

2022 Symposium

# Climate Change and Cultural Heritage

What's Happening Now?

Japan Consortium for International Cooperation in Cultural Heritage



いま、何が起きているのか

## 気候変動と文化遺産

**2022 Symposium**  
**Climate Change and Cultural Heritage:**  
**Cultural Heritage**  
What's Happening Now?

**2022 10.23** 日

会場：東京大学弥生講堂一条ホール

主催：文化遺産国際協力コンソーシアム、国立文化財機構文化財防災センター、文化庁  
後援：外務省、国際協力機構、国際交流基金、日本イコモス国内委員会、ICOM(国際博物館会議)日本委員会



JCIC-Heritage

Japan Consortium for International Cooperation in Cultural Heritage

**2022 Symposium**

# **Climate Change and Cultural Heritage**

**What's Happening Now?**

## Explanatory note

This report records the contents of the FY2022 symposium “Climate Change and Cultural Heritage: What’s Happening Now?” held by the Japan Consortium for International Cooperation in Cultural Heritage (JCIC-Heritage), Cultural Heritage Disaster Risk Management Center, and the Agency for Cultural Affairs on October 23, 2022. This report consists of transcripts of voice recordings, which have been edited into a report format. All photographs used without sources cited in presentations are provided by the presenters.

We hereby express a sense of gratitude to the experts below for their great contribution to this symposium.

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### Organizers

Japan Consortium for International Cooperation in Cultural Heritage, Cultural Heritage Disaster Risk Management Center, Agency for Cultural Affairs of Japan.

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## Conference Theme

How is climate change affecting cultural heritage? In the Japan Consortium for International Cooperation in Cultural Heritage (JCIC-Heritage) 2022 symposium, we will look at the impact of climate change from a historical perspective and consider its relationship to human society, share and discuss issues facing tangible and intangible cultural heritage under climate change, and explore the possibility of international cooperation for a better future of cultural heritage.

## Program

- 9 : 15 – 9 : 20 **Opening Remarks**  
AOYAGI Masanori
- 9 : 20 – 10 : 00 **Lecture I**  
**Potential of cultural heritage as the memory of past climate adaptation inferred from paleoclimatology**  
NAKATSUKA Takeshi
- 10 : 00 – 10 : 10 **Q&A**
- 10 : 10 – 10 : 50 **Lecture II**  
**The Futures of our Past: Cultural Heritage and the Climate Emergency**  
William Megarry
- 10 : 50 – 11 : 00 **Q&A**
- 11 : 00 – 11 : 40 **Lecture III**  
**Climate Change and Traditional Knowledge: Case studies from Oceania**  
ISHIMURA Tomo
- 11 : 40 – 12 : 00 **Q&A**
- 12 : 00 – 13 : 30 **Lunch Break**
- 13 : 30 – 15 : 25 **Panel Discussion**  
Facilitator : SONODA Naoko  
Panelist : TATEISHI Toru  
NAKATSUKA Takeshi/ William Megarry/ ISHIMURA Tomo
- 15 : 25 – 15 : 30 **Closing Remarks**  
KOHDZUMA Yohsei

## Opening Remarks

**AOYAGI Masanori** (Chairperson, Japan Consortium for International Cooperation in Cultural Heritage)



With COVID-19 rampant on a global scale, online or hybrid meetings are already common. Today, I am pleased to hold this symposium and meet face-to-face with many people after such a long time.

Today's symposium is also delivered online to allow more people to participate. I would like to take this opportunity to express my sincere gratitude to everyone who is at the hall or participating online.

Recently, with a heightened sense of crisis over global warming and climate change, there have been many discussions in the international field of cultural heritage protection, such as consideration of countermeasures to mitigate their impact and adaptation measures based on new preservation concepts, and reevaluation of traditional knowledge as a basis for sustainable thinking. Cultural and natural heritage sites around the world and the cultural pursuits of people living there are endangered, and there are also moves to reinterpret World Heritage as a system that includes all of these things and consider the possibility of being a role model in modern society under climate change.

In Japan, however, there still seem to be very few discussions and efforts that focus on the relationship between climate change and cultural heritage protection. How does climate change affect cultural heritage? The Japan Consortium for International Cooperation in Cultural Heritage has set up this symposium first for us to understand together the relationship between climate change and cultural heritage, while considering the coming challenge of strengthening international coordination and cooperation to protect cultural heritage against climate change.

Cultural heritage protection so far has been based on a forecasting approach in which the future is forecasted from the current state. From now on, however, we need a backcasting approach that considers how we can address the effects of climate change such as larger-than-expected tsunamis and sea level rises.

For this, this symposium focuses on disaster prevention efforts with many years of cutting-edge experience in connecting the protection of Japanese cultural properties with climate change. The Cultural Heritage Disaster Risk Management Center of the National Institutes for Cultural Heritage will participate in a panel discussion with three other speakers to address the direction for a better future of Japan's international cooperation in the cultural heritage field.

After this, I will give a speech in commemoration of the 100th anniversary of the Shinjuku High School. Around a century ago, the First World War had recently ended and the Taisho Democracy was coming to an end, before the Showa Depression would occur and Japan would plunge into the Second World War.

The current global situation is very similar to those days. Before the situation becomes serious, we should quickly determine a course of action for climate change and cultural property protection. With the whole world under such pressure, it is very significant for this kind of symposium to be held.

Thank you very much.

# Potential of Cultural Heritage as the Memory of Past Climate Adaptation Inferred from Paleoclimatology

**NAKATSUKA Takeshi**

(Professor, Graduate School of Environmental Studies, Nagoya University)



Before Dr. Nakatsuka got his Ph.D. degree in 1995, he graduated from the faculty of Science, Kyoto University in 1986 and Graduate School of Science, Nagoya University in 1991. Since being Assistant Professor at the Water Research Institute, Nagoya University, Associate Professor in Institute of Low-Temperature Science, Hokkaido University and Professor in Research Institute of Humanity and Nature, he has been working as a Professor in the Graduate School of Environmental Studies, Nagoya University from 2018 until now. He has been conducting interdisciplinary research projects on the relationship between climate variation and human history based on the precise reconstruction of past climate using tree-ring cellulose oxygen isotope ratios. Recently, he published the following two books. *Oxygen Isotope Dendrochronology* (Dosei-sha, 2021) and *Japanese History on Climate Adaptation* (Yoshikawa-Kobunkan, 2022).

I am Nakatsuka from Nagoya University. Thank you for the invitation to this important symposium. I am neither an expert in the preservation of cultural heritage nor a climatologist who studies the current climate, so I cannot talk about how cultural heritage is damaged by global warming and how to prepare for it. My specialty is paleoclimatology: specifically, I am doing research on reproducing thousands of years of past climate change year by year using the annual rings of trees. Today, I want to talk about how people responded to past climate change, how its memory was carved into cultural heritage, and what and how we should learn

from its memory, by carefully comparing my research results with Japanese history in different periods and cultural heritage in a broad sense (Figure 1).

Cultural heritage, such as landscapes and books, includes many things that are considered to be a memory of adaptation to past climate change (Figure 2). For cultural heritage artifacts such as manmade banks and irrigation channels to prevent flood and drought disasters, and agricultural books and various crops to prepare for famine, much research has been conducted in connection with climate change. Such cultural heritage artifacts have served as measures

文化遺産国際協力コンソーシアム令和4年度シンポジウム  
「気候変動と文化遺産—いま、何が起きているのか—」  
◎東京大学・弥生講堂・一条ホール (2022-10-23)

Potential of cultural heritages as the memory of past climate adaptation inferred from paleoclimatology

古気候学から見た過去の気候適応の  
記憶としての文化遺産の可能性  
中塚 武  
(名古屋大学大学院・環境学研究科)

NAKATSUKA Takeshi, Professor of the Graduate School of Environmental Studies, Nagoya University

1. 「過去の気候適応の記憶」としての文化遺産とその限界
2. 「古気候学」から見た東アジアの過去2600年間の気候変動
3. 「数十年周期変動」への適応の困難性…先史から近代まで
4. 「文化遺産」に刻まれた数十年周期変動への適応の記憶

多くの文化遺産の中には、過去の気候変動への人々の適応の記憶が、良い意味でも悪い意味でも刻み込まれている。その記憶からどのように学ぶかが問われている。

Figure 1

「過去の気候適応の記憶」としての文化遺産@日本

治水・利水（水害・干害への適応）

- ・霞堤、輪中・・・ 等々
- ・溜池、用水路・・・ 等々

農業生産（水干害・冷害への適応）

- ・農書、多様な作物品種・・・ 等々
- ・義倉、社倉・・・ 等々

★こうした文化遺産は、実際に、エルニーニョ南方振動現象（ENSO）などによって数年に一度程度の頻度で起こる気象災害への適応に、大きな役割を果たしてきた。

●しかし現在の温暖化は、更に長い時間スケール（数十年～）で起きている。

【設問】過去に起きた「数十年以上の時間スケールの気候変動」に対して、人間社会は、どのように「適応」に成功（失敗）し、その記憶は「歴史の史資料⇒文化遺産」の中にどのように刻み込まれているのか？

Figure 2

of adaptation to climate change because they were created intentionally by people in those days to prevent disasters that occurred once in several years, that is, disasters that people had already experienced. However, the global warming that is happening now is a long-time-scale phenomenon, and we cannot always predict the scale and state of disasters that will occur in the distant future. If large climate change occurred over a time scale of several decades or more, how did people of the past cope with it? How was its memory carved into recorded history and cultural heritage in a broad sense? To clarify such issues, it is necessary to correctly understand how climate change occurred at various points in the past.

Figure 3 shows a reconstruction of yearly climate changes in the summer over the past 2600 years based on analysis of the oxygen isotope ratio of annual rings contained in many wood specimens in central Japan. Comparing the obtained data with 20th-century meteorological observation data reveals that there is a high correlation between precipitation and temperature in the summer in a wide area of East Asia. Moreover, comparing these data with archaeology and history findings in Japan or existing paleoclimatic data on a broad time scale reveals that past climate change is correctly reproduced on all time scales of from one to a thousand years.

Figure 4 shows the result obtained by decomposing the previous data into different periodic components using a mathematical approach. First, the figure shows that the climate in Japan has a periodicity of about a thousand years, which is in good agreement with the already known fluctuations in other regions of the

world. Additionally, there was another new finding. As we focus on fluctuations in cycles of several decades such as 16 to 32 years or 32 to 64 years, we can see that the amplitude of these fluctuations has increased once every about 400 years. This trend was especially clear until the 14th century, and since then, the amplitude has continued to be large. Behind this, there is said to have been a historical change in volcanic eruption frequency, but here, I want to discuss its social outcomes, not its causes.

Comparing the data of the amplitude of fluctuations in decades-long cycles with chronologies of Chinese and Japanese history revealed something interesting (Figure 5): the increase of the amplitude of climate changes in decades-long cycles was always accompanied by a historical change, such as a reform of the political system in China or Japan. This suggests that climate changes in decades-long cycles may have a considerable impact on human society.

Then, let me conduct a thought experiment as to why human society is susceptible to climate changes

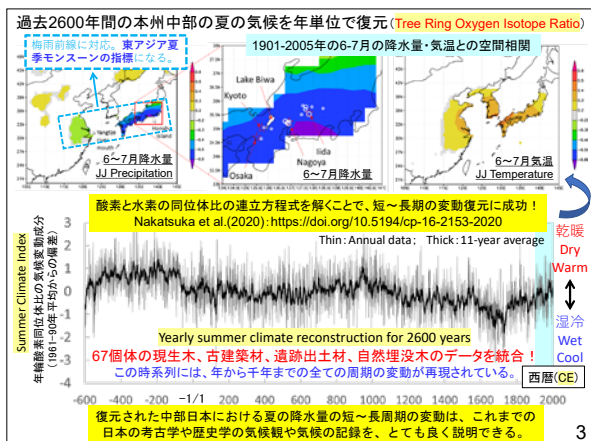


Figure 3

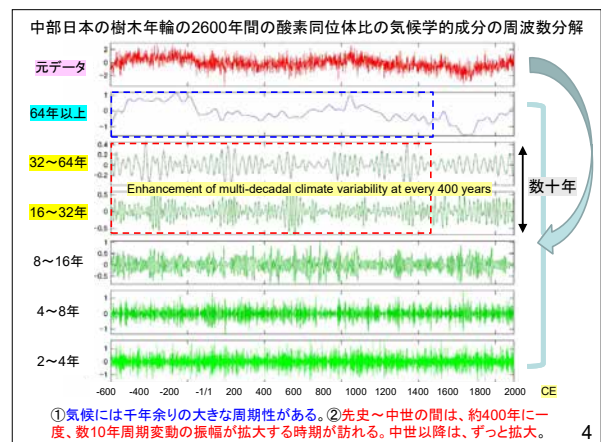


Figure 4

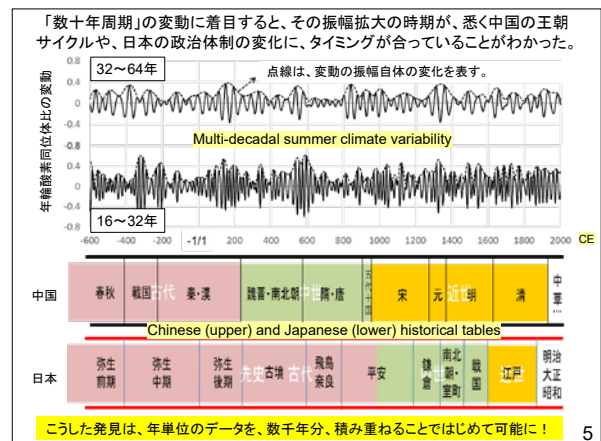


Figure 5





during a period when changes in decades-long cycles were at their lowest point. In short, famine occurred as in the thought experiment with four circles in Figure 6. However, the response of society to famine was not simple. The lower graph in Figure 8 represents the number of peasant uprisings across Japan in the Edo period. Until the middle Edo period, uprisings did not occur if a famine happened, but in the late Edo period, peasant uprisings occurred each time famine happened, and at the end of the Edo period, fierce uprisings occurred because of increases in the price of rice due to crop failures, even if famine itself did not happen. This indicates that society's ability to respond to climate change changes over time.

Figure 9 summarizes what happened in Japan in periods in which the amplitude of climate changes in decades-long cycles increased. In the short run, famine and conflict occurred in any period, but society's response in the long run varies over time. Here, I want to take a closer look at society's response, that is, what adaptation occurred in response to climate change. I

will do this in chronological order for as long as time allows.

The most notable change in the climate from the early to late Yayoi period was humidification and cooling, which occurred in the first century B.C. (Figure 10). Although we could infer that this caused a population decline and the spread of hilltop settlements across western Japan, the periods of the most remarkable climate changes in decades-long cycles were the third to fifth centuries B.C. and the second century A.D. Active migration of people can be found in both periods.

The former period corresponds to the Warring States period in China, when people in mainland China migrated to Japan with metal tools and rice cultivation spread across Tohoku and Kanto, which were the last areas of the main island of Japan in which rice cultivation had not been practiced. In this period, rice cultivation was not widespread in every corner of the Japanese islands, so it can be surmised that for people who were engaged in agriculture, migration could be a solution to problems associated with climate change.

In the latter period, however, rice cultivation was already practiced all over Japan, so migration of farmers in search of new land did not necessarily solve problems and may rather have caused new problems in new locations. According to Gishiwajinden (Account of the Wa in History of the Wei Dynasty), a great war, the Wakoku War, occurred in Japan, which led to the transformation of the political system represented by the Yamatai Kingdom.

Figure 11 shows changes in the number of houses remaining in areas in Kinki. It indicates that in each

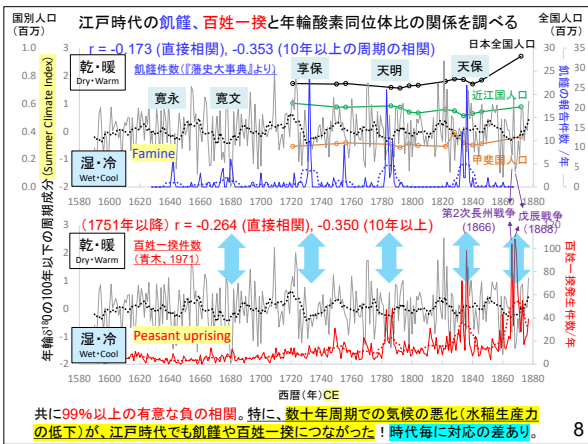


Figure 8

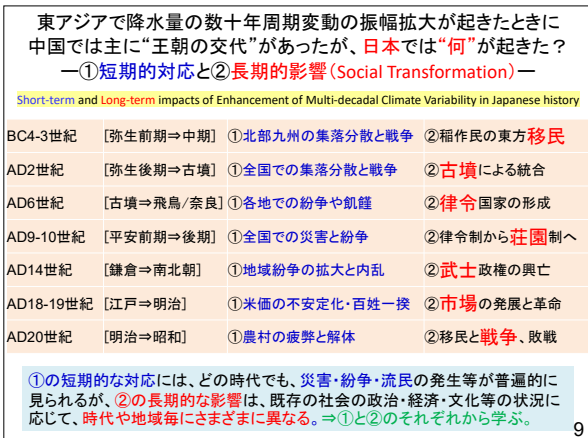


Figure 9

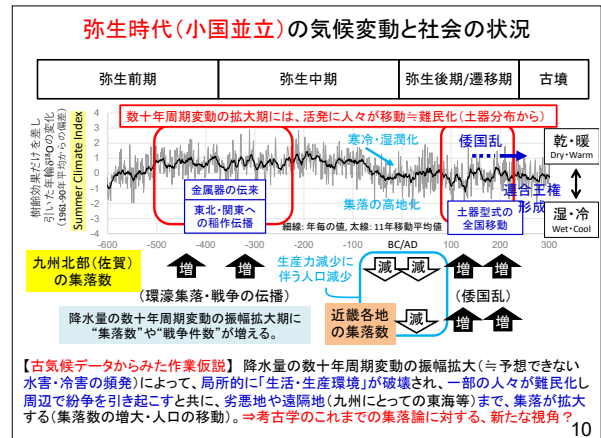


Figure 10

area, the number of houses increased as the amplitude of climate changes in decades-long cycles increased. Changes in the number of houses are generally considered to indicate changes in population. If people are forced to migrate in response to climate changes in decades-long cycles, they must make simple houses in a new location. Thus, an increase in the number of houses in this period was possibly due to increased migration of people, similar to the spread of earthenware in wide areas. For such cultural heritage remains, age dating—including dendrochronology—allows us to accurately read memories of climatic adaptation.

The Aoya-Kamijichi site, the remains of a large port village in Tottori Prefecture, may also be the result of a second-century negative adaptation to climate change (Figure 12). At this site, the bones of more than 100 people with fatal wounds were found. Recent DNA analysis showed that they were mostly unrelated by blood and originated from various places overseas. This means that people who escaped as refugees by ship from many regions, including the mainland, may have

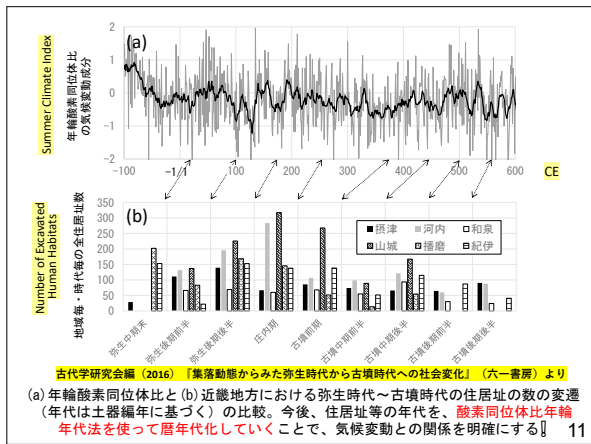


Figure 11

been killed together as the result of some unrest. Such ghastly facts can also be revealed from cultural heritage artifacts.

In the third century, however, the Japanese islands entered the Tumulus period (Figure 13), when a large number of gigantic tombs called Kofun (tumulus) were made. Why did people start to make these tumuli? Construction of a Kofun required a lot of labor, and thus we could infer that Kofun were initially constructed as public works to give work to people who lost their residences and farmland to flooding and came as refugees. Actually, the Yamato Basin, in which Hashihaka Tumulus (the oldest keyhole-shaped tumulus) is located, is less likely to be affected by flooding because of its geographical features, so it is possible that such a place attracted many people.

After that, the amplitude of climate changes in decades-long cycles was small in the early to middle Tumulus period but increased in the sixth century (Figure 14). The early sixth century saw civil wars such as the Iwai War in Kyushu and the Musashinokuni-

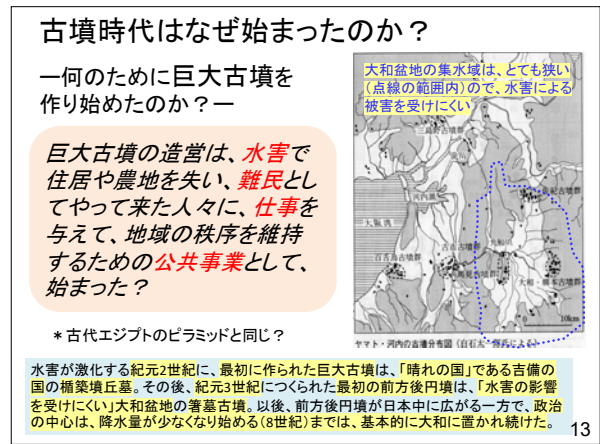


Figure 13

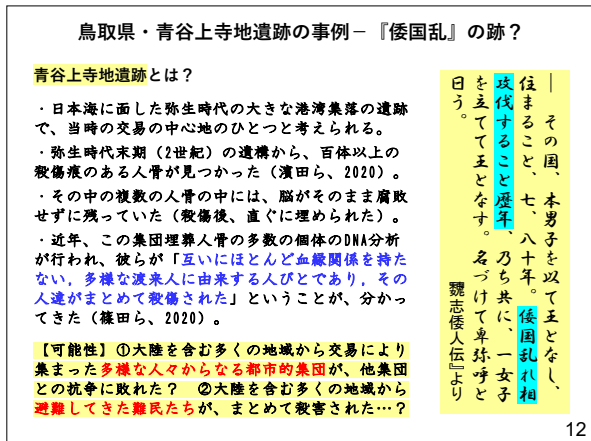


Figure 12

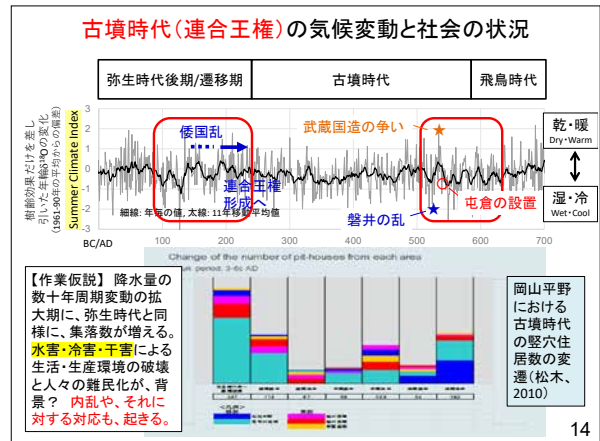


Figure 14

no-Miyatsuko Rebellion in Kanto, and around the same period, many articles on miyake (Imperial-controlled territory) appeared in the Nihonshoki (The Chronicles of Japan).

Miyake is land that consisted of farms and warehouses that were directly controlled by the Yamato sovereignty. According to the Nihonshoki, miyake was installed throughout Japan in 534 and 535 (Figure 15). Why were articles on miyake concentrated in these two years? Among researchers of the Nihonshoki, there was a long-standing interpretation that those articles were fabricated by people in the Nara period who actually wrote the Nihonshoki. However, a totally different interpretation is possible with regard to climate change: the installation of the miyake system provided a big opportunity for the subsequent establishment of the Japanese nation under the Ritsuryo codes.

As an aside, Figure 16 shows the result of using oxygen isotope dendrochronology to analyze a pillar root of a large Heian-period building in the provincial capital of Izumo Province. The pillar root was

borrowed from the Shimane Prefectural Archaeological Center several years ago. A date around the ninth century was estimated, but actual measurements showed that the date of the outermost annual ring of the pillar is 534. This is just when the miyake system was installed throughout Japan, which means that at least in Izumo Province, huge buildings were built at that time. The Ritsuryo system of ancient times was based on Handen Shuju-no-ho, the law of imposing obligations to pay taxes and do military service in exchange for lending farmland by creating koseki (Japanese family registry) of people to manage them. It was believed that behind this, there was a very tense situation in East Asia due to the defeat by the allied forces of the Tang Dynasty of China and Silla (Korea) in the Battle of Hakesukinoe in 663 (Figure 17). However, koseki based on miyake were first introduced in the mid-sixth century, and the equal-field system in China, which became the origin of Handen Shuju-no-ho, existed from the late fifth century. Neither system had anything to do with the rapidly changing situation in East Asia.

Looking at the relationship between climate change and miyake—including other cases—we find that the periods in which the Yamato sovereignty improved and expanded miyake were concentrated in warm periods in changes in decades-long cycles, like the period when the equal-field system started in Northern Wei in China (Figure 18). From this, we can consider that after the amount of abandoned agricultural land increased and many people became refugees during lean years in changes in decades-long cycles, the miyake system was installed so that refugees could be sent to abandoned

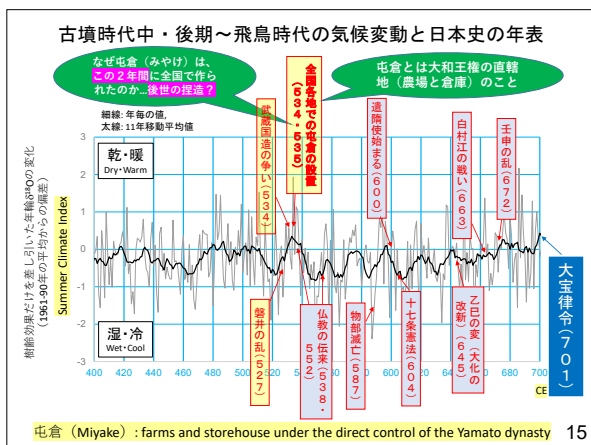


Figure 15

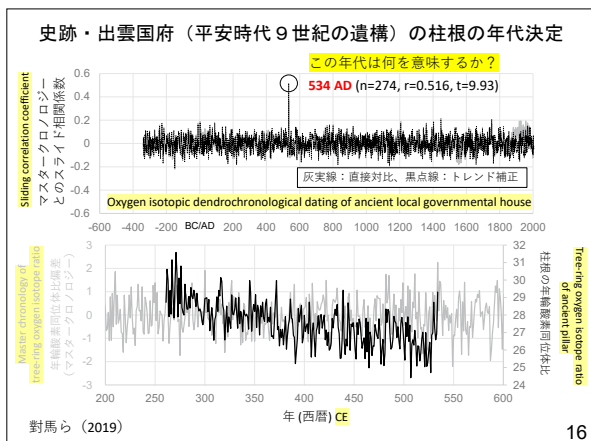


Figure 16

**古代日本の『律令制』（中央集権制）の特徴は？**

「戸籍」を作って、日本中の全ての人々を政府が管理し、人々に農地に貸し与える代わりに、納税（租庸調）と兵役（防人など）の義務を課した。班田収授法（⇒直後から形骸化し、徐々に荘園などが広がる。）

**【教科書的な説明】**  
律令制は、663年の白村江（現・韓国西南部）での唐と新羅の連合軍に対する大敗北が契機となって、激動の東アジア情勢に対抗するために作られた...とされてきた。

**【反論】**  
① 実際には6世紀（500年代半ば）には、渡来人の技術を借りた蘇我氏が、各地の屯倉において「戸籍」を作り始めたことが知られている。つまり「激動の東アジア情勢」とは別の理由で、戸籍の導入が始まったのではないのか？  
② 日本の「班田収授法」は中国の「均田制」を真似たものだが、均田法は5世紀末からあり、もちろん「激動の東アジア情勢」とは関係がない。

Figure 17

agricultural land to engage in farming during abundant crop years following the lean years, as was the case with the equal-field system in China.

The koseki system was started during a cold period with changes in decades-long cycles when a great famine occurred. It can be interpreted to have been introduced to prevent people from escaping and to collect taxes during lean years. After that, the amplitude of climate changes in decades-long cycles decreased through the seventh century. After the defeat in the Battle of Hakusukinoe, the first nationwide family register, Kogo Nenjaku, was made. The purpose of koseki may also have changed at this point.

In this way, the Ritsuryo system, the greatest intangible cultural Heritage from ancient Japan, can also be interpreted as part of climatic adaptation.

After that, the amplitude of climate changes in decades-long cycles increased again from the late ninth to tenth century, when in China, the Tang Dynasty fell, and in Japan, civil wars occurred in various regions (Figure 19). In this period, the Ritsuryo system was

not strengthened but rather collapsed and was turned into a manorial system, and various social disorders, especially conflicts between Zuryo (the heads of Kokushi [provincial governors]) and local people, intensified.

The famous Konjaku Monogatari Shu (Tales of Times Now Past) also includes many tales that mention the tyranny, brutality, and greed of Zuryo Kokushi (Figure 20). Behind this conflict between central and local areas were changes in agricultural production due to climate change over a time scale of several decades or more, especially the difficulty of adapting to lean years.

The amplitude of climate changes in decades-long cycles increased again from the late 13th to 14th centuries (Figure 21). The lower graph shows the results of an analysis of the Kamakura Ibun, a collection of all ancient documents from the Kamakura period. In it, the ratio of documents including the word "Akuto" (villain), which indicates the occurrence of regional conflict, is compared to the line obtained by vertically flipping changes in the oxygen isotope ratio

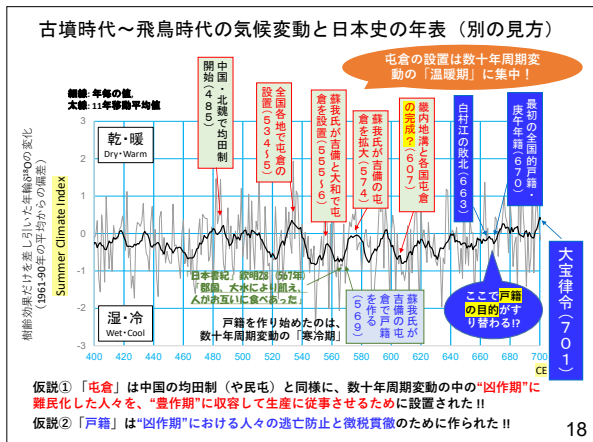


Figure 18

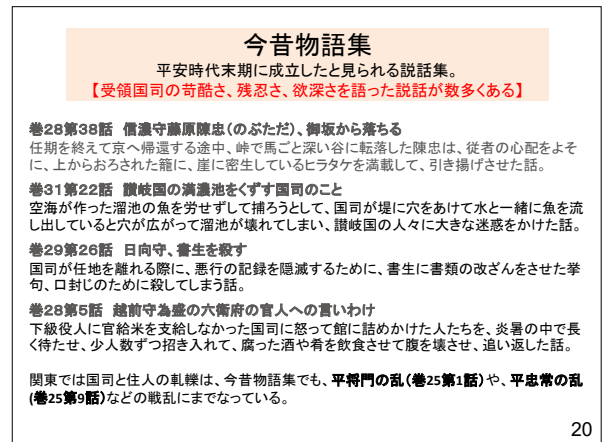


Figure 20

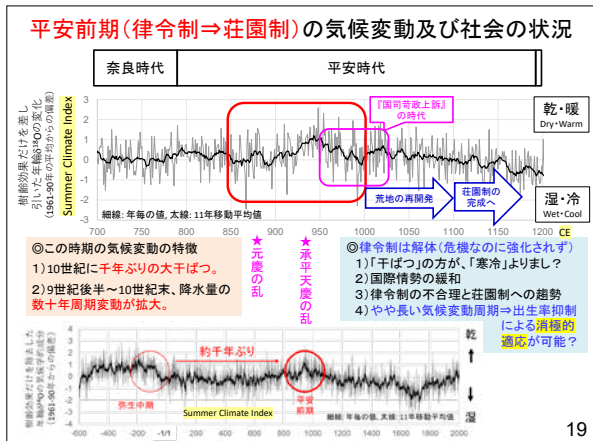


Figure 19

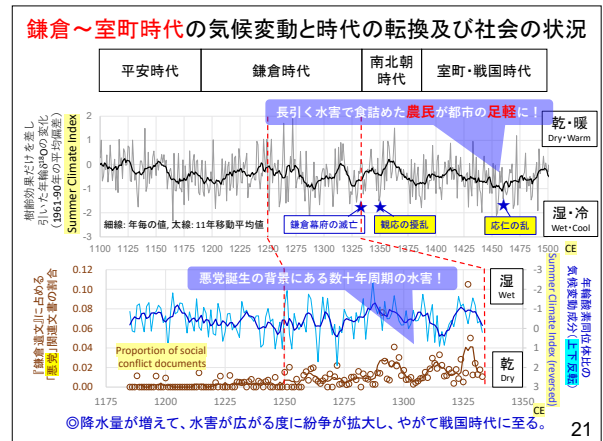


Figure 21

of annual rings. In the late Kamakura period, we can see that as precipitation increased, “akuto” activities increased a little later. It seems that an increase in precipitation resulted in flood disasters, and flood disasters in the middle ages caused regional conflict to intensify during disaster recovery.

The Kamakura shogunate was suddenly overthrown immediately after a surge in precipitation in the 1320s, but even after that, representative civil wars of the middle ages, such as the Kanno Disturbance and the Onin War, occurred each time precipitation increased. Behind such civil wars, there was likely a situation in which farmers who were no longer able to make a living because of a flood disaster became common foot soldiers and went to a battlefield to earn their living.

Flood disasters are generally said to occur due to heavy rain and because there are houses and rice fields in the areas that become flooded (Figure 22). Then, we must consider that more than ten years previously, those places had not been flooded. That is, flood disasters occurred not because of high precipitation but because of an increase in precipitation over a time scale of several decades or more. Although disaster recovery methods differ greatly between the present day and the middle ages, lessons from the time scale of climate change remain relevant today.

In the early Edo period of the 17th century, the development of new rice fields resulted in a surge in food production and population despite global climate cooling (Figure 23). However, in the middle Edo period of the 18th century, the population decreased, mainly in Eastern Japan, which had originally been cold. Behind this, there seems to have also been

side effects such as frequent flooding due to the development of mountainous regions, but a negative approach of controlling the birth rate to adapt to a cool climate may also have been taken in Eastern Japan.

It can also be estimated from the population statistics of the Tokugawa shogunate that even in the Edo period, people migrated repeatedly because of changes in their occupation in response to temperature changes. Figure 24 shows an example of present-day Ishikawa Prefecture in Hokuriku and compares reproduced temperature and population data. The data indicate that in a cold period, people migrated to Noto, where fishing was active, whereas in a warm period, people migrated to Kaga, where agriculture was prosperous.

Climate changes in decades-long cycles brought about the Great Tenmei Famine, the Great Tempo Famine, and an extremely poor harvest at the end of the Edo period. After that time, the climate fluctuated periodically, and poor harvests due to cooling continued in the 1900s and 1930s (Figure 25).

**ところで、水害は、何故起こるのか？**

- 1) 大雨が降るから。  
→だけではない。
- 2) 大雨が降ったら水に浸かる場所に、家や田んぼがあったから。  
→では、何故、そんな場所に家や田を作るのか？
- 3) そこは、かつて(10年以上前)は、水に浸からない場所だったから。

つまり、水害は、単に降水量が多いことで起こるのではなく、降水量が変動し、乾燥気候が、湿潤気候に変化することで起きる。

**水害は、冷害と異なり、被害が必ず空間的に不均質に生じる！**  
**地域社会で、復旧・復興を巡って、格差(不公平)が発生する。**  
**政治が悪いと、(数十年より長い周期でも)紛争に発展する！**

Figure 22

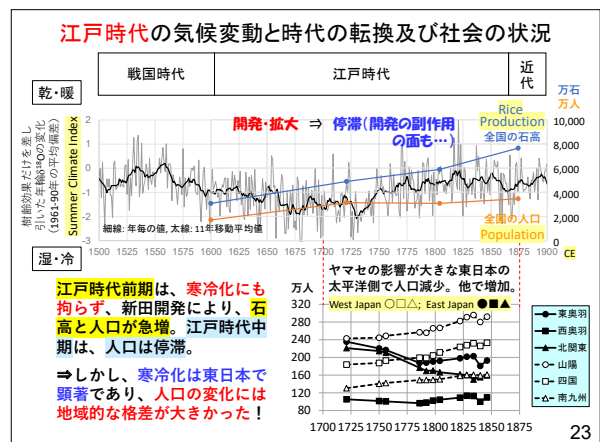


Figure 23

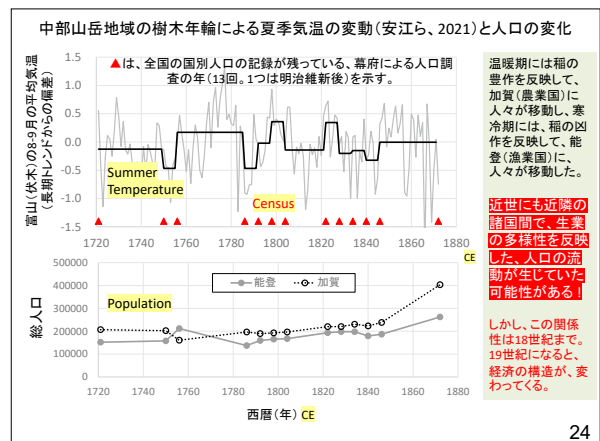


Figure 24

The upper graph in **Figure 26** shows the temperature data of Hakodate, where meteorological observations were made first in modern Japan, and information on changes in the total number of migrants from Japan to Manchuria or other overseas locations. Modern migrants have various economic and political backgrounds; similarly, in cold periods during which poor harvests continued, agricultural villages were impoverished across Japan, which resulted in an increase in the number of immigrants to overseas. At that time, Japan, led by the military, tried to solve the problem of surplus population in domestic rural communities by invading the mainland but lost a large number of soldiers who were from rural communities in battle. In a sense, this outcome was the same as that in the middle ages, or it was a system that was worse than that of the middle ages.

We have taken a quick view of the history of climatic adaptation in the Japanese islands since the early Yayoi period. What and how should we learn from cultural heritage, that is, memories of our predecessors who

faced the difficult challenge of adapting to climate changes in decades-long cycles (**Figure 27**)?

Here, I want to first consider the reasons for society's vulnerability to changes in decades-long cycles.

**Figure 28** shows a sketch that appeared in **Figure 6**. This cycle also includes the key determinant of success or failure in adaptation to climate change, such as global warming that will happen from now on. That is, how should we control over-adaptation when the environmental carrying capacity is increased? Conversely, how should we avoid collapse when it is reduced? Then, how can we promote restoration after a decrease in the environmental carrying capacity? For these issues, we can consider various perspectives such as the diversity of occupations, peaceful and just society, and tolerance for refugees and can also assume that results of what was actually tried in society in the past are embedded in cultural heritage.

What we assume here is that climate changes in decades-long cycles—that is, changes in productivity—provide opportunities of collapse and regeneration at

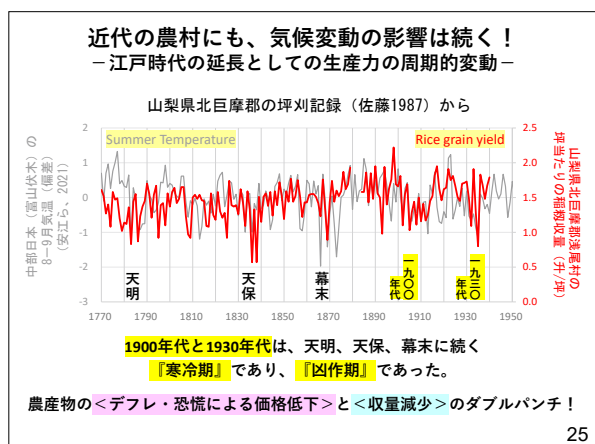


Figure 25

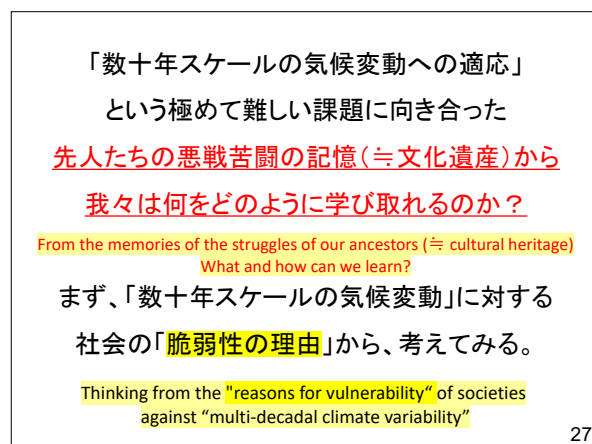


Figure 27

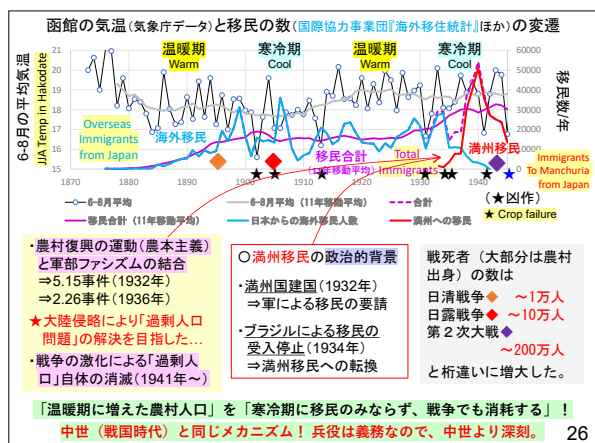


Figure 26

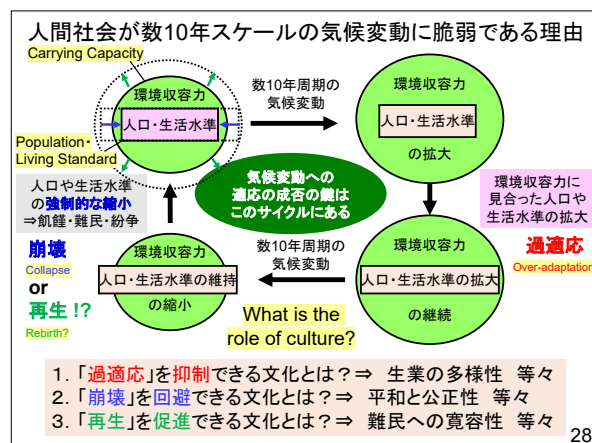


Figure 28

the same time for human society (Figure 29). Japanese history seems to include many examples of failure to adapt. We can consider that it was possible to control over-adaptation in periods in which there was a wide variety of occupations and food resources and that it may have been possible to avoid collapse in periods in which peace was emphasized, for example, by helping refugees through public works. In periods in which it was possible to maintain a peaceful society by positively accepting foreigners, it seems to have been possible to promote regeneration. More careful and comprehensive research is required to learn from the experiences of past societies, and all issues will be challenges for the future. I think that the key phrase common to all issues is perhaps “emphasis on diversity.”

Today, I spoke about several things in a short time (Figure 30). Many cases of cultural heritage were intended as adaptations to short-term climate change. Global warming has a time scale of several decades or more, so it is important to follow memories of cultural

heritage that correspond to it.

We have succeeded in reproducing the past 2600 years of climate year by year by using the oxygen isotope ratio of annual rings of trees in central Japan, and in this process, we found that human society is especially vulnerable to climate change on a scale of several decades. Comparing the paleoclimatic data of annual rings with the history and cultural heritage of the Japanese islands makes it possible to read memories of success and failure of people who faced climate change on a scale of several decades.

For us to learn from memories of climatic adaptation that were carved into cultural heritage, it is necessary to understand our predecessors’ activities from the perspective of the mechanism of society’s vulnerability to changes in decades-long cycles.

In conclusion, I thank you very much for your attention.

過去に起きた数十年(或いはそれ以上)の周期の大きな気候の変動への社会応答の「成功」と「失敗」から学べる事とは？

●共通の理解

数十年周期の変動(自然と社会環境の変動)は、人間社会にしばしば大きな影響を与える。それは、崩壊と再生のきっかけを、同時にもたらす。

●日本史から現代社会への教訓...失敗例が多いが**覚えて成功例を探す**と...

1)「過適応」を抑制する To suppress “over-adaptation”  
⇒多様な生業の存在(江戸後期など);多様な食糧源の存在(縄文時代)等々...

2)「崩壊」を回避する To avoid “collapse”  
⇒公共事業で難民救済(古墳時代、江戸時代)、平和の重視(平安・江戸時代)等々...

3)「再生」を促進する To promote “rebirth”  
⇒渡来人の重用(古墳時代)、平和下での復興(江戸前期、昭和後期)等々...

★真の教訓を探し出せるかどうかは、今後の多くの人々による歴史の探索に掛かっている。

共通するキーワードは「多様性」の重視!!(含む難民の許容)

The common key word may be the emphasis on “diversity”, including acceptance of refugee. 29

Figure 29

まとめ

1. 前近代の社会には「数年に一度程度の頻度」で起きる気候災害に対応できるように意図された、治水・利水や農業生産に関わるさまざまな事物(有形・無形の文化遺産)が存在していた(気候適応の記憶)。しかし、現在の地球温暖化はそれよりも長い時間スケールでおきているので、過去の気候適応の手法が、そのまま有効である保証はない。

2. 近年、中部日本の樹木年輪の酸素同位体比を使って、過去2600年間に及ぶ年単位での東アジアの夏の気候の変動を復元することに成功した。そのデータからは、「数十年スケールの気候変動」に対して人間社会は最も脆弱であることが示され、理論的にも、その意味が理解できる。

3. 数十年スケールの気候変動に対峙した先史から近代までの日本列島の人々の営みの記録(歴史≒文化遺産)からは、時代ごとに様々な気候への適応が試みられて、成功と失敗を繰り返してきたことが分かる。

4. 我々が過去(歴史≒文化遺産)の気候適応の記憶に学ぶには、数十年スケールの気候変動への社会の脆弱性の本質的な原因から、過去の人々の営みの意味を理解する必要がある。その際には①過適応を抑制できる文化、②崩壊を回避できる文化、③再生を促進できる文化とは何なのかについて気候適応の記録(≒文化遺産)から学んでいくことができるはずである。

30

Figure 30



# The Futures of our Past: Cultural Heritage and the Climate Emergency

## William Megarry

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Focal Point for Climate Change, The International Council on Monuments and Sites (ICOMOS))



As a landscape archaeology and heritage management specialist, he has always had a keen interest in the relationship between people and their surroundings. Following an undergraduate degree in ancient history from Trinity College Dublin and a master's degree in geospatial analysis from University College London, he completed a Ph.D. in Dublin exploring prehistoric landscape modeling before working in commercial GIS consultancy for a number of years. In 2014, he traveled to the USA on a European Marie Skłodowska-Curie post-doctoral fellowship to explore the intersections between heritage management, remote sensing and geospatial analysis. Around this time, he became increasingly concerned about the impacts of climate change on cultural heritage, a research topic he has continued to explore during his subsequent and current academic position at Queen's University Belfast. He has been a member of the ICOMOS Working Group on Climate Change and Cultural Heritage since its inception in 2016 and in 2021 he became the focal point and working group lead. He has led projects exploring climate communication, traditional ecological knowledge and - most recently - developing new tools to assess the vulnerability of cultural heritage sites and properties to climate change.

Good morning, everyone. Allow me to begin by thanking the organizers of this important event. I would like to thank the Japan Consortium for International Cooperation in Cultural Heritage in particular for this opportunity to speak, Dr. ISHIMURA Tomo for recommending me, and Dr Jenny Chiu for arranging and organizing my attendance here so perfectly. This is my first-time visiting Japan, and it is a great honor to be here with you all today.

This conference – 'Climate Change and Cultural Heritage: What's Happening now?' - is a timely event happening at a key time in the climate emergency. The last few years have seen an acknowledgment of the role in cultural heritage in climate action, manifest in the increasing focus on loss and damage for both countries and communities, and the importance of adaptation planning at last year's Conference of Parties in Glasgow. In the build up to the 27th Conference of Parties in Egypt next month, there is a growing movement within the heritage sector, led by organizations like the International Council on Monuments and Sites (or ICOMOS) and the Climate Heritage Network, to put culture on the agenda and

promote its immense value to climate action.

This presentation will begin by contextualising the current policy and practice landscape before exploring the topic of loss and damage, focusing on how our tangible cultural heritage is impacted by climate change (Figure 1). It will then explore some key emerging themes; specifically, the need for new tools and methodologies to record sites and assess their vulnerability to climate impacts, drawing on examples from a recent project focused on African World Heritage properties.

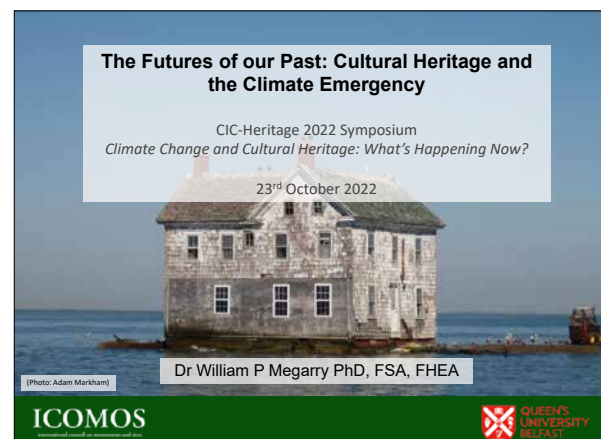


Figure 1

But first, allow me to introduce myself (Figure 2). I am an archaeologist by training with a particular interest the archaeology of island cultures in prehistory. I currently run a research project exploring Neolithic polished stone tool production on the Shetland Islands in Northern Scotland. Like most archaeologists, I am probably more comfortable in boots and a woolly sweater than in a suit; however, over the last decade – as the impacts of the climate crisis became more evident in the places where I was working - much of my time has focused on the intersection between cultural heritage and climate change. I am now the focal point for climate change at ICOMOS and lead their Climate Action Working Group. This has over 100 members from around the world and is committed to equipping the heritage sector to respond to climate change by realising the huge value of culture to climate action. I am also an expert member of the ICOMOS International Committee on Archaeological Heritage Management (ICAHM) and a member of ICOMOS Ireland, my national committee.

When discussing the subject of climate change and culture I am often asked why, during a climate emergency with so much suffering around the world, we should be concerned about cultural heritage at all. This is a valid question and one that we must be able to answer. And there are many responses, but I would like to focus on three of relevance to our discussions today (Figure 3).

The first, is that heritage anchors us in place. It is the

cumulative memory of humankind and the memory of communities, and it is the thing from which many of us derive our identities. As such, it gives us a grounding in the world. Without it, people lack that anchoring, that sense of identity and that sense of community. Cultural heritage is the glue that holds us all together.

The second response is that culture allows us to realize and understand climate change in a people-centered and relevant way. For many, climate change can be overwhelming, and people very quickly get lost in a forest of scientific terms and doomsday predictions. Culture and heritage are about people and things which are important to people. It is an immense asset in encouraging action and promoting change.

The final response is that heritage can act as a lens, through which we can explore many associated angles on climate change including justice, livelihoods, migration, mitigation, identity, loss, impacts, solutions and of course urgency. Culture is embedded in every aspect of our lives and cannot be ignored. Moving culture from the periphery to the center of our climate conversation results in more effective and inclusive climate action. It can be considered the ‘missing link’ in our global response.

This importance and value of cultural heritage to climate action has already been acknowledged by the international climate change community, albeit in a limited manner, in Article 7.5 of the Paris Agreement which makes the link between adaptation planning and indigenous and local knowledge (Figure 4).



Figure 2



Figure 3

More recently, it was further emphasized during the COP 26 in Glasgow which stressed this value as part of the Glasgow–Sharm el-Sheikh Work Programme on the Global Goal on Adaptation. Specifically, it called on governments to, ‘take into account traditional knowledge, knowledge of indigenous peoples and local knowledge systems’ when devising adaptation plans. This initiative raises the importance of adaptation, putting it on a par with mitigation within the IPCC (Intergovernmental Panel on Climate Change). The Glasgow COP was also important because it switched the focus to loss and damage including a conversation on how states’ funds can be used to support the most vulnerable. These discussions included - albeit indirectly - impacts on cultural heritage as non-economic losses.

This insertion of culture into climate debates was a key part of our recent International Co-Sponsored Meeting on Culture, Heritage and Climate Change, which was a collaboration between ourselves at ICOMOS, UNESCO and the IPCC. This meeting was a response to growing calls for international attention to culture, heritage and climate change from across the sector, including heritage advisory bodies and the UNESCO World Heritage committee. They were a recognition that significant gaps exist in understanding the role of culture and heritage in global climate science and climate change responses and aimed to put culture at the heart of the climate conversation. Over 120 participants attended from 40 countries across all six

continents, with 40% of the participants coming from the Global South. They included representatives from natural and cultural heritage, and climate scientists. Indigenous Peoples and local communities were also well represented.

This meeting has really set the agenda for the coming decades and was summarised in our Global Research and Action Agenda on Culture, Heritage and Climate Change which was published last month. It is available to download, alongside three White Papers commissioned for the meeting, from the Project website and from the ICOMOS Archive (**Figure 5**).

A huge amount of the conversation on climate change and cultural heritage focuses on the subject of loss (**Figure 6**). While responding to the conservation and preservation challenges posed by climate change is critically important, it is only one side of the coin. Already today, you will have heard me refer to culture

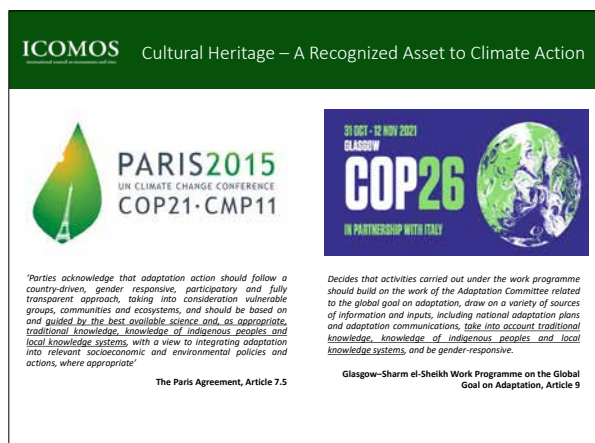


Figure 4



Figure 5

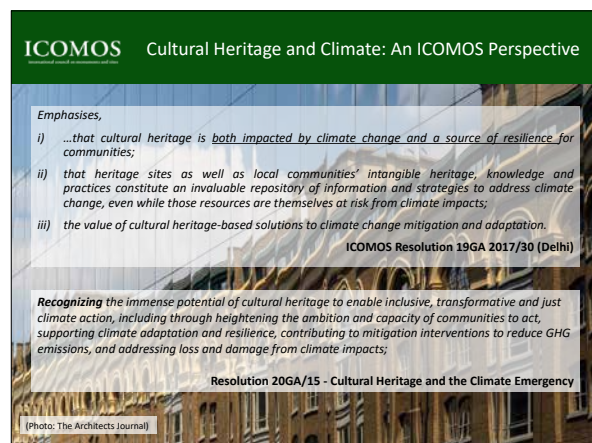


Figure 6

as an asset in our response to climate change more than once. This is a key part of our message and vision in ICOMOS and is central to all our activities in the Working Group. We were amongst the first major heritage organizations to declare a climate emergency in 2020 and we firmly believe that culture is a source of resilience for communities facing climate impacts, and can enable inclusive, transformative and just climate action. This is outlined in all our outputs and projects, including in the text of our climate emergency declaration.

That being said, climate impacts and loss – especially to tangible heritage – is an important place to start our climate heritage journey today. I would like to explore this topic in more detail by exploring direct climate impacts at four World Heritage properties. These properties were featured in our 2019 “Heritage on the Edge” project, which worked with Google Arts and Culture and CyArk, to promote climate awareness and action through story-telling at iconic world heritage properties. These properties were chosen as they represented a range of heritage typologies and threat profiles. They do not address the myriad complex indirect impacts of climate change as these tend to impact intangible cultural traditions to a greater degree.

The first property I’d like to look at is the Old and New Towns of Edinburgh (Figure 7). Inscribed on the World Heritage list in 1995 as a ‘remarkable juxtaposition of two clearly articulated urban planning phenomena’, the property includes one of the most

well-known castles in the world. Climate impacts in Edinburgh are largely due to rapidly changing precipitation patterns. Rainfall has increased in both volume and intensity, and this is resulting in both the leakage and inundation of buildings, and the undermining of structures due to increasing sub-surface water logging. Conversely, Edinburgh castle, and World Heritage property as a whole, is also a very good example of how historic buildings can be retrofitted for carbon efficiency and serves as an international exemplar for adaptation planning.

The second property I want to look at is Rapa Nui National Park (Figure 8). Also inscribed in 1995, its iconic moai and ahu are amongst the best known archaeological objects in the world and are instantly recognisable to many. Situated on the coast looking out to sea, they are at immediate and ongoing risk from rising sea-levels and coastal erosion caused by increased storminess. Well publicised fires in recent weeks have illustrated that these sites often face complex risk profiles aside from direct climate impacts.

The third property I would like to explore is the Historic Mosque City of Bagerhat in Bangladesh (Figure 9). Built in the 15th century on the edge of the Sundarbans, a vast riverine Delta in the Bay of Bengal, the site was inscribed on the World Heritage list in 1985 and continues to be a living site and landscape, central to local and Bangladeshi national identity. When constructed, the designers used materials sympathetic to the landscape and the environment including stone



Figure 7



Figure 8

foundations which prevented water-logging of the brick architecture. Rising water levels in the delta have begun to permeate into the red brick walls. This is resulting in a process called efflorescence where salt concentrations in the brick lead to their degradation. Removing the salt is both time-consuming and costly. Once built to adapt to difficult climatic conditions, Bagerhat is a clear example of the stresses sites are now facing due to anthropogenic climate change.

Situated on the east coast of Tanzania, the Ruins of Kilwa Kisiwani and Ruins of Songo Mnara World Heritage property is a quite well-known example of climate vulnerability and adaptation (Figure 10). Inscribed on the World Heritage list in 1981, it bears exceptional testimony to the expansion of Swahili coastal culture, the islamisation of East Africa and the extraordinarily extensive and prosperous Indian Ocean trade from the mediaeval period up to the modern

era. Climate impacts at the site are complex as were exacerbated by other issues including land use. They include coastal erosion due to rising sea levels and increased storminess. Alongside other factors, these resulted in the site being placed on the World Heritage in Danger List in 2004. Adaptation measures – which we shall return to later in this presentation – resulted in the site being removed from the World Heritage in Danger List in 2014.

These four examples have focused on extant archaeological or historical sites but heritage sites come in many different forms. Figure 11 contains examples of such properties from three continents. They are the Coffee Cultural Landscape of Colombia, the Rice Terraces of the Philippine Cordilleras and the Champagne Hillsides, Houses and Cellars of France. These are all landscapes where production aligns with living traditions and they are some of the most vulnerable to changing climates. Having evolved within specific climates, changes can be acutely felt. The 2019 State of Conservation report for the Champagne Hillsides noted potential impacts on both the quality and quantity of the wine, but also on long established cultivation practices. To make a difficult situation worse, adaptation is particularly difficult in these cases where changing climates can render entire crops and traditions associated with harvesting and production irrelevant. There is no protective wall tall enough to reduce this impact and these landscapes risk losing their outstanding universal value through no fault of

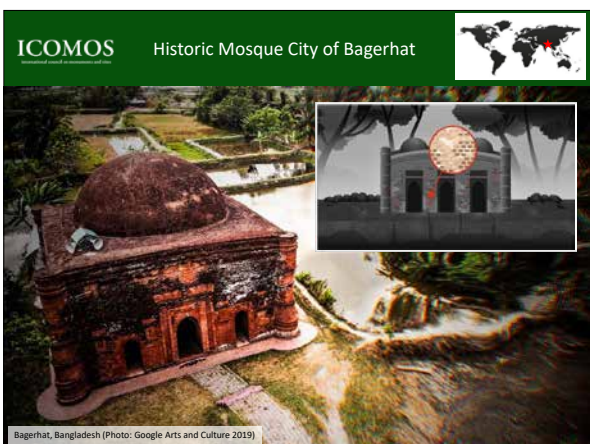


Figure 9



Figure 10

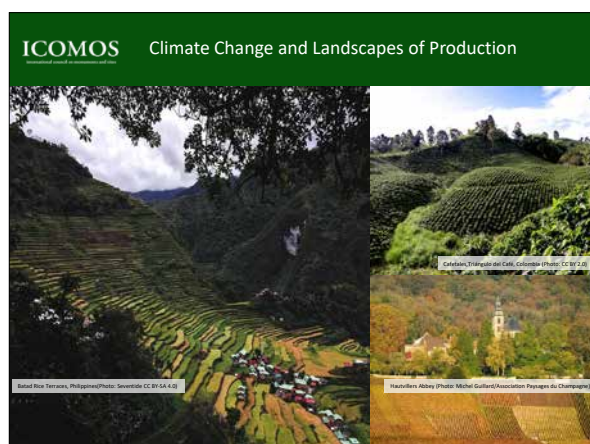


Figure 11

their own and with little ability to respond.

Either directly or indirectly, climate change is and will impact every heritage site on the planet and forward planning is key to our response (Figure 12). One of the main challenges in cultural heritage management is deciding how we respond to these impacts. Climate change is not like other threats and existing tools may not be suitable to respond to this new challenge. The need for new tools and methodologies was one of the key findings from our seminal 2019 report *Future of our Pasts*, and many of our efforts in recent years have focused on developing new approaches and methodologies customized to the climate crisis. Central to this task is understanding how we respond to the threat of climate change at cultural heritage sites. As no two sites are the same, our tools and methodologies must be malleable and adaptable.

One way to think about this is to use a medical metaphor and to triage sites based on our ability to respond. Within this model, it is hoped that the vast majority of sites can be preserved and protected through proactive adaptation and forward planning. In some cases, reactive measures can also be applied and this may be especially important in rapidly changing environments like coastlines. While sometimes adaptation planning involves expensive and time-consuming interventions, the vast majority of adaptive measures can be built into existing conservation plans. These might include more regular cleaning of drain pipes or wall consolidation in response to increasing

precipitation. Both take extra resources, but the latter category is far more cost-efficient if instigated far enough in advance. Key in all adaptation planning is a robust and site-specific framework based on the best possible understanding of both the site and of climate science.

In a small number of cases a site may be of such importance as to necessitate the expenditure of considerable resources. Impacts to these types of sites (often World Heritage properties) evoke a particularly emotive public response, often nationally and internationally. Responding to these impacts can be both costly and difficult, especially for countries struggling with other priorities.

Finally, there are some sites which we cannot save. In reality, the number of these sites is far greater than we know as most are lost before they are even recorded. In cases like this, we must rely on conservation by record, preserving what we can about a site, rather than preserving the site itself. It is an unpleasant reality of the climate crisis, that we are and we will lose much of our heritage to rising global temperatures.

From a climate perspective, the IPCC definition of adaptation is ‘The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects’. One good example of where reactive adaptation planning has been successful is at the previously mentioned World Heritage property of the Ruins of Kilwa Kisiwani and the Ruins of Songo Mnara. Put on the World Heritage list in danger in part due to coastal erosion, the property engaged with international stakeholders and governments, utilizing both financial and heritage resources to respond. This response included the construction of some walls along the coast to protect the most iconic structures, like the Gereza or fort shown on the Figure 13. This was done with the support of many governments, including Japan.

Central to this response was the understanding that



Figure 12

these projects were not just once-off events. Within a conservation context, adaptation must be seen as ‘an ongoing process that is managed over time by committing to shorter term actions embedded within a clear long-term vision’ (Figure 14). Even quite minor adaptation efforts - like this small protective wall which prevents the erosion of sub-surface archaeological deposits - must be maintained and monitored.

Adaptive measures do not always have to be intrusive structures like walls or dykes. At Kilwa Kisiwani, the most effective measure to prevent coastal erosion was the replanting of mangrove forests along the coast (Figure 15). These had been commonplace until more recent decades when over-grazing along the shoreline led to their destruction. Mangroves are amongst the most effective responses to coastal erosion as they absorb much of the sea’s energy and force. Sometimes referred to as ‘soft’ or nature-based adaptation, such

measures represent win-win scenarios, increasing biodiversity and greenness while protecting heritage assets.

As aforementioned, some sites require a more drastic response. In these cases, while every effort should be made to work within an adaptive framework, protective or conservation works may be more extreme. An example here would be the efforts taken to consolidate the foundations of Edinburgh Castle and prevent rock-falls due to increased precipitation (Figure 16).

Perhaps the most challenging sets of heritage sites are those at high risk of imminent loss or damage. One such example from my own country - Ireland - was Dunbeg Fort which is eroding into the sea (Figure 17). In reality, there is little that can be done to prevent this process which climate change has significantly expedited. The response in this situation is familiar to all archaeologists. This is to record by record using



Figure 13

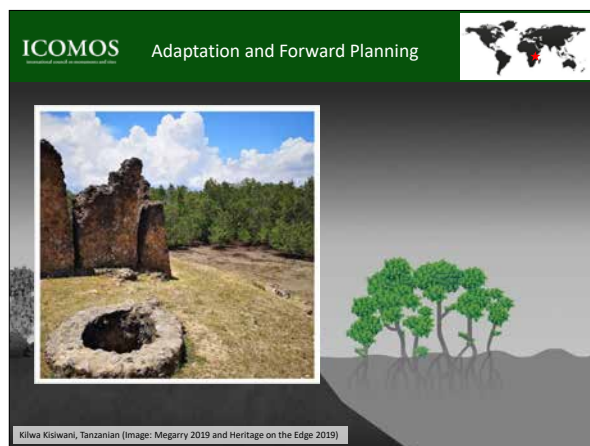


Figure 15



Figure 14

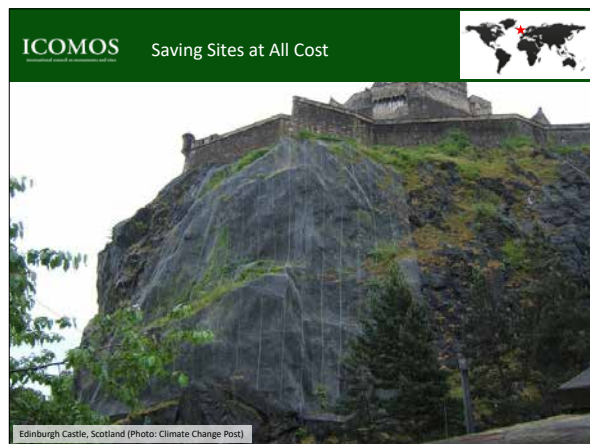


Figure 16

traditional techniques like excavation, but also newer techniques like laser scanning and 3D structure-from-motion which uses photographic imagery from unmanned aerial vehicles to create larger 3D models of sites. These allow us to rapidly respond and record structures and landscapes. Dunbeg, alongside many other coastal sites in Ireland and Wales, have now been recorded by the Cherish Project before many are lost forever.

Digital technologies offer us an opportunity to both conserve sites by record and set a baseline for future conservation efforts. The erosion of landscapes or structures can be monitored and quantified periodically while - with laser scanning - the sensor data can capture a wider range of variables. They are also a great way of communicating with the wider public. **Figure 18** shows a 3D model of the Great Mosque at Kilwa Kisiwani in Tanzania and was created using a combination of

laser scanning and structure-from-motion as part of the “Heritage on the Edge” project. This was also made available to the public in augmented reality using the Google Arts and Culture mobile application.

Each of these steps requires decision making from heritage professionals which depends on an accurate assessment of the threats to and vulnerability of the property (**Figure 19**). Yet there is no agreed upon tool to assess the climate vulnerability of heritage sites and developing one remains one of our key goals in ICOMOS. The Intergovernmental Panel on Climate Change describes vulnerability as, ‘The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.’ Since the third IPCC Assessment cycle in 2001, the emphasis on assessing climate impacts has been on assessing vulnerability rather than risk. While risk is the potential for adverse consequences at sites, vulnerability is the predisposition to be adversely affected, taking other parameters into account. Within this framework, vulnerability is understood as a function of a range of factors including climate hazards, risks, impacts and resilience or adaptive capacity.

Crucially, vulnerability acknowledges the agency and capacities of both heritage science and local communities to respond to climate risk and reduce impact and potential risk. For cultural sites, this agency or adaptive capacity is a key component when



Figure 17



Figure 18

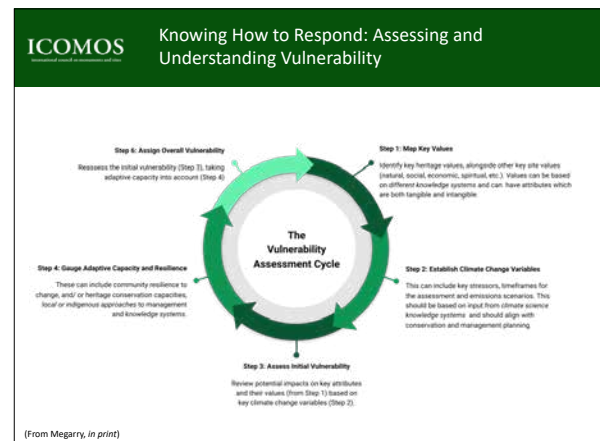


Figure 19



considering vulnerability.

It is also important that we understand exactly what is at risk. Therefore, all vulnerability assessment must start with an understanding of key site values (Figure 20). The Operational Guidelines for the WHC stresses the importance of including and acknowledging a range of values and that these need to be protected. Understanding the significance, attributes and associated values of heritage properties is central to their preservation and conservation yet concepts of significance and values are multifaceted and can have a range of meanings as outlined in The Burra Charter. This plurality of significance and values is further emphasised in the influential Nara Convention which stresses the cultural specificity of values.

It may seem obvious that sites have different values; however, often our heritage conservation processes and tools tend to focus on some more than others. This is especially the case for World Heritage properties where the Outstanding Universal Value, or OUV of properties, is protected at all costs to retain the coveted World Heritage property label. This OUV is based on a statement of OUV written at the time of inscription. In many cases, these are thoughtful and inclusive documents which include a wide selection of site values. In other cases - often with older World Heritage properties - the statement of OUV may focus solely on heritage values at the expense of others. In these cases, conservation practices and efforts risk preserving walls and buildings at the expense of the communities

who live in and around them. Given the broad range of climate impacts - both direct and indirect - any assessment of values must be inclusive and widely encompassing, including community values, economic and social values, natural values and spiritual or religious values alongside heritage values like OUV.

Of course none of these values are tangible by themselves. They are associated with physical attributes. For example, tourism at a site may depend on specific vistas or popular archaeological remains while religious values may rely on intangible traditions often held in tangible spaces. These values are threatened when their attributes are at risk. Understanding vulnerability must start with an understanding of what makes a site important. This requires a thorough understanding of site values and their attributes.

Values mapping often relies on traditional knowledge. Understanding impacts relies on scientific knowledge, and climate modelling in particular. It is now possible to downscale climate models from regional or national scale to individual sites. While the impacts of climate change are not going to reduce, the future is not certain. There are many factors to consider when assessing how climatic changes will impact specific sites. These include the future quantities of carbon dioxide and other greenhouse gases in the atmosphere, known as Representative Concentration Pathways (RCP), and the temporal scale of the evaluation (Figure 21). As we saw previously, adaptation can be understood as ‘committing to shorter term actions embedded within a

**ICOMOS** Step 1: Map Key Values

Conservation of a place should identify and take into consideration all aspects of cultural and natural significance without unwarranted emphasis on any one value at the expense of others.

**The Burra Charter, Article 5.1**

- 1. Understand your site's key values**
  - Heritage Values (SOUV or statement of significance)
  - Social values (religious, spiritual or identity)
  - Economic values (businesses, tourism, research funding)
- 2. Map site attributes to site values**
  - Tangible attributes (ruins, buildings, ecosystems)
  - Intangible attributes (traditions, customs)

Satra, India (Photo from Megary 2017)

Figure 20

**ICOMOS** Step 2: Establish Climate Variables

Climate projections are based on three relevant variables:

- Scale (Regional, national and **local**);
- Emissions scenarios based on Representative Concentration Pathways (RCP):
  - RCP 2.6 (most ambitious)
  - RCP 4.5 and RCP 6 (business as usual)
  - RCP 8.5 (nightmare scenario)
- Timeframe (2040, 2060, 2080 and 2100)

Assessments must be based on accurate models and defined by specific emission scenarios and timeframes

Figure 21

clear long-term vision'. So impacts must be considered not in terms of years, but in decades and centuries. Climate models allow us to make informed decisions about how site attributes and their associated values may be impacted over the coming decades and even centuries by identifying specific climate stressors like rising sea levels or desertification.

So the heritage sector must become more comfortable with different knowledge systems - both local and scientific. Once we have mapped our site values and attributes and engaged with climate science to understand potential climate stressors, we must then assess how the former is affected by the latter (Figure 22). For example, a coastal site may have values surrounding significant subsurface human remains. If stressors include coastal erosion, these may represent a potential impact to the site.

The final stage in understanding vulnerability is

assessing the resilience gap (Figure 23). This is the difference between potential impacts and adaptive capacity. Adaptive capacity or climate resilience can be understood as, 'the ability to anticipate, prepare for, and bounce-back from hazardous events, trends, or disturbances related to climate'. This may include the capacity and resources of heritage professionals, or the support available to a site from national agencies. Potential impacts may be severe but considerable adaptive capacity can hugely reduce vulnerability. Conversely, relatively minor impacts may have enormous consequences at sites with little or no adaptive capacity.

I would like to conclude my talk today by talking about a recently completed project which explored the topic of climate vulnerability assessment in an African context. This was called the "CVI Africa" project and was based around applying an existing vulnerability technique called the climate vulnerability index (CVI) in an African Context (Figure 24). Developed by Dr Scott Heron and Dr Jon Day from James Cook University, the CVI was originally developed for natural World Heritage sites. It is a values-based, science-driven and community-focused approach which assesses both the Outstanding Universal Value and the socio-economic vulnerability of World Heritage properties.

The project's primary aim was to increase capacities in heritage management in Africa (Figure 25). To achieve this, it designed and delivered a 12-week

ICOMOS Step 3: Map Climate Variables to Attributes

Stressor	Impacts	Example
Temperature trend	Warming, hotter than average, increased evaporation	Value: Important Archaeological Remains Attribute: Archaeological remains and burial areas
Extreme events	Heatwaves, bleaching, desiccation	
Precipitation trends	Rainfall, Rainstorms, hail, heavy dew, drizzle	Key stressors* Precipitation events Coastal erosion
Increased precipitation	Rainstorms, cyclones, blizzards, extreme rainfall, storminess	
Flooding	Runoff, soil absorption, flash flooding	*based on selected RCP and timeframe
Drought	Aridity, dehydration, prolonged water shortage, soil moisture	
Mean wind trend	Gales, gusts, changes in wind direction	
Storm intensity and frequency	Tropical cyclones, tornadoes, lightning, blizzards	
Sea or lake ice change	Ice extent or thickness, age of ice	
Snow cover change	Snowpack, snow thickness, snow compaction, age of snowpack	
Sea Level Rise Trend	Flooding, post-glacial rebound, thermal expansion	
Coastal flood	Coastal vulnerability, nuisance flooding	
Storm surge	Storm floods, storm tides, wave height, wave setup	
Coastal Erosion	Currents, waves, sediment transport, accretion, deposition	

Figure 22

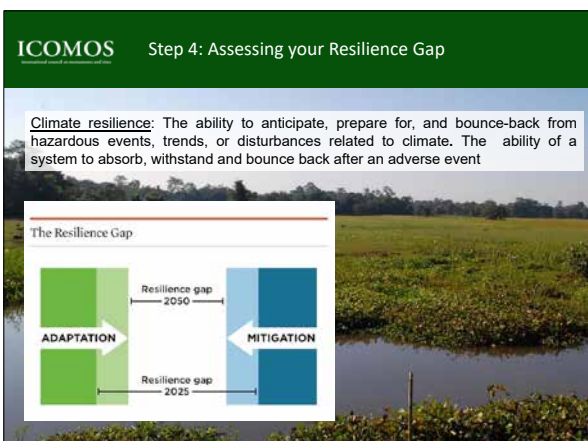


Figure 23

ICOMOS Example: The Climate Vulnerability Index (CVI) and CVI Africa Project

Climate change is the fastest growing global threat to our heritage.

Today, around the world there are over 1,100 World Heritage properties. Many of these properties are already experiencing significant negative impacts and damage from climate change.

**CVI**

The Climate Vulnerability Index (CVI) is a rapid assessment tool which assesses both site and community vulnerability

Shetland, Scotland (Image: Megarry 2022)

Figure 24

training course in culture and climate change, including vulnerability analysis, to a cohort of eight professionals from six countries. Given the global health situation, all of this was done online. It was always hoped that we would be able to run two in-person vulnerability assessment workshops, one in Tanzania and one in Nigeria. The purpose of this was twofold. Firstly, it was an opportunity for the trainees on our course to apply the skills they learned during the course in person. It also allowed us to explore the project’s secondary aim - to test the utility and adaptability of the CVI technique in an African context. This latter aim was important because - prior to the project - it had only been applied to sites in Europe and Australia. Given the geopolitical nature of climate change, it is essential that the tools we develop are malleable and widely applicable in different countries and at different types of sites.

Key to a project like this is working with a wide range of partners (Figure 26), and the “CVI Africa”

project had many! This included in-country partners in both Tanzania and Nigeria, African heritage organizations like the African World Heritage Fund, and international professional organizations like the International National Trusts Organization and the Union of Concerned Scientists (UCS). As it was funded by the United Kingdom Government through their Arts and Humanities Research Council, it also included three UK based organizations.

I will now look more closely at the results from one of the workshops which we held as part of the project. Figure 27 was for the Ruins of Kilwa Kisiwani and Ruins of Songo Mnara in Tanzania which we have already explored both in the context of impacts and adaptation. It is situated on the Swahili coast on two small islands and was, for nearly a millennium, a significant and important coastal trading emporium. With Swahili, Portuguese and Omani influences, it was a cosmopolitan city once described by the 14th century Moroccan traveller Ibn Battuta as, ‘one of the most beautiful cities in the world’.

Ideally, vulnerability workshops should be held as close to the site as possible to allow for maximum stakeholder support. Given the global health situation, it was necessary to have a hybrid event which was held over two days in Dar es Salaam this time last year (Figure 28). This ensured strong internet for remote engagement, while stakeholders traveled from the site and the local community.

Impacts at the site have already been discussed and

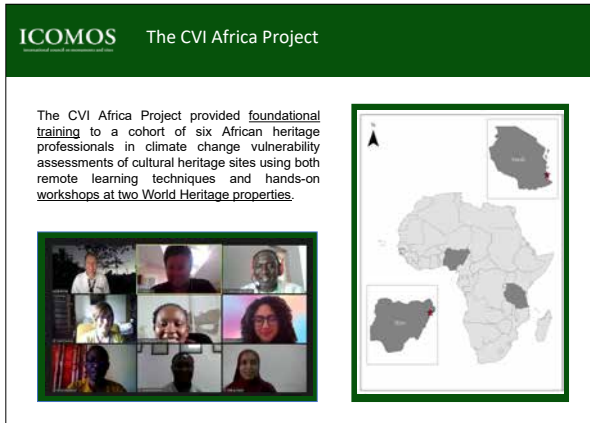


Figure 25



Figure 26

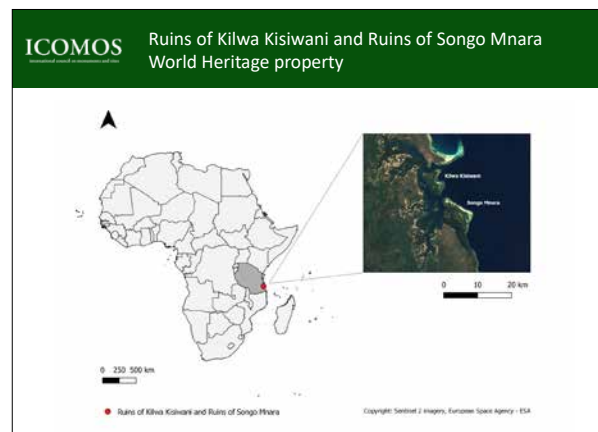


Figure 27

include rising sea levels leading to coastal erosion of key structures visible on the **Figure 29**, alongside the adaptive measures already discussed.

Prior to the workshops, climate scientists from the University of Dar es Salaam were commissioned to write a report based on downscaled climate predictions (**Figure 30**). This included key stressors over three representative concentration pathways or RCPs. Heritage professionals from the site including the site manager set a timeframe of 30 years to assess vulnerability, which aligned with their own site management plan, and based their assessment on RCP 8.5, seen by most as the worst possible emissions scenario.

The CVI process was designed for World Heritage properties and so puts a priority on assessing impacts to their outstanding universal value. In this case, key values were extracted from the statement of outstanding universal value and mapped to the primary

climate stressors based on the experience of the local community and heritage professionals. Interestingly, this identified increased precipitation and not coastal erosion as the primary climate stressor, potentially impacting five out of seven key values. Two further stressors - sea level rise and coastal erosion were also identified, potentially impacting three key values each.

The above table on the **Figure 31** shows the assessed impact of each of these three stressors on the heritage values of the site. These range between moderate and extreme which means that, without adaptive measures, the site is highly vulnerable to climate change over the next 30 years. While local skills and knowledge are quite high the site lacks resources to fully deal with these impacts. Once these are taken into account, the vulnerability of the site's outstanding universal value is gauged to range between moderate and high.

The CVI also explored the socio-economic values of the site (**Figure 32**). These were compiled by a



Figure 28

Key values of OUV	Climate stressors	Intense precipitation events	Sea level rise (trend)	Coastal erosion
Runs of Kiwa Kiswani		X		X
Swahili trading history				
Diverse cultural history				
Great mosque		X	X	
Other key buildings		X	X	X
Archaeological remains		X	X	X
Remains of Songu Mhara		X	X	X
<b>Total</b>		<b>0 0 0 5 0 0 0 0 2 3 1 0 3 1</b>		

Figure 30

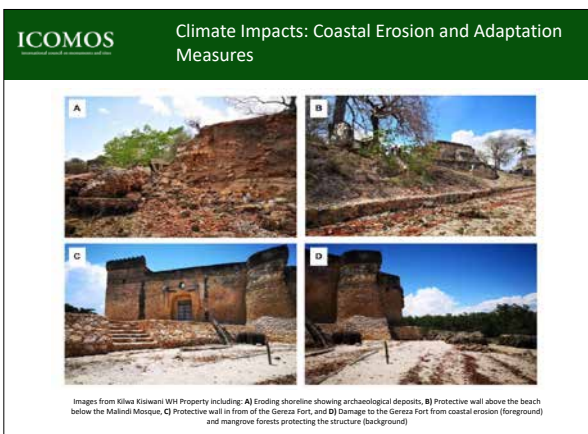


Figure 29

Key Climate Stressors:	Intense precipitation events	Sea level rise (trend)	Coastal erosion
Exposure	Very likely	Possible	Very likely
Sensitivity	Moderate	Moderate	High
Potential impact	High	Moderate	Extreme
Local management response	Low	Low	Low
Scientific/technical support	Low	Low	Moderate
Effectiveness	Moderate	Low	Low
Adaptive capacity	Moderate	Low	Low
<b>OUV Vulnerability</b>	<b>Moderate</b>	<b>Moderate</b>	<b>High</b>
<b>Combined OUV Vulnerability</b>	<b>Moderate</b>		

Figure 31

wide range of local stakeholders which included those working at the site in cultural and natural conservation, tourist guides, fishermen, townsfolk and craftspeople. They identified a range of further values of importance to the community, aside from the heritage values identified above. These included the societal and community importance of fishing around the site and its wrecks, the pristine natural reef ecosystems and their value to natural heritage, the economic importance of tourism to the community, many of whom act as guides, and the centuries-old tradition of boat building which is still practiced on the island of Songo Mnara.

A similar process was then undertaken, assessing the impact of key stressors on these values and the adaptive capacity of the community to respond to these impacts (Figure 33). As the impact of climate stressors on these activities was shown to be minimal within the chosen parameters for the exercise, and the adaptive capacity moderate in some cases, the overall vulnerability of socio-economic factors was deemed to be low. These results showed that the heritage values of the site were more vulnerable than the socio-economic values, and identified which attributes and values required specific adaptive measures over the next 30 years. It is worth noting that the CVI exercise only assessed vulnerability over a relatively short period based on a single representative concentration pathway. Different parameters would likely yield a slightly different result. This raises the important issue of replicability and including techniques like CVI into

the periodic recording mechanisms of at risk sites.

The reports from this workshop are available to download from the ICOMOS Open Archive in English and Swahili alongside our report from the second workshop which we held at the Sukur Cultural Landscape in Nigeria in September 2021. I have also put references to two other reports which I have mentioned in my talk today which are also available to download. Figure 34 are the Future of our Past report which was co-authored by the ICOMOS Working Group including the esteemed Professor KONO Toshiyuki who also wrote its foreword as our then President, and the recent Global Research Action Agenda report from the International Co-Sponsored Meeting on Culture Heritage and Climate Change.

I would like to conclude by thanking the many people who have been involved in the initiatives and projects I have discussed today (Figure 35). There are too

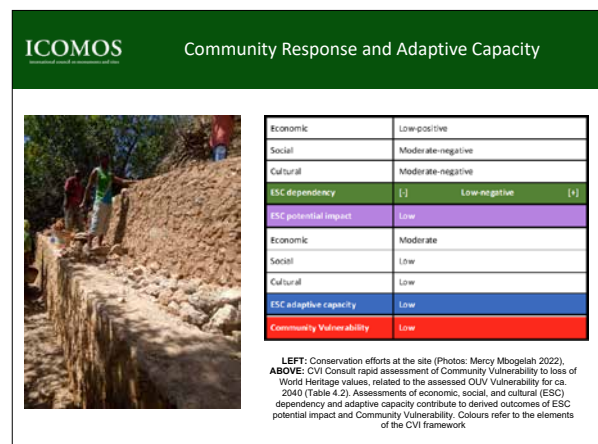


Figure 33

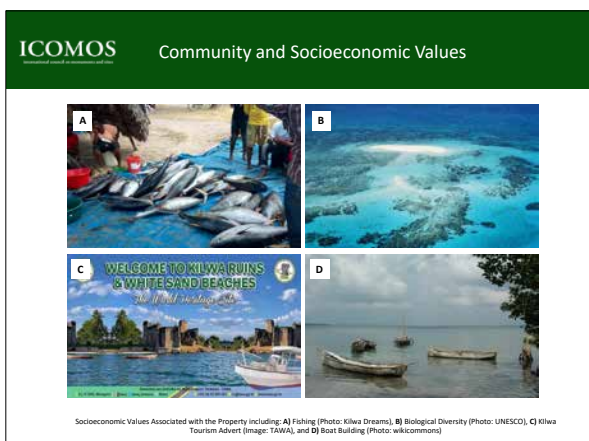


Figure 32

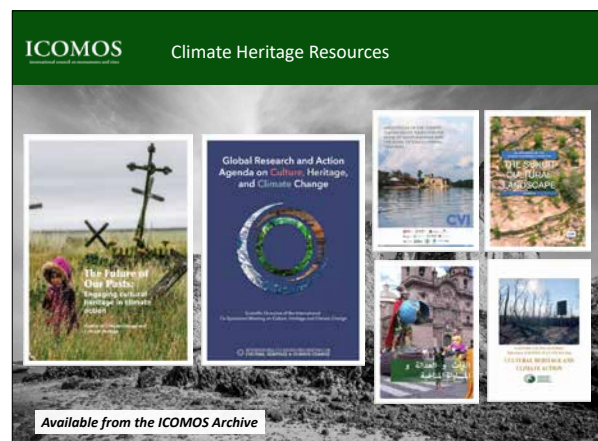


Figure 34

many to mention here, but I would like to especially acknowledge the many sites and communities who have welcomed and worked with us in these initiatives including our Tanzanian colleagues from the Tanzanian Wildlife Authority and all involved in the “CVI Africa” project.



Figure 35

# Climate Change and Traditional Knowledge: Case Studies from Oceania

## ISHIMURA Tomo

(Head, Audio-Visual Documentation Section, Department of Intangible Cultural Heritage, Tokyo National Research Institute for Cultural Properties)



Dr. Ishimura graduated from the doctoral program at the Graduate School of Letters, Kyoto University in 2004. He is a specialist of archeology and cultural heritage studies. After working at the Research Fellowship for Young Scientists at the Japan Society for the Promotion of Science, and as a researcher at the Nara National Research Institute for Cultural Properties, he has been involved in research on intangible cultural heritage at the Tokyo National Research Institute for Cultural Properties since 2015. He also contributed to the inscription of the Nan Madol ruins in the Federated States of Micronesia on the World Heritage list (2016). His publications include *Revived Ancient Ports: Restoring Ancient Landforms* (Yoshikawa Kobunkan, 2017).

My name is ISHIMURA Tomo. Today, I will give a talk with the title “Climate change and traditional knowledge.” Before that, let me briefly introduce myself.

I was originally an archaeologist, like Dr. Megarry. In 2015, I was transferred to the Audio-Visual Documentation Section of the Department of Intangible Cultural Heritage in the Tokyo National Research Institute for Cultural Properties. There, I have been engaged in the work of recording intangible cultural heritage using video. For years, I have also conducted research on disaster management and prevention for intangible cultural heritage.

The research was started in part because of the Great East Japan Earthquake in 2011. A large number of tangible and intangible cultural heritage were damaged in the earthquake, and in particular, damage to intangible cultural heritage has not received much attention so far in the context of disasters in Japan. Communities were destroyed by the tsunami that followed the earthquake, and people individually left

the affected areas, so it became impossible to hold traditional festivals that had been held up until that point. However, there were also positive cases; for example, some people who left their hometown to take refuge performed traditional entertainment using tools at evacuation sites, thereby strengthening the ties among people. In this respect, a certain amount of research on intangible cultural heritage and disasters has been accumulated. Therefore, I think that how climate change and resulting disasters affect intangible cultural heritage is also an important issue. The ICOMOS Climate Action Working Group, which was introduced by Dr. Megarry earlier, was launched several years ago, and I have also been participating in this working group as a contact person of ICOMOS Japan.

The contents of today’s speech are as follows. First, I will speak about the relationship between climate change and cultural heritage. Next, I will introduce two examples in Oceania: first Kiribati and second Fiji. After that, I want to consider how to protect traditional

knowledge from the impact of climate change.

We will first look at the relationship between climate change and cultural heritage. As Dr. Megarry mentioned, the International Co-sponsored Meeting on Culture, Heritage and Climate Change was held on December 2021 under the joint sponsorship of UNESCO, ICOMOS, and the IPCC. In this meeting, three themes were discussed: 1) knowledge systems and climate change: systemic connections of culture, heritage and climate change; 2) impacts and climate change: loss, damage and adaptation for culture and heritage; and 3) heritage solutions and climate change: role of culture and heritage in transformative change and alternative sustainable futures.

This meeting was on a large scale and was held for five days. It comprised a panel discussion for each of the three themes, three workshops with experts, and a poster session. About 100 people participated, including experts and representatives of local residents. However, it is very difficult for 100 people to talk at the same time at a workshop. In addition, all sessions were conducted online, which means that the participants' locations and time zones varied. Therefore, each workshop was conducted three times a day to suit those in different time zones. In this case, each workshop had about 30 participants, which was still too many for all the members to talk together. So, it was further divided into sub-groups comprising 5 to 10 people. I really appreciate the efforts of Dr. Megarry, who organized as an executive office this large-scale meeting that discussed various complicated issues. From Japan, I and Dr. IWABUCHI Akifumi at Tokyo University of Marine Science and Technology participated in this meeting. Probably, he is in this hall today.

Of the three themes, the first one—Knowledge systems and climate change: systemic connections of culture, heritage and climate change—is most relevant to today's speech. The session on knowledge systems showed that there are three knowledge systems: not only scientific knowledge but also indigenous knowledge and local knowledge. In consideration of the lesson that previous discussions on climate

change had been biased towards scientific knowledge, the importance of integrating these three types of knowledge was highlighted.

Then, what are indigenous knowledge and local knowledge? I think that they correspond to traditional knowledge in intangible cultural heritage.

UNESCO's Convention for the Safeguarding of Intangible Cultural Heritage classifies intangible cultural heritage into five categories: 1) oral traditions and expressions, including language as a vehicle of the intangible cultural heritage; 2) performing arts; 3) social practices, rituals and festive events; 4) knowledge and practices concerning nature and the universe; and 5) traditional craftsmanship. Of these, item 4) corresponds to traditional knowledge.

We think that traditional knowledge as intangible cultural heritage is deeply connected to the identity of a community and is an important thing that should be inherited to the next generation. What's more, an expectation that traditional knowledge includes wisdom to adapt to and mitigate climate change was expressed in last year's international workshop.

This may have been because of the influence of the concept of "wise use" in the Ramsar Convention. The concept of wise use is a way of thinking that it is necessary to not only protect natural environments but also make effective use of them. Now, this way of thinking seems to be very common among us, although the Ramsar Convention was established in the 1980s. The concept of wise use suggests that the traditional use of resources by people in local communities can play an important role in preserving the environment.

In addition, it is often pointed out that traditional knowledge can possibly play a key role in achieving the Sustainable Development Goals (SDGs), for which various efforts have been made internationally in recent years. In reality, however, there are many cases in which traditional knowledge itself is at stake because of the impact of climate change.

Next, I discuss two examples in Oceania to see a situation in which traditional knowledge is endangered by the impact of climate change and then point out the



need to protect it.

The first is the case of Kiribati, which is an island nation located in the central Pacific. Kiribati mostly comprises atolls. This is an environment in which people live on soil that accumulated on coral reefs. There is an inland sea called a lagoon at the center of the island, and people live on a narrow strip of land that surrounds it. The island is formed on soil that accumulated on raised coral reefs and is at a very low altitude, which is only about three meters even at the highest point. There is concern about sea level rise due to recent climate change and the risk of the island itself being submerged. Atoll island nations including Kiribati are regarded as the places most affected by climate change globally.

**Figure 1** shows the situation of Tarawa Island, where the capital of Kiribati is located. The water level is near houses. The plants growing there are mangroves. The fact that mangroves are already growing indicates that this area is submerged in seawater. Beyond this area are three palm trees, of which the middle one is already withered. This is probably because it was affected by seawater.

In Kiribati, a traditional farming practice called pit irrigation has been used (**Figure 2**). An atoll has an aquifer called a lenticular layer under the ground. In pit irrigation, potatoes are grown with the use of fresh water welling up from a lenticular layer through a hole dug in the ground. These potatoes are a variety of potato called giant swamp taro, which is a staple food

of Kiribati.

It does not rain very much on an atoll island. In general, as wet winds hit a mountain, clouds are formed, from which rain falls. However, there is no mountain on an atoll island, so clouds are less likely to form. On islands with a mountain, a river is formed or forests grow on the mountain and store water. However, in the case of an atoll island like Kiribati, if rain falls, there are no forests or rivers to store it, so people have lived using this lenticular layer. In **Figure 2**, we can see stems of giant swamp taro; each is given a name by a family who planted it and is grown with great care. Giant swamp taro is not only important as food but also plays a social and cultural role; for example, it is served as a feast when a gathering is held in a village.

In recent years, however, the salinity of groundwater used in pit irrigation has been increasing. This has worsened the growth of giant swamp taro, and the traditional farming practice has become endangered.

For this, two possible causes are pointed out: 1) seawater came to run into the lenticular layer because of sea level rise; and 2) sea water flowed into cropland because of a cyclone storm surge.

Once salt gets into a pit, it cannot be easily removed, and productivity may therefore be reduced. In Kiribati, it is feared that sea level rise and the frequent occurrence of cyclones due to climate change may lead to the decline of traditional farming practices using pit irrigation and traditional knowledge about food culture.

Of course, the submergence of land is the greatest



**Figure 1**



**Figure 2**

concern in Kiribati, but social and cultural changes due to decline of traditional knowledge are also issues that cannot be ignored.

Next, we will look at the case of Fiji.

Fiji is also an island nation located in the central Pacific and is not so far from Kiribati. However, unlike Kiribati, the islands of Fiji are made up of coral atolls and volcanic islands. Fiji was severely damaged by Cyclone Winston in February 2016. In response, the International Research Center for Intangible Cultural Heritage in the Asia-Pacific Region (IRCI) conducted a field survey on intangible cultural heritage and disaster risk management in September 2017 in cooperation with the Fiji Museum and the Ministry of iTaukei (major indigenous people of the Fiji Islands) Affairs of the Fiji government. An organization called the International Research Center for Intangible Cultural Heritage in the Asia-Pacific Region (IRCI) is a UNESCO Category 2 Center in the field of intangible cultural heritage and is located in Osaka. It belongs to the National Institutes for Cultural Heritage, as does the Tokyo National Research Institute for Cultural Properties to which I belong, so I also participated in the survey after the disaster as a collaborative researcher of IRCI.

Naocobau and Namarai, villages in the eastern part of Viti Levu Island, were the survey subjects, and I conducted a hearing with the inhabitants.

**Figure 3** shows the appearance of a village called Namarai. The white houses are temporary dwellings. The tree at the front is bare of leaves because it was

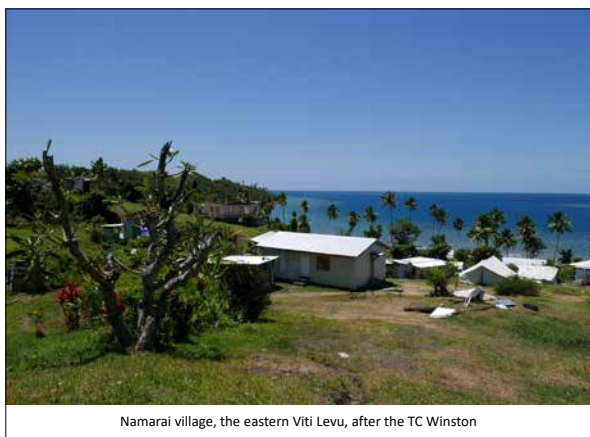


Figure 3

exposed to seawater stirred up by the cyclone, but it is not dead. **Figure 4** is a church destroyed by the cyclone. The roof was completely blown off. In Fiji, Christianity was introduced with the arrival of Europeans, and since then, it has had a great influence on the society and culture of Fiji. This church is a symbolic building of Namarai but was severely damaged. We visited the village to conduct our survey as people were working on the reconstruction of the village (**Figure 5**).

The survey revealed that one of the reasons that the damage was so severe was that Cyclone Winston had come from a direction opposite to that of a normal cyclone.

The buildings of the village were spread with the western hilly area behind them. Cyclones usually come from the west; therefore, the hilly area served as a windbreak. However, Winston came from the east,



Figure 4



Figure 5

so the storm hit the village straight on. The change in the pattern of cyclone movement may have been due to climate change. The traditional arrangement of settlements may have been intended to reduce damage by a cyclone, but because the pattern of movement was different this time, severe damage resulted instead.

It has also been found that traditional knowledge about disasters does not work effectively in the present day. Traditional knowledge also includes that of damage prevention from cyclones. For example, a change in the flying pattern of seabirds and a change in the growth pattern of plants such as bananas and breadfruit have been regarded as a sign of a cyclone. Traditional knowledge also includes knowledge such as for using wild plants as emergency food and processing potatoes, which are usually not stored for long periods, so that they can be stored.

It has also been found that a change in traditional customs may occur in the post-disaster recovery process. After the disaster, an overseas support group immediately supplied prefabricated temporary houses. **Figure 6** shows these temporary houses. However, the temporary houses were small ones designed for a nuclear family. They are too small to cater to families of more than four or five people.

The traditional family life of Fiji is such that a big family live together in a large main house (**Figure 7**). There is a large main house, in which a big family live together. In Fiji, this traditional family style is often called an “extended family” and grandparents, parents,

and children and other relatives live together in one house. As shown in **Figure 8**, only the main house has a large space with no other rooms; all family members eat together in this space and thereby strengthen their family ties.

However, temporary houses like the ones we just saw (**Figure 6**) cannot accommodate such large families. Therefore, big families must be separated into nuclear families, and the family ties may weaken. **Figure 7** shows a different village to the damaged village we saw earlier; here a traditional large main house has been reconstructed, which requires a lot of time and money. The main house is thatched with plant material, and the techniques to procure this plant material and create the roof with it are now rare. Therefore, many people



Figure 6



Figure 7



Figure 8

may choose to continue to live in a temporary house. In our survey, several people actually responded that they would continue to live in a temporary house instead of constructing a new house. We can see that changes in family structure after the disaster may change Fiji's traditional family system.

Finally, I want to consider how we can protect traditional knowledge from the impact of climate change. When we face the challenge of protecting cultural heritage from climate change, the necessary action differs a little between tangible and intangible cultural properties. For a tangible cultural property, it can be said that damage is relatively easy to see; for example, physical damage caused by a disaster. As such, preventive measures against disasters can be taken, and the action to take is relatively clear. However, in the case of intangible cultural properties including traditional knowledge, the reality of damage is hard to see. Damage does not appear immediately after the occurrence of a disaster; rather, such a change can occur during the disaster recovery process. As such, it is very difficult to prevent disaster damage to intangible cultural heritage, and chances to do so are few.

What's more, traditional knowledge as I mentioned today is at stake in the first place. There are two reasons for this: globalization and modernization. As I mentioned in the case of Fiji, traditional knowledge is considered superstitious, and young people are becoming less interested in it. Even though traditional knowledge is already disappearing, the speed of this may increase due to the impact of climate change. However, as I pointed out in the beginning, traditional knowledge can also be said to be an important thing that is deeply connected to local people's identity. If a disaster happens, it can also be the basis of ties between people in the process of recovery.

To protect traditional knowledge, it is necessary to make its existence visible. Although I am an expert on Oceania, my knowledge is not so great, and there is no doubt that the local people living there have much more traditional knowledge than I do. The process to make traditional knowledge visible so that we can protect it cannot be accomplished by us or outside experts alone. How we involve local people, how we make it visible, and how we gain local people's cooperation are essential for protecting traditional knowledge.

Thank you very much for your attention.

Facilitator : SONODA Naoko (Professor, National Museum of Ethnology )

Panelist : TATEISHI Toru

(Director, Center for Conservation Science, Tokyo National Research Institute for Cultural Properties / Deputy Director, Cultural Heritage Disaster Risk Management Center)

NAKATSUKA Takeshi / William Megarry / ISHIMURA Tomo

**SONODA Naoko** (Professor, National Museum of Ethnology)



Professor at the National Museum of Ethnology. After working at the Laboratoire de Recherche des Musées de France, the Service de Restauration des Peintures des Musées Nationaux (France), and the National Museum of Japanese History (Japan), she joined the National Museum of Ethnology. Her research focuses on conservation science, especially preventive conservation, in order to balance the conservation and utilization of a wide variety of materials, including ethnographic materials, books, and audio-visual materials. Her research interests include Integrated Pest Management, storage reorganization, development of analytical systems for pest trap investigation and temperature and humidity monitoring, and technological development of deacidification and strengthening methods for acidic paper. She has also been involved for many years in the museology course offered by the National Museum of Ethnology in cooperation with JICA for museums in developing countries. Edited books include *Conservation of Cultural Heritage in a Changing World* (SES102, 2019), *New Horizons for Asian Museums and Museology* (Springer Singapore, 2016).

**TATEISHI Toru**

(Director, Center for Conservation Science, Tokyo National Research Institute for Cultural Properties / Deputy Director, Cultural Heritage Disaster Risk Management Center)



Dr. Tateishi is currently the director of the Center for Conservation Science at the Tokyo National Research Institute for Cultural Properties. He is also the deputy director of the Cultural Heritage Disaster Risk Management Center, Japan. After graduating from the Cultural Property Science Course of the Tokyo Gakugei University he worked as an assistant at the Conservation Science Department at Tokyo University of the Arts, the Agency for Cultural Affairs as the Senior Specialist for Cultural Properties Investigator, and the vice director of the Department of Culture, Education and Life Creation (in charge of Cultural Resources Division), the Nara Prefectural Government, before assuming his current position in 2021. He is engaged in the research and practice of cultural property conservation science and cultural property disaster prevention. He is the co-author of *Material Preservation Theory for Humanities Museum* (Yuzankaku, Inc, 2012) and the *Manual on Rescue Operations for Movable Cultural Property* (Kubapro, 2012).

**Sonoda** Hello everyone. I am Naoko Sonoda from the National Museum of Ethnology. Pleased to meet you. We will now start a panel discussion.

First, let me summarize this morning's speeches.

First, Dr. Nakatsuka from Nagoya University gave a speech entitled "Potential of cultural heritage as the memory of past climate adaptation inferred from paleoclimatology." This showed that climate change is not a problem specific to the present. From the oxygen isotope ratio of annual rings of trees in central

Japan, he reproduced yearly changes in the amount of precipitation in the summer over thousands of years, from around the Jomon period until now, and showed that climate change has occurred in cycles in Japan. Then, he pointed out that human society is especially vulnerable to climate changes in decades-long cycles and that actually, the climate change of global warming we are now facing has occurred on a time scale of several decades. This indicates that if memories of adjustment and adaptation to climate change can be

found in cultural heritage artifacts, they can give us hints for how to overcome climate change.

The next speech was “The Futures of our Past: Cultural Heritage and the Climate Emergency” by Dr. Megarry from Queen’s University. On the basis of four concrete examples in the “Heritage on the Edge” project, he showed us that cultural heritage artifacts are significantly affected by climate change. Then, he explained that when evaluating the impact of a climate event, we can use a tool to evaluate vulnerability to a climate event rather than evaluating the risk. This tool is called the CVI project. It was developed by experts in cultural heritage and climate scientists and is based on scientific evaluation, and it employs an approach that focuses on communities. The CVI project was also implemented in Africa, where it was also intended for human resources development. Dr. Megarry also explained that it was based on a view that it should actually be evaluated by local people.

The third speech was by Dr. Ishimura of the Tokyo National Research Institute for Cultural Properties. While Dr. Megarry focused on cultural and natural heritage, which are tangible and physical, Dr. Ishimura focused on the importance of intangible cultural heritage, or formless cultural heritage, which is easy to forget and hard to realize as it cannot easily be seen. In this speech, he spoke about traditional knowledge in intangible cultural heritage. After noting that this traditional knowledge potentially includes clues to solve problems related to climate change, he pointed out that traditional knowledge itself must be changed because the climate change that is happening now in many regions differs from previous patterns.

Three presentations were given, focusing on relics, buildings, and natural heritage in connection with climate change. Looking back, it seems that climate change also affects other cultural heritage artifacts and assets. For example, climate change has a great influence on cultural properties such as museum or art gallery collections. One point I want to mention in this regard is that in 2014, two international organizations of experts for the preservation of cultural properties

issued a joint declaration on environmental guidelines for museums and art galleries. These organizations are the International Institute for Conservation of Historic and Artistic Works (IIC) and the ICOM Committee for Conservation (ICOM-CC), an international committee of the International Council of Museums (ICOM). The joint declaration issued by these two organizations recommends reducing energy consumption and introducing alternative energy. It also says that carbon emissions should be reduced to mitigate climate change and that for material management, easy-to-maintain and energy-efficient solutions should be considered ahead of air conditioning. This joint declaration was issued in 2014, but such discussions had already begun internationally as early as 2008.

Seen in this light, it can be said that climate change affects all cultural heritage artifacts such as tangible and intangible cultural properties, immovable and fixed cultural heritage properties such as buildings and relics, and movable cultural properties like collections of museums and art galleries. Being affected by climate change means that these are subject to damage. Of course, not all damage that cultural heritage artifacts suffer is related to climate change, but it is a fact that climate change increases the scale of natural disasters and thereby causes greater damage.

What matters here is the perspective of protection against disasters. In short, reduce damage as much as possible. If damage is caused, minimize the damage. If very great damage occurs, provide relief and support. This is protection against disasters. On October 1, 2020, the Cultural Heritage Disaster Risk Management Center was established in the National Institutes for Cultural Heritage. Its missions can be organized into the three points I just mentioned. I want Dr. Tateishi to speak from the perspective of protection against disasters. He is Deputy Director of the Cultural Heritage Disaster Risk Management Center and Director of the Center for Conservation Science of the Tokyo National Research Institute for Cultural Properties. Dr. Tateishi, I appreciate your help.

**Tateishi** Thank you for the introduction; I am Tateishi of the Cultural Heritage Disaster Risk Management Center (**Figure 1**). It's nice to meet you all. Old Japanese words that have scary connotations include the words “Jishin,” “Kaminari,” “Kaji,” and “Oyaji” (earthquake, thunder, fire, and father, respectively). Incidentally, I try to be a not-so-scary and kind father! When considering protection against disasters in Japan, earthquakes, fires, and lightning are mainly discussed, and the themes like today’s have not received much attention. The year 2023 will mark the 100th anniversary of the Great Kanto Earthquake, the first great disaster in modern Japan. Japan’s disaster risk management of cultural properties was first implemented on a full scale after the Great Hanshin-Awaji Earthquake in 1995. After that, efforts were accelerated because of the Great East Japan Earthquake in 2011 and have been ever since.

I think that Japan has become one of the advanced countries in protecting cultural properties against disasters through its experiences of various disasters including the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake. However, climate change, which is today’s theme, is not often recognized and discussed in the cultural property field in Japan, even if the discussion is not limited to protection against disasters.

In reality, cultural properties in Japan have frequently been damaged in recent years by disasters related to climate change as explained earlier. Most recently,

Typhoon No. 19 in 2019 caused devastating damage to the Kawasaki City Museum. I think this is fresh in the minds of Japanese people.

Responses to the Great East Japan Earthquake, especially related to cultural properties damaged by the tsunami and experiences of this have much in common with responses to torrential rain and other disasters resulting from climate change. I think that seeking a point of contact between both allows Japan’s experience to contribute internationally as well as domestically.

Dr. Megarry spoke about the Nara Document in his speech. The Nara Document is an excellent document that was published to the world by Japan. While being fully aware of the diversity of each region, which is one of its aims, I want to send out an international message for protection against disasters. With this as an assumption, let me talk about Japan’s efforts in response to the Great East Japan Earthquake.

A large tsunami occurred soon after the earthquake (**Figure 2**). The accident at the Fukushima nuclear power plant is also known internationally (**Figure 3**). Eastern Japan, especially its Pacific coastline, suffered heavy damage. There was also severe damage resulting from the nuclear accident (**Figure 4**). In the process, cultural properties were also damaged.

The building shown in **Figure 5** is the Ishinomaki Culture Center, a museum in Ishinomaki City in Miyagi Prefecture. It is one of the largest museums in the disaster-stricken area and was completely destroyed



Figure 1



Figure 2

by the tsunami. **Figure 6** shows the cultural property rescue activity at the museum. A curator died and the building was seriously damaged but many materials were saved. **Figure 7** also shows part of the activity.

**Figure 8** shows a cultural property storage room in a radiation-exposed area in Fukushima Prefecture.

The picture shows wet documents and paper materials (**Figure 9**). A radiation check was first performed before the start of the recovery activity in Fukushima.

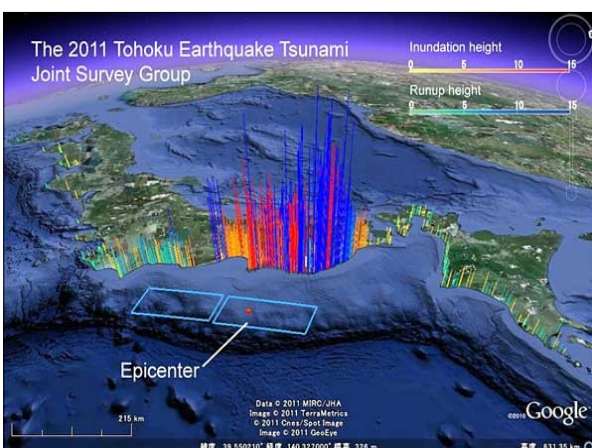
The Great East Japan Earthquake (the 2011 off the Pacific Coast of Tohoku Earthquake) occurred in March. As such, soon after the earthquake, the June



**Figure 3**



**Figure 6**



**Figure 4**



**Figure 7**



**Figure 5**



**Figure 8**



rains and the summer season came. As time passed, damage caused by organisms such as fungi and insects occurred. Wet materials must be rescued as quickly as possible through freezing or other treatments, but there were no facilities to do so in the disaster-stricken area. Large freezers that were operating in the disaster-stricken area were all used to store food for affected people.

We used a large freezer in Nara in western Japan, which was far from the disaster-stricken area (Figure 10). Materials were sometimes frozen during the transportation from the disaster-stricken area to Nara (Figure 11). The materials were temporarily stored in Nara. Figure 12 shows a vacuum freeze dryer belonging to the Nara National Research Institute for Cultural Properties, in which the current headquarters

of the Cultural Heritage Disaster Risk Management Center is located. Nara is an ancient capital of Japan. Usually, this equipment is used to store and treat wooden cultural properties, such as a large well unearthed from the ancient remains. This equipment is capable of treating two tons of materials at a time.

Figure 13 shows work at the Tohoku University



Figure 9



Figure 11



Figure 12

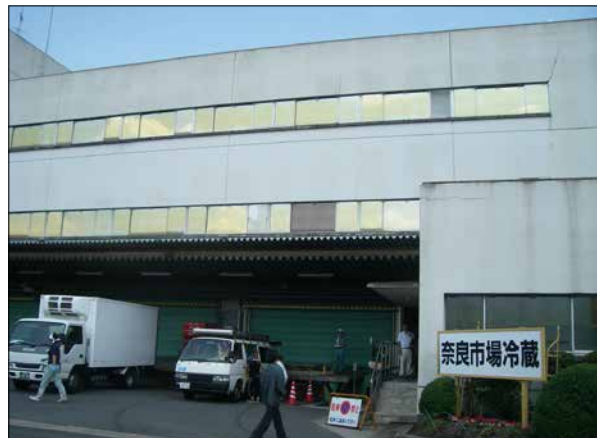


Figure 10



Figure 13

of Art & Design, a university in Yamagata Prefecture, which is near the disaster-stricken area. Various networks worked effectively in not only western Japan but also elsewhere. In this picture too, there is a vacuum freeze dryer at the back. Shown is a scene where we had students treat cultural properties—wet paper—for preservation partly for their hands-on training. **Figure 14** shows prefectural and municipal officials in charge of cultural properties who were actually engaged in work using a vacuum freeze dryer in western Japan. Experts in various areas in western Japan gathered at the Nara National Research Institute for Cultural Properties to consider what treatment was appropriate. **Figure 15** shows the scene at the Tokyo National Research Institute for Cultural Properties, where people shared information and discussed the treatment of cultural properties of wet paper using the squelch-packing technique, which differs from vacuum



Figure 14



Figure 15

freeze-drying.

All of these works were conducted around April and May 2011. After that, we experienced various processes, but some work remains unfinished. Although I cannot say for sure that the first stage has been completed, the Cultural Heritage Disaster Risk Management Center was established in the National Institutes for Cultural Heritage in October 2020, almost ten years after the earthquake and already two years ago.

I think that the Cultural Heritage Disaster Risk Management Center should function properly as a promoter of disaster risk management of cultural heritage in Japan and as a hub of networks in cooperation with the Agency for Cultural Affairs, facilities of the National Institutes for Cultural Heritage, and experts and specialized agencies around the country.

Today's theme of climate change does not receive much attention in Japan, as I said before. While being fully aware of this, I want to consider the work from now on.

Broadly speaking, the Cultural Heritage Disaster Risk Management Center has three missions (**Figure 16**), which Dr. Sonoda also mentioned earlier: first, prevent damage; then, minimize the scale of damage when a disaster actually happens; and take appropriate action if a disaster actually happens. Experience also leads to the next prevention, so I want to create a proper cycle. After listening to this morning's speeches,

## Cultural Heritage Disaster Risk Management Center, Japan

established in October 2020 at the headquarters of the National Institutes for Cultural Heritage, Japan.



独立行政法人国立文化財機構  
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Mission

1. Prevent damage
2. Minimize damage
3. Provide relief and support for damage

Figure 16

I have become keenly aware that not only earthquakes, thunder, and fires but also climate change should be positioned at the center of discussion. As an assumption for the panel discussion that follows, I offered topics. My speech is over. Thank you.

**Sonoda** Thank you so much, Dr. Tateishi. Well, let's move on to the panel discussion. First, if there are any questions from the presenters to other presenters, I would like to hear them. If there are any questions for the first presenter, Dr. Nakatsuka, please ask him.

**Tateishi** I listened to Dr. Nakatsuka's speech in the morning with great interest. Thank you very much. For years, I have paid attention to Dr. Nakatsuka's research including a large joint research project at the Research Institute for Humanity and Nature, and I think that there are probably findings that Japan can boast to the world. I wonder how they are disseminated internationally, what the international research situation is like, and whether there may be similar research overseas as well. I would like to ask something like these.

**Nakatsuka** Regarding international dissemination of my research related to paleoclimatology in natural science, I disseminate research results to an international database and at the same time publish them in their entirety in an important European international journal. Regarding discussions of history and climate, I have so far disseminated them in academic conferences on Japanese history and archaeology. A difficult point is that Japanese and Chinese history is not familiar to scientific referees of international journals, especially European and American ones, and as such, it is sometimes difficult for them to understand the core of an issue. Honestly, because of my lack of ability to explain Japanese and Chinese history at once in a short paper, my thesis was not accepted easily.

Meanwhile, this research discusses history on the basis of changes in summer climate reproduced from annual rings, and the major grain in Japan is, as you

know, rice which grows in summer. The time when rice grows correlates with the time when the climate is recorded in annual rings of trees, and consequently I was able to obtain very clean data to interpret history. However, the relationship between climate change data and crops in Europe and America is not as simple as in Japan, so as we look at the data of Europe and America, we cannot find such a simple relationship. In Europe and America, however, research on the relationship between climate change and history is very active, and many important discussions have been conducted because the disciplines of dendrochronology and dendroclimatology were originally developed in Europe and America. There seems to be no such research that interprets the entire history over more than 2000 years using a single idea as I did, and I will work hard on international dissemination of our research results so that I will be able to communicate with researchers in Europe and America, where advanced research including the possibility of such research is conducted.

**Sonoda** As just explained, combining various historical events to analyze scientific data is a very new approach and perspective. An approach to combine what has been accumulated in different fields to find new discoveries will work for not only Japan but also the world and is not limited to the relationship with rice and crops, so it was a very interesting presentation.

we have also received a similar question from a participant for Dr. Nakatsuka: "Thank you for your valuable speech from the perspective of the integration of humanities and sciences. I was able to learn new approaches in considering climate change and cultural heritage. I would like to hear from Dr. Nakatsuka on the future possibility of international cooperation regarding cultural heritage and climate change. Would you please tell me keywords as possible actions?" What do you think about this?

**Nakatsuka** In the sense of reproducing climate changes using oxygen isotopes, I have already reproduced data with a direct relationship with most

countries in Asia at the laboratory level. This includes obtaining documents to determine ages, reproducing climate changes, and making interpretations in cooperation with people who are engaged in the preservation of cultural properties in other countries, so I am conducting international cooperation in that sense as a matter of course. As for the latter question, the issue of how to use cultural heritage under climate change is very essential, so let me express my views at the end after everyone's discussions become active.

**Sonoda** Do the other presenters have questions?

**Ishimura** In Dr. Nakatsuka's presentation, he explained that medium-term changes over 30 to 60 years lead to social catastrophes because they are forgotten as it is rare for humans to experience these changes in their lives. It is often the case that once on shore, we pray no more, and therefore, it is very difficult to pass on the memories of disasters. In particular, disasters that occur because of climate change are probably medium-term changes that happen beyond a human lifetime, like a periodic change over 30 or 60 years. I think passing on such changes and memories is a difficult challenge. Dr. Nakatsuka, if you have any ideas to pass them on to the next generation, please let me know.

**Nakatsuka** It is a very essential problem. As with climate change, it is difficult to hand down the memories of disasters as they occur periodically. As Dr. Tateishi said earlier, there are serious problems with earthquakes, tsunamis, and other disasters that occurred in Japan, for which an enormous amount of research has been conducted. However, such a perspective is absent from discussions of climate change. Here, I want to emphasize that they are actually the same thing. It is very important to pass down memories through generations, and according to Edo-period documents, at the time of the Tempo Famine, 50 years had passed since the Tenmei Famine, so while many elderly people warned that a famine might occur soon, young people

mostly did not listen to their warnings. Therefore, efforts to properly pass on lessons from the past from the present to the future should be repeated in various contexts such as climate change, protection against disasters, and preservation of cultural properties.

**Ishimura** Let me briefly introduce what I studied in connection with what Dr. Nakatsuka said. The Kawasaki City Museum, which Dr. Tateishi mentioned earlier, was submerged by the flooding of the Tama River in 2019. The Kawasaki City Museum is situated in a place called Todoroki, which is near a bank of the Tama River. Looking into the origin of the Todoroki area, I found that the Tama River once flowed in the area. The river once meandered but was straightened to today's route from around the Edo period. The Kawasaki City Museum was built in a former bed of the Tama River. Upon hearing the place name "Todoroki," some people may recall another place. In Tokyo's Setagaya City, there is also a place named Todoroki, which is home to the Todoroki Valley Park. Formerly, the northern Todoroki and the southern Todoroki were part of the same land area. They are now separated because the Tama River runs through the middle, but the place names remind us that they were actually once the same land. However, such old place names are doomed to disappear with the times. I am not sure that place names themselves can be said to be intangible cultural heritage, but I think it is important to leave memories included in such things.

One more thing I want to introduce is the story of Mabi-cho in Okayama Prefecture, where a flood disaster occurred in 2018. Mabi-cho is situated on a plain at the confluence of a large river called the Takahashi River and a relatively small river called the Oda River. A flood disaster occurred there, the biggest reason for which is that the Takahashi River is a raised bed river. A raised bed river flows above the adjacent ground. They are caused by a build up of sediment carried by the river, which elevates the river over time. This happened here mainly in the Edo period and can be traced back to Tatara (foot bellows) iron making

practiced in the upper part of the Takahashi River in the middle ages. This used a technique that extracted iron sand using river water; through that process, large amounts of earth and sand flowed into the river. In short, the fact that the Takahashi River is now a raised bed river is also the result of human activities since the Edo period. There is a positive aspect that as soil flows in this way, the alluvial plain there can be used as cropland to grow crops, but it is undeniable that there is also a negative aspect in that the area is susceptible to such disasters.

The place in Mabi-cho most affected by the flood disaster in 2018 was actually an area relatively recently developed as a residential area. Mabi-cho has repeatedly been hit by floods since the Edo period, and after the war, the Takahashi River was improved so that flooding would be less likely. Partly because Mabi-cho became a bedroom suburb of Okayama and Kurashiki Cities, a place that had been hit by floods until then was turned into a residential area and new residents were not properly informed that it was vulnerable to floods. This was already pointed out as a major cause of the disaster in reports. In this case too, it is also important to pass on its memories of vulnerability, but besides that, it is also necessary to give back to society the result of academic analysis based on the history of human activities since the Edo period and geoarchaeology, that is, an archaeology of land, for example, analysis of how soil has built up.

**Sonoda** I think he pointed out that the history of human activities and what the people who lived there took for granted are forgotten as time passes and thus should be recorded or left in memories. Do you have any comment, Dr. Megarry?

**Megarry** Yes, thank you very much Dr. Nakatsuka for a wonderful talk, which I found very interesting and inspiring. And one of the things I enjoyed most was this identification of tipping points between environmental change, climate change and cultural change. And I specifically enjoyed the fact that you focus not just on

successful adaptation, but also on maladaptation or unsuccessful adaptation because I think we can learn a lot about our failures, as well as our successes.

And one of the questions I had was, you talked about migration as a form of adaptation. And I think there's an interesting question to be had on the panel from Dr. Ishimura's talk as well, about whether migration is an impact, or whether it's a risk or an actual form of adaptation. But one of the questions I had was your use of building numbers to identify the movement of people, and was whether or not it would also be possible to integrate other archaeological data sets, like carbon 14 dating, to look at the increase of activity in certain areas, or even a look at things like a DNA, ancient DNA to look at the movement of populations using maybe stable isotopes as well, to kind of explore that question of population migration. And maybe it might fill in some gaps where we don't have the historical record.

**Nakatsuka** Records of migration and population changes are very important in archaeology. Probably for the first time, I pointed out that an increase in the number of houses indicates an increase in the level of migration, although there is no direct evidence. Many argue that the number of houses is proportional to population in many cases. For example, looking at the second century shows that as migration records, earthenware moved over a very long distance between various areas in Japan. Some types of earthenware as goods are sometimes found to have been moved. Sufficient discussions about this have already been held. What I want to do now is dendrochronology based on oxygen isotope ratios. I want to examine when and where houses were built and when those houses disappeared in a short period when large climate changes in decades-long cycles really happened. I want to track such residential records in units of one year. This, however, requires a lot of materials made of good-quality wood. As Dr. Megarry said, carbon-14 concentrations and other various data are also required. DNA and the number of human graves are also

important, if the conditions are good. The number of graves does not change with migration, and it is also necessary to directly discuss migration and population changes using such data to make our discussions more accurate. In fact, right now, I am undertaking such a project. I will disseminate its results internationally.

**Sonoda** Well then, I want to accept questions for Dr. Megarry. Any questions?

**Nakatsuka** Dr. Megarry said that in cases in which relics are being damaged by climate change, if they will certainly be lost in the last stage, it is important to make records. Although most of the relics I mentioned in my speech are things of the past that do not currently exist, it is very important to make use of the records of such relics for future research. However, I am not an expert at all regarding this, so I would like to ask you. Is there any organizational plan as to how such records are to be used?

**Megarry** Thank you for that question. I think the loss of our special places is one of the hardest things that society has to deal with when it comes to climate change. As we saw at the recent COP, many countries, especially those in the Pacific, are experiencing this loss at an alarming speed. The question of recording prior to loss, I think is one that maybe is easier for archaeologists to actually accept, because it's such a huge part of what we do as a discipline. Most of us have probably spent a lot of our lives working on large infrastructural projects, excavating sites prior to their destruction. We have a unique perspective on loss. And I also think a unique set of skills, which allows us to conserve by recording these places before they are lost, sometimes not all of them, sometimes we just sample and excavate that way. In that sense, I think we already have an established mechanism to record prior to the loss. But new tools and methodologies give us new opportunities as well, especially in terms of things like 3D recording. There are many platforms now online, which allow people to look at 3D models of things, for

example. And also, we need to be building databases of this data, openly available data of the sites for people to study going forward.

Ideally, our records of these sites need to be feeding into large open databases, which can allow us to – allow researchers, Ph.D. students, post-docs, and large projects, to explore their significance to the archaeological record in the same way as archaeological data has been feeding in as well. And one of the great challenges of that exercise is the scale of loss and that as a discipline, in archaeology, we often lack the resources to be able to respond to every site that is eroding out of a cliff or flooded in a river. And I think that is where actions like Citizen Science, so utilizing community engagement, Dr. Ishimura talked about this in terms of communities helping to preserve their own heritage. And in those cases, it's even more important that the knowledge that is being collected is stored centrally. Because the risk is that as communities or the general public are involved in this, that we might not get records of that.

So there needs to be project in place which encourage community engagement, encourage citizen involvement, but also make sure it's being done robustly, and that the data being collected is then made available in a standardized way. Thank you for your question.

**Sonoda** I have a question related to this. When the evaluation is made in this CVI project, the perspective of a community is taken into account and local people are therefore involved in the evaluation. I understood this to mean that evaluation is conducted mainly by local people. I guess that this project is also intended to develop human resources or involve people. When the evaluation is completed, what should be done after that? Whatever you do, you actually need people's know-how and money and also require time. I would like to hear what steps are to be taken after the evaluation is conducted with this tool and what plan and ideas you have to make this project sustainable and work effectively.

**Megarry** Yes, thank you for that question. Two responses. Yes, the inclusion of the local community, local heritage professionals and site custodians are key to understand the vulnerability of sites because they bring different plural and sometimes even conflicting beliefs as to the value of the Heritage under the site and threat. So, it's very important that they are listened to. I would see the CVI and the tools associated with vulnerability analysis as being less a tool and more of a toolkit. I don't think it's as simple as one step after another after another, I think it's important that it is malleable and adaptable. In the CVI Africa project, we ran two workshops, one at a quite traditional archaeological site, which we looked at today, and another one at a living cultural landscape with an indigenous community in Nigeria. And the technique had to adapt considerably in order to be able to work in both places. For example, the stakeholder value mapping and the integration of traditional knowledge were far more important in Nigeria than it was in Tanzania.

The final question is, how do what do we see coming next? How do we integrate our learnings? Vulnerability and an understanding of vulnerability is an essential prerequisite to adaptation planning. If we make adaptation measures without understanding how the site is vulnerable, we risk maladapting our sites and creating issues down the line that can cause more problems. For us, the best way of dealing with this is not to do vulnerability assessment, but to embed the skills necessary to do vulnerability assessment within people working in these countries and at these sites, because this means that it can become part of the standard recording mechanisms at the site. So it's not a one off event. It's something that happens again and again and again, as any of the parameters involved change. It would also hope that by embedding this knowledge within the local community and the local heritage sector, that it can feed into more higher level organizational priorities like for existence adaptation planning, which we discussed earlier. And one of the lovely things about the project was of the eight students

we had from six different African countries, most of them have gone on in their careers now to focus more specifically on climate impact vulnerability and adaptation planning within their organizations and in other organizations.

So I would like to think that it's less about the tool, and more about the people involved in learning how to use it, because I think they're the people who can instigate that change, which you're talking about. And in fact, three out of our eight trainees from the CVI Africa course, will actually be speaking at a special event we organized at the COP the climate change conference in Egypt in two weeks' time. That is a major platform for heritage professionals at – the highest platform in the world on climate change, for them to bring their experiences right to the heart of the global discussions. And I think this is what's so powerful about heritage and one of our major findings from the international co-sponsored meeting which we were at was the power of stories, the power of people, and the power of places to communicate about climate change in a meaningful way, is very important. And so these people, in a sense become advocates of the importance of culture, when thinking about climate change. Thank you.

**Sonoda** Through the project, the awareness and way of thinking of the students, local people, and people in each country are changed, and their awareness of climate change issues is raised, which will lead to long-lasting activities in communities. The project and tool are for that purpose, but what is actually important is the development of human resources, and its seeds and core are expected to grow and spread throughout Africa.

**Megarry** Yes, it's not just about Africa too, I think climate change is a truly geopolitical issue. It's affecting everywhere in the world from Stone Town in Zanzibar to Stonehenge in England. And so it's not just necessarily about training people for Africa, but it's that the experiences in Africa are also valid in Japan,

Canada, and South America as well. So it's that bigger picture too. Thank you.

**Ishimura** Dr. Megarry's CVI project is a wonderful project and also has the effect of making communities more aware of climate change while involving them, if I remember correctly. In Oceania too, where I was involved in research, I had the impression that people's awareness of climate change was strong. It seems that not only government officials but also ordinary people like those who live in villages are highly interested.

Behind this is the fact that climate change is a geopolitical issue. In developing countries in particular, the impact of climate change tends to be greater because they are especially vulnerable. Such countries are extremely likely to be the first victims of climate change or are actually already being harmed, so their awareness is strong.

Besides, there is a strong sense of unfairness that developed countries are mainly responsible for the current situation and developing countries are most disadvantaged by the results.

Considering the extent to which Japanese people are aware of climate change issues, the mindset of saving electricity in daily life to reduce the amount of carbon dioxide emissions is becoming common together with SDGs, but Japanese people still seem not to be very aware that because of the impact of climate change, they themselves may actually be affected and cultural heritage may actually be damaged.

Dr. Megarry is conducting such a project in the U.K. What is the general public's awareness of climate change in a developed country like the U.K. and how aware are they of the extent to which it may affect cultural heritage?

**Megarry** Thank you for that question. I'll answer the second part first. I think that about five years ago, people in Europe talked about climate change as something that will happen. And in the last five years now people are talking about climate change as something that is happening. And that's an important

transition in appreciating the urgency of the climate crisis. We've seen unprecedented weather conditions, heat waves, rain flooding in Ireland and the UK and Western Europe. It's been one of the hottest summers on record in France. And when we combine that with a global fuel crisis, especially in Europe, which is also caused by the same thing that causes climate change, oil and petrochemicals and what have you, I think the reality of it's becoming very, very clear. And that also the bigger question of climate justice and equity, which is that those least responsible for climate change are the ones suffering most and those most responsible for climate change have the greatest capacity to adapt, is one of the worst and most difficult aspects of climate change.

In a sense, we perpetuate great historical injustices of exploitation by continuing to produce greenhouse gases which most negatively affect people in other countries. I would say people's awareness of the impact of climate change on cultural heritage, where I'm from, is not high. It's not as high as say its impact on agriculture or coastal communities. What often is the case is that specific examples of impacts will have a very large public response and that will then create a platform for us to talk more about this, but I also think a lot of it is back to this idea that cultural heritage is embedded in so much of our society already. And so, sometimes what we have to do is we have to talk about those aspects of culture in migration and business and tourism and all these things in the role of cultural heritage in these things, in order for people to realize more that cultural heritage is a key part of this impact by climate change. Thank you.

**Tateishi** Dr. Megarry, thank you for a very interesting report. There are some questions I would like to ask. The Nara Document, which I also mentioned in my speech, appeared in Dr. Megarry's speech. It was very impressive. I and other members who are engaged in the preservation of Japan's cultural properties are always conscious of the Nara Document, but honestly, we did not expect to hear about it today from Dr.



Megarry.

The Nara Document expresses and declares the diversity of cultural heritage and the diversity of methods and approaches of heritage protection. According to Dr. Megarry's speech, standardization is required for recording, and I agree with this statement.

How can we make use of the concepts of the Nara Document when considering not only protection against disasters but also all aspects of cultural heritage? They will make a difference in the role of communities, the development of human resources, and the action to take for individual heritage artifacts, which were summarized by Dr. Sonoda earlier.

Of the examples that Dr. Megarry gave us, I would like to know concrete examples in which such differences can be seen, especially in terms of the concepts of the Nara Document. Such examples will likely be very informative for experts in Japan like us.

**Megarry** Thank you very much, Dr. Tateishi, for that question. And I feel nervous speaking of such an important document, so close to where it was written and where it came from. So please bear with me and be patient in my response. Climate change is going to force us to rethink many of the central concepts of World Heritage. Already, we have seen concerns in natural heritage say the Great Barrier Reef in Australia, about the impact of climate change on the outstanding universal value of that property. And it is also undoubtedly going to it is and will cause us to question concepts of authenticity and integrity.

For example, the traditional European approach that structures must be conserved, using the same materials which were used to construct it in the first place, or the conservation efforts should not affect the authenticity, or the integrity of structures just might not be an option in the future with climate change. If it is necessary to preserve a coastal site from eroding into the ocean by putting up concrete walls, then we must think about whether or not traditional concepts of authenticity are actually useful anymore in those situations. One example would be the Scottish site of Skara Brae, the

heart of Neolithic Orkney, where they've had to literally build concrete protection around a Neolithic tomb. It's impossible that that is not impacting the authenticity of that site. But without doing that, the entire site is lost.

I think not just in our document, but the examples of the conservation of wooden architecture. The need to think about the locally specific, as you said, values and meanings of sites, offers us an exciting way to think about the evolving landscape of World Heritage and heritage management. And maybe retain concepts of OUV by thinking differently about concepts of authenticity and integrity. Now, as I said, this is a huge conversation. And it is currently happening at the moment in UNESCO, where they're revising the policy document on cultural heritage and climate change. There's a massive reticence I think, understandably, within the heritage community, both cultural and natural to move away from this concept of OUV, the standard World Heritage concept. But there definitely is space for us to think about authenticity and integrity differently. And documents like Nara give us a framework to do that in a really very important way. But as I said, it's rather intimidating talking about such an important document with people who were probably involved in promoting it and being part of it. So, I hope that answers your question, Dr. Tateishi, does it?

**Tateishi** I think it is also related to the difficult issue of what to think of the "U" (Universal) in OUV. I have learned a lot. Thank you very much. Regarding the very difficult aspects of authenticity that Dr. Megarry just described, it will become even more difficult when it comes to what to think of the authenticity of traditional knowledge, which was explained by Dr. Ishimura, including the parts that can currently be changed. When I heard your story, I was really inspired. Thank you.

**Sonoda** Next, I want to accept questions for Dr. Ishimura. Any questions?

**Megarry** Dr. Ishimura, I loved the part of your talk where you talked about the living experience of people

versus their cultural heritage. And very often, I think we're faced with a false choice, where we're told that in the urgency of climate change, we have to save people at all costs, even if it means we sacrifice culture. I'm wondering if you think that is correct, that approach, and what your experience would tell you about the importance of culture when people do have to move?

**Ishimura** In front of the large stream of climate change, culture tends to be swept away. However, for traditional knowledge and culture, it is not enough just to leave old things as they are, as I said in my presentation. For example, you will agree that it is very radical to say that you should live with your old lifestyle left as it is. Consider what meaning tradition has for communities, I always think that a community in which traditional culture and society remain strong is a highly resilient community. Looking at culture and its relationship with disasters in various communities in Japan and overseas, it seems that in the event of a disaster, responses are sufficient and reconstruction is quick in highly resilient communities, in which traditional culture tends to remain strong. This means that the strength of tradition for a community can be a criterion with which to assess the community's resilience and soundness. It may be an exaggeration to say that leaving tradition itself is not so important, but creating a strong community in which tradition can be left is more important and will also lead to adaptation to climate change. This is my view and opinion.

**Nakatsuka** After hearing that, I totally agree. I belong to the Graduate School of Environmental Studies, which is a research department of Nagoya University, where there are many people who are doing a revitalization project for a hilly and mountainous area. For such a project, the definition of a community is very important. They discuss cases in which people move into and revive marginal villages (depopulated villages where most inhabitants are senior citizens), although I do not know whether it is simply a good thing. Then, I want to ask who takes the lead in

protecting traditional culture; that is, whether people who have lived there for generations should protect it or whether people who came from outside can inherit it. Then, there is another question. Now, conscious efforts seem to be made to combine traditional culture and advanced technology, and so on. How can we evaluate such efforts in terms of the protection of cultural heritage or intangible cultural heritage? What do you think about this?

**Ishimura** When we think about a community and tradition, what the original community is becomes an issue. However, in a community, there are often few people who have lived there for generations. Population is always on the move. From a historical perspective, large-scale migration of people should be considered as in Dr. Nakatsuka's speech, but here, for clarity, let me introduce an actual example from Amami-Oshima Island, where I conducted fieldwork.

I think that Amami-Oshima Island is widely recognized as an area in which traditional communities are well-conserved. I previously conducted a survey to hear the life history of people who live in a certain village. I interviewed almost all the villagers. I found that few people had actually lived in the village for a long time. In Amami-Oshima Island, there were many people who followed a pattern of leaving the community and then returning to it, including those who left the island once to find work or, in earlier times, to go to war. More recently, there were also many people who had come from outside, that is, those who were not originally natives of this particular village in Amami-Oshima Island.

Considering the factors that allow a community to be regenerate in such a situation, there are cases in which people who once left the island return and revitalize the community and in which people who came from a totally different place in search of work start a new business and refresh the community in that way. With this, a community is always invigorated. As for whether it is the same as in former times, it is, of course, different. However, I do not think that tradition

is interrupted. Rather, I think that tradition always changes and is always renewed in such a way. Looking at a somewhat older history, you will see that in Amami-Oshima Island, there were already people who had a lifestyle of, for example, moving to other areas such as Satsuma and Okinawa or going to Southeast Asia to engage in deep-sea fishing. In short, traditional life is by no means static.

With that in mind, I want to answer Dr. Nakatsuka's last question regarding how to evaluate new technology. Although the example I just explained may be a little different from that about new technology, a community always accepts new elements and uses them as an opportunity to revitalize the community. This is very important in terms of community sustainability, and a community in which this process is going well can be said to be highly resilient overall and also be resistant to disasters.

**Sonoda** Now, we have received a question from the a participant. Let me introduce it as it is related to both Dr. Ishimura and Dr. Megarry: "This is an 'if possible' thought experiment. Suppose that the traditional knowledge of Kiribati and Fiji to respond to storms and floods, which was explained by Dr. Ishimura, is relocated across regional boundaries to the port city at Kilwa in Tanzania, which was mentioned by Dr. Megarry. In this case, what should we pay attention to?" I would like to hear opinions from both of you.

**Ishimura** Local knowledge and indigenous knowledge only work there, and this is why they are local and indigenous. As such, I think it will be quite difficult for such knowledge to be directly useful in other areas. For example, the story of predicting a cyclone from the flying pattern of frigate birds in Fiji will probably become a different story if you go to a different village in Fiji. Therefore, direct relocation of such knowledge will be difficult; however, it may be possible if the knowledge is a little more abstracted. I introduced the term "wise use" as the sustainable use of natural resources. For example, it is said that slash-and-

burn farming is actually environmentally sustainable. I think it is possible for such abstracted knowledge to be helpful in other areas. Secondly, for example, efforts like the CVI have been made in Fiji, Kiribati, Tanzania and so on, and I think that the efforts themselves can be referred to as good practices in other areas. In that sense, they can contribute to horizontal relocation.

**Sonoda** Dr. Megarry, what is your opinion?

**Megarry** Yes, I think that answer is brilliant, I don't have a huge amount extra to say. Traditional knowledge and local knowledge are also owned by traditional knowledge keepers and local knowledge keepers. And so we need to be careful as we sit here and talk about knowledge in Tanzania and Nigeria, to be aware that's not necessarily our knowledge in some cases, especially with indigenous knowledge, even if it's deemed to be useful. So, it's back to the question of consent, and making sure people share it. But I mean, absolutely, in Nigeria, they'd be noticing the closet changing climate for 15 years now. And their solution was to change the structure of their stone doorways in the village to move the breeze around differently in a way to cool it. And that's not a model that can be picked up and put somewhere else. Likewise, planting mangroves might be great in Tanzania. It's not going to work in northern Scotland, right, where they just won't plant. Okay.

But I think that there's a way of thinking about adaptation, and assessing risk vulnerability, and developing adaptation plans, which can be transferred. And so crucial to this is having our colleagues from Fiji, Kiribati, Tanzania, Nigeria, as part of being able to communicate and talk with professionals elsewhere in the world about the processes, the methodologies, the way in which they think about climate change and about vulnerability and about site adaptation is very important because otherwise, we just work in silos, and people reinvent the wheel in different places. And it's one of the reasons we're so keen, not necessarily to develop a tool like CVI but to develop a set of tools and resources that are malleable and can be used differently

in different places. Thank you.

**Sonoda** Again, direct migration seems to be difficult because cultures and backgrounds differ. But, if there is information and knowledge about what has not been done so far, this can provide new hints, so that that person, the community, and the people living there may apply them in their own way. In that sense, sharing information is very important.

Here, I want to move on to a slightly different but related subject. The purpose of holding a symposium of the consortium is to explore the possibility of international cooperation for a better future for cultural heritage. I would like to ask the presenters to speak about the possibility of international cooperation. First, Dr. Nakatsuka, please.

**Nakatsuka** I have already answered some questions, which were asked before. The answer I reserved earlier was different from international cooperation, so let me start with that.

When analyzing the annual rings of trees, I cut cultural properties with a saw and otherwise cause damage to them. This kind of topic is difficult to discuss here, but after listening to today's discussion, I realized again that cultural heritage itself is not only what should be protected but also information sources that are crucially important in adapting to and mitigating climate change. With cultural heritage becoming increasingly lost all around the world, I realized again that all of you are working eagerly on its preservation as it is no longer possible to leave this situation as it is.

In the Graduate School of Environmental Studies, to which I belong, I discuss climate change and all aspects of global environmental problems on a daily basis. However, among the environmental studies researchers, as well as those in meteorology and climatology, very few are interested in the world in the past, including cultural heritage.

Some people say that it is no use looking at old things because the past is different from the present and global environmental problems are problems that

began in the 20th century. The past is different from the present, but the future is also different from the present. Global environmental problems, including the current global warming, have great power and influence and will change the world radically, so we cannot understand the future just by seeing the present. In that sense, the tool for connecting all the past, present, and future is cultural heritage, and I think it is very important to make use of it. Today, I spoke from that perspective, but for researchers in history and archaeology as well as many of the general public, it is not common to consider the relationship between past climate change and cultural heritage from that perspective. There were comments and questions from Dr. Tateishi in terms of international dissemination, which I think remains insufficient. I have expressed several opinions in terms of natural science, of course, but from now on, I think I should actively express my opinions about the relationship of climate with history and culture.

I am working eagerly on international cooperation in the natural sciences. I believe that extending such cooperation to the level of culture and speaking about its relationship with climate change is commonly required for Europe, America, Asia, Africa, and all other regions. We have received many comments about this. I will work seriously and quickly on international cooperation in this academic sense.

**Sonoda** Dr. Megarry, you know a lot about the situations in other countries. What can Japan do for the world? What roles and contributions are expected? Your personal opinion is fine. Probably, you are the most suitable person to answer the questions.

**Megarry** Thank you very much. I'll speak both from personal opinion and from what we feel like we need within the working group. From that kind of higher level, one of the things we've already talked about, which is that we need to reconceptualize how we think conservation practice, and constant preservation, in terms of climate change, we need to get better at

managing change, not preventing it. And we need to rethink some of the core concepts, which we currently use to think about heritage practice, especially in Europe and North America. And so we've already talked about the amazing, what Japan has and can offer in that. And I think there are indeed incredible capacities, knowledge and resources there both in terms of knowledge, but also as a wealthy country, much like the UK, Europe.

We have a duty to fund and to ensure just transitions especially with countries that are suffering the effects of climate change they did not cause. I think there's research bodies in countries like Japan, and countries like the UK, the European Union, the USA, need to have more research, which funding and more development funding, which is linked specifically to cultural heritage and climate change. And that would just be equitable and be fair.

A second thing that I really think Japan can offer in this regard is disaster risk management. And we heard Dr. Tadeishi's wonderful presentation already with regards to the response to the earthquake. I come from a country where we don't really have natural disasters. Now, depending on who you talk to, some people would say there's no such thing as a natural disaster. There are events and human systems make them disastrous. But I think that, in that sense, many countries don't have a history of having to think about these things. It puts us on the backfoot, so that considering the long history here of disaster risk management, that is a huge, huge asset and skill set present in Japan that a lot of countries just don't have and really need to think about in that regard.

And I think there's an open question, and I'm sure it would be a wonderful conversation we could have about whether or not climate vulnerability and risk fits within disaster risk management or whether it's something different. I tend to think they're very similar in some ways and very different than others. But I certainly think we would be not utilizing our full global knowledge and capacities by not thinking about what one has done already when we're thinking about

inventing something new, it doesn't make any sense.

From a personal perspective, then we have a saying in our working group that which is that every place has a climate story. What that saying means is when we want to communicate about climate change and its impacts globally, all our heritage sites have a role to play in it. And I think countries like Japan, who have one of the longest histories, archaeologically, all the way up to through the industrial period and into the present day, offer a unique insight into so many aspects of our past, who we are, where we come from. And that those places or assets to think about the future, we say, we often say that the secrets to a post-carbon future lie in a pre-carbon past.

I think that's another really important asset here, which is the depth of your culture, the depth of history here, and what they can tell you. I mean, for example, one of the themes that came out of the International co-sponsored meeting was, how are we going to conceptualize industrial heritage in 20 years' time, in 50 years' time, when the climate emergency is much, much, much more severe than it is now? How do we think about those assets, those industrial heritage assets associated with fossil fuels with petrochemicals thinking to the future? That's a challenge we need to think about now because there is a risk that they will become seen as negative things. And we need to conceptualize how we're going to think about that, at this point, we need to do it before it happens. And you know, countries like Japan with sites that allow us to have those conversations are really very important. And of course, we've already heard so clearly and wonderfully today about how the past and past places can tell us about the climate change as well and maybe identify ways of thinking moving forward about adaptation.

So in that sense, I think if every place has a climate story, there are lots of stories to tell here. And it's a real asset in thinking about how we respond to and talk about climate change. Thank you.

**Ishimura** I would like to speak about international

cooperation, focusing on issues related to intangible cultural heritage. International cooperation for protecting intangible cultural heritage is probably somewhat different from when protecting tangible cultural heritage. This comes down to fundamental differences between the World Heritage Convention and the Convention for the Safeguarding of Intangible Cultural Heritage. The framework of protecting cultural heritage internationally is common to both conventions. The primary purpose of the Convention for the Safeguarding of Intangible Cultural Heritage is to urgently protect the intangible cultural heritage that is currently endangered. Another purpose is to make intangible cultural heritage more visible. This is intended to not only make it clear that a heritage property of interest has value in itself but also spread among people awareness that the existence of an intangible cultural heritage itself is precious; these are explicitly stated in the convention. They are important because there is a fundamental idea that intangible cultural heritage shows the diversity of various cultures around the world.

The Convention for the Safeguarding of the Intangible Cultural Heritage has a list called the Representative List. This is similar to the World Heritage List, but there are differences. As mentioned in Dr. Megarry's presentation, heritage that have Outstanding Universal Value (OUV) are registered in the list of the World Heritage Convention, whereas the Representative List of the Intangible Cultural Heritage of Humanity in principle does not consider the value of cultural heritage to be listed. The heritage in the Representative List is listed not because its value, although this may not be so familiar to many people. This is because it is self-evident that intangible cultural heritage, whatever it may be, is valuable for the community that possesses it. As such, evaluation of its value by experts and outsiders is presumptuous in itself, which is the idea of the Convention for the Safeguarding of the Intangible Cultural Heritage.

Then, it comes down to the question: exactly what is the Representative List? It is considered just like a

specimen box of diverse cultures that mankind has. That is, the fact that diverse cultures are listed in the Representative List indicates that mankind has diverse cultures. So, why is cultural diversity important? The reason is that diversity will become a very powerful weapon for society to address disasters, climate change, and other risks, as explained by Dr. Nakatsuka in his presentation. We currently face the problem of climate change, which all mankind faces equally. Through diversity, mankind itself needs to address this issue. In that sense, what the Convention for the Safeguarding of the Intangible Cultural Heritage aims for will lead to the preservation and protection of the diversity of mankind. Protecting this diversity will in turn give us the power to fight against climate change. Regarding what Japan should do in terms of international cooperation, I explained that it is not that experts in Japan are more knowledgeable about intangible cultural heritage in other countries than local people living there. This means that through Japan's role in international cooperation, it is important to make intangible cultural heritage visible and provide support for realizing diversity, instead of protecting intangible cultural heritage itself.

**Tateishi** Today, I learned a lot from Dr. Nakatsuka, Dr. Megarry, and Dr. Ishimura about cutting-edge research. Thank you very much. Partly because of Dr. Nakatsuka's efforts so far in Japan, various findings about a point of contact between climate change and history have been produced in Japan and abroad, but when it comes to a point of contact between climate change and cultural heritage and properties, this event is the first of its kind or is at least close to it and epoch-making, as far as I know. I also learned a lot through it and became aware of the trends around the world. First, I want to start with sharing its results within Japan.

As I said at the beginning, Japan's experience in protecting cultural properties against disasters will probably help contribute to the world in various ways—especially for tsunami-related issues, and measures not just against tsunamis but also for cultural properties

that get wet through other disasters or are affected by radiation disasters. These are of course unfortunate events, but as a result, Japan leads the world in the research and implementation of anti-disaster measures for cultural properties. I realize that it is important to spread this knowledge within Japan and overseas. It may all come down to the concepts of the Nara Document, which was mentioned earlier. I think it is important and required to make necessary arrangements while giving due consideration to the diversity in each region and to promote technology transfer while communicating with local people.

We must press on with this work while being aware that when it comes to climate change, Japan, a developed country, is likely to be on the side that causes damage. It is necessary to consider this, especially when proceeding with international work.

Dr. Ishimura mentioned intangible cultural heritage in his speech. The types of cultural properties that are difficult to handle like this include tangible folk-cultural properties, which became a major theme, especially after the Great East Japan Earthquake. Appropriate methods of handling them differ greatly from that for artistic crafts and buildings. First, it is difficult to determine the range of cultural properties from all other materials. Those are just living cultural properties having many points of contact with intangible cultural properties and are therefore difficult to handle. I was thinking about that while listening to the explanation of intangible cultural heritage.

The National Museum of Ethnology, as a national center, has worked on a big project for disaster response related to tangible ethnocultural properties, especially since the Great East Japan Earthquake and even before that, although Dr. Sonoda has not spoken much about it today as she served as the facilitator.

Today, I participated from the perspective of protecting cultural properties against disasters, and as I have talked with all of you, I have come to think that from now on, I will continue my work in Japan and overseas while confronting climate change from a wider perspective of protecting cultural heritage.

Then, it is extremely important to work in coordination with not only the speakers here but also everyone who is now in the hall and everyone who is participating remotely. In that sense, we, the Cultural Heritage Disaster Risk Management Center, should proceed with our work while properly acting as a hub. I learned a lot today. Thank you very much.

**Sonoda** The title of this symposium is “Climate Change and Cultural Heritage.” At first, many people may have thought that there would be no connection between climate change and cultural heritage. Although climate change and cultural heritage have not often been connected so far, this symposium has addressed this issue head-on. In the latter half, there were various opinions as to how to develop international cooperation in the future. Our findings and experiences include pioneering research conducted in Japan, support that Japan can provide regarding cultural heritage, the way of interacting with tangible ethnocultural properties, as mentioned earlier, and how to address damaged cultural properties from the experience of Japan with many disasters. Dissemination of these findings and experiences may be of help in solving problems of climate change and cultural heritage.

We in Japan can see various information on the Internet. If information is written in English, we can get and read it in some way. However, people outside Japan do not know what information there is in Japan, where to search first, and how to collect information; if they can find information, there are a very limited number of people who can read papers and reports written in Japanese. People outside Japan know that various things are happening in Japan. As I attend an academic conference, I am often asked questions such as “What kinds of things is Japan doing?” and “I heard an amazing thing regarding this matter. What is the truth about it?” Partly because of this, I feel and believe that this international symposium is an important place for disseminating information from Japan to the world and sharing it with the world.

I would like to thank the presenters who participated

in the panel discussion. I would like to thank those who asked questions in the hall or through a chat. This concludes the panel discussion.



## Closing Remarks

**KOHDZUMA Yohsei** (Director, Cultural Heritage Disaster Risk Management Center)



Thank you for participating in the Japan Consortium for International Cooperation in Cultural Heritage 2022 symposium “Climate Change and Cultural Heritage: What's Happening Now?” On behalf of the organizers, I would like to say a few words of thanks and greetings.

In addition to the three significant lectures in the morning, I believe that we were able to delve deeper into the issues in the panel discussion in the afternoon. Every day, we get more and more used to the region in which we live and our daily life become routine, as the way of life in each region is handed down over the years. Unintentionally, we stop to think about the history or identity of the region, but it's important, and that's what culture and cultural heritage are. Of course, even though not everything has been handed down, things have changed with the times and become the way we live today. However, disasters can destroy daily life in an instant. Only then do we realize its importance. This is especially the case for disaster reconstruction; local culture, which is part of our daily lives, will be a major driving force for reconstruction. Undoubtedly, the power of culture can revive a disaster-hit area.

We have discussed climate change and cultural heritage today, and the drastic influence the changing climate has had on the environment. The intensity of heavy rains and storms has increased, and cultural heritage is being damaged by these events. We must come to fully understand climate change, disseminate and share information, and think about how climate change will affect cultural heritage and whether traditional knowledge can be applied to it. I think that's what it means, and a very important point has been made in today's discussion. On a daily basis, we work from the standpoint of protecting cultures and cultural heritage, but the region itself is in a vulnerable situation due to social problems such as depopulation, declining birthrate and aging population, and urbanization. According to today's lectures, and through the discussion, I was made to think again, if we want to protect culture and cultural heritage, in other words, protecting the livelihoods of local communities while sustainably developing them, we must also turn our attention to the underlying social problems.

The problems related to climate change and cultural heritage that we have been addressing today cannot be solved immediately, but I believe that we must urgently and swiftly respond to climate change, which is progressing at a tremendous speed.

Thank you very much for taking the time to participate in the symposium. We have heard that there are many participants online as well. I hope that we will continue to put our heads together on climate change and cultural heritage issues and seek possibilities to create a better future. Thank you very much.



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