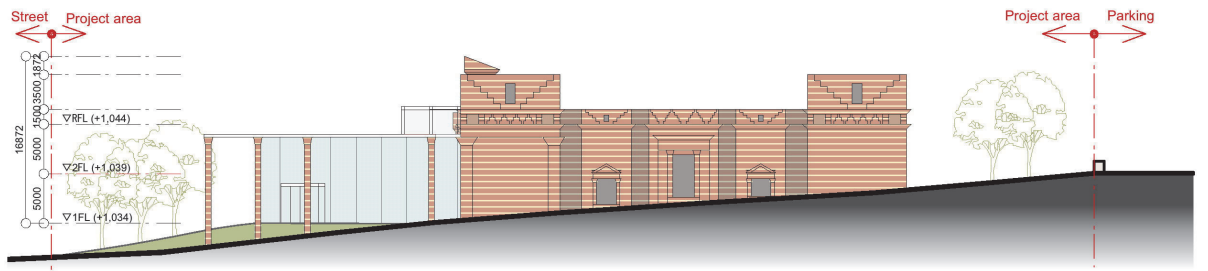


Entrance hall

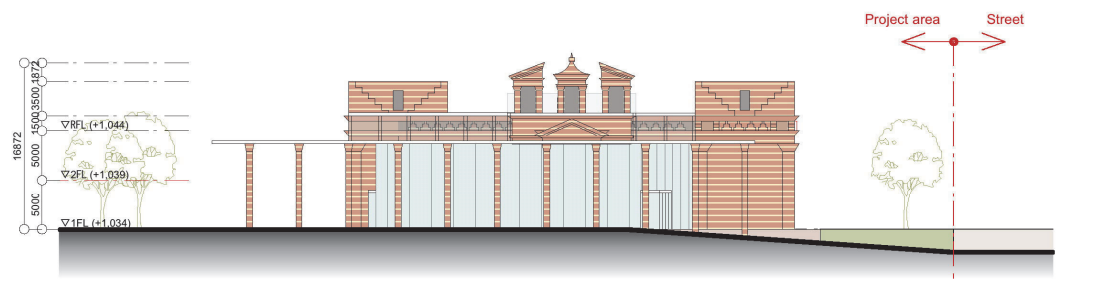




Second Floor Plan



East Elevation



South Elevation

## Design 2: Partly two-story building with simple curved walls

The entrance hall for Design 2 is located on the first floor and all exhibition rooms are located on the second floor, but, because of the sloping land, the northern extremity of the building is a single-story construction. The walls of the exhibition room use simple two-dimensional (2-D) curved surfaces, the roof uses simple 3-D curved surfaces, and natural light comes in from the top and sides so that the exhibits can be enjoyed by artificial and natural lighting simultaneously. Existing trees are preserved in a courtyard that includes a cascade. The forest on the west side of the site can be seen from the museum's exhibition room corridors and the rooftop garden passages.



Viewpoint 1: From the roof of the PDTRA office  
The simple curved wall harmonizes with the landscape of the sandstone mountains.



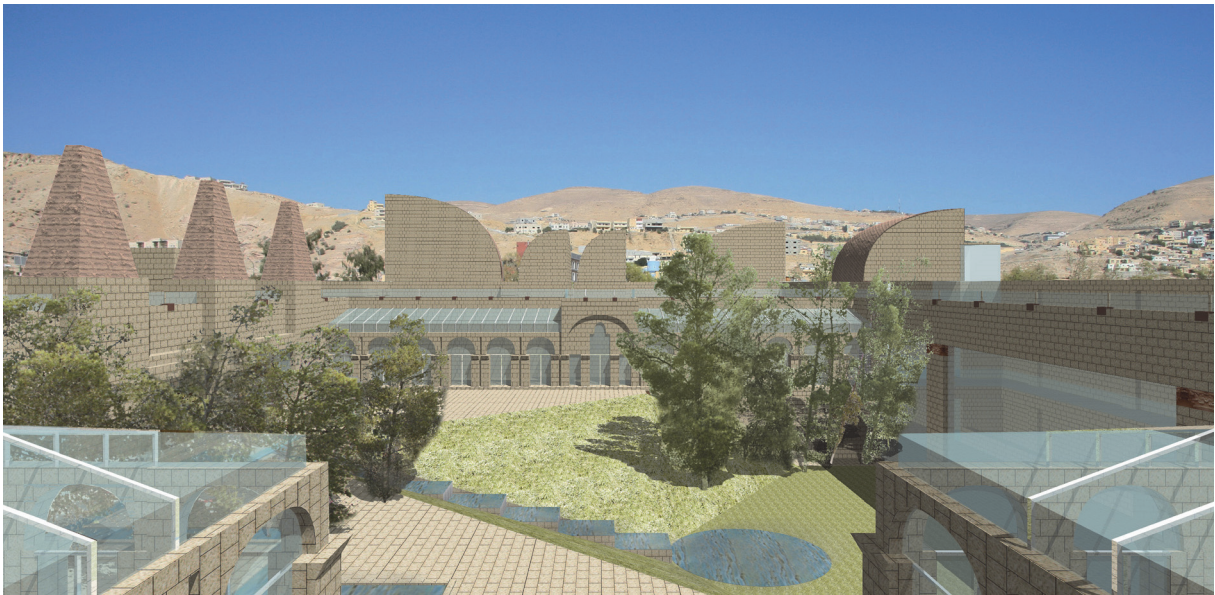
Viewpoint 3: From the entrance to the Visitor Center's Plaza





Viewpoint 7: From the rotary on the north side of the site

Many stands appeared in this area this year. While beneficial for an active market town, it is important to plan an appropriate location for these stands.



The courtyard with cascade and the rooftop garden, which uses the landscape of the surrounding mountains  
This courtyard preserves the existing trees.

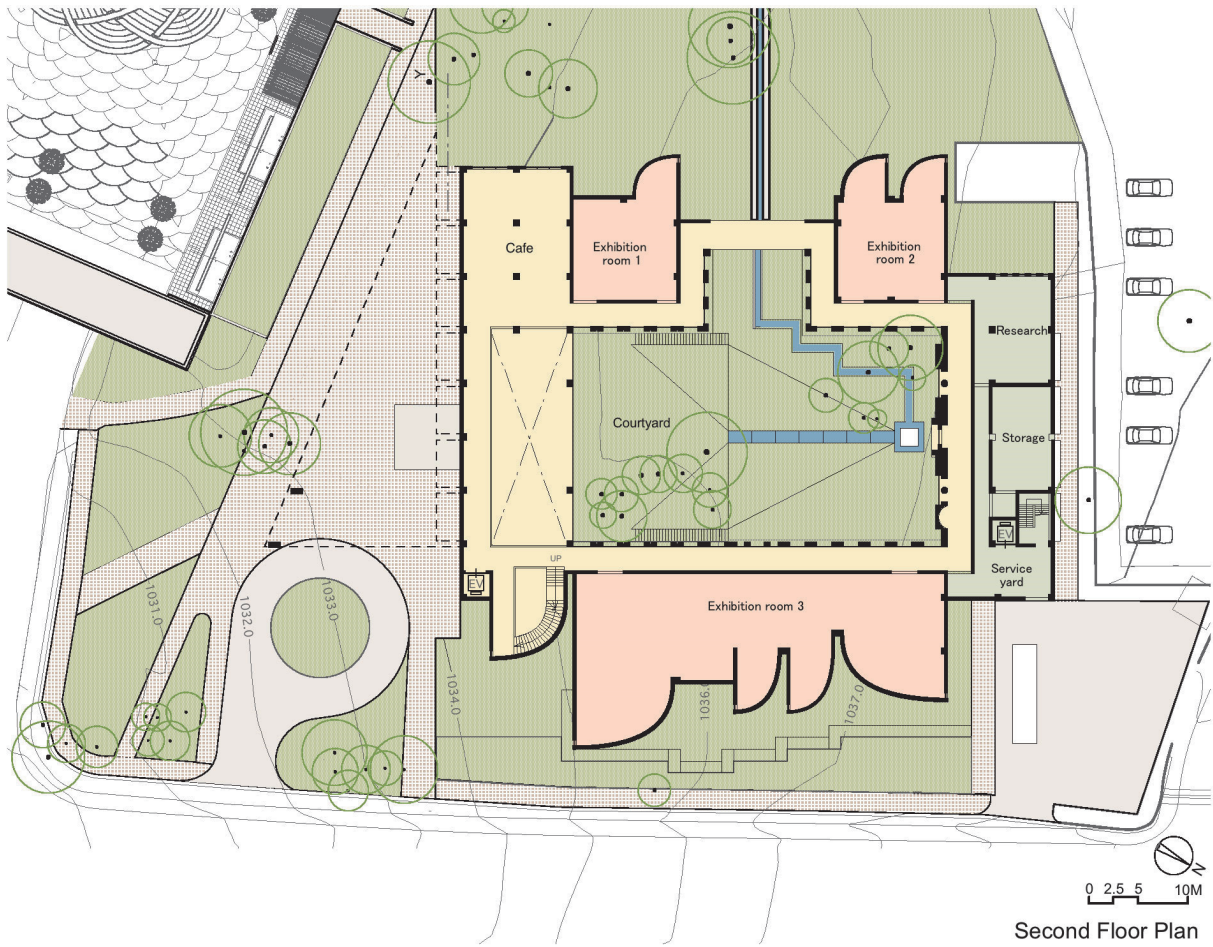


Entrance Hall

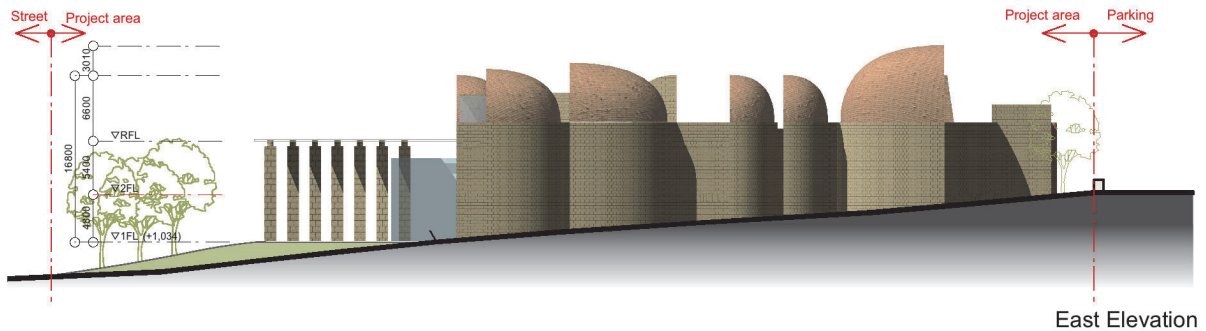


Exhibition room with simple curved walls and sunlight

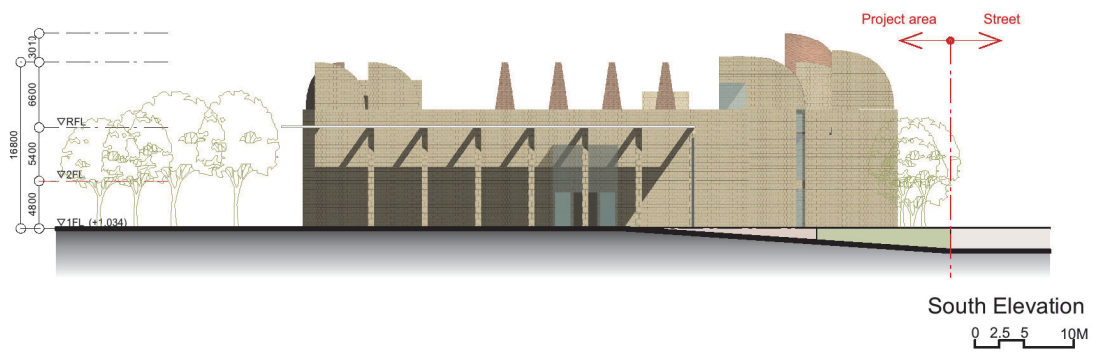




Second Floor Plan



East Elevation



South Elevation

### Design 3: Single-story building with standardized walls

In line with the present slope of the land, the floor levels of all exhibition rooms have been planned to gradually incline from the entrance towards the back of the interior. A sloped corridor on the courtyard side connects each exhibition room. Some of the partition walls between adjacent exhibition rooms will be operational and staircases will connect the exhibition rooms. Flat walls are unitized and loophole decorations (multiple crowsteps) adorn the top parts, forming rooftop breast walls. In addition, the rooftop symbolizes the ancient Nabataean culture: the rooftop garden will be accessed by a crowstep that connects various levels of the rooftop alcove. The surrounding mountains will be used as borrowed scenery.



Viewpoint 1: From the roof of the PDTRA office  
Visitors can walk on the roof.



Viewpoint 3: From the entrance to the Visitor Center's Plaza





Viewpoint 8: From the parking lot on the east side of the site



Viewpoint 6: From the parking lot on the north side of the site



The rooftop garden will be accessed by a crowstep (a staircase for the deceased, which symbolizes the ancient Nabatean culture) that connects various levels of the rooftop alcove.

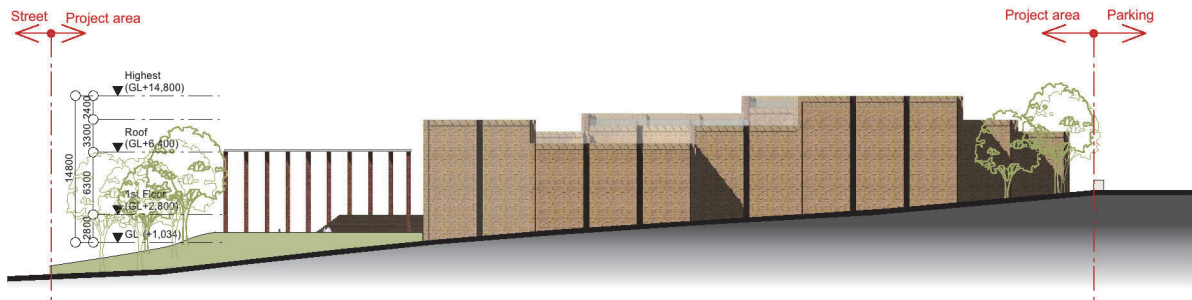


Sloped corridor surrounding the courtyard

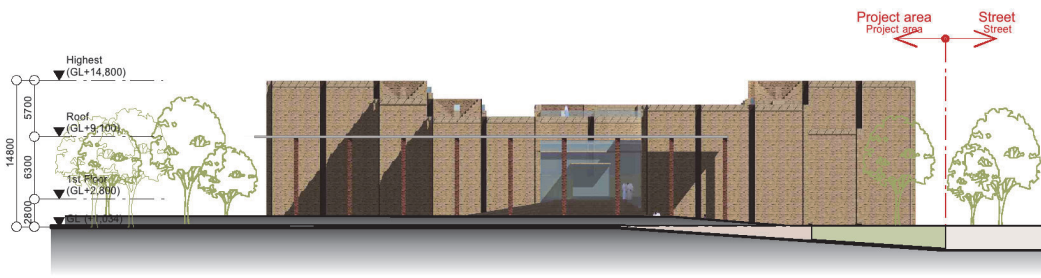




0 2.5 5 10M  
 First Floor Plan



East Elevation



0 2.5 5 10M  
 South Elevation

#### Design 4: Single-story building with complex curved walls

In line with the present slope of the land, the floor levels of all exhibition rooms have been planned to gradually incline from the entrance towards the back of the interior. A sloped corridor on the courtyard side connects each exhibition room. Some of the partition walls between adjacent exhibition rooms will be operational and staircases will connect the exhibition rooms. The walls have irregular 2-D curved surfaces, but, up on the roof, this changes into complex 3-D curved surfaces. The bottom of the walls extends towards the ground like the roots of a tree. The complex 3-D curved surfaces represent the undulation of the rocks in nature and harmonize with the undulation of the mountains that are visible in the background as borrowed scenery.



Viewpoint 1: From the roof of the PDTRA office  
The complicated curved walls and roof, which harmonizes with the sandstone mountains.



Viewpoint 3: From the entrance to the Visitor Center's Plaza





Viewpoint 9: From the Petra Moon Hotel's roof on the east side of the site  
The appearance is divided into a small-scale oblong.



Viewpoint 2: From the entrance to the Al-Hussein Bin Talal University

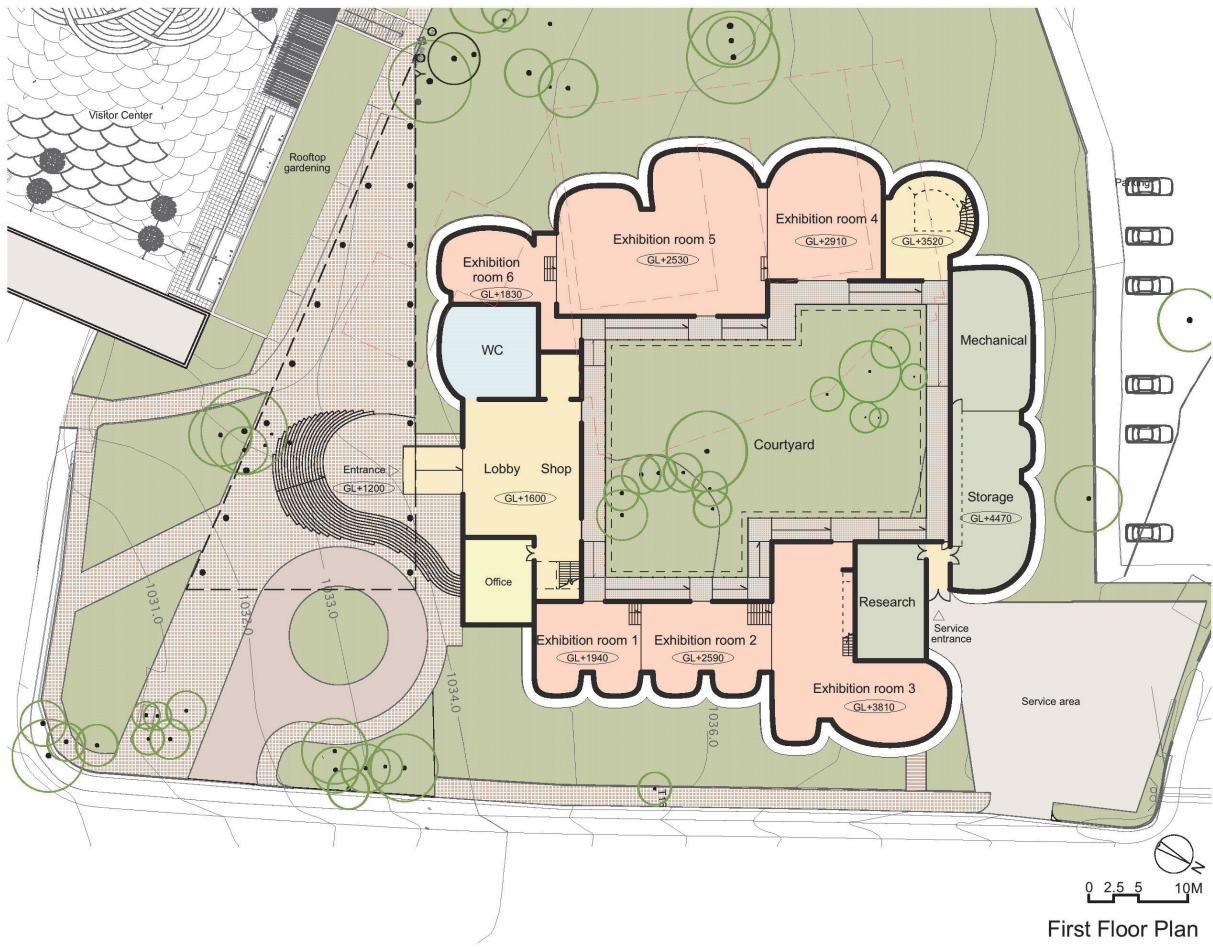


Exhibition room with irregular curved walls and sunlight

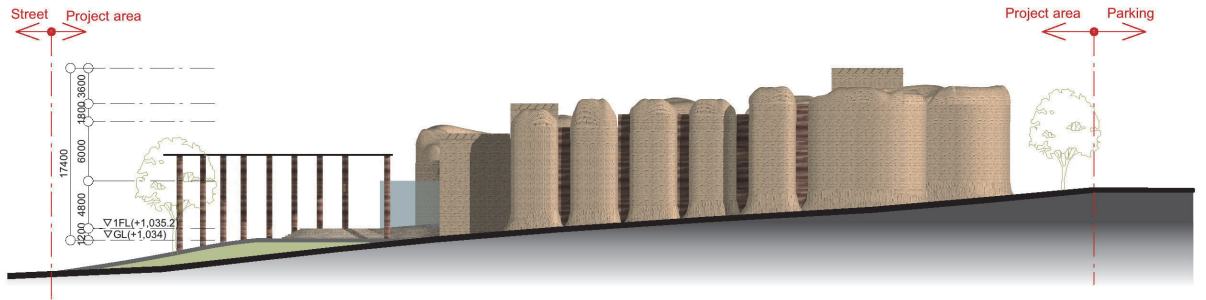


Courtyard that preserves existing trees

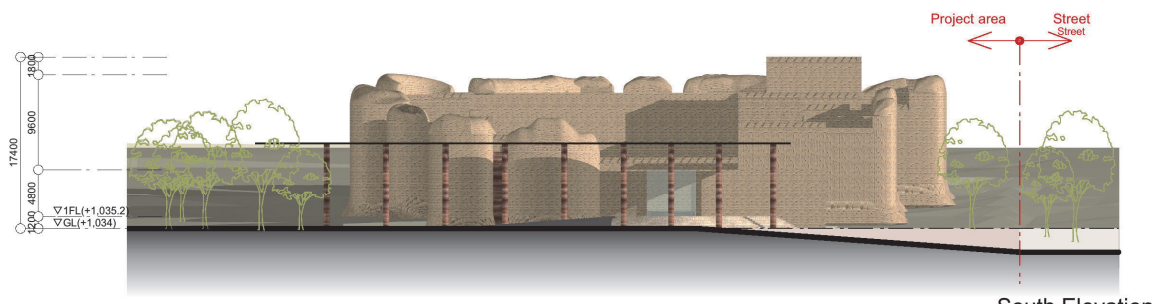




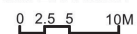
First Floor Plan



East Elevation



South Elevation



The results of the simulation show that, in terms of a preventive environmental assessment, it is unlikely that the present scenery would be harmed and, if the relevant items shown in the four designs are taken into consideration when carrying out construction, any negative impact on the scenery would be negligible. Furthermore, in terms of the creative environmental assessment, Petra's natural environment could potentially be presented in a more appealing manner as a cultural monument, resulting in a positive impact on the scenery.

(Reported by Shigeyuki Okazaki and Hideaki Tembata)



## **Inter Cultural Studies of Architecture (ICSA) in Japan 2013**

Based on the general exchange agreement between Mukogawa Women's University (MWU) and Bahçeşehir University (BAU), students and professors from BAU's Faculty of Architecture and Design joined us at Koshien Hall and the Architecture Studio on MWU's Kami-Koshien Campus from June 25 to July 31, 2013.

BAU's students tackled third- and fourth-year MWU student design projects. By participating in this program, they gained knowledge, learned techniques, and increased their awareness of architectural design. They also joined basic design studios of first-year MWU students and had the opportunity to experience traditional Japanese culture, such as Ikebana (Japanese flower arrangement under Ryuho Sasaoka, headmaster of the Ikebana Misho-ryu Sasaoka in Kyoto) and woodwork (with Sadahide Kanda, a master carpenter in Hyogo). They also participated in fieldwork on Saturdays, exploring the cities and architecture of Japan, such as Omihachiman, the Itsukushima Shrine.

### **Participants**

Professors: Associate Professor Murat Dündar, Research Assistant Sinem Kültür

Students: Nihan Metiner, Nergis Taşkent, Özge Keleş, Sunay Altuntepe, Fahriye Gürsoy, Çiğdem Çavuşoğlu, Müge Kahraman, Nur Bostancı, Ezgi Çiçek, and İmge Bilek

### **1. Greetings**

#### **1.1. Welcome Party: June 27**

Ten students and one teacher from Bahçeşehir University were greeted by the students and teachers of Mukogawa Women's University. Prof. Dr. Shigeyuki Okazaki (Chair, Department of Architecture, MWU) and Assist. Prof. Dr. Murat Dündar (Vice-Dean, Faculty of Architecture and Design, BAU) spoke and the BAU students and teacher introduced themselves. Following this, MWU undergraduate students gave a speech in English, and MWU graduate students gave a welcome speech in Turkish.



Prof. Okazaki greeting the BAU group in Turkish.



Assist. Prof. Dean Murat speaking in Japanese.



BAU students introducing themselves in Japanese.



MWU undergraduate students greeting the participants from BAU in English.



MWU graduate students greeting the BAU participants in Turkish.



MWU graduate students giving BAU students "Teru teru bozus."

## 1.2. Courtesy Call on Chancellor Ryo Okawara and President Naosuke Itoigawa of MWU: July 2

The BAU students and their teacher visited MWU's Central Campus and paid a courtesy call on MWU's Chancellor Ryo Okawara and President Naosuke Itoigawa. They expressed their delight at visiting to Japan. Chancellor Okawara encouraged them to enjoy themselves and to study hard.



Meeting with Chancellor Ryo Okawara and President Naosuke Itoigawa.



Commemorative photo.



## 2. Design Classes

### 2.1. Architectural Design Studio III: Rebuilding Hanshin Koshien Station with a Membrane-Structured Roof: June 28 to July 27

Three of the BAU students tackled the same project as MWU's third-year students in their studio. They addressed how to safely move a large number of passengers and how to make membrane roofing for the platforms. The students visited Hanshin Koshien Station after a baseball game. They then created membrane roof models, drew perspectives, and planned layouts, elevations, and sections. They also received advice from teachers and Akihiro Noguchi, a membrane expert from Taiyo Kogyo Corp., and used this advice to improve their initial ideas. Lastly, they made their final submissions and presented them to the final-jury.



A teacher explaining to the BAU students how to create tensional forces on a membrane.



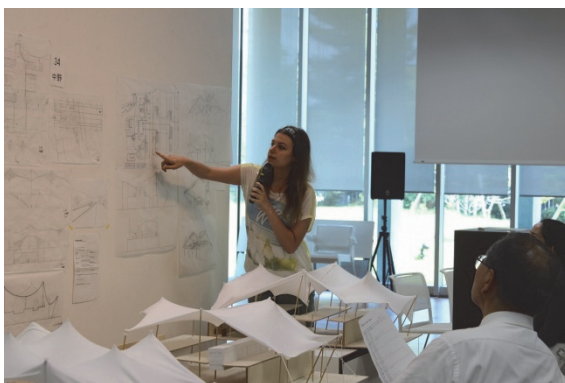
Conversing with a teacher.



Studying before the inter-jury.



Studying before the inter-jury.



Presenting to the inter-jury.



Presenting to the inter-jury.





Presenting to the inter-jury.



Presenting to the inter-jury.



Studying a membrane-structured roof.



Conversing with teachers.



Nur's presentation at the final-jury.



Dr. Mamoru Kawaguchi, Honorary Professor at Hosei University, commenting during the final-jury presentations.



İmge's presentation at the final-jury



Architect Nobuaki Furuya, Professor at Waseda University, commenting during the final-jury presentations.



Ezgi's presentation at the final-jury



A BAU student commenting on a presentation by an MWU student.

## 2.2. Architectural Design Studio V: Paradise along Waterfront : June 27 to July 29

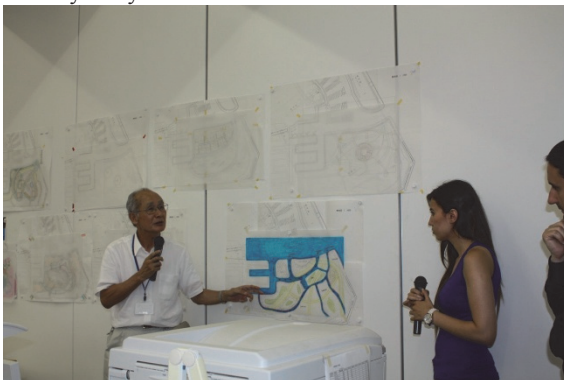
The remaining seven BAU students tackled the same project as MWU's fourth-year students in their studio, specifically, to design a pleasant urban space for the Shioashiya Area, which is reclaimed ground in Ashiya City. They made models, drew perspectives, and planned layouts, elevations, and sections. They also received advice from teachers, which they used to improve their initial ideas. Lastly, they made their final submissions and presented them to the final-jury.



Visiting the Shioashiya Area, which is reclaimed ground in Ashiya City.



Conversing with a teacher.



Conversing with a teacher.



Conversing with a teacher.





Presenting to the inter-jury.



Presenting to the inter-jury.



Presenting to the inter-jury.



Presenting to the inter-jury.



Presenting to the inter-jury.



Commenting during the inter-jury presentations.



Nihan's presentation at the final-jury.



Sunay's presentation at the final-jury.



Müge's presentation at the final-jury.



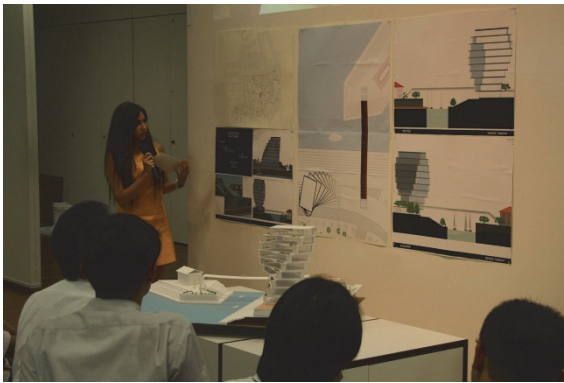
Özge's presentation at the final-jury.



Fahriye's presentation at the final-jury.



Dr. Teruyuki Monnai, Professor at Kyoto University, participating in the final-jury.



Nergis's presentation at the final-jury.



Çiğdem's presentation at the final-jury.

### 2.3. Basic Design Studio

To deepen their understanding of Japanese culture, the BAU students studied Ikebana (Japanese flower arrangement) and woodwork with the first-year MWU students.



### 2.3.1. Ikebana: June 27 and July 9

On June 27, the students experienced Ikebana under Headmaster Ryuho Sasaoka (Ikebana Misho-ryu Sasaoka, part-time MWU lecturer). On July 9, they collaborated with MWU students, making and presenting large-size Ikebana arrangements.



Headmaster Ryuho Sasaoka instructing the BAU students in Ikebana



An Ikebana lesson.



Large-size Ikebana arrangement lesson.



Large-size Ikebana arrangement lesson.

### 2.3.2. Woodwork: July 11 and 16

The students used a plane and woodworked under Master Carpenter Sadahide Kanda, a part-time MWU lecturer, increasing their understanding of traditional Japanese carpentry techniques.



Master Carpenter Sadahide Kanda instructing the BAU students in using a plane.



BAU students woodworking.

### 3. Fieldwork

#### 3.1. Architecture of Membrane Structure and Ichijo-ji Temple: June 29

Before designing a train station with a membrane structure, the Turkish students and MWU third-year students listened to a lecture by Akihiro Noguchi (engineer at Taiyo Kogyo Corp.) on the history of membrane structures, and their materials, mechanical properties, construction techniques, and examples. They next visited the Rest House on Okura Beach in Akashi City to see an example of a suspended membrane structure. They then moved on to Ichijo-ji Temple in Kasai City. The pagoda, completed in 1171, is a Japanese National Treasure constructed in the Wayo architectural style (Japanese style).



Visiting the Rest House on Okura Beach in Akashi City.



Visiting Ichijo-ji Temple in Kasai City.

#### 3.2. Suzaku-no-niwa and Suikeien Garden in Kyoto: June 29

The students visited Umekoji Park with fourth-year MWU students and saw the Suzaku-no-niwa Garden, which was constructed in the Japanese chisen-kaiyu-shiki garden style. After that, they moved on to Keihanna Commemorative Park and saw the Suikeien Garden, which was built using traditional Kyoto techniques.



Visiting Suzaku-no-niwa Garden in Umekoji Park.



Sketching in Suikeien Garden.



### 3.3. Iba and Omihachiman in Shiga: July 6

The ten BAU students visited Iba to see the Iba-naiko (lagoon) and settlement with canals. They then moved on to Omihachiman, and saw the Hachiman-bori area, which has been preserved as a national important preservation district for the area's historic buildings and canals.



Visiting the Hachiman-bori area in Omihachiman.



Sketching in the Hachiman-bori area.

### 3.4. Itsukushima Shrine and Hiroshima Peace Memorial Park, Hiroshima: July 13

The students visited Miyajima Island, one of Japan's three most famous scenic places, with the fourth-year MWU students. After arriving by ferry, they walked to the Itsukushima Shrine along a beachfront road, visited many buildings within the shrine, and viewed the mountain range over the O-torii (the Grand Gate). After that, they visited Hiroshima Peace Memorial Park.



Visiting the Itsukushima Shrine.



Posing for a photo at the Itsukushima Shrine.



Visiting Hiroshima Peace Memorial Park.



Visiting Hiroshima Peace Memorial Park.

#### 4. Farewell Party: July 31

Before the BAU students returned to Turkey, we gave them a farewell party. The third- and fourth-year MWU students, who had spent a month studying in the same studio with the BAU students gave them presents, followed by a BAU student, acting as a representative for all the BAU students, thanking the MWU students.



MWU students giving presents to the BAU students.



A student thanking the MWU students on behalf of the BAU students.

(Reported by Toshitomo Suzuki)



## **Inter Cultural Studies of Architecture (ICSA) in Istanbul 2013**

On April 26, 2013, the Architecture Major (Master's Program) and the Department of Architecture of MWU was certified by JABEE as an authorized Architectural Education Program for the first time in Japan. As a result our 6-year Master's Program of Architecture Major, Department of Architecture was formally certificated as a program that corresponds to the international standard for education, UNESCO-UIA Charter for Architectural Education. Our program aims to nurture perceptive architects with insights into the life and culture both of their own society and of the world, thus able to work internationally.

As part of such education, we started overseas practical training program in 2010 under the general exchange agreement signed in December 2008 between Bahcesehir University (BAU), Turkey, and MWU. Graduate school students (architecture major, in the Master's program) led by faculty members visited BAU for about two weeks to experience conservation-related practical training as coursework. This year a similar course was given to fourteen master program students in the first grade from October 1(Tue) to 17(Thu), 2013 as part of the curriculum 'Practice in Architectural Design I' and 'Internship in Building Conservation'.

### ◆Participants

Professors: Kazuhiko Yanagisawa and Yuna Hongo

Students: Kanna Ishizu, Yukako Uno, Shiho Kasai, Hazuki Kawase, Atsuko Kitaoka, Wakana Kitada, Shoko Kodama, Satomi Konishi, Manae Saito, Kei Takemono, Rieko Nakamura, Ai Nishida, Yasue Masuda, Natsuko Miyata

### ◆Schedule

- October 1 Departure from Kansai International Airport
- October 2 Arrival at Istanbul Ataturk Airport  
Visit to Bahcesehir University
- October 3 Visit to Bursa
- October 4 Iznik tile manufacturing experience and visit to the historic wooden house in Soloz
- October 5 Istanbul: Visit to Ayasofya, Topcapi Palace and Sultanahmet Camii
- October 6 Visit to Edirne
- October 7 Practical training of restoration work at Dolmabahce Palace
- October 8 Practical training of restoration work at Yildiz Palace  
and visit to Dolmabahce Palace
- October 9 Practical training of restoration work at KUDEB
- October 10 Istanbul: Visit to Uskudar and Besiktas
- October 11 Cultural property conservation training in Uskudar
- October 12 Visit to a large-scaled wooden structure in Buyukada
- October 13 Istanbul: Visit to Eyup, Eminonu and Galata
- October 14 Istanbul: Visit to Chora Church, Grand Bazaar etc.
- October 15 Istanbul: Visit to Rumelihisari and other places
- October 16 Istanbul: Visit to Istanbul Archaeological Museums and other places  
Departure from Istanbul Ataturk Airport for Japan
- October 17 Arrival at Kansai International Airport

### October 1-2

Leaving Kansai International Airport in the night on October 1, we arrived at the Istanbul Ataturk International Airport early in the morning on October 2. Associate Dean of the faculty of architectural design Murat was at the airport to meet us. We were taken to the hotel in the school bus. After resting for a while we visited Bahcesehir University. Associate Dean Murat and assistant Sinem took us around the campus before we paid courtesy visits to Dean Sema and President Senay. Although it was a very cold day with untimely rainy weather, we could appreciate best part of international exchange thanks to warm welcome by the people of Bahcesehir University.

### October 3

Today we visited Bursa, the first capital of the Ottoman Empire. To begin with, we observed traditional colony called Cumalikizik, which has 700 years' history. The colony has come to attract attentions in the past decade, and today, we see active preservation and restoration work of the buildings. After strolling along the lanes of labyrinth we had lunch on a semi-indoor/outdoor terrace space. Then we moved to the central area of Bursa to see such places as a caravansary called Koza Han, Ulu Camii, which means 'big Camii', Yesil Turbe (literally, 'green tomb'), where Mehmed I sleeps, and Yesil Camii, or 'green Camii'.



Courtesy visit to Dean Sema of Faculty of Architecture and Design



Commemorative photograph with President Senay



Cumalikizik



Bursa: students as sketching a Camii in the courtyard of one-time caravansary Koza Han



## October 4

Today we practiced at the atelier of a tile fabricant Ms. Mesude. First of all we had a lecture on the history of Iznik tile from Byzantine to Seljuk and Ottoman Empires and the characteristics of the tiles in each period. She explained the process of tile making and properties of Iznik tile giving demonstrations. Then at the work table everyone experienced decoration of 12-cm square tile with the help of four staffs of the atelier.

On the way from Iznik to Istanbul, we observed a historic wooden house in a town called Soloz. This architecture is said to be at least 150 years old. It is basically of timber framework. The wall is composed of masonry construction at the lower part and brickwork at the upper part. It has a typical composition of traditional Turkish house, which we have also seen in Cumalikizik. But a large scaled 4-story structure like this is very rare. After observing the structure, we had a bird's eye view of Soloz village atop the hill.

## October 5

Today we visited Ayasofya, Topcapi Palace and Sultanahmet Camii with the guidance and explication by Professor Murat. We made sketches of them. We learned about ayasofya, the magnum opus of Byzantine architecture which has a huge dome of 31 meter in diameter, Topcapi palace, where sultans of the Ottoman Empire lived, the harem of the Topcapi palace with beautiful Iznik tile and Sultanahmet Camii called the blue mosque. As we had experienced drawing patterns on the tile in Iznik yesterday, we were especially impressed to see the Iznik tiles at the harem. It has been a day to appreciate the magnificent legacy that Istanbul has.



We tried drawing the patterns on Iznik tile ourselves. The brush handling turned out to be very difficult.



The historic wooden house in Soloz



Ayasofya



Topcapi Palace

## October 6

Today we visited Edirne situated close to the borders with Greece and Bulgaria. The town was once called Hadrianopolis (Adrianople) and was the capital of Ottoman Empire for a period of time. After Istanbul became the capital Edirne played an important role as the second capital. We observed Selimiye Camii, which is said to be the magnum opus of the Ottoman architect Mimar Sinan, Eski Camii, which is the oldest of the existing Camii in Edirne as well as the Ottoman kulliye and hospital built by Bayezid II (Bayezid II Kulliyesi Health Museum) with its characteristic space for music therapy and a well-known model case of restoration.

## October 7

Today we had a restoration practice at Dolmabahçe Palace. The palace was completed in 1856 and it is now used as the state guest house. Palace's bottega is engaged in the restoration not only of the Dolmabahçe Palace but also of the whole national palaces in Turkey. We could visit many different studios for specialized works such as metal ornament, lamps, stucco, gilding, picture restoration, lead work, book repair and ceramic stove. We were allowed to observe the restoration work at the building for crown prince on the Palace's compound. At the site of ceiling restoration we were specially allowed to have a close look at the repair work on the temporary scaffold.



Students as sketching Selimiye Camii



The courtyard of Bayezid II Kulliyesi Health Museum



Gilding studio at Dolmabahçe Palace



Visiting the restoration site of the building for crown prince



## October 8

Today we had a restoration practice at the bottega in Yildiz Palace. Alike the one at the Dolmabahce Palace where we practiced yesterday, it is a national bottega which is engaged in the restoration of Dolmabahce and the other national palaces across the country. We could visit studios of shell work, upholstery fabric, furniture finishing, wood working, furniture ornament, textile, fixtures, parquet flooring material, and metal work. Then we observed the Dolmabahce Palace and summarized what we have learned during the two days' experience in restoration and repair works observing the furniture and fixtures placed in the palace and confirmed how they had been restored at the bottega. Finally we went to the Bahcesehir University, where we could enjoy the view of beautiful Bosphorus Strait at sunset.

## October 9

Today we had a training course at a municipal organization of Istanbul, KUDEB, which specializes mainly in the restoration of wooden architecture. After hearing the outline of KUDEB we went to the bottega to see a replica of the door from Suleymaniye Camii, a framing model of an existing construction which has actually undergone restoration, and a restoration work of the door from a 130 years old house once stood in the Zeyrek district. Then we observed the office building of KUDEB, which is an example of restoration itself. It was a residence of a naval officer in power back in 1850s, which KUDEB is restoring taking time while using it as their office. We concluded the course at KUDEB with a visit to a wooden house in Suleymaniye district, which KUDEB has restored. Leaving KUDEB we visited Suleymaniye Camii to make sketches of it. For the dinner we were invited by Dean Sema of Faculty of Architecture and Design.



Wood work studio at Yildiz Palace



Textile studio at Yildiz Palace



Visit to the bottega at KUDEB



Students as sketching Suleymaniye Camii

## October 10

Today we visited Uskudar and Besiktas in Istanbul to see Camii and other places. In Uskudar on the Asian side we observed Yeni Valide Camii (literally, new mother's Camii) built for a sultan's mother and Semsî Pasa Camii, one of the Mimar Sinan's works. In Besiktas on the European side, we visited Palace Collections Museum, which houses daily living utensils used in the Dolmabahçe Palace and Sinan Pasa Camii, another work of Mimar Sinan. In the evening we sketched the Bosphorus against the backdrop of the setting sun on the rooftop of the Bahcesehir University.

## October 11

Today we had a conservation training course in Uskudar, a district on the Asian side noted for its numbers of ancient structures. With the help of the Uskudar ward office we observed many objects including congregation-related facilities reconstructed based on the original drawings of religious buildings from about 100 years ago, the conservation site of the school of Ottoman Empire days for foreign students, and another conservation work at Burhan Felek residence built by the same architect that built Dolmabahçe Palace, as well as the site of Adile Sultan Pavilion. We ended with a visit to the atelier in Uskudar. After the course we made a Bosphorus Strait tour.



Semsî Pasa Camii in Uskudar, one of the Mimar Sinan's works



A sight of new district across Bosphorus viewed from Uskudar



Visit to a congregational facility in Uskudar reconstructed based on the drawings from about 100 years ago:



Adile Sultan Pavilion as a case example of restoration work



## October 12

Today we visited the Greek Orphanage, a large-scaled wooden structure in Buyukada. Buyukada is the largest of the Prince Islands. Cars are banned in principle in the island and transportation has to be made on foot or bicycle and horse-drawn carriage. One reaches the Greek Orphanage taking a carriage from the port and then going up the mountain road in the pine wood for a while. The building, which was built in 1898, is said to be the world's largest wooden structure next to Todai-ji. It is a 5-story structure occupying a space of 20,000 m<sup>2</sup>. Though it was designed to be a hotel, it had never been used as a hotel, but as an orphanage. It is vacant and abandoned today. It has been argued for years whether to be restored or not. Typical designs with traditional Turkish houses which we have learned so far are being applied in very part of the building. Everyone made a sketch of them identifying characteristics of each object.

## October 13

Today we visited Eyup, Eminonu and Galata in Istanbul. In Eyup, we first visited Eyup Sultan Camii, the sacred ground of Muslim and made sketches of it. Then we took the ropeway to go to Pierre Loti, a noted viewing point of the glorious view of Golden Horn. In Eminonu, we visited Rustempasa Camii adorned with beautiful Izunik tiles and Yeni Camii at the foot of Galata Bridge. On the way from Yeni Camii to Galata Tower we took a ride on the Tunel ('tunnel' in English), a short subway line which runs 573 m's distance. After making sketches of Galata Tower we climbed atop and fully enjoyed 360° view of Istanbul. Finally, we visited one of Istanbul's downtown, Istiklal Avenue. It has been a day we could see various aspects of Istanbul.



The Greek Orphanage



Istanbul as seen atop the Galata Tower



Interior of Yeni Camii

## October 14

Today, we mainly observed the remains of Byzantine Empire in Istanbul, such as Chora Church known for its masterpiece Byzantine art i.e. mosaic and fresco paintings, the fortress called Yedikule (literally, seven towers) located to the south of the Theodosian Walls, Basilica Cistern, which is the underground reservoir of Roman Empire, and Grand Bazaar with 4,000 outlets crowding together. We sketched Ayasofya and Sultanahmet Camii in the square at Sultanahmet. Turkish students who had participated in 'ICSA in JAPAN 2013' joined us and we exchanged each other.

## October 15

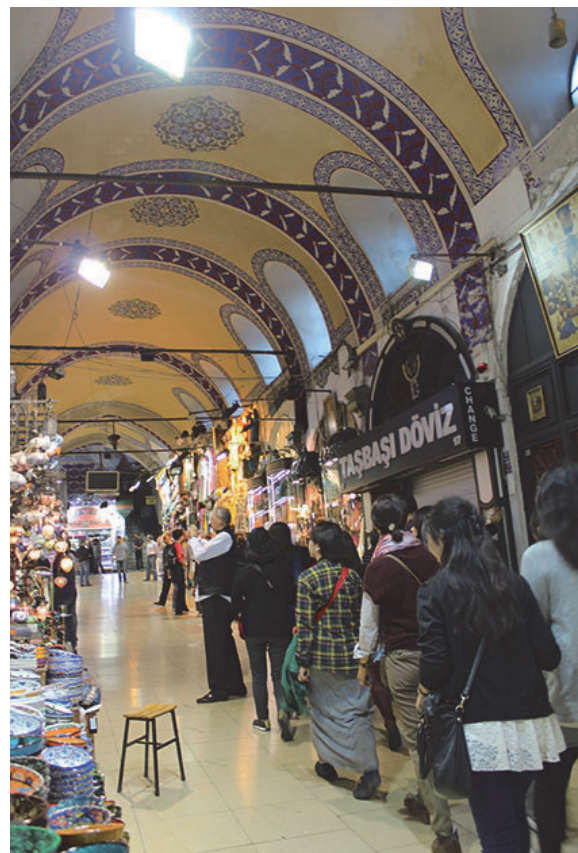
Today, we continued the tour in Istanbul. To begin with we visited Rumelihisari, a fortress which is said to have been constructed in four months in 1453 prior to the battle against the Constantinople force. At present, concerts are held occasionally. We went up flight of stone steps to see a spectacular view of the Bosphorus Strait. Then we observed modern Turkish architecture, Zorlu Center, a complex facility which has been just completed last week. We also visited Kanyon Shopping Mall designed with an image of canyon in mind. We returned to Besiktas to complete the day's tour to see and make sketches of Ertugrul Tekke Camii, a palace-like Camii completed in 1888.



Chora Church



Rumelihisari



Grand Bazaar

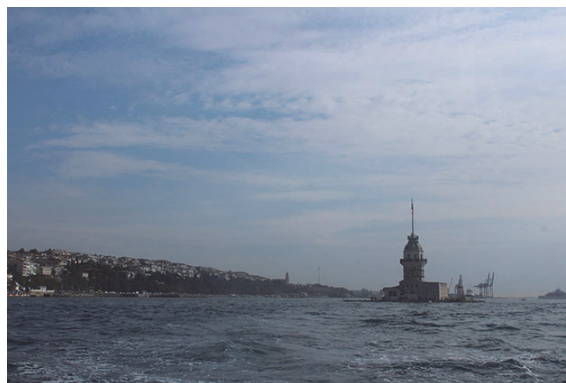


## October 16-17

Today, we continued the tour of Istanbul. In the morning, we went to Istanbul Archaeological Museums, and visited Archeological Museum, which exhibits important collection of Turkish relics commencing with that of the Greek and Roman periods. We also visited Tiled Kiosk Museum converted from once sultan's summer house to see the splendid tiles. In the afternoon, we took a ferry to cross the Bosphorus to go to the fortress, Kiz Kulesi(The Maiden's Tower) at the mouth of the strait to have lunch at a restaurant refurbished in 1999. In the evening, we climbed Camlica Hill to the highest point in Istanbul where we could see the vast view of the city of Istanbul and the sea and islands below. Then we moved to Istanbul Ataturk International Airport to leave for home. It has been a fulfilling study tour to get a glimpse of the profound Turkish history and culture.



Archaeological Museum



To Kiz Kulesi (The Maiden's Tower), a fortress at the mouse of Bosphorus Strait, by ferry



Students as chatting with a Turkish student



View of Istanbul as seen from Camlica Hill.

(Reported by Kazuhiko Yanagisawa)

## Special Lecture #01

### *Historical and Cultural Aspects of the World Heritage Remains of Bamiyan Valley: Description of its Past, Present and Future*

**Date :** Saturday, November 2, 2013, 13:00~16:40

**Place :** West Hall, the Koshien Hall

**Lecturer :** Dr. Kosaku Maeda (Professor Emeritus at Wako University, Japan)

A lecture entitled “Historical and Cultural Aspects of the World Heritage Remains of Bamiyan Valley—Description of its Past, Present and Future” invited professor emeritus Kosaku Maeda of Wako University as a lecturer.

Prof. Maeda first gave a brief history since the foundation of Afghanistan from the period of principality, republic, Soviet invasion and withdrawal, Taliban rule and vandalism (destruction of Great Buddha) to the end of war and postwar. And we could recognize the importance of Japan’s efforts being made in cooperation with UNESCO to restore the culture of Afghanistan.

Prof. Maeda also introduced the ancient history of Afghanistan as cultural crossroads, which was influenced by the cultures of Greece, Persia and other neighboring countries showing a lot of pictures of excavations. Then, Prof. Maeda, based on the precious materials, commented on the caves, murals and Buddhist statues of Bamiyan Valley including their conditions before and after the Taliban-led vandalism, which he has been studying over half a century. It was a valuable opportunity to understand how important it is for Japan to take the initiative in the cooperative effort to revitalize the culture of Afghanistan hereafter.

(Reported by Toshitomo Suzuki)



Lecture by Professor Emeritus Kosaku Maeda



## Special Lecture #02

### *Caves and Murals in Bamiyan: As Compared with the Cave Temples in India and Kucha*

**Date :** Saturday, November 9, 2013, 13:00~17:00

**Place :** AS-120, the Architecture Studio

**Lecturer :** Dr. Akira Miyaji (Professor Emeritus at Nagoya University, and Director Emeritus at Ryukoku Museum, Japan)

MWU held a lecture inviting Professor Emeritus Akira Miyaji of Nagoya University as lecturer titled “Caves and Murals in Bamiyan - As Compared with the Cave Temples in India and Kucha -

The lecture began with tracing the flow of the history of ancient cities of Afghanistan that had changed themselves under the influence of the countries of east and west or south and north. And, religion of each period before the present status of the remains was introduced. Prof. Miyaji also commented on the prosperity of the city after the introduction of Buddhism, Buddhist art, which developed amalgamating the Hellenism and Gandhara culture, and the shift in object of worship from Buddhist *stupa* to statue.

Then Prof. Miyaji introduced cave temples of Buddhism, as well as that of Hinduism and Jainism in India with especial detailed commentary of the structure and way of use, decorative art and murals of the Buddhist cave temples in Ajanta, India. And making reference to the outline and history of the Bamiyan site, Afghanistan, Prof. Miyaji picked up on the structure of caves and the murals of Bamiyan and illustrated the influence of India, Persia or Gandhara as seen on the iconographies as well as the differences of murals between that of Bamiyan and Ajanta. Iconography and coloration of murals of the Caves of Kizil and Dun Huang in China were also introduced in comparison with the Bamiyan counterpart. Prof. Miyaji’s detailed commentary on the subjects from wide-ranging regions from Europe to west, central and south Asia was copious and enlightening. It was a precious opportunity for us to look at the architecture from the different viewpoint of art history.



(Reported by Tomoko Uno)



Prof. Miyaji as giving the lecture

## **Seminar on the Culture and History of the Silk Road # 01**

### ***The Latest State of Armenian Cultural Heritage—Culture and History of Caucasia***

**Date :** Friday, February 14, 2014, 13:30~17:00

**Venue :** K-222, the Koshien Hall

**Lecturer :** Dr. Makoto Arimura (Associate Professor, Kanazawa University, Japan)

MWU held a series of seminar entitled “The Culture and History of the Silk Road” inviting five foremost experts as lecturers. We asked Associate Professor Makoto Arimura of the Kanazawa University, an archaeologist, to speak at the first meeting titled as above.

Dr. Arimura first explained the geological feature of Caucasia before dealing with the course of the history. He then described the diffusion of mankind in the Paleolithic period as has been identified in Caucasia, origin and proliferation of the agricultural and herding society in the Neolithic period, origin of viticulture around the Neolithic period and the Copper age, Kula/Araxes culture in the Bronze age, the rise and fall of the empire of Urartu during the Iron age and the origin of the Armenian nation ensuing from the fall of the empire.

It was quite an informative occasion for us to learn about the Armenian culture of each period. In the Q&A session after the lecture we exchanged active discussions on Armenia and the Silk Road.

(Reported by Kazuhiko Yanagisawa)



Associate Professor Makoto Arimura as giving the lecture





## Seminar on the Culture and History of the Silk Road #02

### *Stupa/ Hindu Goddess/ Lingam—Indian World of Life and Death, Sex and Sacredness*

**Date :** Friday, February 21, 2014, 13:30~17:00

**Venue :** K-222, the Koshien Hall

**Lecturer :** Dr. Akira Miyaji (Professor Emeritus at Nagoya University, and Director Emeritus at Ryukoku Museum, Japan)

MWU held a series of seminar titled “The Culture and History of the Silk Road” inviting five foremost experts as lecturers. We invited Dr. Akira Miyaji as the lecturer for the second of five seminars.

We had Dr. Miyaji deliver a lecture on cave shrines and murals of Bamiyan last autumn. This time he described the ambiguity as seen in Indian Buddhism and Hinduism using ample pictures and illustrations. In the first section of the lecture, Buddhism-related topics were introduced such as caitya (sacred tree; sacred column) worship that go back to pre-Buddhist religion, stupa as a symbol of “life” and “death” and reliefs of goddess given on the Torana (gate) and Vedika (balustrade) of stupas.

In the second section, Hindu-related topics were presented such as Lingam worship and Hindu goddess worship and reliefs of goddess given to the temples Khajuraho group of monument. After the lecture we had an active Q & A session about the reason why the reliefs were given to the vedika of the stupa, celestial maiden depicted on earthen plates, miniatures, Hindu temple structures, comparison of pagoda and stupa.

(Reported by Fumie Ooi)



Professor Akira Miyaji as giving the lecture

## Seminar on the Culture and History of the Silk Road #03

### *Archaeological Perspectives on the Achaemenid Persian Empire: From the Survey around the Bolaghi Valley and the Pasargadae Plain, Southern Iran*

**Date :** Monday, March 3, 2014, 13:30~18:00

**Place :** K-222, the Koshien Hall

**Lecturer :** Dr. Shin'ichi Nishiyama (Associate Professor, Chubu University, Japan)

MWU held a series of seminar entitled “The Culture and History of the Silk Road” inviting five foremost experts as lecturers. The 3<sup>rd</sup> lecture was given by Associate Prof. Shin'ichi Nishiyama of Chubu University, who had involved in several archaeological projects in West Asia and Central Asia including Iran. He talked about the formation of the Achaemenid Persian Empire from the viewpoint of archaeological evidence.

The lecture began with explaining the purpose of the lecture, and on to the basic historical information of the ancient Persian Empires, the relationship between the Persian Empires and the Silk Road, the cultural links between the Persian Empires and Japan, the current state of the archaeological study of the Persian Period, and the general history of the Achaemenid Empire.

In the second part of the lecture, he discussed the achievements of his archaeological investigation in the Bolaghi valley and the Pasargadae plain in the Fars province, southwest Iran. This was the region where the heart of the Achaemenid Empire lied. First, the architectures and artefacts of the royal cities of the Empire were explained. Then, the detailed account of the two royal cities in the Fars province, Persepolis and Pasargadae were looked into. He argued that the foundation of the Empire was laid by strategically placing the transport, irrigation, and defense systems around the royal cities, especially around Pasargadae, the first royal city of the Empire. Especially important was the controlling of the human movements, i.e. pastoral nomads, who provide not only goods, but also vital information to control the Empire.

(Reported by Tomoko Uno)



Associate Professor Shin'ichi Nishiyama as giving the lecture





## Seminar on the Culture and History of the Silk Road #04

### *Xuanzang/ Stein/ Otani Expedition*

**Date :** Wednesday, March 5, 2014, 10:30~12:00, 12:30~14:30  
**Venue :** K-222, the Koshien Hall  
**Lecturer :** Dr. Takashi Irisawa (Professor at Ryukoku University, and Director of Ryukoku Museum, Japan)

MWU held a series of seminar titled “The Culture and History of the Silk Road” inviting five foremost experts as lecturers. We invited Professor Takashi Irisawa of Ryukoku University this time, who gave the lecture titled as above.

Professor Irisawa first described several caves following the track of Xuanzang such as Bezeklik caves in suburban Uighur Autonomous Region, China, Kizil caves in Kucha and Bamiyan caves in Afghanistan. In the lecture tales of Nentobutsu-juki (Dipankara) and Shashin-shiko (Bodhisattva offered his body to feed tigress and her cubs) were introduced using images of relevant paintings as well as the Buddhism’s mingling with the local religions, expedition of caves and propagation of Buddhism to the Western Regions, and an epigraph in Bactrian language as an evidence of coexistence of Buddhism and Islamism. In the second half of the lecture, he described activities of archaeologist Stein who revered Xuanzang, and Otani expedition organized by Kozui Otani, latter-day 22<sup>nd</sup> Abbot of Hongwan-ji, sub sect of Jodo-shinshu, who received lot of stimulations from Stein. The audience was overwhelmed by the magnificent views of the world of Xuanzang, Stein and Kozui Otani.

(Reported by Kazuhiko Yanagisawa)



Professor Takashi Irisawa as giving the lecture

## Seminar on the Culture and History of the Silk Road #05

### *Ruins in Xinjiang Uyghur Autonomous Region, China*

**Date :** Saturday, March 8, 2014, 13:30~17:00  
**Venue :** K-222, the Koshien Hall  
**Lecturer :** Mr. Kazuya Yamauchi (Head of Regional Environment Section, Japan Center for International Cooperation in Conservation, National Research Institute for Cultural Properties, Tokyo)

MWU held a series of seminar titled “The Culture and History of the Silk Road” inviting five foremost experts as lecturers. This time, we asked archaeologist Kazuya Yamauchi of National Research Institute for Cultural Properties, Tokyo, to give a lecture as titled above.

The lecture began with the geographical explanation of three major routes of the Silk Road, i.e. “Northern Route of Tian-shan Mountains”, “Southern Route of Tian-shan Mountains” and “Southern Route in the Western Region” followed by the introduction of the ruins in Xinjiang Uyghur Autonomous Region. Mr. Yamauchi described the various ruins introducing the conditions of restoration and preservation based on his experience. The ruins introduced included Kizil Gaha Beacon Tower, which is said to date back to Qianhan Period (over 2,000 years ago), ruins of Gaochang, which is associated with Xuanzang, the old city of Jiaohe, both located in outskirt Turpan, Site of Bashbaliq City, Kizil caves, the largest of the caves in the Uyghur region, and Subashi ruins, the largest Buddhist temple in Kuqa. Mr. Yamauchi ended the lecture suggesting the need to see the Silk Road in a comprehensive way not only from the aspect of trade route but also from that of people’s life and natural surroundings.

(Reported by Kazuhiko Yanagisawa)



Mr. Kazuya Yamauchi as giving the lecture





## Annual Events Apr. 2013- Mar. 2014

Date	Events
June 6, 2013	Lecture “ <i>Afghanistan's Cultural Heritage</i> ” (Ms. Keiko Nishigaki, Representative of Takarazuka Afghanistan Friendship Association, Japan)
June 25-July 31, 2013	Inter Cultural Studies of Architecture (ICSA) in Japan 2013
September 7-12, 2013	Landscape Survey of the Planned Site for the Petra Museum
October 1-17, 2013	Inter Cultural Studies of Architecture (ICSA) in Istanbul 2013
November 2, 2013	Special Lecture #01 “ <i>Historical and Cultural Aspects of the World Heritage Remains of Bamiyan Valley: Description of its Past, Present and Future</i> ” (Dr. Kosaku Maeda, Professor Emeritus at Wako University, Japan)
November 9, 2013	Special Lecture #02 “ <i>Caves and Murals in Bamiyan: As Compared with the Cave Temples in India and Kucha</i> ” (Dr. Akira Miyaji, Professor Emeritus at Nagoya University, and Director Emeritus at Ryukoku Museum, Japan)
December 10-11, 2013	12th Expert Working Group Meeting for the Safeguarding of the Cultural Landscape and Archaeological Remains of the Bamiyan Valley World Heritage Property, Orvieto, Italy
February 14, 2014	Seminar on the Culture and History of the Silk Road #01 “ <i>The Latest State of Armenian Cultural Heritage—Culture and History of Caucasia</i> ” (Dr. Makoto Arimura, Associate Professor, Kanazawa University, Japan)
February 21, 2014	Seminar on the Culture and History of the Silk Road #02 “ <i>Stupa/ Hindu Goddess/ Lingam—Indian World of Life and Death, Sex and Sacredness</i> ” (Dr. Akira Miyaji, Professor Emeritus at Nagoya University, and Director Emeritus at Ryukoku Museum, Japan)
March 3, 2014	Seminar on the Culture and History of the Silk Road #03 “ <i>Archaeological Perspectives on the Achaemenid Persian Empire: From the Survey around the Bolaghi Valley and the Pasargadae Plain, Southern Iran</i> ” (Dr. Shin'ichi Nishiyama, Associate Professor, Chubu University, Japan)

<p>March 5, 2014</p>	<p>Seminar on the Culture and History of the Silk Road #04  <i>“Xuanzang/ Stein/ Otani Expedition”</i> (Dr. Takashi Irisawa, Professor at Ryukoku University, and Director of Ryukoku Museum, Japan)</p>
<p>March 8, 2014</p>	<p>Seminar on the Culture and History of the Silk Road #05  <i>“Ruins in Xinjiang Uyghur Autonomous Region, China”</i> (Mr. Kazuya Yamauchi, Head of Regional Environment Section, Japan Center for International Cooperation in Conservation, National Research Institute for Cultural Properties, Tokyo)</p>



## OUTLINE OF THE INSTITUTE OF TURKISH CULTURE STUDIES

### Organization

Position	Affiliation	Title	Name
Director	Department of Architecture	Professor	Shigeyuki Okazaki
Researcher	Department of Architecture	Professor	Jun Sakakihara
		Professor	Yusei Tazaki
		Professor	Sanae Fukumoto
		Professor	Kazuhiko Yanagisawa
		Associate Professor	Fumie Ooi
		Associate Professor	Noritoshi Sugiura
		Associate Professor	Toshitomo Suzuki
		Associate Professor	Hiroyuki Tagawa
		Lecturer	Akira Tanaka
		Lecturer	Hideaki Tembata
		Lecturer	Keisuke Inomata
		Lecturer	Tomoko Uno
		Lecturer	Junko Morimoto
		Visiting Professor	Mamoru Kawaguchi
	Visiting Professor	Kunihiko Honjo	
	Institute of Turkish Culture Studies	Professor	Shushi Sugiura
Visiting Researcher	Bahçeşehir University (Turkey) Faculty of Architecture and Design	Associate Professor	Murat Dündar
Assistant	Department of Architecture	Assistant	Ayane Ise
		Assistant	Aya Yamaguchi
	Institute of Turkish Culture Studies	Assistant	Yuna Hongo
Secretariat	Secretariat Division of School of Human Environmental Sciences	Chief Clerk	Miyuki Nakaichi

### Reviewers on *Intercultural Understanding*

Name	Title and Affiliation
Yasushi Asami	Professor, The University of Tokyo, Japan
Kunio Kato	Professor Emeritus at Kyoto University, Japan
Mamoru Kawaguchi	Professor Emeritus at Hosei University, Japan
Mitsuo Takada	Professor, Kyoto University, Japan
Shuichi Hokoi	Professor, Kyoto University, Japan
Kosaku Maeda	Professor Emeritus at Wako University, Japan
Minako Mizuno Yamanlar	Representative of NPO The Japanese-Turkish Friendship Association, Japan
Kazuya Yamauchi	Head, Regional Environment Section, Japan Center for International Cooperation in Conservation, National Research Institute for Cultural Properties, Tokyo, Japan
Hironobu Yoshida	Professor Emeritus at Kyoto University, Japan
Murat Dündar	Associate Professor, Bahçeşehir University, Turkey
Murat Şahin	Associate Professor, Özyeğin University, Turkey
Shigeyuki Okazaki	Professor, Mukogawa Women's University, Japan
Kazuhiko Yanagisawa	Professor, Mukogawa Women's University, Japan

## **Rules and Regulations of the Institute of Turkish Culture Studies (ITCS) at Mukogawa Women's University**

### **(Establishment)**

**Article 1** Mukogawa Women's University (hereinafter referred to as "the University") locates the Institute of Turkish Culture Studies (hereinafter "the Institute") in the University.

(2) The Institute shall be operated under the administration of the department of architecture (of the University) for the time being.

### **(Objective)**

**Article 2** The objective of The Institute is as follows:

(i) to conduct comparative studies on life, technology and culture centered around architecture of Japan and Turkey, as the east and the west starting points of the Silk Road, and to clarify the cultural base common to both countries beyond the differences in history, climate and so forth between the two countries.

(ii) to conduct, developing above-mentioned aims, extensive studies on life, technology and culture centered around architecture of neighboring Silk Road countries and to clarify similarities among them and contribute to new mutual understandings and contribute to the peace and prosperity of the Silk Road region through such understandings.

(iii) to support international exchange of students mainly in the field of human environment and conduct international education activity of architecture and human environment based on the achievements of the studies mentioned in (i) and (ii).

(iv) to discuss internationally the achievements of research and education referred to in the preceding three items and to introduce (*or* transmit) it to the world in various ways at every occasion, and to share common values with the people around the world.

### **(Operation)**

**Article 3** The operations of the Institute to achieve the above-mentioned objectives are as follows:

(i) to conduct studies in cooperation with the Research Center of Japanese Culture Studies at Bahcesehir University, Istanbul

(ii) to hold an international workshop "Inter Cultural Studies of Architecture in Japan (ICSA in Japan)" where architecture and human environment students of the world centered around Turkey are invited every year in principle, to support the similar workshop "Inter Cultural Studies of Architecture in Istanbul" which is held at the Research Center of Japanese Culture Studies at Bahcesehir University and to send teachers and students of the University centered around the department of architecture for the research and education activities.

(iii) to hold seminars, introduce the research achievements, exhibit and hold lectures, concerning life, technology and culture centered around architecture, where researchers, business persons and residents who belong to the field of studies conducted by the Institute are invited.

(iv) to hold permanent and special exhibitions on life, technology and culture of neighboring Silk Road countries centered around Turkey.

(v) to conduct public relations activities such as publication of the research and educational achievements of the Institute, symposium and so forth.

(vi) other operations required to accomplish the aims mentioned in the preceding article.

### **(Organization)**

**Article 4** The Institute may have research departments with respect to differences in research fields to perform relevant activities.



**(Director)**

**Article 5** The Institute shall install a director.

- (2) The chancellor appoints a director from among professors
- (3) The director shall be appointed for a period of two years and may be reappointed
- (4) The director handles the operations of the Institute under the president's direction

**(Vice Director and Head of Research Department)**

**Article 6** The Institute may install a vice director and heads of research in each department referred to in article 4.

- (2) The chancellor appoints a vice director and heads of research department from among the faculty. The latter position may be substituted by adjunct teaching staff.
- (3) The vice director assists the director and engages in the administrative operations
- (4) The vice director fills in for the director under the director's direction
- (5) Each head controls his research department and engages in the research under the director's direction .

**(Senior Researcher)**

**Article 7** The Institute may install senior researchers with the chancellor's approval.

- (2) The director appoints senior researchers from among researchers.
- (3) The senior researchers assist their heads and engage in the research.

**(Researcher)**

**Article 8** The Institute shall install researchers required.

- (2) Teachers at Bahcesehir University may be appointed as researchers
- (3) The researchers engage in research under the director's direction.

**(Temporary Researcher)**

**Article 9** The Institute may install temporary researchers as the need arises.

- (2) The president appoints temporary researchers upon recommendation of the director
- (3) The period of the appointment shall be less than one year and it may be renewed when necessary.
- (4) The temporary researchers engage in the specific research or joint research.

**(Assistant)**

**Article 10** The Institute may install assistants.

- (2) The assistants assist research under the director's direction.

**(Steering Committee)**

**Article 11** The University shall have the steering committee of the Institute (hereinafter "the steering committee") to deliberate the basic policy concerning the operation of the Institute.

- (2) The steering committee shall consist of the director and a few members chosen from among the vice director, the heads of research departments, the senior researchers and researchers.
- (3) The president appoints the members of the steering committee.
- (4) The director shall be the chairperson of the steering committee.
- (5) The chairperson shall convene and lead the steering committee.
- (6) The member shall be appointed for a period of two years and may be reappointed. When a vacancy arises, the successor's term of office shall be the predecessor's remaining term.
- (7) The details on the steering committee shall be otherwise laid down.

**(Secretariat)**

**Article 12** The Institute shall install a secretariat.

(2) The secretariat shall consist of a few members and the chief clerk of School of Human Environmental Sciences shall be the chief of the secretariat

(3) The members of the secretariat handle clerical works under the guidance and supervision of the chief clerk under the director's direction.

**(Supplementary Rules and Directions)**

**Article 13** In addition to what is provided in this rules and directions, the necessary matters concerning the administrative operations of the Institute shall be prescribed by the director.

**(Modification or Elimination of the Rules and Regulations)**

**Article 14** Modification or elimination of the rules shall be implemented with the chancellor's prior approval.

**Supplementary Provisions**

(1) The rules and regulations shall be enforced starting on July 29, 2009.

(2) In the period from the day the rules and regulations is enforced until March 31, 2011, the term of the appointed directors and members of the steering committee shall begin on the day when they are appointed and end on March 31, 2011 notwithstanding the provisions of Article 5, paragraph(3) and Article 11, paragraph(6).





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