JAPAN CONTRIBUTION TO THE IGCP 2011

(International Geoscience Programme)

ACTIVITY REPORT in 2011

January 2012

Japan National Committee for IGCP
1. Japan National Committee for IGCP

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Dr. Takashi Azuma (567)
Prof. Ryuji Tada (581)

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Dr. Kiichiro Kawamura (585)
Dr. Yuki Sawai (588)

The committee consists of Chairman, Secretary, national representatives of participating IGCP projects, and guest members of related organizations.

Activities in 2011
The business meetings of the national committee in 2011 were held at the Science Council of Japan, Tokyo on February 25 and September 26. The meetings reviewed activities of the year, discussed future plans, and approved new proposal. These activities were reported from a newsletter of the
Geological Society of Japan. All our activities and reports will be appear in our home page: http://www.yg.kobe-wu.ac.jp/wu/igcp/
2. National Participation in IGCP Projects


Project Leader: Yong Il Lee (Seoul National University)
Co-Leader: Takashi Sakai (Kyushu University)
Japanese Regional coordinator: Takashi Hasegawa (Kanazawa University)
(This report is prepared by T. Hasegawa with many helps by the project members)

International meetings including IGCP507 international symposium in Beijing and domestic meeting of academic societies acted as major opportunity of presentations for their topic. We do not have a domestic meeting of IGCP507 in Japan. Members are also active to publish their results on international journals. In addition, three joint researches that supported by “JSPS Grant-in-Aid for Scientific Research (Abroad survey)” were proceeded successfully. Prof. H. Ando proposed new IGCP project that will follow after IGCP507 and submitted the application to UNESCO in October. Some members also contributed as science advisory boards of newly selected Japanese Geoparks (Hakusan-Tedorigawa Geopark and North Ibaraki Geopark) that help outreach of our project. Large special exhibitions of Cretaceous dinosaurs were successfully done by National Science Museum and Fukui Prefectural Dinosaur Museum to which some of our members belong.

Meetings

Japanese members participated four domestic meetings during 2011. Annual meeting of the Palaeontological Society of Japan was held July 1-3 at Kanazawa, hosted by Kanazawa University staffs including T. Hasegawa of primary member of IGCP507. He presented his contributions of international correlation of Cretaceous system between Japan and US or Europe as a special lecture. Other members including Japan-Mongolia international joint research group described below presented their results about Cretaceous paleontology at this meeting. Stratigraphy of the Yezo Group using carbon isotope stratigraphy was also presented by two groups.

The Geological Society of Japan is one of the most important societies for the Japanese IGCP 507 members. It was held September 9-11 at Mito, hosted by faculties of Ibaraki University including H. Ando, a primary member of IGCP507. H. Ando organized a geological excursion that visited Cretaceous strata along Pacific coast of Ibaraki region as a post-meeting excursion. It was a region suffered by the Tsunami at March 11 after the shock of M9 earthquake.

Japan Geoscience Union, Annual Meeting 2011 held at Chiba was also an important opportunity for Japanese members for presenting their results. Some members also presented their researches at the annual meeting of Sedimentological Society of Japan.

Joint Researches
<Japan and China joint-research>
Following international joint research took a step forward:
Title: Study on carbon isotope stratigraphy and sequence stratigraphy of Early Cretaceous Yezo and Jehol Groups.
Subjects of investigation:
・ Yixian and Jiufotang Formations in Liaoning Province, China
・ Hutubei, Shengjinkou, Lianmuqin Formations in Xinjiang Uygur Autonomous Region, China
Aims:
・ Age determination by δ¹³C fluctuation patterns
・ Basin analyses and sequence stratigraphy (paleoenvironment, depositional systems, and environmental change)
・ Correlation of non-marine and marine sequences in NE Asia
・ Examination of tectonics and eustasy
・ Geochemical analysis of hinterland paleoweathering conditions and paleoclimate

The former international joint-research project by the Japanese and Chinese joint group started their activity during the IGCP434. This new succeeding research program is another activity that started from the IGCP507. This research program aims to determine the age of the Jehol Group and related formations by means of carbon isotope stratigraphy and sequence stratigraphy. Another aim is to elucidate the paleoenvironment and land-ocean depositional system of the whole eastern Asian continental margin by integrating the data from China and Japan. The team conducted a research in Heilongjiang, Hebei and Jilin Provinces. Some results were presented in international and domestic meetings as well as international journals.

This year, this Japan-China joint research team expanded the research area to Liaoning Province and Xinjiang Uygur Autonomous Region. They have collected samples for organic geochemistry and inorganic geochemistry explorations. Analysis of these samples are not fully finished, however, the results are planned to be presented in upcoming international and domestic meetings.

</Japan and Mongolia joint-researches>
Two joint researches between Japan and Mongolia has been selected as JSPS (Japan Society for the Promotion of Science) funded projects since 2009. One project aims to understand interaction between terrestrial and oceanic environments during Oceanic Anoxic Event 1a, and the other try to elucidate initial evolutional history of angiosperm. IGCP 507 members (H. Ando, T. Hasegawa, H. Hasegawa, T. Ohta) are the core members of these projects. Following is detail of the projects:

Project A:
Title: Terrestrial humidification during mid-Cretaceous: Survey on Cretaceous in Mongolia for elucidating earth system during greenhouse period.

Leader: Hisao Ando (Ibaraki University)


Mongolian counterparts: N. Ichinnorov, Y. Khand

Other participants: G. Lee (China), H. Weissert (Swiss)

Background of the project: The Cretaceous period is characterized by an extremely warm “greenhouse” climate, elevated atmospheric CO$_2$ levels, and repeated occurrences of Ocean Anoxic Events (OAEs); however, detailed processes and causal mechanisms of these marked events, particularly the response of terrestrial climate system, have been poorly understood. Possible causal mechanisms of OAEs in the greenhouse conditions include enhanced surface productivity and the excess of organic burial in the oceans. Terrestrial weathering may have increased terrigenous input into the oceans. Previous studies by H. Hasegawa revealed that the sedimentation in Gobi desert, Mongolia were controlled by global climatic changes and associated with pattern of Hadley Circulation.

Objective of project: To evaluate paleoclimatic interaction between the land and the ocean during OAE1a interval in eastern Eurasia. Contribution for constructing dynamic model during perturbation of carbon cycling during greenhouse is also focused.

Activity of this year: A meetings was held in Japan for planning and discussion in April. The survey was done for 12 days in August at Shine Khudag section in Shaazangiin Gobi area, Southeast Mongolia. They (H. Ando, H. Hasegawa, T. Murata, N. Ichinnorov) collected samples from previously logged Shine Khudag section to expand the log and sampling interval. A part of the Shinekhudag Formation was trenched and nearly continuous samples were corrected for finer scale study. Lowest part of Khukhteeg Formation was also sampled.

Part of the results were presented at domestic (PSJ, GSJ and JpGU) and international meetings (EGU and IGCP507).

New proposal for research fund: The group member submitted new research-abroad proposal to JSPS to extend this joint project as the current Grant-in-Aid from JSPS will be completed within this fiscal year. It aims to apply the drilling of the Shinekhudag Formation (lacustrine deposits) and underlying Tsagantsav Formation (Fluvio-lacustrien deposits) to recover the continuous sediment record of the early Aptian OAE1a interval.

Project B:

Title: Elucidation of initial origins of angiosperm during Early Cretaceous in Mongolia.

Leader: Masamichi Takahashi (Niigata University)

Other Japanese participants: T. Hasegawa, H. Hasegawa, T. Yamada,

Mongolian counterparts: N. Ichinnorov, Y. Khand

Other participants: P. R. Crane
(6) Background of project: Cretaceous is a period of diversification and rapid extension of angiosperm. Recent progress of knowledge on preservation of small-sized plants showed that under specific conditions, fruits, seeds and flowers fossils can be preserved enough for taxonomic and anatomical studies. The project members of IGCP 507 who had knowledge on geology of Gobi desert discussed with paleobotanists and they reached that the selected theme was worth establishing as a joint research project.

(7) Objective of project: To elucidate angiosperms during the early evolutional stage. They aim to reveal what type of flowers, fruits and seeds composed the initial angiosperm in Mongolia, during Early Cretaceous (~130-100 Ma). Anatomical descriptions for these organs are also prerequisite for elucidating the evolution of the plants.

(8) Activity of this year: The Japanese members visited Mongolia and collected samples of plant fossils in Mongolia.

Publications
Japanese Cretaceous researchers including IGCP507 members were very active during 2011 and published more than 24 papers on international journals. See following list for publication during 2011 by Japanese IGCP507 members.

An important publication for our project was a thematic session of IGCP507 published on Island Arc that focused on the evolution of climate in Asia during Cretaceous times. Researchers involved in the project (including Asian countries outside Japan) discussed the causes of Cretaceous climate change and trace climate perturbations related to tectonic, orbital or volcanic forcing, and they investigated response reactions of the biosphere. H. Ando and T. Hasegawa worked as guest editors for this thematic session and a paper by Japanese authors was published in that session.

(*: international journal)


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Achievements in 2011:

The IGCP-559 project focus on that part of planet Earth that has the most significance for the world’s communities, namely the Earth’s crust and upper mantle. The project makes available to communities-at-large a wealth of information and seismic imaging that is commonly only available to research workers but yet has a profound effect on how we think of the landscapes, natural environments and their controlling geological processes and tectonic influences. This information allows an understanding of crustal architecture and tectonic processes that is fundamental to any appreciation and understanding of landscapes, surface geology and natural hazards at a local, regional and global scale.

IGCP-559 and Geoscience Australia organized the 14th International Symposium on Deep Seismic Probing of the Continents and Their Margins (SEISMIX-14), on 29th August - 3rd September in 2010, Cairns, Australia. IGCP-559 sponsored a special session on “Classis Transects” at the SEISMIX symposium. The Proceeding Volume the conference has been prepared as the special issue on “Tectonophysics”, and will be published within 2012. Several major topics on crustal architecture and images, structural controls on landscapes, resources and hazards are included in this volume. The sessions organized by IGCP-559 are also conducted at IUGG general assembly meeting on July 2011, Melbourne, Australia.

Several striking results involving the structure and evolution of the continents composing the ancient Gondwanaland including Antarctica were published in many international journals with significant multi-national collaborators. Target oriented DSS in several specified area, as well the widely distributed broadband seismic arrays across the continents have revealed the excellent architecture of the crystalline crust and clear images of the underlying upper mantle. The most remarkable points are an accumulation of the legacy from a sufficient number of stations distributing composing the regional network, together with archived precious data-set retrieved from the International Polar Year program.

Activities planned in 2012 or later (Forthcoming events of the project and/or training facilities):

The IGCP-559 project will continue to develop the web site started by IGCP-474 that gives ready access to information on crustal architecture principally determined by seismic methods. The project will also sponsor and support symposia focused on deep seismic profiling and imaging techniques aimed at further enhancing our knowledge of crustal architecture around the world.
The “15th international symposium on ‘Deep Seismic Profiling of the Continents and their Margins; SEISMIX-15’” conference will be held at China in 2012, with joint organizations of IGCP-559, the National Nature Science Foundation of China, Chinese Academy of Sciences, and other organizations. The website www.earthscrust.org.cn is established with supports from IGCP-559. The SEISMIX-15 will be held from 16th to 25th September 2012, in Beijing, followed by the post-symposium excursion to Sichuan with disastrous Wenchuan Earthquake and Three Georges will be planned. The IGCP-559 is also looking at providing some advance support to some sessions within the 34th IGC conference in 2012, Brisbane, Australia. IGCP-559 will be a sponsor for a session on Crustal Architecture and Images: structural controls on landscapes, resources and hazards. Coordinators of the session to be selected from IGCP-559 working group members. A symposium joint with the other science bodies (African Geophysical Meeting, IASPEI and AOGS) are planned in future.

The IGCP-559 working group is aiming to make advance for several topics regarding future plan including outreach activities. A significance of cooperation with UNESCO, as well as the other geoscience bodies could be taken into consideration for future tasks of the working group. Participation from countries on Africa and South America is mostly expected to achieve global viewpoint in continental studies. It is also considered about the utilization of web-based mapping software and database portals (Google Earth, GIS, metadata portals, SEG-Y data format, geological map, linkages with BSA). As for the Classic Transect program, majority of the data from Australia and Russia have been compiled but the contribution from the other nations is relatively small, then it is recommended to gather the data from involved countries.

**Participation countries (for project leaders only):**

Australia, USA, UK, Canada, New Zealand, Germany, France, Russia, Finland, Spain, Netherlands, Japan, China, South Africa, India

**Publications:**


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Main object of the project, and target of the national working group of this year:
We will progress the knowledge on the palaeoearthquakes by using the seismic damage in the archaeological relics same as the evidence in the geological method. Through this project, four workshops will be held at the archaeological sites in the Dead Sea Region, Greece, Iran and India. Japanese working group will compile the huge numbers of archaeoseismological data in Japan and will introduce them and results of study to the other countries.

Achievements in 2011:
We joined to the XVIII INQUA Congress in Bern, Switzerland and opened a session on “Paleoseismology, megacities, and critical infrastructures”.

Meetings held during this year or Japanese participation in the project meeting:
International Symposium on the 2001 Bhuj Earthquake and Advances in Earthquake Science was held at the Institute of Seismological Research in Gandhinagar (Gujarat, India) from 22nd to 27th January 2011. The scope of this international symposium is to provide a platform to scientists from different countries to exchange their ideas and experiences in seismology in all its dimensions. The main themes of discussion will be studies on the Bhuj earthquake, intraplate seismicity, seismic microzonation. Other sessions will concern structures, tectonics, earthquake ground motion, damaging earthquakes, tsunami, seismic designing of nuclear power plants and structural knowledge derived from oil exploration. No Japanese participants were there, unfortunately.

There was a business meeting during the XVIII INQUA Congress in July-August, 2011 in Bern, Switzerland.

2nd INQUA-IGCP567 International Workshop on Active Tectonics, Earthquake Geology, Archaeology and Engineering was taken place from 19 to 24, September 2011 in Corinth, Greece. This workshop was organized by Ioannis D. Papanikolaou (University of Athens, Greece), Klaus Reicherter (RWTH Aachen, Germany), Andreas Vott (University of Mainz, Germany) and Pablo G. Silva (Universidad de Salamanca, Spain). One researcher attended to this workshop from Japan and he made a presentation on the outline of the 2011 Tohoku Earthquake.

The number of Japanese working group members:
We act with 4 members now and still are calling for new members.
Activities planned in 2012 or later (Forthcoming events of the project and/or training facilities):

Thematic Session of “Natural hazards and ancient societies” will be held in the 34th International Geological Congress (IGC) in Brisbane, Australia, from 2nd to 10th, August 2012. Convenors of this session are Patrick Nunn (Australia), Bruce McFadgen (New Zealand), Iain Stewart (U.K.) and Manuel Sintubin (Belgium). This session addresses multidisciplinary approaches to understanding natural hazards and human culture change during recent millennia. Key hazards are tectonic in origin (earthquakes, tsunamis, and volcanic eruptions) but other extreme natural phenomena are relevant. Understanding how natural hazards affected former societies can extend our knowledge about the resilience and adaptability of modern human communities to future hazard threats.

Publications:

None

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Main object of the project:

The aims of the project are: 1) Strengthen cooperation with deep subsurface sampling and monitoring programmes and eventually lobby within these programmes to create awareness into the topic of submarine slope failures that might lead to drilling and/or monitoring proposals being funded. 2) Provide a lobbying platform for E-MARSHAL members to national and international funding agencies to fund scientific projects in this research topic. 3) Promote the publication of scientific articles and books on this submarine geohazard that contribute to the following societally relevant problems. 4) Identification of the causes of submarine landslides and their consequences. 5) Provide advice on mitigating their impacts. 6) Provide data (frequency, magnitude, …) that allow probabilistic approaches to the geohazard from submarine landslides and therefore a better management of the seafloor and coastal areas. 7) Promote events that enhance the exchange of results and scientific ideas on the problems above. 8) Provide knowledge transfer to developing countries

Improve the links between academia, industry and public administrations in order to create partnerships to address the topic of geohazards from submarine landslides and to develop methods for transferring knowledge to end-users.

Meetings held during this year or Japanese participation in the project meeting:

Two scientific sessions were proposed during the 11th International Symposium on Landslides (ISL) in Banff, Canada and during 2011 EGU in Vienna, Austria. One international symposium was held in Kyoto, Japan. We have 136 participants from 16 countries in this symposium.

The number of Japanese working group members:

Japanese working group of IGCP-585 is not officially organized. We are planning to make a mailing list to address related international and domestic meetings.

Activities planned in 2012 or later:

The IGCP-585 plans to have a scientific session at 2012 EGU in Vienna, Austria during 22-27 April, and the 34th International Geological Congress in Brisbane, Australia during 5-10 August, 2012.

Publications:


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Main object of the project:
This project focuses on the impact of humans on coastal landscapes at different timeframes. The project comprises three themes; (1) Catastrophic events, (2) Sea-level "fingerprints" and their implications for future coastal change, and (3) Sea-level changes over geological timeframes - investigating the role of humans. The aim of this project is to not only examine the past and present coastal dynamics and evolution, but to also incorporate predictive modeling of the coastal response to changing climates, anthropogenic impacts and natural hazards.

Achievements in 2011:
On 11th March 2011, an earthquake off the Pacific coast of Tohoku occurred and a tsunami devastated the shores of Japan. About 300 researchers among over 60 different institutes/universities conducted a joint research group for measurement of tsunami heights after the tsunami. All the measured points, at over 5,000 in total, were compiled and then displayed on the web (http://www.coastal.jp/tsunami2011/). In the urgent field survey, we also described lithostratigraphy, thickness, changes in grain size, biostratigraphy (micro and macro fossils) of tsunami deposit to provide archives helping future interpretation of past-tsunami deposits.

Meetings held during this year or Japanese participation in the project meeting:
Two scientific sessions were proposed during the XVIII INQUA Congress in Bern, Switzerland. In the two sessions, three and seven Japanese researchers provided oral (two of them were invited) and poster presentations, respectively. There was no participants for an annual business meeting in Bangkok held between 28th November and 3rd December.

The number of Japanese working group members:
Japanese working group of IGCP-588 is not officially organized. We are planning to make a mailing list to address related international and domestic meetings.

Activities planned in 2012 or later:
The IGCP-588 plans to have a business meeting in Kiel, Germany, from September 5th to 10th including a 3-day field trip to Sylt-Island. Other related scientific meetings are proposed during the 34th International Geological Congress in Brisbane, Australia.
Publications: