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

BPT27-01 Room:101A Time:May 25 13:45-14:00

Review of fossil chelonioid sea turtles (Class Reptilia: Order Testudines: Chelonioidea) from Japan

HIRAYAMA, Ren[1*]

[1]SILS, Waseda University

Chelonioidea is the group of marine turtles appeared in the Early Cretaceous, about 110 m.y.a. Their limbs are modified as paddles for swimming, and lachrymal glands are enlarged for excluding salt. Diversified chelonioids from Japan are allocated into three families, Cheloniidae, Dermochelyidae and extinct Protostegidae.

Upper Cretaceous Yezo Supergroup of Hokkaido Prefecture, northern Japan, including Middle and Yezo Groups, and Hakobuchi Group, has been yielding more than 100 specimens of chelonioid sea turtles. Most specimens are fragmentary and contained in the calcareous concretions weathered out from sediments, although they are well preserved uncrushed bones after acid preparation. Desmatochelys lowii is a protostegid from the Middle Turonian of Yubari, including skull, lower jaw, and limb bones of one individual as estimated with 1 m long carapace. This represents the oldest known chelonioid in Japan. Partial shells of the genus Protostega, advanced large protostegid, are found from the Coniacian of Yubari and the Santonian of Mikasa. Mesodermochelys sp., a primitive dermochelyid with carapace less than 1 m long, is the most dominant sea turtles in the Santonian of Hokkaido Prefecture. Scute was already lost in Mesodermochelys sp. Undescribed small protostegid with about 60 cm long carapace is also known from the Santonian, characterized by keeled neurals and retention of scute. Mesodermochelys undulatus was an almost exclusive chelonioid species from the Campanian to the Early Maastrichtian of Japan. M. undulatus has more massive peripherals and pelvic girdle, and its carapace is reaching up to 1.5 m long. This species is particularly abundant in the Maastrichtian Hakobuchi Group of Hobetsu area of Mukawa-cho of Hokkaido Prefecture. M. undulatus is also known from the Late Campanian to Early Maastrichtian Izumi Group of Hyogo and Kagawa Prefectures, western Japan. An isolated humerus is about 50 cm long, suggesting an individual with almost 2 m long carapace.

The Late Cretaceous chelonioids of Japan show the following history:

1: Protostegids were dominant during the Turonian and Coniacian.

2: Primitive dermochelyid, Mesodermochelys sp., appeared and became dominant in the Santonian.

3: Larger dermochelyid, M. undulatus, was almost exclusive sea turtles during the Campanian and Maastrichtian. Several turtle egg shells have been collected from the Turonian to Santonian marine deposits of Hokkaido Prefecture. They might be derived from protostegids based on temporal distribution of turtles.

Dermochelyid dominant assemblage of Japan was unique, different from those of North America and Western Europe with Cheloniidae dominant assemblage. Such provincialism among chelonioids are quite distinct from the cosmopolitan geographical distribution of marine turtles after K-T boundary. Such difference might be related with changing pattern of marine currents affected by the continental drift.

Early Oligocene undescribed cheloniids with 30 cm long carapace from Saga Prefecture, western Japan, are the earliest occurrence of Cenozoic chelonioids in Japan. Syllomus aegyptiacus, an aberrant cheloniid with about 50 cm long carapace, is the most abundant Neogene chelonioids; more than 60 specimens, including skulls, have been collected from the Miocene sediments of Toyama, Gunma, Saitama, and Chiba Prefectures. This species was cosmopolitan in geographical distribution, known from Egypt, USA, and Italy. Procolpochelys susaensis, another cheloniid, from the early Middle Miocene of Yamaguchi Prefecture, western Japan, is characterized by fifth vertebral overlying the seventh costals and neural. Right scapula of dermochelyid Psephophorus is known from the Pliocene of Hokkaido Prefecture.

Fossil sea turtles of Japan would be important materials for understanding paleobiogeography and paleoenvironments of marine ecosystem.

Keywords: Mesozoic and Cenozoic, turtles, Chelonioidea, organic diversification, paleogeography, oceanic environment

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

BPT27-02 Room:101A Time:May 25 14:00-14:15

Mammalian Fauna and its paleoenvironments of the Late Miocene Samburu Hills and Nakali, Rift Valley, Kenya

NAKAYA, Hideo[1*], Mayu Onodera[1], YAMADA, Eisuke[1], KUNIMATSU, Yutaka[2], NAKATSUKASA, Masato[2], SAKAI, Tetsuya[3]

[1]Dept. Earth & Environmental Sci., Graduate Sch. Sci. & Engineer., Kagoshima University, [2]Lab. Physical Anthropology, Graduate Sch. Sci., Kyoto University, [3]Dept. Geoscience, Inter. Fac. Sci. & Engineer., Shimane University

Rich and various mammalian fossils including hominoids were found from the Late Miocene Namurungule (Samburu Hills) and Nakali Formation. The ages of Namurungule Formation have been dated as 9.6 Ma. and the Nakali Formation have been dated as 9.8 to 9.9 Ma. Only three early Late Miocene hominoids sites are known in East Africa: Samburu Hills, Nakali, and Chorora (10 to 11 Ma). The mammalian assssemblage from the Namurungule Formation bears a close resemblance to that from the Nakali Formation. We analyzed mesowear of Hipparion and bovids teeth from both formations to evaluate their diets and compare paleoenvironments at these sites. Furthermore, we described rodents from the Nakali Formation.

Data from mesowear analysis indicate that *Hipparion* and bovids from the Nakali Formation were mixed-feeder whereas *Hipparion* and bovids from the Namurungule Formation were grazer and mixed-feeder, respectively. Comparison of the rodents from the Nakali Formation with phylogenetically close or morphologically resembling extant rodents suggested that habitat of fossil rodents was woodland and waterland under seasonal climate in highland.

These contrasting paleoenvironments may reflect an altitudinal difference (highland Nakali vs. lowland Namurungule), not necessarily an environmental change through a narrow age gap in the early Late Miocene between these sites. This interpretation is supported from the evaporite of the Aka Aiteputh Formation (15 Ma) overlain by the Namurungule Formation. Arid climate probably continued through the Middle Miocene to the Late Miocne in the Samburu Hills. Our paleoenvironmental reconstruction delivers an explanation for the richness and the paucity of primate fauna in Nakali and Namurungule, respectively.

The following conclusions are reached: The paleoenvironment of the Nakali Formation may have been a woodland under seasonal climate while that of the Namurungule Formation may have been an openland under arid climate. This environmental difference between the Nakali and Namurungule Formations is also supported by stable isotope analysis, pollen analysis, and sedimentological analysis.

Keywords: Late Miocene, Kenya, Mammal, Paleoenvironments, Fauna, Human evolution

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

BPT27-03 Room:101A Time:May 25 14:15-14:30

Phylogenetic analysis of all living leporid genera based on the morphology of skull, jaw, and dentition

TOMIDA, Yukimitsu[1*], Tomoyuki Ohashi[2], Changzhu Jin[3]

[1]National Mus. Nature & Science, Japan, [2]Kitakyushu Mus. Nat. Hist. & Human Hist., [3]Inst. Vert. Paleont. Paleoanthrop., CAS

Extant family Leporidae is a relatively small group, consisting of 11 genera, which are rather homogenous in general morphology. Supra-generic and phylogenetic classification of the family has been based mainly on dental (particularly p3) morphology. Molecular cladistic studies that became common during 1990's have been applied on leporids also, and a phylogenetic study based on multiple molecular data of nuclear and mitochondodria was published by Matthee et al. in 2004. But, their result was nearly totally different from the previous one based mainly on the dental morphology.

We started in 2004 and have continued a cladistic phylogenetic analysis of all living genera of the family Leporidae, based on the morphology of the skull, jaw, and dentition, which are applicable on fossils, assuming that extinct genera should be included as much as possible in the future. Extant 11 genera of the family (*Pronolagus* includes 2 different species) and *Ochotona* as an outgroup (13 taxa in total) were analyzed with 47 (25 clanial, 7 mandibular, and 15 dental) characters. Cladistic analysis of those data by PAUP 4 provides 10 most parsimonious trees (MPT) by branch and bound search, and the strict and 50 % majority consensus trees were obtained from them. These trees are quite different from Matthee et al. (2004) and also differ in some part from the one based mainly on the dental morphology.

On 50 % majority consensus tree, the basal tree pattern is relatively conformable with place of origin and distributional diffusion. *Caprolagus* and *Poelagus* consist of a monophyletic group, and *Pentalagus* locates next to them as their sister group. *Poelagus* was originally described as a subgenus of *Caprolagus*, and our result shows their close relationships. Excluding these 3 genera and *Nesolagus* whose distribution is restricted in Asia, the other 7 genera consist of a monophyletic group. Among them, *Romerolagus* and *Brachylagus* are restricted in North America in distribution and have been thought to be primitive, which is conformable with our result. *Lepus*, *Sylvilagus*, and *Oryctolagus* have been considered to have close a relationship to each other, and this relationship is also supported by our result. *Bunolagus* and *Pronolagu* consist of a monophyletic group, and this point is conformable with their close relationship traditionally thought. But, the point where both genera thought to be closely related to *Pentalagus* because of having 5 reentrant angles on p3 does not agree with our result. It is suggested that this character may be obtained independently from *Pentalagus*.

Kriegs et al. (2010) recently analyzed phylogenetic relationships of some leporid genera based on retroposon insertions. Although number of genera included is limited, they demonstrated that *Lepu* branched off at last. This clearly differs from the results by Matthee et al. (2004) and might support our results. Their paper can be highly evaluated in that they showed the molecular phylogeny by Matthee et al. may not be a "winning hit", and it can be expected that phylogenetic estimations by molecules and by morphology will be conformable in the future.

Keywords: phylogeny, cladistic analysis, Leporidae, skull, dentition

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

BPT27-04 Room:101A Time:May 25 14:30-14:45

Evolutionary history of macaques in East Asia: internal cranial morphology and its phylogenetic significance

ITO, Tsuyoshi[1*], NISHIMURA, Takeshi[1], TAKAI, Masanaru[1]

[1]Primate Research Institute, Kyoto University

Macaca is one of the most successful genera of nonhuman primates. Macaques are usually classified into four species groups. The *fascicularis* and *sinica* groups are distributed widely from tropical to temperate zones in Asia; the former is more widely distributed in higher-latitude regions than the latter. The phylogenetic relationship of northern Chinese fossil species, *M. anderssoni* (Early Pleistocene, Mianchi), to living species is one of the key issues for interpreting paleobiogeographic events, but there is still controversial about whether *M. anderssoni* is phylogenetically related to the *sinica* group or the *fascicularis* group. The present study evaluated phylogenetic values of internal cranial variations in macaques to reappraise the phylogenetic position of *M. anderssoni*. Results indicated that nasal cavity shape well reflects phylogenetic relationships rather than environmental influences. Parsimonious reconstruction indicated that pear-shaped nasal cavity shown in members of the *sinica* group is derived condition among macaques. *M. anderssoni* shares pear-shaped nasal cavity with some living species of the *sinica* group, suggesting their phylogenetic closeness. The results of this work indicate that population of the *sinica* group was widely distributed in northern China during the Early to Middle Pleistocene, but they retreated southward into southern China and Indochina. On the other hand, the *fascicularis* group dispersed from Southeast Asia to East Asia since the Middle Pleistocene and acquired wide distribution in high latitude regions. Thus, in East Asia, the *sinica* group was replaced by the latecomer, the *fascicularis* group, probably due to the deterioration of climate during the Late Pleistocene.

Keywords: Pleistocene, Paleobiogeography, Nasal cavity, Maxillary sinus, Computed tomography, *Macaca anderssoni*

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

BPT27-05 Room:101A Time:May 25 14:45-15:00

Evolutionary history of Rhinopithecus (snub-nosed monkey) in East Asia

TAKAI, Masanaru[1*], Chun-Hsiang Chang[2]

[1]Primate Research Institute, Kyoto University, [2]National Museum of Natural Science, Taiwan

Rhinopithecus, snub-nosed monkey or golden monkey, is a relatively large, folivorous monkeys that are vicariantly distributed from southern China to Southeast Asia at present. It is usually classified into four species, all of which are now on the merge of extinction. However, the fossil record of the genus is relatively rich: many fossil specimens have been reported from the early to late Pleistocene sediments of China, suggesting their wide distribution during the Pleistocene in East Asia. Recently we reported *Rhinopithecus* fossils from the early/middle Pleistocene of Chochen locality, southern Taiwan, where only macaque monkey, *Macaca cyclopis*, now occur. In Taiwan *Rhinopithecus* presumably became extinct in the late Pleistocene, probably owing to global cooling and vegetation change, whereas macaques, which is of almost the same body size as *Rhinopithecus*, survived to the present. The contrasting history of survival between the two kinds of monkeys may be due to ecological/behavioral differences between them or as a result of accidental events that occurred in the Pleistocene of Taiwan.

Keywords: Rhinopithecus, Taiwan, evolutionary history, Pleistocene, fossil

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

BPT27-06 Room:101A Time:May 25 15:00-15:15

A review of early Pleistocene Gigantopithecus fauna from south China

JIN, Changzhu[1]*

[1]Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences

Among the most important Quaternary mammalian faunas, the *Gigantopithecus blacki* fauna from south China has received a good deal of attention. As the largest primate fossil all over the world, *G. blacki* was firstly found from a Chinese traditional medicine store in Hongkong and named by the Dutch paleontologist Von Koenigswald in 1935.

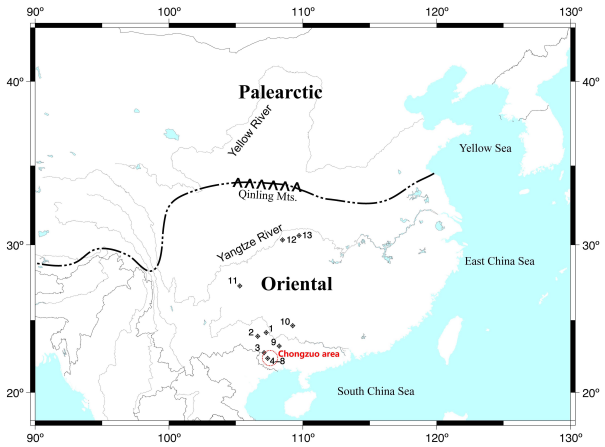
Twenty years later (1956), Pei WZ with his team firstly discovered the *G. blacki* and associated mammalian fossils with reliable geological horizon in Quaternary cave sediments in Daxin, Guangxi Province, south China. Since then, there have been at least 13 Pleistocene *G. blacki* localities discovered across 5 provinces in south China. The *G. blacki* fossils all come from the Karst cave deposits well developing in the south China bare calcareous Karst rocks and locate in the Oriental (Fig. 1).

The Karst caves nearby Chongzuo area in Guangxi, south China, contain a plethora of Quaternary mammalian remains, especially the conspicuous fossils of *G. blacki* and Hominoid. During the past few years' excavations in this area, six new *Gigantopithecus* layers belonging to different ages of Quaternary have been found. The six newly discovered *Gigantopithecus* cave sites (viz. Baikong Cave, Boyue Cave, Sanhe Cave, Queque Cave, Hejiang Cave, and Shuangtan Cave) all distribute in or nearby the Chongzuo Eco-Park, which belongs to the north tropical zone.

In this area, six vertical horizons of caves have been recognized. The sediments of the karst caves of the fifth horizon with an elevation of about 200 m above sea level yield the early Pleistocene *Gigantopithecus* fossils (e.g. Baikong Cave, Boyue Cave, Sanhe Cave and Queque Cave). Meanwhile, middle Pleistocene *Gigantopithecus* fossils have mainly been discovered from caves in the fourth layer (e.g. Hejiang Cave), which is about 180 m ASL.

Here, I report the 4 newly discovered *Gigantopithecus* cave sites in Chongzuo during the past few years' excavations: viz. Baikong Cave, Boyue Cave, Sanhe Cave and Queque Cave, belonging to the different ages of early Pleistocene. Also, the characteristics, distribution, sequence and the evolutionary stages of the early Pleistocene *Gigantopithecus* fauna will be discussed based on the newly discovered fossil materials and the chronological data.

Keywords: Gigantopithecus fauna, South China, Karst caves, Early Pleistocene, Gigantopithecus blacki, sequence and evolution stages



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

BPT27-P01 Room:Convention Hall Time:May 25 15:30-17:00

Taphonomy and geology of dinosaur fossil localities in the Gobi desert, Mongolia

WATABE, Mahito[1*], Tsogtbaatar, Kh.[2], Chinzorig, Ts.[2]

[1]Hayashibara Institute for Paleobiological Research, [2]Mongolian Paleontological Center

Many dinosaur fossil localities of Mesozoic age are distributed in the Gobi desert, Mongolia. The geologic age of these localities is mainly late Cretaceous, however, there are those with early Cretaceous and late Jurassic age. The sedimentological environments of these localities have been clearly understood by joint expeditions between Mongolia and Japan, or with U.S. In addition to the results, taphonomy of those localities and dinosaurs there has also been understood. The localities are all continental. The upper Cretaceous is of mainly fluvial and partially alluvial origin. In Campanian period, the wide distribution of eolian beds with dinosaur fossils, by development of arid environments is observed. Those two different environments existed in the same time. From those coexisting fluvial and eolian beds, mass burial sites of dinosaurs were found.This mass burial events are occurred in sandstorm in the eolian condition, and in flood and mud-trap in the fluvial. The eolian beds yield lizard, turtle, and Mesozoic mammals, bird, and dinosaur footprints. In the terminal Cretaceous, the eolian environments became minor, and fluvial environments were widely distributed. From the fluvial beds, mainly flood plain and channel deposits, isolated and partially articulated dinosaur bones, turtle, lizard, crocodiles, fish, and pterosaur are found. The footprints of dinosaurs are preserved on the food plain deposits. In early Cretaceous, fluvial and lacustrine environments are dominant. The former yields rich dinosaur fossils, and the latter rich plant and insect fossils, together with bird feathers. The oldest dinosaur bearing beds, the upper Jurassic, deposited in fluvial condition, yields sauropod dinosaur, crocodiles, and synapsid reptile. The reconstruction of sedimentary environments of those localities in the Gobi desert provides important information for understanding of ecology, behavior, habitat, and kinetics of dinosaurs. For this, taphonomy of those fossils should be correctly interpreted.

Keywords: dinosaur, Mongolia, Mesozoic, taphonomy

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

BPT27-P02 Room:Convention Hall Time:May 25 15:30-17:00

The trionychian turtles from the Middle Miocene to Lower Pleistocene in Myanmar and its paleobiogeographic implications

SONODA, Teppei[1*], HIRAYAMA, Ren[2], TAKAI, Masanaru[3], Thaung-Htike[4], Zin-Maung-Maung-Thein[5], ANDO, Hisao[1]

[1]Ibaraki University, [2]Waseda University, [3]Kyoto University, [4]Shwebo University, [5]Mandaley University

The Irrawaddy Group, the latest Middle Miocene to Early Pleistocene fluvial sediments widely distributed in central Myanmar, yields a number of terrestrial vertebrate fossils such as mammals and turtles. A nearly complete carapace of large Trionychidae and three peripherals of Carettochelyidae were newly discovered from the Gwebin and Magwe areas.

The nearly complete carapace of the Trionychidae is 60cm long and wide, suggesting its total shell length as about 90cm long when living. Trionychid synapomorphies such as losses of scute sulcus, peripherals, pygal and suprapygals, and well-developed pocked mark sculptures on the dorsal surface, are observable. The nuchal is much wider than long, with a nearly straight anterior margin. Its distal ends bend toward latero-posteriorly, nearly attaching to the distal parts of the first costals. The first neural is elongated and hexagonal, with curved anterior border with nuchal. The first and second costals have distinct rib ridges on the proximal ventral surface. Ventral surfaces of the first to third thoracic vertebrae are flat, without median ridges. These characters are shared by the genus Chitra, and are quite similar to Chitra chitra that is distributed in Thailand and Malaysia. However, this specimen has a few unique characters such as a sinuous margin at the distal end of the second costals and the well developed eighth costal.

The left first, second and the right ninth peripherals can be determined as a turtle of the family Carettochelyidae based on the distinct sculpture on their surfaces, consisting of fine tubercles. There is no sulcus on their surfaces. Carapace is estimated as about 70cm long at maximum. These specimens are the first record of carettochelyids from the Neogene in Asia. Carettochelyids first appeared during Albian in Asia, and extended its geographical distribution to North America, Europe and Africa during Paleogene. However, their fossil records are very sparse in Neogene. Only two peripherals are known from the Miocene sediments of Germany and Zaire.

All specimens except for the left second peripheral have yielded from the upper Pliocene in the Gwebin area. The Pliocene carettochelyid from Myanmar are the latest known record of this family except for a living species (Carettochelys insculpta) in New Guinea and Northern Australia. They seem extinct during Pleistocene as well as pleurodilan turtles such as Shweboemys pilgrimii. Fossil turtles from Myanmar should be important to make a contribution to the paleobiogeographic history of tropical Asia.

Keywords: Myanmar, Cenozoic, Irrawaddy Group, Fossil turtles, Trionychia

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

BPT27-P03 Room:Convention Hall Time:May 25 15:30-17:00

Rodents from the upper Miocene to the lower Pleistocene of central Myanmar

NISHIOKA, Yuichiro[1*], TAKAI, Masanaru[1], Thaung-Htike[2], Zin-Maung-Maung-Thein[3], Maung-Maung[4]

[1]Primate Research Institute, Kyoto Univ., [2]Shwebo Univ., [3]Mandalay Univ., [4]Magwey Univ.

Here we report some rodent fossils (Hystricidae, Spalacidae, and Muridae) were newly discovered from the upper Miocene to the lower Pleistocene Irrawaddy sediments of central Myanmar.

All fossils of Hystricidae was identified as *Hystrix*, including two species, *Hystrix paukensis* and *Hy*. cf. *brachyura*. The former was continuously occurred from the upper Miocene to lower Pleistocene, while the latter was found only from the upper Pliocene to the lower Pleistocene. The comparisons of cheek teeth indicates *Hy*. *paukensis* has much larger and lower teeth than *Hy*. cf. *brachyura*. The occurrence of *Hy*. cf. *brachyura* from the Irrawaddy sediments indicates the lineage of *Hy*. *brachyura* likely appeared in Inland Southeast Asia as early as the late Pliocene.

The fossils of Spalacidae includes an indeterminate species, but it is surely assigned to Rhizomyinae represented by *Rhizomys* and *Cannomys*, both presently exist in central Myanmar. Rhizomyinae is known from the lower Miocene of Asia. Here, we compare the fossils from the Irrawaddy with ancestral genera such as *Kanisamys* and *Brachyrhizomys* from the middle Miocene Siwaliks in Indo-Pakistan and *Rhizomys* from the Plio/Pleistocene of China.

The fossils of Muridae include at least four species, a large-, two medium-, and a small-sized forms. The large one is reffered to *Hapalomys* that is a common arboreal rat presently exist in Southeast Asia. The specimens from the Irrawaddy sediments are similar to *Ha*. *longicaudatus* presently lives in a southern part of Myanmar, but there are slight differences between them in the occlusal pattern of the first lower molar. One of the medium species is reffered to cf. *Ratchaburimys* that is an extinct genus occurred from the upper Pliocene to the lower Pleistocene of Thailand. Thus, the rodent assemblage during Plio/Pleistocene from Myanmar is correlated with that from Thailand. Another medium-sized and small-sized murids are now in identification.

Keywords: Rodentia, Myanmar, Neogene, Paleontology

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

BPT27-P04 Room:Convention Hall Time:May 25 15:30-17:00

Effects of dietary difference in sympatric environment on mesowear analysis

YAMADA, Eisuke[1*], NAKAYA, Hideo[1]

[1]Dept. Earth & Environ. Sci., Kagoshima U

Mesowear analysis is one of the methods for reconstructing diets based on facet development on the occlusal surface of cheek teeth. It has been applied mainly to reconstruct the food habit of extinct species and paleoenvironments they live in. However, there was little knowledge about the effect of paleodiet difference in sympatric environment. This limitation cause troublesome when apply this method to fossil assemblage. The aim of this study was to determine the sensitivity of mesowear analysis.

Intraspecific comparison was conducted by using the wild population of sika deer (*Cervus nippon*) in the Kinkazan Island, northern Japan. Then, there were significant differences between the sex (Fisher's exact test (FET): $P < 0.05$) and hierarchical cluster analysis (HCA) with other the reference data classified doe deer into mixed feeders and stag deer into grazers.

Interspecific comparison was conducted by using the wild populations of the Japanese serow (*Capricornis crispus*) and the sika deer in Nikko National Park, central Japan. Mesowear variables frequencies of them were also significantly different (FET: $P < 0.05$), and the population of Japanese serow was classified into browsers and the population of sika deer was classifed into mixed feeders by HCA.

As previous ecological surveys well supported these results, we concluded that mesowear analysis detected dietary difference in sympatric area with high precision.

Keywords: paleodiet, Cervus nippon, Capricornis crispus, teeth, mesowear analysis

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

BPT27-P05 Room:Convention Hall Time:May 25 15:30-17:00

The relationship between astragalar size and body mass in land mammals: Estimating body mass of fossil species

TSUBAMOTO, Takehisa[1*]

[1]Hayashibara Biochemical Laboratories, Inc.

Astragalus is a compact and easily handleable bone. Astragalar fossils have been well studied as an indicator of the functional morphology and phyletic relationships of many mammals. However, few studies have investigated the relationship between astragalar size and body mass, even though the body mass of animals strongly correlates with their ecology and physiology and the body mass of fossil taxa has been intensively estimated by several methods.

In this study, I examined the allometric relationship between body mass and astragalar size in extensive extant land mammals (11 orders, 48 species, 80 individuals; body mass ranging from 18 g to 3.4 metric tons) using regression analysis. The results indicate that the best body mass estimator for extensive land mammals is the tibial trochlear size rather than the total size of the astragalus. For example, the body mass is estimated using the width of the tibial trochlea by the following formula (R^2 = 0.985; %SEE = 42.0; %PE = 28.8): ln (body mass [g]) = 2.789 X ln (width of tibial trochlea [mm]) + 2.078.

Then, the body masses of several Paleogene land mammals were estimated using the results of the regression analysis. The estimated body masses are consistent with the results by previous studies. For example, the body mass of the largest terrestrial mammal that ever lived, '*Indricotherium*,' was estimated to be about 10-15 metric tons. Therefore, the regression equations by this study using the astragalus are useful for estimating body masses of fossil land mammals and have the potential to be widely applied to quantitative ecological and physiological studies of fossil mammals.

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

BPT27-P06 Room:Convention Hall Time:May 25 15:30-17:00

Rhinocerotid (Mammalia, Perissodactyla) fossil from Takashima Island, Nagasaki, Kyusyu, Japan

MURAKAMI, Tatsuro[1*], MIYATA, Kazunori[2], KATO, Takafumi[3], NAKAYA, Hideo[1]

[1]Graduate School of Science and Engineering, Kagoshima University, [2]Fukui Prefectural Dinosaur Museum, [3]College of Life Sciences, Kurashiki University of Science and The Arts.

Mammalian fossil was discovered from Takashima Island, Nagasaki, Kyusyu, Japan. This material consist of six cervicals including axis, eight thoracic vertebrae, three lumbar vertebrae, a sacrum, right ilium, 17 libs, a metacarpal, right tibia, right fibula, right and left astragali, left calcaneum, right and left naviculars, right ectocuneiform, three right metatarsals, and four phalanges. This character of tibia, astragali, calcaneum, and metatarsals of this materials fossil suggests Family Rhinocerotidae.

Keywords: Kyusyu, rhinocerotids, mammal, Early Miocene

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

BPT27-P07 Room:Convention Hall Time:May 25 15:30-17:00

The Late Miocene Elasmotheriini (Rhinocerotidae, Mammalia) from the Namurungule and Nakali Formations of northen Kenya

HANDA, Naoto[1*], NAKAYA, Hideo[1], NAKATSUKASA, Masato[2], KUNIMATSU, Yutaka[2]

[1]Graduate School of Sci. and Engr., Kagoshima Univ., [2]Graduate School of Sci., Kyoto Univ.

The Japan-Kenya joint expedition team has discovered abundant large mammal fossils from the Late Miocene Namurungule and Nakali Formations, northern Kenya. We reported several rhinocerotid fossils from Namurungule and Nakali Formations.

The specimen from Namurungule Formation consists of a maxilla with upper M2 and M3, a mandibular fragment with lower P4 to M2 and isolated teeth of upper P4 and M3. This specimen was preliminary identified as Iranotheriinae sp. nov. (Nakaya et al., 1987). The specimen from Nakali Formation includes isolated teeth of upper M1 or M2 and M3.

These specimen share following characters of Elasmotheriini, crown cement, constricted protocone of upper molar and labiolingually elongated postfossette of upper P4. Therefore, the specimen from Namurungule and Nakali Formations is identified as Elasmotheriini.

We compared the specimen of Namurungule and Nakali Formation with ten genus of Elasmotheriini. As a result, these are similar to genus *Huaqingtherium* from Middle Miocene, China (Huang and Yan, 1983) in characters lingually elongated protoloph and metaloph, undeveloped enamel folding and small crochet. However, molar size of these specimen is smaller than that of *Huaqingtherium*.The specimen from the Namurungule and Nakali Formations has enamel plication in the medisinus of the upper molars. This character is not seen in the upper molars of *Huaqingtherium*. Moreover, the specimen from the Namurungule and Nakali Formations was discovered from Late Miocene. In contrast, *Huaqingtherium* was discovered from the Middle Miocene. Therefore, the specimen of the Namurungule and Nakali Formations is identified as new taxon.

Keywords: Kenya, Rhinocerotidae, Late Miocene, mammal, teeth

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

BPT27-P08 Room:Convention Hall Time:May 25 15:30-17:00

New Tetraconodontinae (Suidae) from the latest Middle Miocene in the Chiang Muan Formation, the northern Thailand

OZAWA, Yusuke[1*], NAKAYA, Hideo[1]

[1]Grad. Sch. of Sc. and E, Kagoshima Univ.

The Chiang Muan Mine is one of the most famous fossil sites in the Thailand because of the discovery of the earliest large-bodied Miocene hominoid in Southeast Asia (Kunimatsu 2002: Chaimanee et al. 2003: Kunimatsu et al. 2004). The Chiang Muan Mine is composed of the Chiang Muan Formation. Due to the lack of igneous rock layers, the age of the Chiang Muan Fm. had been controversial until the magnetostratigraphic analyses by Nagaoka et al (2002) and Suganuma et al. (2006), and the biostratigraphic comparisons by Nakaya et al (2002) and Pickford et al. (2004). Most of these studies have been derived from work of Thai-Japanese Paleontological Expedition Team (TJPET) and have revealed that the Chiang Muan Fm. belonged to the late Middle to early Late Miocene (9.8-13Ma). The Chiang Muan Fm. consists of five distinctive members from the base to top (Fukuchi et al., 2007). Among them, the Sa Tai Lignite Mem. and Kon Lignite Mem. are known as fossil-bearing layers and contain numerous vertebrate fossils: hominoids, proboscideans, rhinocerotids, suids, tragulids, cervids, bovids, avians, reptilians, and osteichthyan (Nakaya et al., 2002). Pickford et al. (2004) reports four suoid species found in the Chiang Muan Fm. up to the present. Two of them are Tetraconodontinae: Parachleuastochoerus sinensis and Conohyus sindiensis. Another is, Hippopotamodon cf. hyotherioides, which is classified into Suinae, and the other is Pecarichoerus sminthos, belongs to Tayassuidae.

The TJPET had conducted an intensive geological and paleontological investigation in the Chiang Muan Mine composed of the Chiang Muan Fm. and had excavated several suid fossils, and new fossil suid materials, CMu 050625-01, were found in 2005 (Fukuchi et al., 2006). This fossil consists of one individual, although it is not a complete skeleton. The materials contain fragments of a cranium with several isolated upper teeth (incisors, premolars, and molars), mandible with incisors and p2-m3, humeri, radius, metacarpals, carpals, femur, patellae, tibia, fibula, metatarsals, tarsals, pharanges, fragments of vertebrae, and bones assumed to be ribs. The fossil preserves morphologically characteristic structures in its lower teeth and mandible which classify itself into Subfamily Tetraconodontinae. Also, another set of lower teeth of a suid fossil from Chiang Muan Fm., CMu 201, shares the same morphological characteristics with CMu 050625-01, so presumably they are the same species. Those distinctive characters of CMu 050625-01 and CMu 201 were analyzed based on diagnoses of Pickford (1988) and Made (1999), and it was revealed that those suids were close to Conohyus sindiensis, but characters of their lower p4 were quit different from those of C. sindiensis. Consequently, they were identified as Conohyus cf. sindiensis.

Keywords: Miocene, Mammalia, Suidae, Tetraconodontinae, Thailand, Fossil