Sun. May 30, 2021

[J] Oral | O (Public)：Public

10:45 AM - 12:15 PM JST | 1:45 AM - 3:15 AM UTC | Ch.01 Zoom Room 01

[O-01] Recent Advances in Earth and Planetary Science

convener:Tatsuhiko Hara(International Institute of Seismology and Earthquake Engineering, Building Research Institute), Katsuyoshi Michibayashi(Department of Earth and Planetary Sciences, Nagoya University), Hajime Naruse(Department of Geology and Mineralogy, Graduate School of Science, Kyoto University), Yasuhito Sekine(Earth-Life Science Insitute, Tokyo Institute of Technology), Chairperson:Tatsuhiko Hara(International Institute of Seismology and Earthquake Engineering, Building Research Institute)

10:45 AM - 11:30 AM JST | 1:45 AM - 2:30 AM UTC

[O01-01] Development of earthquake and tsunami studies in the last decade since the 2011 Tohoku disaster

★Invited Papers

*Kenji Satake[1] (1.Earthquake Research Institute, University of Tokyo)

11:30 AM - 12:15 PM JST | 2:30 AM - 3:15 AM UTC

[O01-02] Hayabusa2 - What will the samples from asteroid Ryugu tell us?

★Invited Papers

*Shogo Tachibana[1,2] (1.UTokyo Organization for Planetary and Space Science, University of Tokyo , 2.Institute of Space and Astronautical Science, JAXA)

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1:45 PM - 3:15 PM JST | 4:45 AM - 6:15 AM UTC | Ch.01 Zoom Room 01

[O-02] Natural disasters and people -Listen to the voice of the Earth on the Japanese Geoparks-

convener:Noritaka Matsubara(Graduate School of Regional Resource Management, University of Hyogo), Kyohei Sano(Graduate School of Regional Resource Management, University of Hyogo), Suzuka Koriyama(Itoigawa city), Hikaru Yokoyama(Hokusho University), Chairperson:Kyohei Sano(Graduate School of Regional Resource Management, University of Hyogo), Suzuka Koriyama(Itoigawa city), Hokuto Obara(Mine-Akiyoshidai Karst Plateau Geopark Promotion Council), HIROKO IMAI(Com Support Office /Wakayama University Center for Tourism Research), Hikaru Yokoyama(Hokusho University)

1:45 PM - 2:15 PM JST | 4:45 AM - 5:15 AM UTC

[O02-01] Itoigawa Geopark in a Post-COVID-19 World: Current Situation and Issues

★Invited Papers

Takeo Kobayashi[1], *Takuma Katori[1], Theodore Brown[1], Takahiko Ogawara[2], Ko Takenouchi[2], Yousuke Ibaraki[2] (1.Itoigawa Geopark Council, 2.Fossa Magna Museum)

2:15 PM - 2:45 PM JST | 5:15 AM - 5:45 AM UTC

[O02-02] Geohazards and wisdom of ancestors in Nanki Kumano National Geopark, Japan.

★Invited Papers

*Seiya Fukumura[1], Chuki Hongo[1] (1.Nanki Kumano Geopark promotion council)

2:45 PM - 3:15 PM JST | 5:45 AM - 6:15 AM UTC

[O02-03] Reconstruction from Great East Japan Earthquake aimed at by "Michinoku Coastal Trail"

★Invited Papers

*Hiromitsu SEKI[1] (1.NPO Michinoku Trail Club)

[J] Oral | EVENT：EVENT

10:30 AM - 10:40 AM JST | 1:30 AM - 1:40 AM UTC | Ch.01 Zoom Room 01

[EV-01] Opening Talk

10:30 AM - 10:40 AM JST | 1:30 AM - 1:40 AM UTC

[E-11-01] Opening Talk

[J] Oral | EVENT：EVENT

3:30 PM - 5:30 PM JST | 6:30 AM - 8:30 AM UTC | Ch.01 Zoom Room 01

[EV-02] NASA-JAXA Event for Junior and Senior High School Students

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This is an outreach session. Invited speakers present their recent findings and developments in fields of earth and planetary sciences. This session has been presented as a public session since 2005. The JpGU Publicity and Outreach Committee members are conveners of this session.

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[O01-01] Development of earthquake and tsunami studies in the last decade since the 2011 Tohoku disaster

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Development of earthquake and tsunami studies in the last decade since the 2011 Tohoku disaster

*Kenji Satake[1]

1. Earthquake Research Institute, University of Tokyo

The East Japan Earthquake and Tsunami Disaster on 11 March 2011 caused nearly 20,000 casualties, mostly due to the tsunami, and caused fatal accident of Fukushima Dai-ichi Nuclear Power Station.

The Tohoku earthquake (M 9.0) was gigantic size, the largest among instrumentally recorded ones in Japan. The aftershock area is 500 km long and 200 km wide. This earthquake was recorded and studied in most detail in the world. The GPS network on Japanese Island recorded large coseismic displacements. Marine geodetic, pressure and bathymetry measurements, started before 2011, revealed the large seafloor movement. The tsunami was first recorded on offshore pressure gauges before it reached coast, and the data were sent to Japan Meteorological Agency (JMA) through submarine cable. Types and locations of smaller earthquakes in Tohoku region have changed after 2011, indicating that the stress field changed. Postseismic displacements on land and seafloor are still continuing, after ten years.

In the Tohoku region, similar tsunamis were recorded in the past. On Sanriku coast, the 1896 Meiji Sanriku tsunami caused more casualties than the 2011 tsunami. Ground shaking by earthquake was weaker, but the tsunami heights were similar to the 2011 event. Such an earthquake is called “tsunami earthquake,” and due to large slip near the trench axis. In Sendai plain, a Japanese chronicle depicted earthquake damage, tsunami inundation and casualties in AD 869 (Jogan era). The distribution of the tsunami deposit is similar to the 2011 inundation area. Geological studies clarified that similar earthquakes repeated with 450 to 800 year interval.

Our analysis of high-resolution tsunami waveforms has shown the temporal and spatial distribution of slip on faults. It shows that the 2011 Tohoku earthquake consists of an interplate earthquake (M 8.8) similar to the 869 event and a tsunami earthquake (M 8.8) similar to 1896 event. They occurred almost simultaneously, or the former triggered the latter.

On 11 March 2011, JMA issued tsunami warning 3 min after the earthquake, but the size (M) was underestimated as 7.9, hence the forecasted tsunami heights were 3 to 6 m. JMA updated the forecasted heights, based on the offshore tsunami data, but it did not reach all the coastal residents, because of a power failure and early evacuation. Currently, 150 seismic and bottom pressure sensors were installed off Tohoku coast, and the data enable JMA to issue earthquake early warning and tsunami warning more quickly and accurately. By using the observed tsunami data and numerical simulation, tsunami data assimilation method is developed as a tsunami forecast method.

The Earthquake Research Committee (ERC) of the government made a long-term forecast that the probability of an M 7.5 earthquake off Miyagi in 30 years from 2010 would be 99 %. This is based on the 37 year interval of previous earthquakes in historical records. The ERC now also uses geological data to forecast giant earthquakes with longer recurrence intervals. The Central Disaster Management Council, based on lesson of the 2011 tsunami disaster, decided to consider two types of future tsunamis: More frequent L1 tsunamis with lower tsunami heights, and less frequent L2 tsunamis with larger tsunami heights. For L1 tsunami, hardware must be constructed to protect lives, properties and economy. For L2

tsunami, saving people’s lives is the highest priority with software measures.

For tsunami assessment at nuclear power stations, deterministic tsunami hazard assessment based on past recorded tsunamis were used to design tsunami heights. After 2011, probabilistic tsunami hazard assessment, considering aleatory and epistemic uncertainties, has been introduced.

Importance of education has been pointed out by Torahiko Terada, in his essay “Tsunami and Humankind.” He wrote that the lessons from the 1896 Sanriku tsunami was not utilized to reduce damage in 1933.

Keywords: East Japan earthquake and tsunami disaster , Giant earthquake, Tsunami

Hayabusa2 - What will the samples from asteroid Ryugu tell us?

*Shogo Tachibana[1,2]

1. UTokyo Organization for Planetary and Space Science, University of Tokyo , 2. Institute of Space and Astronautical Science, JAXA

How did the solar system come into being, and how did the Earth and other planets form? How did the Earth become covered with oceans and support life? JAXA,s Hayabusa2 mission was a journey to the asteroid Ryugu to find the key to answering these questions. It is believed that small celestial bodies record the origin and early evolution of the Solar System.

Hayabusa2 successfully returned the reentry capsule to the Earth on December 6, 2020. The capsule was transported to ISAS, JAXA on December 8, 2020. Numerous dark particles, up to about 1 cm in size, were found inside the sample catcher enclosed in the sample container. Detailed analysis of the particles will begin this summer.

In this presention, I will talk about the scientific objectives of the mission and sample analysis.

Keywords: Hayabusa2, asteroid, Solar System, Sample return

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[O-02] Natural disasters and people -Listen to the voice of the Earth on the Japanese Geoparks-

convener:Noritaka Matsubara(Graduate School of Regional Resource Management, University of Hyogo), Kyohei Sano(Graduate School of Regional Resource Management, University of Hyogo), Suzuka Koriyama(Itoigawa city), Hikaru Yokoyama(Hokusho University), Chairperson:Kyohei Sano(Graduate School of Regional Resource Management, University of Hyogo), Suzuka Koriyama(Itoigawa city), Hokuto Obara(Mine-Akiyoshidai Karst Plateau Geopark Promotion Council), HIROKO IMAI(Com Support Office /Wakayama University Center for Tourism Research), Hikaru Yokoyama(Hokusho University)

People benefit from the earth, while sometimes geological activities bring disaster to human society. Geoparks aim to reconnect human society at all levels to our home planet and to celebrate how the planet with 4.6 billion years long history has shaped every aspect of our lives and society. Many geoparks in tectonically active areas of the world have a crucial role in helping mitigate geo-hazards through awareness-raising and constructing disaster response strategies. In this session, we discuss how people have lived with geological activities and natural hazards, and how to deal with new threats, including COVID-19, in nature through geoparks.

1:45 PM - 2:15 PM JST | 4:45 AM - 5:15 AM UTC

[O02-01] Itoigawa Geopark in a Post-COVID-19 World: Current Situation and Issues

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Takeo Kobayashi[1], *Takuma Katori[1], Theodore Brown[1], Takahiko Ogawara[2], Ko Takenouchi[2], Yousuke Ibaraki[2] (1.Itoigawa Geopark Council, 2.Fossa Magna Museum)

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[O02-02] Geohazards and wisdom of ancestors in Nanki Kumano National Geopark, Japan.

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*Seiya Fukumura[1], Chuki Hongo[1] (1.Nanki Kumano Geopark promotion council)

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[O02-03] Reconstruction from Great East Japan Earthquake aimed at by "Michinoku Coastal Trail"

★Invited Papers

*Hiromitsu SEKI[1] (1.NPO Michinoku Trail Club)

Itoigawa Geopark in a Post-COVID-19 World: Current Situation and Issues

Takeo Kobayashi[1], *Takuma Katori[1], Theodore Brown[1], Takahiko Ogawara[2], Ko Takenouchi[2], Yousuke Ibaraki[2]

1. Itoigawa Geopark Council, 2. Fossa Magna Museum

1 Background

The Itoigawa Geopark Council is an organization which is the management body of the Itoigawa UNESCO Global Geopark. It is comprised of 34 organizations including local councils, tourist associations, private companies and government agencies.

2 Effects of Novel Coronavirus (COVID-19)

COVID-19 has effected the activities of Itoigawa UNESCO Global Geopark in many ways, becoming an opportunity to effect radical change in direction and ways of thinking as we prepare for a "Post-COVID-19 World." April 2020 and January 2021 were marked by declarations of emergency in the Greater Tokyo Area as well as other regions around Japan. As governments urged citizens to stay indoors, it essentially restricted movement between regions, greatly reducing the visitors to Itoigawa. In particular, foreign tourism was devastated and regular programs performed with our Sister Geopark in Hong Kong, including exchange programs, could not be conducted. Many popular conferences, workshops and events were postponed or cancelled. Also, many local businesses have suffered reduced visitors and face closure or insolvency when government relief is not enough.

3 Activities during the Pandemic

We have continued Geopark Activities during the pandemic through enforcing infection prevention measures which balance social conditions as well as the needs of local residents. The following are a few examples:

(1) Promotion of school trips (partnership with travel agencies, promotion)
(2) Use of the Itoigawa Geopark Logo and Mascots to share prevention information (social distancing, mask usage, etc.)
(3) Improved online content (geopark scenery and experience videos, virtual museum tour, papercrafts, origami, coloring pages, etc.)
(4) Use of Webinars and Online Meetings (online lectures, online tours and experiences, exchange with Hong Kong, Japanese Geoparks Network [JGN] Online Conference)
(5) Improved communication (website, social media, newsletters)

With regard to the school field trips, we have focused on attracting school trips from within Niigata and neighboring prefectures starting in spring of 2020. As a result, between the months of September and November when the infection rate was low, the Fossa Magna Museum saw a total of 3,444 students from 51 schools, an increase of 70% compared to previous years. The reasons for this increase include schools are avoiding large cities, the Gopark's ability to adjust to each school's needs, and the Geopark's value as a compact destination for earth science education. With increased usage of work-from-home programs and online meetings, new programs and activities have become possible, including new exchange meetings with Hong Kong, the Japanese Geoparks Network and the Asia Pacific Geoparks Network.

4 Geopark Activities in a Post-COVID-19 World

After the pandemic subsides, a quick rebound is hoped to be achieved in the fields of academics, tourism and economic development through a mixture of both pre- and post-COVID activities. Geopark activities like geotours and field trips, are mostly operated by the Geopark Tourist Guide Society, which has ceased

activities until April 2021. Because of this, the motivation of guides has decreased significantly. Some comments heard include “COVID-19 is scary, but I want to guide,” “I haven’t guided in so long, I don’t know if I want to anymore.” Itoigawa Geopark Council has joined the society’s board meetings since autumn 2020 to help the society develop new online tours and programs, improve existing tours including the walking tour of the site of the Itoigawa City Station North Fire (28 Dec 2016, 147 buildings lost), as well as producing new guide manuals for individual sites within the Geopark.
Pandemics have a revolutionary effect on lifestyles and social structures. We must continue working closely with JGN and other organizations to meet the needs of a Post-COVID-19 World, with a focus on safety, communication and a shift from centralization to decentralization.

Keywords: Itoigawa UNESCO Global Geopark, COVID-19

Geohazards and wisdom of ancestors in Nanki Kumano National Geopark, Japan.

*Seiya Fukumura[1], Chuki Hongo[1]

1. Nanki Kumano Geopark promotion council

In the Nanki Kumano Geopark area which located southern part of the Kii Peninsula, it has suffered from “floods” caused by heavy rain and “earthquakes and tsunamis” caused by subductions at Nankai Trough. I will introduce the geohazards and the wisdom of ancestors in our area.

1. Heavy rain disaster

Floods and landslides caused by heavy rain have occurred repeatedly in the same area due to topographic factors. For example, the “Hitari” district in the southeastern part of the Kii Peninsula is an area where floods have frequently occurred. “Hitari” means that the land is submerged in Japanese. There are many other place names that remind us of floods and landslides. Here, we will introduce the wisdom of ancestors make provisions against Geohazard by place name. In addition, we will introduce the wisdom of farming in places with little flat land and flood control to protect people's lives from floods.

2. Earthquake and tsunami disaster and tsunami monument

Our area is very close to Nankai Trough where the plate subduction zone, people have been damaged by earthquakes and tsunamis. It has 29 monuments that convey the record of tsunamis in four towns, our area, and 24 of them are tsunami arrival records. However, even if houses swept away by the tsunami, it is not unusual to build houses in the same place. In fact, there are many cases where people still live around the tsunami monument. We will introduce the distribution of these tsunami tradition monuments, the local industry, and the lives of people since the Great East Japan Earthquake, 2011.

Keywords: geopark, flood, earthquake, tsunami

Reconstruction from Great East Japan Earthquake aimed at by "Michinoku Coastal Trail"

*Hiromitsu SEKI[1]

1. NPO Michinoku Trail Club

The long-distance nature trail that the Ministry of the Environment has developed nationwide aims to deepen the understanding of nature, history and culture, refreshment of mind and body, and nature conservation by walking on its own feet. As the tenth trail, the Tohoku Pacific coast nature trail, nicknamed "Michinoku Coastal Trail," which started maintenance in 2013, was fully opened in June 2019. It is a long distance trail stretching over 1000 km and covering 4 prefectures and 28 municipalities from Hachinohe City in Aomori Prefecture to Soma City in Fukushima Prefecture.
If you walk along this trail that connects the areas affected by the 2011 off the Pacific coast of Tohoku Earthquake and Tsunami from north to south, you will not only enjoy the spectacular scenery unique to Sanriku region and places that you can only walk to, but you will also be able to interact with the local residents you meet. You can touch the history, traditions and culture of the area and trace the memories of the earthquake. Each person walks differently, but the real pleasure of long-distance trails is to enjoy walking while staying overnight.
Here, we report on our efforts so far and future issues.

Keywords: Michinoku Coastal Trail, Reconstruction from Great East Japan Earthquake

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[EV-01] Opening Talk

Tajika Eiichi, President of JpGU, will give a welcome address for the meeting attendees.

10:30 AM - 10:40 AM JST | 1:30 AM - 1:40 AM UTC

[E-11-01] Opening Talk

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[EV-02] NASA-JAXA Event for Junior and Senior High School Students

JAXA and NASA researchers on planetary exploration, solarobservation, and earth observation will deliver a lecture for junior and senior high school students.

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