Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-01 Room:101A Time:May 19 11:00-11:15

A unique condition for the SSF diversification and the phosphogenesis in the Early Cambrian in Chengjiang, South China

Tomohiko Sato[1*], Yukio Isozaki[1]

[1]Komaba, Univ. Tokyo

In the earliest Cambrian, a major diversification of small shelly fossils (SSFs) occurred as the first stage of the Cambrian Explosion. In order to clarify the precise location and environmental background of this event, we examined the detailed litho- and bio-stratigraphy of the SSF-enriched lowermost Cambrian in central Yunnan, South China.

In the Chengjiang area, ca. 40 m-thick lowermost Cambrian (the Zhongyicun Member of the Zhujiaqing Formation) is composed of interbedded phosphorite and limestone. Phosphorite is in fact composed of clastic grains with calcite matrix. This texture suggests that phosphate was primarily deposited in a relatively shallower setting than limestone, and eroded/transported into the depositional site of limestone as clastic grains. Primary phosphorite deposition likely occurred in an extremely shallow setting. At the Hongjiachong section, we subdivided the Zhongyicun Member into 5 units; i.e., Units A, B, C, D and E. Units A, D and E are mainly composed of phosphorite, whereas Units B and C of limestone. Units A, D and E were likely deposited in a site deeper than that of Units B and C. The depositional setting has likely changed from shallow to deep, and deep to shallow again. A unique sandstone bed occurs at the boundary of Units B and C. It is noteworthy that the sandstone truncated the bedding of the beds of Unit B. The sandstone is likely a turbidite bed that reached to the deeper part of basin intermittently. The SSFs occurred solely from this sandstone between Units B and C. As the SSFs occur in the same manner as phosphate clastics, they were also derived likewise from shallow environments.

At Hongjiachong, we identified 15 genera of SSFs from 10 horizons in the Zhongyicun Member, and recognized two distinct assemblages; one with *Anabarites* sp. and *Protohertzina* sp. from the bottom of Unit A, and the other with various mollusc shells, such as *Paracarinachites* sp. and *Ocruranus-Eohalobia* group from the sandstone and higher units. This assemblage shift, i.e., the major SSF diversification, occurred in the earliest Cambrian probably before that of the marker sandstone, i.e. during the deposition of Unit B of the lower half of the phosphorite-bearing sequence.

We speculate that phosphorites might have primarily deposited in a unique shallow-water environment where phosphorous-rich seawater was concentrated, such as a small restricted embayment, and that the SSF diversification possibly occurred in such extreme conditions.

Keywords: small shelly fossils, phosphorite, Cambrian, South China

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-02 Room:101A Time:May 19 11:15-11:30

n-alkanes and isoprenoids extracted from the Ediacaran-Early Cambrian section in the Three Gorges area, South China

Kentaro Yamada[1*], Yuichiro Ueno[1], Keita Yamada[2], Naohiro Yoshida[2], Shigenori Maruyama[1]

[1]Earth & Planetary Sciences, TITech, [2]Environ. Chem. and Engr, TITech

The Ediacaran-Early Cambrian (635-509Ma) is one of the most important periods in the Earth life history. Almost all of eumetazoan phyla emerged and radiated during this period. Although it is expected that the eumetazoan evolution be influenced by the change of ecosystem including microbiota and geochemical cycle in the ocean, the detail is still ambiguous.

South China is the most suitable area for studying continuous biogeochemical change during the Ediacaran-Early Cambrian because there are less hiatus through the sequence.

Molecular fossils, which are organic compounds extracted from sedimentary rocks, are useful to reveal the microbiota and biogeochemistry, but the continuous change of molecular fossils composition during the Ediacaran-Early Cambrian in South China have not been reported.

In this study, the results of n-alkane and isoprenoid composition from 80 samples, and their compound specific carbon isotope ratios from 30 samples are reported. Dominant longer chain n-alkanes, and different carbon isotope ratios between pristane and phytane which were derived from the multiple phototroph communities, indicate the emergence of the stratified ocean and photic zone euxinia in the earliest Cambrian.

Keywords: molecular fossil, carbon isotope ratio, Ediacaran-Early Cambrian, South China

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-03 Room:101A Time:May 19 11:30-11:45

Litho-, bio-, and C-Sr isotope stratigraphy of the Middle Permian carbonates in central Sichuan, South China

Takumi Futamori[1], Yukio Isozaki[1*], Tomomi Kani[2], Atsushi Suzuki[3], Toyoho Ishimura[3]

[1]Department of Earth Science & Astronomy, The University of Tokyo, [2]Faculty of Science, Kumamoto University, [3]AIST Geological Survey of Japan

We analyzed the stratigraphy of the Wordian to Capitanian (Middle-Upper Guadalupian, Permian) shallow marine cabonate (Maokou Formation) in the Ebian area of central Sichuan, South China, using samples from outcrop and drilled core. Fusulines and conodonts confirmed that the studied section ranges from lower Wordian to mid-Capitanian. Owing to depositional gap beneath the limestone conglomerate, the horizon of the end-Guadalupian extinction is missing. Nonetheless, we detected a nearly 20 m-thick interval characterized by extremely high positive values of stable carbon isotope ratio of carbonate ($>$ 5 permil) in the Capitanian. This is the first confirmation of the similar signal proposed from paleo-atoll carbonates in Japan (Kamura event). This suggests the appearance of cool climate in the later half of the Capitanianon a global scale, in good accordance with the global sea-level drop and ubiquitous hiatus on the top the Maokou Fm throughout South China (except the Penglaitan section).

Keywords: Permian, Maokou Formation, South China, Kamura event, mass extinction, Guadalupian

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-04 Room:101A Time:May 19 11:45-12:00

Active anaerobic respiration in an anoxic ocean prior to the end-Guadalupian (Permian) extinction

Masafumi Saitoh[1*], Yuichiro Ueno[1], Manabu Nishizawa[2], Katsumi Shozugawa[3], Tetsuya Kawamura[1], Ken Takai[2], Naohiro Yoshida[4], Motoyuki Matsuo[3], Jianxin Yao[5], Zhansheng Ji[5], Yukio Isozaki[3]

[1]Graduate School of Science and Engineering, Tokyo Institute of Technology, [2]Japan Agency for Marine-Earth Science and Technology, [3]Graduate School of Arts and Sciences, The University of Tokyo, [4]Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, [5]Chinese Academy of Geological Science

We present nitrogen and sulfur isotope (d15N and d34S) records of Guadalupian-Lopingian (Middle-Upper Permian) shelf-carbonates in northern Sichuan, China, to examine oceanographic changes around the end-Guadalupian extinction. d15N values of organic matter are remarkably high in the topmost part of the Guadalupian Maokou Formation, suggesting active denitrification in the Capitanian (Late Guadalupian) ocean. On the other hand, distinctly low and constant d34S values of pyrites in the topmost Maokou Formation suggest vigorous sulfate reduction in the water column. Active anaerobic respiration is in accordance with the emergence of oxygen-depleted waters and with the occurrence of anomalous carbonate precipitates on the relatively deep disphotic slope/basin in northwestern South China. Enhanced sulfate reduction in the water column implies that a sulfidic condition may have developed on the continental margin, at least locally, prior to the extinction. The emergence of a sulfidic water mass is supported by the abundant occurrence of small framboidal pyrites and by the extremely high proportions of pyrite Fe to highly reactive Fe (FeP/FeHR) in the rocks shown by 57Fe Mossbauer spectroscopic analysis. A development of a sulfidic water mass on the disphotic slope/basin may have influenced on the end-Guadalupian extinction through upwelling of the harmful waters along the continental margin.

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-05 Room:101A Time:May 19 12:00-12:15

The Guadalupian (Permian) minimum of seawater 87Sr/86Sr

Tomomi Kani[1*], ISOZAKI, Yukio[2], KOFUKUDA, Daisuke[2], FUTAMORI, Takumi[2], HISANABE, Chihiro[1]

[1]Department of Earth and Environmental Sciences, Kumamoto University, [2]Department of Earth Science & Astronomy, The University of Tokyo

The Guadalupian (Permian) $^{87}Sr/^{86}Sr$ ratio of surface seawater recorded the unique Permian minimum ($<$0.7070) interval, , the lowest in the Phanerozoic. Two mid-superoceanic carbonate sections in Japan, i.e. Akasaka and Kamura, recorded extremely low $^{87}Sr/^{86}Sr$ values for nearly 5 million years during the Capitanian (Late Guadalupian; ca. 265-260 Ma) (Kani et al., 2008; 2013). We newly found out the same signal for the first time at the Shizipo section in central Sichuan, South China (Futamori et al., 2013). This confirms that the minimum $^{87}Sr/^{86}Sr$ interval started already in the late Wordian (Middle Guadalupian). After the long-term late Guadalupian minimum, for more than 5 m. y., the seawater Sr isotope values increased in the most rapid manner during the Late Permian. This rapid increase can be explained either by the deglaciation or by the Pangean rifting. The regime likely shifted to a warmer climate that removed ice covers from continents and increased the erosion/weathering rate. With respect to the Pangean rifting, the continental doming by plume impingement might intensify erosion/weathering of surface of continent. The continental rifting with new drainage systems likely increased decisively the radiogenic continental flux to superocean.

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-06 Room:101A Time:May 19 12:15-12:30

Meteorite impact, volcanism, and radiolarian faunal turnover recorded in the Upper Triassic bedded chert in Japan

Tetsuji Onoue[1*], Honami Sato[2], Tatsuo Nozaki[3], Junichiro Kuroda[3], Katsuhiko Suzuki[3]

[1]Kagoshima University, [2]Kyushu University, [3]JAMSTEC

The Late Triassic was characterized by several marine and terrestrial biotic turnover events prior to the end-Triassic mass extinction. The causes of the end-Triassic mass extinction and Norian to Rhaetian biotic turnover events are still the subject of active debate. Catastrophic processes such as widespread eruption of the Central Atlantic Magmatic Province (CAMP) flood basalts and extraterrestrial impacts have been proposed to account for the biotic turnover events. We report a marine osmium (Os) isotope record reconstructed from an Upper Triassic chert succession in Japan, which accumulated on the paleo-Pacific deep seafloor. Os isotope data exhibit an abrupt and marked negative excursion from an initial Os isotope ratio of ˜0.456 to unradiogenic values of ˜0.126 in in a claystone layer within the middle Norian (˜215 Ma), indicating the input of meteorite-derived Os into seawater. A gradual decrease in 187Os/188Os ratios during the Rhaetian (201-210 Ma) is considered to have been closely linked with the CAMP volcanic event.

An analysis of radiolarians does not show a mass extinction event across the impact ejecta layer and during the CAMP volcanic phase. However, a significant faunal turnover occurred ˜1 Myr after the impact event. Biostratigraphic analysis shows that 20 radiolarian species became extinct at this level and the extinction rate is estimated to be 83%. It is possible that the impact may have triggered the extinction of these 20 species, though the direct cause of their extinction remains uncertain.

Keywords: Triassic, Radiolaria, Meteorite impact, Volcanism, Chert

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-07 Room:101A Time:May 19 12:30-12:44

Stem evolution and Crown evolution; Role of atomic bomb magma

Shigenori Maruyama[1*], Toshikazu Ebisuzaki[2]

[1]Earth-Life Science Insitute, Tokyo Institute of Technology, [2]RIKEN

When we see the history of life and its evolution, there are some points to focus as follows. (A) Paleogeographic constraints on the birth of metazoan which occurred on a rift system back to 750 Ma after the Sturtian Snowball Earth and before Marinoan Snowball Earth. (B) Metazoans evolved in the South China block that was isolated in paleo-Pacific Ocean. (C) Rapidly diversified animals suddenly evolved in a rift system on the Gondwana margin. These three-step evolutions can be related to:(1) stem evolution in a rift system within supercontinent Rodinia (ca. 750Ma), (2) migration in a Paleo-Pacific Ocean during Ediacaran radiation (635-560Ma) and (3) crown evolution to diversify the life forms into 35 phyla of metazoans after the collision-amalgamation docking with Gondwana by 540Ma.

For evolution of life, supply of nutrients is necessary. There are 3 kinds of rock types which can be candidates as source of nutrients, e.g. granite, anorthosite (KREEP) and carbonatite. Among them, carbonatite plays unique role, functioning like atomic bomb magma to cause local mass extinction, and resultant promotion of genome mutation by internal radiation through food chains.

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P01 Room:Convention Hall Time:May 19 18:15-19:30

Intensive continental weathering rate in the Lower Cambrian: evidenced from Sr isotope ratios preserved in the strata at

Yusuke Sawaki[1*], Tsuyoshi Komiya[2], Shigenori Maruyama[1]

[1]Tokyo Tech, [2]The University of Tokyo

One of the most important times in biological evolution was from the first appearance of soft-bodied animals and possibly Metazoan animals in the late Neoproterozoic to the sudden diversification of animals with mineralized skeletons in the Cambrian. Neoproterozoic to Cambrian fossiliferous succession is well exposed in South China (e.g., Luo et al., 1984); it has been much investigated using biostratigraphy, sequence stratigraphy and chemostratigraphy (e.g. Condon et al., 2005; Zhou and Xiao, 2007; Zhu et al., 2007). We carried out on-land drilling of the Ediacaran to Cambrian sedimentary succession in Three Gorges, South China. The drill-sampling allows us to minimize the effect of secondary alteration and oxidation on the surface and to make a very continuous chemostratigraphy at intervals of centimeters. Now, members of our group at Tokyo Tech and the Univ. of Tokyo have analyzed several kinds of isotope ratios to estimate paleo-environment; including carbon, oxygen, nitrogen and strontium isotope ratios.

The weathering influx from continents is thought to be a major influence on the change in composition of ancient seawater and on biological evolution. Its flux can be estimated from the 87Sr/86Sr ratio of carbonate rocks. We present a new detailed chemostratigraphy of 87Sr/86Sr in the Three Gorges region in South China. The result shows that 87Sr/86Sr ratios had decreased from ca. 0.709 around the Precambrian/Cambrian boundary to ca. 0.7085 at the Atdabanian stage. Subsequently, 87Sr/86Sr ratios recovered to ca. 0.709 at the end of Early Cambrian. We calculated secular variation of weathering flux using the analyzed data, suggesting intensive continental weathering rate in the Lower Cambrian.

Keywords: 87Sr/86Sr, continental weathering, Early Cambrian, Three Gorges, drill-core

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P02 Room:Convention Hall Time:May 19 18:15-19:30

Platinum group element anomalies in the Triassic-Jurassic deep-sea sediments

Wataru Fujisaki[1*], Yusuke SAWAKI[1], Shinji YAMAMOTO[2], Tetsuya YOKOYAMA[1], Shigenori MARUYAMA[1]

[1]Department of Earth and Planetary Sciences, Tokyo Institute of Technology, [2]Department of Earth Science and Astronomy, University of Tokyo

One of the biggest mass extinctions in the Phanerozoic occurred at the Triassic-Jurassic (T-J) boundary (e.g., Sepkoski, 1984). The large magmatic activity associated with the breakup of Pangaea and the initial stage of rifting in the Central Atlantic Magmatic Province (CAMP) are characteristic across the T-J boundary (McHone, 2000; Nomada, 2007). So, these magmatic activities likely changed the climate and caused biotic crisis at the T-J boundary (e.g., Deenen et al., 2010). On the other hand, Olsen and others (2002) suggested that bolide impact triggered the climatic change and mass extinction, based on an Ir anomaly preserved in the Newark rift basin. In addition, it is also proposed that the encounter with dark clouds and supernova explosion caused extreme environmental change on the earth surface (the mass extinction and glaciation; Kataoka at el., 2012). However, the possibilities of these hypotheses remain controversial because of insufficient geological evidence.

In this research, we present secular variation of platinum group elements (PGEs) concentration in the Triassic-Jurassic succession in Inuyama, central Japan. Previous Ir anomalies have been reported from sediments with high sedimentation rate, around the T-J boundary (Olsen et al., 2002; Hori et al., 2007). However, sediments with low sedimentation rate are suitable for the PGEs analyses. In the Inuyama, the depositional rate of the shale part in bedded chert is about one to two orders slower than those of the chert (Hori et al., 1993). Therefore, the best target for the PGEs analyses is the shale part in bedded chert preserved in the accretionary complex.

We conducted geological survey at the Inuyama section, because of good exposure of the T-J boundary. We developed detailed geological map of the study area and collected rock samples bed-by-bed to determine the secular variation of PGEs concentrations. In particular, we collected about 250 samples from shale part in the bedded chert and analyzed the PGEs concentrations of 20 shale samples across the T-J boundary. For whole-rock analyses of PGEs, all shale samples were powdered in an Alumina planetary mill. After chemical separation from coexisting matrix elements using a chromatographic technique, PGEs concentrations were analyzed by coupled plasma mass spectrometry (ICP-MS) at Tokyo Institute of Technology. The PGEs concentrations were determined by isotopic dilution method. The results show that Ir concentration reach ca. 1 ppb just above the T-J boundary. As compared to the previous works (Olsen et al., 2002; Hori et al., 2007), the Ir anomaly is the highest across the T-J boundary and attributes to the difference of their depositional rate and/or sampling resolution. Olsen and others (2002) suggested the possibility of volcanic or impact events for origin of the Ir anomaly. The Ir anomaly in this research also may be associated with impact event, despite the lack of shocked quartz and other index of impact origin (e.g., Grieve et al., 1996). In order to recognize the correlation between PGEs concentrations and CAMP, we need additional stratigraphic and isotopic analyses.

In this presentation, we would like to discuss the origin of the Ir anomaly and its relation to evolution of life.

Reference

Deenen, M. H. L. (2010). Earth and Planetary Science Letters, 5, 291, pp. 113-125.
Grieve, R. A. F. (1996). 2, Significance in geoscience: Meteoritics, 31, pp. 6?35.
Hori, R. (1993). Island Arc, 3, pp. 170-180.
Hori, R. (2007). Palaeogeography, Palaeoclimatology, Palaeoecology, 5, 244, pp. 391-406.
Kataoka, R. (2012). New Astronomy, 21, pp. 50-62.
McHone, J. G. (2000). Tectonophysics, 5, 316, pp. 287?296.
Nomade, S. (2007). Palaeogeography, Palaeoclimatology, Palaeoecology, 5, 244, pp. 326-344.
Olsen, P. (2002). The Geological Society of America Special Paper, pp. 505-522.
Sepkoski, J. J. (1984). Paleobiology, 10, pp. 246-267.

Keywords: the Triassic-Jurassic boundary, deep-sea sediments, platinum group elements

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P03 Room:Convention Hall Time:May 19 18:15-19:30

Detection of cosmogenic material in deep-sea sediments based on platinum group element (PGE) abundances

Hisashi Asanuma[1*], Wataru Fujisaki[1], Yusuke Sawaki[1], Shigenori Maruyama[1]

[1]Tokyo Institute of Technology

Snowball Earth events are widely recognized to have occurred in both the Palaeoproterozoic and Neoproterozoic. All present-day animal phyla appeared following the Marinoan-Snowball Earth, which is the last recorded global glaciation. The primary objective of this research is to determine the cause of this Snowball-Earth event, which is likely associated with the evolution of life. Three models that attempt to explain the onset and termination of Snowball-Earth events are: (1) episodic decrease of greenhouse gases, (2) changes of the albedo of the Earth accompanied by the arrangement of the continents, and (3) an increase in cosmic-ray bombardment to the Earth due to Starbursts in the Milky Way Galaxy or transects of Earth through nebula.

Based on recent investigations, the effects of cosmic fluxes on the Earth are estimated here through the measurement of the abundances of platinum group elements (PGE) in sediments.

Pelagic sediments composed of interlayered shale and/or mudstones are optimal for PGE-abundance analysis because of their low sedimentation rate. Pelagic sediments used for PGE-abundance analysis in this investigation are comprised of bedded shales and/or mudstones sampled from the accretionary complex of Anglesy-Llyen, U.K. The Anglesy-Llyen reportedly was formed by an accretionary orogeny in the Neoproterozoic. During the geological survey, samples were acquired from a pelagic sedimentary sequence, which records late Cryogenian to early Cambrian sedimentation. A relatively high PGE concentration and its flat C1-normalized PGE pattern indicate possible high cosmic fluxes on the Earth during the emplacement of this sequence when compared to average upper continental crust composition.

Keywords: PGEs, deep-sea sediment, Cambrian

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P04 Room:Convention Hall Time:May 19 18:15-19:30

High-resolution litho- and chemo- stratigraphy across the Middle-Late Permian boundary in the mid-oceanic limestone

Daisuke Kofukuda[1*], ISOZAKI, Yukio[1], IGO, Hisayoshi[2], KANI, Tomomi[3], ISHIMURA, Toyoho[4]

[1]The University of Tokyo, Komaba, [2]Insititute of Natural History, [3]Kumamoto University, [4]AIST

The extinction around the Guadalupian-Lopingian boundary (G-LB) recorded the first major biodiversity drop during the Permian. In order to clarify the relevant global environmental changes immediately before the G-LB, high-resolution chemostratigraphy of $^{87}Sr/^{86}Sr$ and $d^{13}C_{carb}$ was analyzed for the Middle Permian paleo-atoll limestone at Akasaka and Ishiyama in central Japan.

Both limestones were derived from a paleo-atoll complex deposited primarily in the low latitude a mid-Panthalassa. At both sections, the Middle Permian black limestone is overlain by the Upper Permian light gray limestone. An interval of white-black striped limestone occurs between the two, and its top marks the G-LB horizon. Fusuline biostratigraphy indicates that the black limestone belongs to the Yabeina Zone (Capitanian; late Guadalupian), whereas the light gray limestone to the Codonofusiella-Reichelina Zone (Wuchiapingian; early Lopingian). The ”barren interval” between them is divided into the lower 1) black limestone, and the upper 2) striped limestone without smaller foraminifer and gastropod.

The lithofacies of the black limestone and of the striped limestone indicates that the depositional setting was subtidal zone and intertidal zone, respectively.

At the Akasaka Limestone, a very thin ($<$5 mm-thick) light greenish non-carbonate layer occurs between the striped limestone and the light gray limestone, which was once reported as a felsic tuff. This layer is enriched in elements such as Al, Fe, K and Cr. The source was not yet identified, however, this layer is possibly correlated with the Wangpo Bed, i.e., the G-LB marker in South China.

This study confirms that $^{87}Sr/^{86}Sr$ ratios stayed extremely low around 0.7068 throughout the Capitanian and increased rapidly to 0.7074 at the G-LB, and that the ”Permian minimium” has persisted throughout the entire Capitanian for more than 5 million years. The $d^{13}C_{carb}$ values stayed extremely high, +6 permil, throughout the Capitanian, and dropped to +2 permil at the G-LB. This records, no doubt, the Capitanian Kamura event of the very high primary productivity of surface ocean. These isotope profiles are correlated well with those of the coeval Iwato Formation in Kyushu, thus likely reflecting the general trend of the low latitude mid-superocean seawater.

The change in lithofacies towards the G-LB recorded that the depositional setting reached the shallowest during the deposition of striped limestone. This implies that sea level became shallower towards the G-L boundary. In accordance with the lowest sea level around the G-L boundary, this may suggest that global cooling has appeared immediately before the G-L boundary and possibly caused the end-Capitanian extinction.

Keywords: G-L boundary, Akasaka Limestone, Ishiyama Limestone, carbon isotope, strontium isotope

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P05 Room:Convention Hall Time:May 19 18:15-19:30

Litho-, bio-, and C, Sr isotope stratigraphy of the Middle Permian mid-Panthalassan paleo-atoll carbonates

Takahiro Nishida[1*], Yukio Isozaki[1], Tomomi Kani[2], Atsushi Suzuki[3], Toyoho Ishimura[3]

[1]Department of Earth Science & Astronomy, The University of Tokyo, [2]Faculty of Science, Kumamoto University, [3]AIST Geological Survey of Japan

The Wordian-Capitanian (Middle-Upper Guadalupian, Permian) Iwato Formation in East Kyushu is composed of shallow marine carbonates in an accreted paleo-atoll complex primarily developed on a paleo-seamount in the low-latitude doamin (12 degree S) of mid-Panthalassa. By analyzing the Wordian interval, we could newly reconstruct a continuous C-isotope profile of the upper half of Guadalupian, and discuss the environmental changes in the low-latitude mid-superocean. We confirmed that the high C isotope interval ($>$ 5 permil) had started already in the Wordian. The onset of the Kamura cooling event likely started much earlier than previously believed, and affected the diversity of the Guadalupian biota.

Keywords: Permian, Iwato Formation, paleo-seamount, Panthalassa, Kamura event, fusuline

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P06 Room:Convention Hall Time:May 19 18:15-19:30

Detailed stratigraphy of the uppermost Iwaizaki limestone (Middle Permian) in the South Kitakami beltin

Ryutaro Hayashi[1*], Yukio Isozaki[1]

[1]Department of Earth Science & Astronomy, The University of Tokyo

The Permian Iwaizaki Limestone in the South Kitakami belt represents a shallow marine carbonates of continental shelf facies. The previous fusuline stratigraphic researches clarified that the upper half of the limestone belongs to Capitanian (Upper Guadalupian, Middle Permian). Nonetheless the topmost ca. 30 m-thick interval was not well analyzed in lithology and age. Here we report new detailed lithostratigraphy of this interval and discuss the environmental changes near the extinction horizon of the large-tested Capitanian fusulines dominated by Lepidolina multiseptata.

Keywords: Permian, Iwaizaki limestone, South Kitakami belt, fusuline, mollusc, Capitanian

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

BPT27-P07 Room:Convention Hall Time:May 19 18:15-19:30

Paleogeographic position of the Permian Iwaizaki limestone in South Kitakami belt

Yukio Isozaki[1*], Ryutaro Hayashi[1]

[1]Department of Earth Science & Astronomy, The University of Tokyo

The Gudalupian (Middle Permian) Iwaizaki limestone in the South Kitakami belt, NE Japan, represents an isolated block of ancient continental margin that features non-metamorphosed Lower Paleozoic to Mesozoic shallow marine sequences. We detected for the first time a bivalve assemblage that features alatoconchidae from the upper part of the Iwaizaki limestone. According to the 10 previous reports from the world, the occurrence of alatoconchidae is strictly limited to low-latitude, i.e. paleo-equatorial domains. Their unique habitat in shallow warm-water, oligotrophic setting was likely related to photosymbiosis. Together with large-tested fusuline (e.g., Lepidolina) and rogose coral, the Capitanian tropical trio from Iwaizaki positively indicates the intimate connection between South Kitakami belt and South China during the Permian. This further suggests that the eastern extension of South China continues all the way through the main pat of Japan up to NE Japan, and that the South Kitakami belt represents its eastern extremity ever confirmed.

Keywords: Permian, paleogeography, South Kitakami belt, Panthalassa, South China, Guadalupian