The Importance of Interdisciplinary Research Connecting Historical, Anthropological, Information, and Engineering Sciences of Based on the Case Study of Spatial-Temporal GIS (DiMSIS-EX) Application

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Our Project “Sharia and Technology”1 which belongs to KIAS (Center for Islamic Area Studies at Kyoto University in Japan), whose leader is Prof. Dr. Yasushi KOSUGI, opened our panel discussion at the 20th Conference of the International Committee on Pre-Ottoman and Ottoman Studies (CIÉPO)2 at the University of Crete on June 27, 2012.

Our panel consisted of the following four papers:
1. Shigeru KAKUMOTO, İlhan ŞAHİN; Hikari EGAWA; Yoshio KAJITANI and Halit Ramazan KUBILAY

   Collaborative Research of History and Information Science: Difference of Recovery Procedure after the Earthquake Disaster Based on Each Culture

2. Koji YOSHIKAWA, Yoshio KAJITANI, Shigeru KAKUMOTO, Michinori HATAYAMA and Mahito USUI


3. Takahiro TOMITA and Shigeru KAKUMOTO

   Development Policy and Social Changes in a Suburban Area of Mongolia: Application of DiMSIS-EX to Anthropological Research

4. Maria KOSUGI and Shigeru KAKUMOTO

   Qur’anic Manuscript Data on Computer: A Case of Applying DiMSIS-EX to Historical Studies

In this Special Issue, we would like to report each revised edition.

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1 http://www.asafas.kyoto-u.ac.jp/kias/kyodo/koubo.html
Preface of the Panel
In March, 2011, we suffered a massive earthquake, and tsunami in North-Eastern Japan followed by the Fukushima nuclear disaster. It has been confirmed that this earthquake and tsunami resembles past cases, such as the Jogan earthquake (M.8.6) and tsunami disaster of July 13th, A.D.869, which occurred about 1100 years ago.

This recent unfortunate incident has demonstrated the urgent need for historical excavation of various natural disaster sites over a long period. Why is this important? Well, to put it another way, if we want to construct a disaster proof town for the future, it is essential for us to study the history of previous disasters by going back at least 1100 years, not only in Japan but also in Turkey and in Crete.

It is said that Knossos and Festos in Crete were destroyed by huge earthquakes between BC.19–17, and the Minoan Civilization was wiped out by an eruption of the Thera Island in BC.17–16, so it is our shared objective to study the history of natural disasters.

In this panel discussion, we would like to point out the following two points. First, the importance of interdisciplinary and long term historical analysis to create a disaster proof town for the future. Second, the value of applying DiMSIS-EX for historical and anthropological studies.

Well, the first speaker will present a case study on Düzce in Turkey, which was severely damaged by huge earthquakes in 1999. The second speaker will explain what DiMSIS-EX is. The third and forth speakers will demonstrate case studies using DiMSIS-EX.

Review for the Researches on the Disasters during the Ottoman Empire and Republic of Turkey.
We have come to realize the importance of studying the history of natural disasters all over again because of the huge earthquake and tsunami in Japan, on March 11, 2011.

With regard to the study of natural disasters in the Ottoman Period, first of all we have to point out the work N. N. AMBRASEYS & C. F. FINKEL, *The Seismicity of Turkey and Adjacent Areas: A Historical Review, 1500–1800*, Istanbul, 1995. “This work is part of a more general study of the investigation on the long-term earthquake activity of the Eastern Mediterranean region during the last 20 centuries which has developed over a period of almost three decades,” (p.13) and this book includes a catalogue of historical earthquakes and location sketch maps of the period 1500–1799, based on the various Ottoman archives, such as the records of the sharia court (Şeriyeye Siciller), the Registers of Important Affairs (Mühimme Defterleri), and so on. And it refers to “Existing catalogues of historical earthquakes in Turkey and adjacent areas”, so they need not be repeated here.

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In 1997, the symposium for *Natural Disasters in the Ottoman Empire* was held by the Institute for Mediterranean Studies (*Halcyon Days in Crete III: A Symposium Held in Rethymnon 10-12 January 1997*). At this symposium, which was held before the 1999 Marmara Earthquake, the participants discussed various earthquakes, floods and droughts during the Ottoman period. However, as it was held at Crete University, most of the papers studied the disasters in the Balkans and Eastern Mediterranean Islands.

At the same time, N. N. AMBRASEYS & C. F. FINKEL in their above mentioned study also presented a paper titled “Unpublished Ottoman archival information on the seismicity of the Balkans during the period 1500–1800” in this book.

After the Marmara Earthquake on the 17th August, 1999, another symposium was held at the Center for History Studies, Faculty of Letters, Istanbul University in 2000, and the proceedings, *Tarih Boyunca Anadolu’da Doğal Âfetler ve Deprem Semineri, 22–23 Mayıs 2000, Bildiriler* were published. Contrary to the symposium at Crete University, as a result of its location next to a recent earthquake, the papers were about different earthquake zones on Anatolia, such as Erzincan, Erzurum, Bursa, Isparta, Istanbul and so on.

So if we try to study the natural disasters that occurred during the Ottoman period, these three books are of essential importance.


However, one and half years after the North-Eastern Japan Great Earthquake and Tsunami disaster has passed, it is slipping from our memories, so it is very important for us to make scientific notes on this event and other natural disasters all over the world to pass on to future generations.

On the subject of earthquakes, there have been occasional disasters not only in Japan but also in Turkey, so there have been cooperative projects on earthquakes in the past. For example, I would like to point out the *Report on the Damage Investigation of the 1992 Turkey Earthquake* (in Japanese), which includes the *Damage Report on the 1992 Erzincan Earthquake, Turkey* (in English). This report is valuable because it was studied as a joint

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4 This book, edited by Elizabeth ZACHARIADOU, was published by Crete University Press in 1999.

5 Istanbul, “Globus” Dünüa Basımı.

6 「緊急特集 東日本大震災・原発事故と歴史学」『歴史学研究 (Journal of Historical Studies)』 No.884, October, 2011.


8 「1992年トルコ地震災害調査報告」 Joint Reconnaissance Team of Architectural Institute of Japan, Japan
research by both Japanese and Turkish study groups, and written in both Japanese and English.

In fact, with regard to the Marmara Earthquake on 17th August, 1999, there are a lot of studies in Japanese. Most of the reports were from the viewpoint of Seismology and Architecture, and at the same time they were only transient reports.

As for Anthropological study, KIMURA Shuhei has analyzed a community living under the constant threat of an earthquake disaster, and the process of scientific knowledge production and a seismographic observatory in Istanbul. Furthermore, he has attached greater importance to the aspect of temporality.

Recently, a report under Oral History studies has begun analyzing the Disaster Memories. Kimura's work includes this point as "Memory as a Sustainable Resource? Disaster Memory of Kocaeli earthquake, Turkey".

In Sociology, Eiko SUZUKI has written a report "Support Programs run by Civil organizations for 1999 Turkish Earthquake Victims: The Civil Organization Viewpoint", and ISHIKAWA Eiko, "Recovery project, 11 years after the Turkey Earthquake 1999". These studies are exceptional because they focus on only one area in the long-term covering more than ten years.

On the other hand, our Düzce Project has been in progress since 1999. The Düzce project is divided into two periods.

Society of Civil Engineers, and Bogazici University, Istanbul, Turkey, 1993, Shadanhoujin Nihon Kenchiku Gakkai (土木学会)．


13 木村周平「サステナブルな文化資源としての記憶？—トルコにおける地震の記録から (Memory as a Sustainable Resource?: Disaster Memory of Kocaeli earthquake, Turkey)」(国立歴史民俗博物館研究報告 (Bulletin of the National Museum of Japanese History)) 156, 2010, 39–56; 仏本真由美; 木村周平; 松多信尚; 松岡哲; 矢野克也「地震の記憶とその語り継ぎに関する国際比較研究―トルコ・台湾・インドネシアの地域間比較研究から」(京都大学防災研究所年報 (Disaster Prevention Research Institute annuals, Kyoto University)) 52(B), 2009, 181–194.


15 石川永子「トルコ西部地震から11年目の被災地―被災した市民団体（男性・女性）を対象とした住宅取得支援の動向―」(都市計画 (City Planning Review)), 286, vol.59/no.4, Aug. 2010, p.76.
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The First Period (1995–2007)

It began with the Hanshin-Awaji Earthquake (Kobe Earthquake) on January 17th, 1995. Just after this earthquake, Kakumoto and other researchers from the Disaster Prevention Research Institute, Kyoto University, entered the stricken area and developed their spatial-temporal GIS, or DiMSIS-EX (Disaster Management Spatial-temporal Information System- Expansion), to grasp the situation related to the destruction and reconstruction of the area. So DiMSIS-EX has been applied to the reconstruction and development of the disaster area and at the same time DiMSIS-EX itself has been technically enhanced for this research.

Right after the Marmara Earthquake in 1999, Kakumoto and his colleagues hoped to apply DiMSIS-EX to the stricken area. Chieko ADACHI,16 and Metin COŞKUN introduced them to Halit Ramazan KUBILAY (Düzce Municipal Office), and they established a joint project for the reconstruction and development of Düzce. In December, 1999, Kakumoto visited Düzce for the first time, and they initiated joint projects and their analyses and planning has achieved their intended goals so far. Their proposal document has belonged to the Library of Düzce, and their studies by applying DiMSIS-EX are follows;

1) Mahito USUI; Koji YOSHIKAWA; Shigeru KAKUMOTO; Yoshio KAJITANI, Activities for supporting the restoration process after the Turkey large earthquakes applying the Spatial-temporal.17
2) Yoshio KAJITANI, Shigeru KAKUMOTO, Yasuhiro HAYASHI, Koji YOSHIKAWA, Michinori HATAYAMA and Mahito USUI, Damages and Recovery Status in Duzce City After the 1999 Turkey Earthquakes.18
3) Yoshio KAJITANI, Koji YOSHIKAWA, Shigeru KAKUMOTO and Michinori HATAYAMA, Spatial-Temporal GIS Analysis of Houses in Duzce City Damaged by the 1999 Turkey Earthquakes.19 (The details of their studies will be explained in the papers of Kakumoto and Yoshikawa in this Special Issue.)

The Second Period (2008-2012)

The second period of our Düzce Project was started in 2008 as part of the “Sharja and Technology” studies of KIAS.

16 Chieko ADACHI, Safranbol (in Japanese), Tokyo; Trans.(from Turkish to Japanese), Orhan PAMUK, 『新しい人生』(Yeni Hayat), Tokyo, 2010.
The participants of the first period consisted of members of Information and Engineering Sciences, but Hikari EGAWA and İlhan ŞAHİN, who study Ottoman History, have also joined as members, \(^{20}\) because they were convinced of the need for a historian’s role in the study of the planning and reconstructing of a disaster proof town by applying DiMSIS-EX. As I have mentioned before, first of all, we would like to begin by emphasizing the importance of interdisciplinary and long term historical analysis to create a disaster proof town for the future. Second, we would like to demonstrate the value of applying DiMSIS-EX for historical and anthropological studies.\(^{21}\)

A part of our study has already been written and announced and we are continuing not only to observe the recovery and development of Düzce, but also to collect the memories of the event from the inhabitants of the area. So this is a long-term project, and at the same time it can be applied to any location in the world that is threatened by earthquakes in the future.

\(^{20}\) Egawa, Hikari & İlhan ŞAHİN, “From Bazaar to Town: The Emergence of Düzce”, Kyoto Bulletin of Islamic Area Studies, 3-1 (July 2009), 293–309.

\(^{21}\) Recently Historical GIS trends are remarkable and in June 2012, 『アジア歴史地理情報学会（日本）』 ANGIS(Japan) (Asian Network for GIS–based Historical Studies(Japan)) has established, whose secretariat belongs to an office of Prof. Dr. Tsukasa Mizushima in Tokyo University (angisjapan@gmail.com).