Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P01 Room:Convention Hall Time:May 25 17:15-18:30

Postglacial melting history of the Greenland ice sheet and pre-historic Greenland culture

MAEMOKU, Hideaki[1*], MIURA, Hideki[2], OKUNO, Jun'ichi[2]

[1]Graduate School of Education, Hiroshima University, [2]National Institute of Polar Research

The past melting history of the Greenland ice sheet is the great key for elucidating the future sea-level rising. The GIA (Glacial isostatic adjustment) model using the spatial and temporal variations of relative sea-level changes is one of useful techniques for the reconstruction of ice melting history. Although many radiocarbon dating ages for the reconstruction of the sea-level history have been obtained from the coastal area of Greenland (ex. Kelly, 1973; Ten Brink, 1974, 1975; Weidick,1968, 1972 in West Greenland), the detailed geomorphological and Quaternary stratigraphical investigations have not been enough. For example, though Reeh (1989) and Henriksen (2008) compiled the map showing the amount of uplift during the Holocene along the coastal area of Greenland, some isolated high coastal existences of the place of the amount of upheaval suggest that the field confirmation of Holocene marine limits is questionable. In this presentation, we introduce the report of the reappraisal for height of the Holocene raised beach through geomorphological and geological approach and also mention the relation with archeological evidences of pre-historic Greenland culture.

References

Henriksen, N., Geological History of Greenland: Four billion years of Earth evolution, Geological Survey of Denmark and Greenland (GEUS), 2008.

Kelly, M. Radiocarbon dated shell samples from Nordre Stromfjord, West Greenland. Rapport, 59, Gronlands Geologiske Undersogelse,Copenhagen, 1973.

Reeh, N., Part 3. Quaternary Geology of Greenland. Fluton, R.J. (ed.) Quaternary Geology of Canada and Greenland: 739-822, Canada, 1989.

Ten Brink, N.W., Glacio-isostasy: new data from West Greenland and geophysical implications. Geological Society of America Bulletin, 85, 219?228, 1974.

Ten Brink, N.W., Holocene history of the Greenland ice sheet based on radiocarbon-dated moraines in West Greenland. Meddelelser om Gronland, 201, 1?44, 1975.

Weidick, A., Observations on some Holocene glacier fluctuations in West Greenland. Meddelelsser om Gronland, 165, 1?203,1968.

Weidick, A., Holocene shore-lines and glacial stages in Greenland: an attempt at correlation. Rapport, 41, Gronlands Geologiske Undersogelse, Copenhagen, 1972.

Keywords: Greenland, ice sheet, post glacial, pre-historic Greenland culture

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P02 Room:Convention Hall Time:May 25 17:15-18:30

Holocene sea level changes in Inbanuma area

CHIBA, Takashi[1*], SUGIHARA, Shigeo[2], Matsushima Yoshiaki[3], Masubuchi Kazuo[4], ARAI, Yusuke[2]

[1]Grad. School of Frontier Sci., The Univ., [2]Meiji Univ., [3]Kanagawa Pre. Museum of Natural History, [4]Kawasakishi board of education

Inbanuma area is situated in southern pert of middle reaches of the Tone river. During the Holocene transgression period, paleo Kinu bay has formed on lowlands located along the middle to lower reaches of the Tone river (Endo et al., 1983). In regard to this area, many studies have been made about reconstruction of paleo environmental changes. So far Takagami lowland (Ota et al.,1985; Kashima et al.,1985) , Kinosaki lowland (Sugihara et al.,1997; 2000; Masubuchi and Sugihara, 2011; Chiba et al., 2011) and lake Kasumigaura (Saito et al., 1990) were surveyed for paleo environmental changes by the Holocene transgression. However, timings and details of paleo sea level changes by the Holocene transgression is not emerged in paleo Kinu bay during Holocene. Besides, many shell mounds were made by Jomon and Yayoi people in coastal areas of this area in Holocene. Therefore, it is important that for geology as well as archeology to reconstruct paleo sea level changes in this area.

In order to reveal the details of sea level changes in Inbanuma area during Holocene, we have basically analyzed 3 cores, and drown Age-depth and sea level curve. The results are as follows;

1. During 11000-7500 cal yrBP, Holocene transgression occurred and the sea level rose from -37m to +2m.
2. During 7000-2000 cal yrBP, sea level fell from +2m to 0m gradually.
3. Timing of Holocene maximum sea level between Sekiyado and Inbanuma area was almost simultaneously.
4. Shell mounds around middle to lower reaches of the Tone river were formed of adapting to changes of sea level, salinity, deposits, during the regression period.

Keywords: Inbanuma area, Holocene, Sea level change

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P03 Room:Convention Hall Time:May 25 17:15-18:30

Tectonic tilting inferred from difference in Holocene relative sea-level changes among the sites in the Nobi Plain

NIWA, Yuichi[1*], SUGAI, Toshihiko[1], OGAMI, Takashi[2]

[1]Graduate School of Frontier Sciences, The University of Tokyo, [2]Faculty of Science and Engineering, Chuo University

This study presents relative sea-level (RSL) curves since the middle Holocene for six core sites on the Nobi Plain, Japan, and considers the influence of vertical tectonic movements on RSL. The cores reveal a typical deltaic succession in which sedimentary facies can be divided into five units. In ascending order these are braided river (unit A), fluvial to intertidal (unit B), inner bay (unit C), delta front (unit D), and delta plain (unit E). Electrical conductivity (EC) in uppermost unit C is proportional to the thickness of unit D, and provides an indication of the water depth close to the top of unit C. We translated EC in unit C to water depth by applying the function y = 5.2x (x = EC, y = water depth). We then estimated RSL by adding the EC-derived water depth to the sea-floor elevation obtained from sediment accumulation curves derived from 115 14C ages. RSL at 6000 cal BP increased with distance from the Yoro fault system. RSL at the four core sites nearest the fault system has been rising continuously since 6000 cal yr BP, indicating subsidence in this area. This trend of continuous rise of RSL and the differences in RSL among core sites show that the Nobi Plain has been tilted down to the west in response to Holocene activity on the Yoro fault system.

Keywords: electrical conductivity, Holocene relative sea-level changes, Nobi Plain, sediment core, tectonic tilting, Yoro fault system

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P04 Room:Convention Hall Time:May 25 17:15-18:30

Sand dunes development of Peski Saryishikotrau desert from the latest Pleistocene, in Kazakhstan

SATO, Akio[1*], SUGAI, Toshihiko[1], KONDO, Reisuke[2], SHIMIZU, Hitoshi[1], ENDO, Kunihiko[3]

[1]NENV,GSFS, The Univ of Tokyo, [2]Geological Survey of Japan, AIST, [3]Geosystem Scienses, CHS, Nihon Univ

Introduction

In central Asia, deserts and semi-deserts develop in wide areas under the continental climate. In this area, research of past environmental evolution is important to estimate sustainability of human activities and water resources. Recently, some researches analyze of endorheic lake sediments in central Asia and show the lake level changes and dry-wet cycles in Holocene. In eastern Kazakhstan, around Lake Balkhash and Ili River delta, the Ili-project team revealed the environmental changes that e.g., lake level changes, the river meandering changes and terrace developments (e.g., Endo et al., 2010).

However, developments of erg (sand sea) and environmental changes about dry-wet cycles in central Asia are almost unknown. But, recently, Maman et al.,(2011) shows that sand dunes around Aral Sea region were formed from 7 to 5ka by OSL dating.

Peski Saryishikotrau desert located around Lake Balkhash and Ili River delta is known as a sand sea. But the development and environmental change records are unknown. This study aims to clarify the relationship between the evolutions of sand sea and climate changes in this desert area.

Methods

Land surveying, magnetic susceptibility measurement, sampling for grain size analyses and OSL dating from some trench sites of sand dunes, were done in Aug.2010, Mar.2011 and Sep.2011. Geomorphological map and sand dunes map was created from DEM.

Results and discussion

Field researches coupled with analyses of high-resolution satellite images indicate the most of sand dunes in this area have been already covered by vegetation. And, the result of DEM mapping classifies the sand dunes by wavelength (WL) and height (H) parameters. The group1 dunes ($1km<WL<5km$, $H<50m$) are Draa (mega londitudinal dune), the group2 dunes ($0.5km<WL<5km$, $H<10m$) and group3 dunes ($WL<0.5km$, $H<10m$) are mainly londitudinal dunes. And these dune patterns suggest wind regime shift in past time.

From the results of OSL dating(Kondo et al., 2011), the pre-Ili river terrace deposit overlane by sand dunes of group2 and 3, gave the age of latest Pleistocene, and the sediments of group3 dunes indicate mid-Holocene. These results suggest that development of the group2 dune and group3 dune had continued from latest Pleistocene to mid-Holocene.

In addition to the developments of sand dunes, add other materials about environmental changes from the Ili project research, we discuss about the climate changes in central Asia from latest Pleistocene to mid-Holocene.

References

Endo et al., (2010) Reconstruction of lake level and paleoenvironmental changes from a core from Balkhash Lake, Kazakhstan. Reconceptualizing cultural and environmental change in central Asia: an historical perspective on the future,Ili Project,93-104.

Maman et al., (2011) The Central Asian ergs: A study by remote sensing and geographic information systems. Aeolian Research, 3, 3, 353-366.

Kondo et al., (2011) OSL dating of sediments from terrestrial area in the eastern Lake Balkhash, Kazakhstan. JAQUA meeting (Poster session), P-13.

KEYWORDS: Kazakhstan, central Asia, sand dunes, Ili River delta, Peski Saryishikotrau desert, prevailing wind

Keywords: Kazakhstan, central Asia, sand dunes, Ili River delta, Peski Saryishikotrau desert, prevailing wind

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P05 Room:Convention Hall Time:May 25 17:15-18:30

Late Holocene fluvial landform chronology and paleo-climate in the middle basin of Ili River, Kazakhstan.

SHIMIZU, Hitoshi[1*], SUGAI, Toshihiko[1], SATO, Akio[1], KONDO, Reisuke[2], ENDO, Kunihiko[3], MONTANI, Hiroki[1], NAKAYAMA Yasunori[3]

[1]The University of Tokyo, [2]Geological Survey of Japan, [3]Nihon University

1. Introduction

In drylands of Central Asia, precipitation change has a major effect on water environment especially hydrology. But about paleo-environment change little is known in this region.Ili River is flows into Balkhash Lake from Tiensian Mountain.It has the largest discharge of the rivers flowing into Balkhash Lake and supplies 80 percent of the total inflow .In Balkhash Lake, several gravity cores have been obtained and Holocene lake level changes are reconstructed (eg., Endo et al., 2009; Chiba et al, 2010; Sugai et al., 2010).

Understanding the cause and mechanism producing such lake level changes is important to lead new insight into paleo-environment in the Central Asia. To know the relationship between Ili River behavior reflecting environmental conditions of the river its basin including Balkhash Lake.

In this study, the history of paleo-climate and avulsion were made clear up based on the analysis of fluvial deposits inc. the paleo-channel fill of Ili River .

2. Methods

Fluvial landforms of Ili River paleo-channels were classified by satellite images from google earth and DEM data from SRTM3.The paleo-channels were dated by AMS-14C method and OSL dating from the channel-fill deposits. Deposits were also examined on particle analysis and magnetic susceptibility.

3. Result and discussion

The middle part of Ili River was classified into five geomorphic surfaces from T1 to T5. T1 is covered with vegetated rough dunes. The outcrops eroded by Ili River has two cycles of fluvial sediment units which is upper-fining from middle sand to silt and are covered with sand dune. T2 is distributed along paleo-channel turning to the north at Bakbakthy. Aeolian sand dunes smaller than those on T1 surface covers T2 surface. The top of paleo-channels on T2 has well-sorted fine sandy sediments thought as aeolian sand. T3 is distributed along paleo-channel turning to the north at Bakanas and has paleo-channels which had larger discharge than modern channel(Shimizu and Sugai 2010).

T4 is distributed along the main stream of modern Ili River and formed after the main channel of Ili River moved to the west. Large Flood is likely to flow into paleo-channels on T4. T5 is the floodplain of Modern channel of Ili River and along the channel.

About 30ka after deposition of T1, T2 was formed before 4ka. Meanwhile, Balkhash Lake has an low-level period. 4.2ka from OSL dating (Kondo et al, 2011) is the last active age of paleo-channel on T2 after deposition age in the downstream of Kurti River (Sugai et al, 2012) . And then the channel was covered with aeolian sand. T3 has four14-C ages. Two of them obtained from shale in sorted sand thought as fluvial sediments show about 1500 years ago, the others show from humic soil showing that the channel changed back marsh about 700 years ago. That is to say, in high-level period of Balkhash Lake(Chiba et. al.,2010), the main channel of Ili River was forming T3 with repeating avulsion, and was moved to T4. And then T3 became terrace and covered with aeolian sand.

Keywords: paleo-channel, aeolian sand, paleo-discharge, Central Asia

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P06 Room:Convention Hall Time:May 25 17:15-18:30

A record of Holocene lake-level change reconstructed from mineralogical analysis and acoustic profiling of the Balkhash

MONTANI, Hiroki[1*], SUGAI, Toshihiko[1], HARAGUCHI, Tsuyoshi[2], ENDO, Kunihiko[3]

[1]Natural enviroment, Univ. of Tokyo., [2]Geosci.,Osaka City Univ., [3]Geosystem Sci.,Nihon Univ.

Introduction

Global warming is the matter in recent years. Although IPCC pointed out that the main factor is human activities, some mention importance of natural environmental changes. To understand actual cause, it is essential to investigate global environmental change and evaluate the influences of human activity. Restoration of local environmental changes is also significant, that enable to consider correlation of those among areas. Local and global climate of Holocene has been restored to know interaction between environmental changes and human activities. Recent study demonstrated that destruction of civilization occurred corresponding with abrupt climatic changes in some cases. This strongly suggests that climate changes have seriously damaged human society. While paleoenvironment of Central Asia which is semiarid has been restored by such as Mischke et al. (2010), the amount of records is short. Lake Balkhash which has the largest area in Central Asia and has recorded detailed paleoenvironment of the region was focused.

This research reconstructed lake level change of Lake Balkhash from the lake sediments with acoustic profiling, and discussed the cause of change comparing climatic changes in near regions.

Study area and methods

The research area is the eastern part of the Lake Balkhash, where is the deepest with the depth of over 20 m. To restore lake level changes, lake sediment cores and acoustic profiling images of the sediments were analyzed. In acoustic profiling the change is captured by analyzing sequence stratigraphy. Two sedimentary cores of 0901 and 0902 were obtained and minerals in sediments were particularly analyzed because they record water quality and origin of the sediments.

Results and discussion

Onlap and toplap structure were confirmed at each upper and lower stratum of reflecting boundary 2 identified in the acoustic profiling images of Line 11, respectively. Onlap structure is formed when water level rises, while toplap structure is formed when water level drop. Therefore, lake level drop phase changed into rise phase bordering the reflecting boundary 2 at Line 11.

Peak of X-ray intensity of quartz and feldspar in 0901 core and that of magnesite and gypsum in 0902 core were confirmed by identifying minerals based on XRD peak chart. Magnesite and gypsum in 0902 core formed under arid environment indicate water level drop. Quartz and feldspar rich horizon in 0901 core indicates increase of fluvial input into the lake suggesting lakeshore migration because of the lake level drop. As a result of core contrast, coarse grain deposition facies of 0901 cores are coincident with gypsum and magnesite of 0902 cores. Therefore, Lake Balkhash fell down its lake level rapidly at this time. Subsequently, terrigenous matter has deposited surrounding the Lepsy river mouth where 0901 core is situated whereas gypsum and magnesite has produced at around 0902 core far from the river mouth. Accumulation of gypsum and magnesite happened ca. 5500 cal years BP. After that, this horizon that shows water level decline is called as event horizon.

As a result of contrasting 0901 core with acoustic profiling of Line 8, the event horizon of 0901 core is coincident with the reflecting boundary of Line 8. Furthermore, the reflecting boundary of Line 8 is coincident with the reflecting boundary 2 of Line 11. Since the reflecting boundary 2 of the event horizon is concordant with the result of acoustic profiling, lake level drop phase changed into rise phase about 5500 cal years BP in Lake Balkhash. Other researches indicated that climate changed from wet to dry at various places ca. 5500 cal years BP. To summarize, the timing of lake level drop phase into rise phase ca. 5500 cal years BP in Lake Balkhash is coincident with climate change period from wet to dry. And Lake level change of Lake Balkhash is caused by aridification. This research clarified lake level change and contributed to discussion of climate change in Central Asia.

Keywords: Lake-level change, Holocene, Lake Balkhash, lake sediments, acoustic profiling, mineralogical analysis

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P07 Room:Convention Hall Time:May 25 17:15-18:30

DNA analysis for identification of a Pinus pollen grain at subsection level found in Belukha Glacier

NAKAZAWA, Fumio[1*], SUYAMA Yoshihisa[2], TAKEUCHI Nozomu[3], FUJITA Koji[4], IMURA Satoshi[1], KANDA Hiroshi[1], MOTOYAMA Hideaki[1]

[1]National Institute of Polar Research, [2]Tohoku University, [3]Chiba University, [4]Nagoya University

We improved our method on DNA analysis for identification of a *Pinus* pollen grain. We presented a method that could identify a *Pinus* pollen grain found in Belukha Glacier, Russian Altai Mountains using polymerase chain reaction (PCR) technique. However the capability of the identification was still at section level and the success rate of PCR was 7.6%. The purpose of the present study was to identify the grain at subsection level and to obtain higher success rate newly using multiplex PCR technique. Fragments of 134-147 bp from five loci of the chloroplast genome in each *Pinus* pollen grain were amplified, and the DNA products were sequenced in order to identify them at subsection level. As a preliminary result, the success rate for sequence amplification in the present study was 35% and exceeded that of our previous study. *Pinus* is a taxon with approximately 111 recognized species in two subgenera, four sections and 11 subsections. From the sequences obtained for the six grains, four pollen grains were identified as belonging to subsection *Pinus*. Trees of *Pinus sylvestris*, in subsection *Pinus*, are currently found surrounding the glacier. The consistency of results for this subsection suggested that these pollen grains originated from the same *Pinus* trees found in the immediate surroundings, which spread also as far as Europe. Interestingly, other two grains were identified as subsection *Australes* that is found in North America, Mexico, Central America and Caribbean.

Keywords: glacier, pollen analysis, DNA, ice core, Russian Altai Mountains

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P08 Room:Convention Hall Time:May 25 17:15-18:30

Fluvial dynamics of the Stung Sen River and geomorphic development processes in lower Mekong basin

NAGUMO, Naoko[1*], SUGAI, Toshihiko[1], KUBO, Sumiko[2]

[1]Graduate School of Frontier Sciences, The University of Tokyo, [2]School of Education, Waseda University

We conducted six drill core analyses and outcrop observations at two investigation sites of KC and KPT at the Stung Sen River downstream in lower Mekong basin. Study area is situated in low-latitude tropic region highly influenced by monsoon, and floodplain environment dramatically changes during each dry and monsoon season. The Stung Sen River is the biggest influent tributary of the Lake Tonle Sap, and its base level of erosion is water surface level of the lake. River longitudinal gradient in the downstream of the Stung Sen River where fluvial plain is developed is very gentle, around 0.06/1000. Floodplain landform of the Stung Sen River is surrounded by upland with less than 5-meter relative elevation, and is roughly divided into back marsh and meander belt consisting of meander scroll and abandoned channel. Sedimentary units of A, B, C, and D are recognized above sandstone basement rock. AMS-^{14}C ages explain that back marsh (Unit A, B and C) has been accumulated in increments of 0.1 mm/yr since the late Pleistocene whereas deposits in meander belt (Unit D) are relatively new and have replaced in decennial to centennial time scale. Coarser deposits at upper KC site and more plant materials at lower KPT site came to accumulate after ca.11 ka, is probably due to rainfall increase derived from monsoon intensity. Landform development pattern diverges at downstream site of KPT. Lowest back marsh III was formed due to the Stung Sen's erosion of higher back marsh II at least after middle Holocene. This geomorphic process might be related to initiation of monsoon reverse flow between the Mekong and Lake Tonle Sap.

Keywords: fluvial landform, meander, drill cores, Stung Sen River, lower Mekong basin

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P09 Room:Convention Hall Time:May 25 17:15-18:30

The initiation and depositional process of the lake sediments in Lake Tonle Sap, Cambodia

YAMADA, kazuyoshi[1*], HARAGUCHI, Tsuyoshi[2], SETO, Koji[3], HAYASHIDA, Akira[4], YONENOBU, Hitoshi[1], TOKUNAGA, Tomochika[5]

[1]Naruto University of Education, [2]Osaka City University, [3]Shimane University, [4]Doshisha University, [5]University of Tokyo

Lake Tonle Sap is a part of the Mekong River Basin. In dry seasons, water flows from the lake through River Tonle Sap River into R. Mekong. Whereas, in rainy seasons floodwater from R. Mekong enters back into the lake.

Paleolimnological studies have revealed that the beginning of the lake formation and the phenomenon of the water reversal can be traced back to the early Holocene (Penny et al., 2005, Penny 2006, Day et al., 2010). However, the low sedimentation rate from the middle to early Holocene suggests that there could be a hiatus in cored sediments.. In addition, no firm evidence has been provided as to whether to the bottom of cored sediments are the actual basement. To overcome these issues, we collected a 14-m long sediment core from the deepest part of the buried valley in the lake, where we observed the lake bed configuration using seismic records.

From the sedimentological analyses, we attempted to reconstruct the onset and subsequent process of sedimentation in Lake Tonle Sap.

Radiocarbon dating was undertaken for organic remains from the core. The onset of the lake environment in the Mekong basin was estimated to be ca. 11,000 cal yrBP, suggesting that the age of the lake formation may precede 2,000 to 3,000 years to those mentioned in the previous studies.

Sequential CNS records at an interval of 1 to 5 cm (n = 406) were obtained to clarify the temporal changes in depositional process of the lake. Our results suggested that five stages are identified as below:

Stage 1 (Depth 14.0-13.2 m): ave. 1 wt% of TOC (total organic carbon) contents and 10-20 of C/N ratio represent the transition between fluvial and lacustrine environments.

Stage 2 (13.2-8.1 m): ave. 2 wt% of TOC, 9-10 of C/N ratio and ave. 80 of C/S ratio represents a closed lake environment in which the valley was gradually filled with fine materials from surrounding.

Stage 3 (8.1-3.3 m): ave. 1 wt% of TOC, 5-6 of C/N ratio and ave. 35 of C/S ratio represents a moderately stable closed lake environment with an increment of lake productivity.

Stage 4 (3.3-0.6 m): 2-4 wt% of TOC, 11 of C/N ratio and ave. 0.15 wt% of TS (total sulfur) contents represents a closed lake environment with a seasonal fluctuation.

Stage 5 (0.6-0.0 m): ave. 1 wt% of TOC, 5-6 of C/N ratio and ave. 35 of C/S ratio represents the modern lake environment.

Keywords: Lake Tonle Sap, buried valley, sediment core, CNS element analysis, magnetic susceptibility, Holocene

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P10 Room:Convention Hall Time:May 25 17:15-18:30

Geoenvironment around the ancient dams at PPNB archaeological sites in Jafr Basin, southern Jordan

KATSURADA, Yusuke[1]*

[1]Nagoya University Museum

Wadi Abu Tulayha is a small settlement site located north-west of the Jafr Basin in southern Jordan. PPNB agro-pastoral outpost was probably derived from the secondary farming society to the west. Ancient dams set along the wadi channel were excavated at the site and several dams that have similar features were found in Wadi al-Nadiya, Wadi Quweir, and Wadi Ruweishid ash-Sharqi sites located in Jafr Basin. In order to clarify natural backgrounds for these ancient dams, surface drainage and catchment area were estimated by calculating digital elevation medel (DEM) and analyzing remotely sensed images. Considering its geological backgrounds, hydrology including underground water in the limestone-based sedimentary rocks may play an important role on the nomadic people's settlement.

Keywords: PPNB, Ancient dams, Limestone, Jafr Basin

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P11 Room:Convention Hall Time:May 25 17:15-18:30

The Eruption Age of 31 Tephras Intercalated in the Late Pleistocene Sediments off Joetsu, Japan

NAKAMURA, Yuya[1*], SUGAI, Toshihiko[1], ISHIHARA, Takeshi[1], Fernando FREIRE[1], MATSUMOTO, Ryo[2]

[1]Environmental Studies, KFS, UT, [2]Dept of Earth & Planet Sci, UT

Introduction

The Age is necessary for the paleoenvironmental studies. The tephras spreaded and deposited in wide area by volcanic explosive eruption play the important role of the time marker in Japan (Machida and Arai 2003). In previous studies, B-Tm, K-Ah, To-H, As-K, NJ2, KsP, AT, B-J, SAN1, U-Ym, Aso-4 and Toya tephra were found in Japan Sea (Ikehara et al., 2004 etc.). Most of these tephras were found from the core extracted offshore in Japan Sea. On the other hand, since sedimentation rate is high in the near coast of Japan Sea, previous studies revealed environmental changes only since about 60,000 years ago. There is almost nothing that was established as a means to acquire the age value before 50,000 years ago. Therefore, it is very important to know the tephra stratigraphy before 50,000 years ago in Japan Sea and to presume the eruption age of tephras. Based on the distributions of each tephra in precedence research, many tephras will be found off Joetsu. This study asked for the eruption age of 95 tephras obtained from 9 core samples extracted in the Joetsu basin circumference region.

Study Area

The Joetsu basin which is located in the east of the Toyama trough has various geographical feature places such as Umitaka spur, Joetsu knoll, submarine canyon. Most core samples extracted there consist of muddy sediments. The core extracted at the lower part of a slope or a submarine canyon contains the slump sediments and the landslide sediments. When depositional environment is calm, TL layer peculiar to Japan Sea (Tada et al., 1999) is formed. Into such a core, tephra with a coarse size is inserted.

Methods

For each individual samples, mud was removed for the samples using sieve, and the remainder was placed inside the ultrasonic washing machine. Then, the mineral composition and volcanic glass shape was indicated using the microscope, and the chemical composition of volcanic glass was analyzed by SEM-EDS. Based on the feature of each tephra, tephra was correlated.

Results

95 samples were classified into 31 kinds, and 11 kinds of them were identified by the tephra the age is presumed to be by precedence researches. As-K(15-17.5ka; Machida and Arai 2003), AT(29.24ka; Kitagawa and Plicht 1998a), Spfa-1(42-44ka; Machida and Arai 2003), DKP(62ka; Nagahashi et al. 2007), On-Ng(85.1ka; Nagahashi et al. 2007), Aso-4(88ka; Oba 1991), On-Kt(94.9ka; Nagahashi et al. 2007), K-Tz(95.2ka; Nagahashi et al. 2007), On-Pm1(97.6ka; Nagahashi et al. 2007), SK(99.9ka; Nagahashi et al. 2007) and Toya(106ka; Shirai et al. 1997) were correlated. On the other hand, the eruption ages of 20 kinds of tephra were not clear. Then, we estimated the eruption ages on the assumption that depositional environment has been calm.

95 samples were classified into 31 different kind of tephras, and 11 of them were identified by the tephras whose ages have been established by precedence researches. Each eruption age of unknown tephras was estimated based on depth of those identified tephras. The 31 eruption age were inserted in sediment of Japan Sea after 120,000 years ago.

Acknowledgements

This study has been financially supported by the cooperative research project of the MH21 Research Consortium Japan.

Keywords: Tephra, Japan Sea, Chronology, Late Pleistocene, Eruption age, SEM-EDS

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P12 Room:Convention Hall Time:May 25 17:15-18:30

Radiocarbon dating of AT ash

MIYAIRI, Yosuke[1*], YOKOYAMA, Yusuke[1], Hiroyuki Matsuzaki[2]

[1]AORI, The university of Tokyo, [2]MALT, The university of Tokyo

Tephra layers formed by large volcanic eruptions have often been used as time markers in geology and archeology to correlate spatially distant events. Exact timing of tephra depositions therefore a key parameter in these studies. There are several radiometrical methods to date tephra layers. Radiocarbon (14C) measurements on buried wood are conducted for the sample whose age is younger than 50,000 years. Direct dating on tephra layer itself can be done using K-Ar dating for the samples older than approximately 100,000 years old. However several lines of problems are arisen for these radiometric methods. Radiocarbon results older than 20,000 years which was conducted for buried woods and charcoal scattered and did not give a precise age of the tephra layer due to secondary contamination after its deposition. It has been reported that the choice of measurement methods, namely 14C measurement by liquid scintillation counter (LSC) and accelerator mass spectrometry (AMS), produces inconsistent age results on same samples.

Keywords: radiocarbon diting, AT ash, tephra

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P13 Room:Convention Hall Time:May 25 17:15-18:30

Luminescence chronology of marine and fluvial terraces of Middle Pleistcene using post-IR IRSL method: A case study in H

KONDO, Reisuke[1*], Sumiko Tsukamoto[2], ENDO, Kunihiko[3], SAKAMOTO, Tatsuhiko[4]

[1]Geological Survey of Japan, AIST, [2]Leibnitz Institute, [3]Nihon University, [4]JAMSTEC

In Hokkaido, it has been difficult to construct a detaled chronology of marine and fluvial terraces before MIS 5 using tephrochronology, due to the lack of the marker tephras and to the deformation of original landforms by strong past periglaciations. The lack of age constraint has prevented studies of precise geomorphic development and palaeoenvironmental reconstruction in this area.

This study applies an elevated temperature post-IR IRSL (pIRIR) SAR method of luminescence dating using polymineral fine grains to marine / fluvial terraces before MIS 5 in northern / southern Hokkaido pIRIR method is a new techniques in the luminescence dating. This method has advantages that there are no anomalous fading in feldspar luminescence signal and is applicable to older sediments beyond the age range of quartz OSL dating.

In this study, polymineral fine grain samples taken from marine terrace deposits and loess covering fluvial terraces were used to test the pIRIR datings.

In Hamatonbetsu area, northern Hokkaido, the pIRIR D_e values from the lower marine terraces are ca.250 Gy, and ca.750 - 850 Gy from the middle marine terraces.

In Yurappu river area, southern Hokkaido, the D_e values of ca.150 Gy, and ca.500 Gy were obtained from the middle fluvial terrace and from the higher fluvial terrace, respectively.

These De values of pIRIR for all samples (from marine and fluvial terraces) are generally in the stratigraphic order.

Our data will provide new age estimates for the loess and sediments from the marine and fluvial terraces. These new ages of the terraces will give excellent chronological information for geomorphrogical development and pareoenvironments in northern Japan.

Keywords: pIRIR, marine terrace, fluvial terrace, Hokkaido, chronology

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P14 Room:Convention Hall Time:May 25 17:15-18:30

Chronology of Kanto Loam formations and Late Pleistocene fluvial terraces using OSL and pIRIR dating in the Kanto plain

KOMURO, Yusuke[1*], KONDO, Reisuke[2], SUZUKI, Takashi[3], ENDO, Kunihiko[1], Sumiko Tsukamoto[4], SAKAMOTO, Tatsuhiko[5]

[1]Nihon University, [2]Geological Survey of Japan, AIST, [3]Ome City Board of Education, [4]Leibnitz Institute, [5]JAMSTEC

In the Kanto plain, chronology of fluvial and marine terraces has been reconstructed mainly by Kanto Loam formations and key tephras. However, since key tephras are not so common in Musashino Upland, application of new chronological measurement method is necessary.At first OSL dating was applied to Tachikawa Loam. However, OSL ages were estimated to be too young. Since abundant quartz grains are contained in sediments of younger volcanic origin. Consequently, new chronological measurement method, the pIRIR dating method was applied to some tephra horizons in Tachikawa and Musashino Loam, and terrace deposits.

From AT tephra horizon along Hanamuro-river, Tsukuba, the OSL age value about 14 ka was obtained and the pIRIR age value about 30 ka was obtained. Tsurugasima, Saitama, the pIRIR age value was about 30 ka for AT tephra horizon. In Tachikawa, Tokyo the OSL age value was about 27 ka and the pIRIR age value was about 30 ka for AT tephra horizon. These results indicate clearly that the pIRIR dating is a useful method to determine ages of late Pleistocene Kanto Loam, tephras and terrace deposits at least in Kanto, even if those include young volcanic Quartz.

Keywords: OSL dating, pIRIR dating, Kanto-Loam, Tachikawa terraces, Musashino terraces, Tephra

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P15 Room:Convention Hall Time:May 25 17:15-18:30

Chronology and processes of fluvial terrace formation in the Ohmi Basin based on cryptotephra analysis

ISHIMURA, Daisuke[1*]

[1]Dept. Geophysics. Kyoto Univ.

In Japan, processes of terrace formation were generally explained by climate and sea-level changes (e.g. Kaizuka, 1969). In downstream areas, sea-level changes affected terrace formations such as marine terraces during interglacial periods and buried terraces during glacial periods (e.g. Kubo, 1997). In mid-upstream areas, changes of water discharge and sediment supply due to climate changes mainly affected terrace formations such as aggradational terraces during glacial periods (Hirakawa and Ono, 1974; Sugai, 1993). However, it is difficult to distinguish the affects of climate and sea-level changes to terrace formations because these study were conducted in the rivers, whose profiles show smooth concave shape from downstream to upstream. This study focused on the Ohmi Basin to understand the processes of terrace formation under the uniform altitude of base level of erosion (Lake Biwa). In this study, cryptotephra analysis of eolian deposits covering fluvial terrace deposits was carried out to identify tephra horizons. Based on tephra horizons (K-Ah, AT, K-Tz) and geomorphic features of fluvial terrace surfaces, processes of fluvial terrace formation in the Ohmi Basin were discussed.

Keywords: Tephrochronology, Ohmi Basin, Fluvial terrace

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P16 Room:Convention Hall Time:May 25 17:15-18:30

Regional characteristics of river long profile development in mountain areas, Japan since the Last Glacial Period

SAKAMOTO, Yuki[1*], SUGAI, Toshihiko[1]

[1]The University of Tokyo, FSKC

Longitudinal river profile is one of the most important geomorphic elements indicating river transportational systems, which changes in response to climate change. As the result, river terraces are developed. Therefore, quantitative researches of river longitudinal profile should be examined to clarify the response of rivers to climate change. River terrace development in the latter half of the last glacial period is different between East and West Japan. Investigating the factor that produced those differences is important to estimate river changes that may occur in the future. In addition, previous studies have clarified river landform changes in individual rivers since the last glacial period, but there are few quantitative studies that focus on rivers all over Japan. This study tries to clarify the long-term river landform changes and at the same time shed light on each region's characteristics by comparing river longitudinal profiles in different areas in Japan. The investigators compared between the Last Glacial River Profile defined by the continuity fluvial terrace surface formed since the Last Glacial Period and the Present River Profile. River longitudinal profiles were fitted with one of the exponential, power or linear functions. Discussion regarding the conformity function type used for evaluating the rivers in East and West Japan will be shown in the next poster session.

Keywords: river longitudinal profile, fluvial terrace, climate change, fluvial system

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P17 Room:Convention Hall Time:May 25 17:15-18:30

Diatom assemblages from the event sediments of the AD core at the Odaiba-Oume, Tokyo Bay Area

NOGUCHI, Marie[1*], ISHIKAWA, Satoshi[1], ENDO, Kunihiko[2], ISOMAE, Yosuke[3], HAYASHI, Takeshi[4]

[1]Kyushu University, [2]Geosystem Sci., Nihon Univ., [3]CTI Engineering Co., Ltd., [4]Faculty of Education and Human Studies, Akita University

The AD core, at the Odaiba-Oume, Tokyo Bay Area, was 60.90 m long core of alluvial deposit along the paleo-Kanda River Valley. Isomae (2011MS) divided the core into ten sedimentary units and presumed that the upper-most Unit (Unit 10) including several sedimentary structures was tidal deposit. But the evidence of reconstruction to this unit has another possibility. So we presumed the detail paleo-environment at Unit 10 and discussed the relations between sedimentary structures of the core and natural hazard events using diatom assemblages.

We took the samples for diatom analysis with 2-5 cm intervals according to the litho-faces changes the Unit 10. The dominated species from the unit were inner bay assemblages such as *Thalassiosira* spp. and *Thalassionema nitzschioides*, and the numbers of freshwater species were less than 10 percent to the total diatoms. Although the assemblages were hardly changed within the Unit 10, the number of diatom fossils per gram has fluctuated cyclically. These changes were presumably related to the flooding process changes at the hazard events in the last 800 years.

Keywords: Diatom, Tokyo Bay, Event sediments

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P18 Room:Convention Hall Time:May 25 17:15-18:30

Shallow topography of occurring liquefaction sites in Urayasu city, Chiba prefecture

WAKAYAMA, Hiroki[1*], SUGAI, Toshihiko[1]

[1]Environmental Studies, KFS, UT

Liquefaction deteriorates seismic disasters because it tends to occur at lowlands where lots of people live and infrastructure concentrates. The research of liquefaction was started from 1964, when occurred Great Alaskan Earthquake and Niigata Earthquake, and it was revealed where liquefaction tends to occur, based on topography, geology and microtopography. The previous studies found out that high groundwater level, loose sand deposited and strong earthquake are main conditions for liquefaction. Landfill areas satisfy these conditions. In fact, liquefaction occurred landfill is but all landfill is not occurred.

The objectives of study are quantitative assessment of liquefaction risk. To this end, we focused on the sedimentary structure of the subsurface and visualized of shallow topography to find out the character of liquefaction sites.

Study area is Urayasu city, Chiba prefecture. Urayasu city was occurred liquefaction in The 2011 off the Pacific coast of Tohoku Earthquake. Landfill is the highest probability of liquefaction in the earthquake, so it is necessary to find out the shallow topography of liquefaction sites in landfill.

To clear up shallow topography, I subject to extract of (1) groundwater level (2) thickness of landfill (3) thickness of sand layer and make out bathymetric images and three-dimensional images. To visualize the groundwater level, it was found to be not straight line. And it was found that liquefaction has occurred in a location close to the surface of groundwater levels.

And also to visualize the landfill and the sand layer, it was found that the meandering shape of the surface and groundwater level is different.

To consider the overlapping liquefaction sites and groundwater level, groundwater level has lowered in places where liquefaction has occurred. It has been reaffirmed that the height of the groundwater level is defining of the occurrence of liquefaction.

Keywords: earthquake, liquefaction, shallow topography

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HQR23-P19 Room:Convention Hall Time:May 25 17:15-18:30

Formation mechanism of cloudy water in tide pool in methane seepage area, Kujukuri-hama beach, Chiba, central Japan

YOSHIDA, Takeshi[1*], KAZAOKA Osamu[1], TAKEUCHI Mio[2], KUSUDA Takashi[1], FURUNO Kunio[1], KAGAWA Atsushi[1], SAKAI Yutaka[1]

[1]Research Institute of Environmental Geology, Chiba Prefectural Environmental Research Center, [2]Institute for Geo-resources and Environment, National Institute of Advanced Industrial Science and T

In the study area, Holocene series unconfomably overlies the Pleistocene Kazusa Group. The Kazusa Group was deposited mainly in a deep sea environment, and contains methane gas dissolved in water. This condition allows gas to emerge easily from the ground as it moves upward through faults and the sand layer.

In 2007, the water in tide pools at Kujukuri-hama beach in Chiba became cloudy. A field survey revealed that methane gas was seeping out around these tide pools where the cloudiness occurred and that bluish gray sand, which represents a reduction condition, is distributed inside the area of gas seep. Yellow groundwater was found lying immediately beneath the area where the bluish gray sand was distributed, and this yellow groundwater became cloudy as it emerged into the tide pools.

Results of analysis indicated a state of sulfate reduction and that the cloudy substances were mainly composed of elemental sulfur. It is thus suggested that the water in the tide pool became yellow or cloudy in the presence of polysulfide ions or irregular reflections induced by colloidal sulfur.

16S rRNA genes of anaerobic methanotrophic archaea belonging to ANME-1 were detected from the yellow groundwater. This suggests the possibility that anaerobic oxidation was involved in the reduction of the sulfate ions. Based on these findings, we propose a hypothesis of mechanism in which the ANME-1 are active along with the gas seeping from the Kazusa Group to the ground surface, and that the reductive condition was eventually formed at the surface.

Keywords: methane seepage, yellow groundwater, cloudy water, ANME