



Master Erasmus Mundus in
QUATERNARY AND PREHISTORY
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**MASTER "EVOLUTION, PATRIMOINE NATUREL, SOCIÉTÉS"
SPÉCIALITÉ « QUATERNAIRE ET PRÉHISTOIRE »
ERASMUS MUNDUS MASTER « QUATERNARY AND PREHISTORY »
ASIA LINK PROJECT « HUMAN ORIGINS PATRIMONY IN SOUTHEAST ASIA »**

MASTER MODULE « PREHISTORY OF SOUTHEAST ASIA »

PhD and PhD TOPICS

MASTER STUDENTS' SEMINAR TOPICS

ABSTRACTS as received on October 21st, 2005

Note about Master Students' seminars abstracts

The abstract which was asked for was about 1000 char / signs long only, but longer documents were reproduced as received (some of them including pictures).

Considering that the basic purpose was only to inform the teaching-staff about the topic, please note that

evaluation for Master credit will not be linked to the abstract's length.

**Palaeontology, palaeoecology and taphonomy
of Middle Pleistocene mammals in the hominid site of Sangiran dome (Central Java, Indonesia)**

Anne Bouteaux (PHD will be defended on October 27th, 2005)

The island of Java is the richest place of palaeoanthropological discoveries of the Middle Pleistocene in Southeast Asia.

Since the seventies, the National Indonesian Center of Archaeological Research, in collaboration with the Gajah Mada's university, organizes a research program on the open-air site of Sangiran's dome which leads the discovery many cranium fragments of *Homo erectus* and fossils mammals in localities : Tanjung, Sendang Busik, Ngrejeng Plupuh, Grogol Plupuh, Bukuran and Dayu. These localities are studied in this work. The bone assemblages of these sites mainly come from volcanic-sedimentary formation of Kabuh (lower middle Pleistocene) in fluvial context.

The best-represented mammals species are big bovids like *Bubalus palaeokerabau* or *Bibos palaesondaicus* and little cervids like *Axis lydekkeri*. The species described in the different sites help to precise Java biostratigraphy. In the Kabuh's formation, the palaeoenvironnement is characteristic of an open forested area close by river, which confirms the palynological and sedimentological results.

The taphonomical study of these collections is one of the first carried on javanese fossils. Bones are mainly flakes bones, which suggest a high fragmentation. In most of the sites teeth and extremities prevail. Conservation and fragmentation of fossil bones change between sites. Water action, either chemical or mechanical, is predominant for the origin and the modification of all assemblages. Carnivores are almost absent in the material and traces of their action are rare. Teeth of crocodiles are found in all the sites, that suggests their possible intervention on the material. Anthropological action is not clear. The lithic tools associated with faunal bones are rare. Since numerous hominids fossils and lithic tools were found in the Sangiran's stratigraphy, a connection between the mammals of Middle Pleistocene and *Homo erectus* is highly probable. This work represents a first approach of the study of the *Homo erectus* subsistence behaviour in insularity to middle Pleistocene.

Key words: prehistory, Southeast Asia, Java, palaeontology, palaeoenvironnement, taphonomy, middle Pleistocene, *Homo erectus*.

**Microscopic characterization of sedimentary facies
and occupation floors in Sangiran (Central Java, Indonesia)**

Boris Brasseur (PHD topic, 1st year)

Since 1891 when Eugène Dubois discovered at Trinil the first fossil of "Pithecanthropus" (*Homo erectus*) the island of Java played an important role in the knowledge of human origins. With the discovery of more than 50% of *Homo erectus* bones inventoried, Sangiran is one of the richest sites in human paleontology.

Unfortunately many were discovered (by local people) without a good stratigraphic position and archeological context (industry, faunas,...). During beginning of the 1990's a French/Indonesian team managed by Prehistory departement of the "Muséum National d'Histoire Naturelle de Paris" organised archeological excavation at Ngebung 2 site (North West part of Sangiran). This mission allowed the discovery of human remain, artefacts and vertebrate fossils in association on an occupation floor. Very few occupations floors of 800.000 yrs BP are knowed in Prehistory and it's the first discovered at Sangiran. It offer the unique opportunity to relate human fossils with their local industry and technical behaviour.

Micromorphological characterization study of this layer and sequences of sedimentary facies can define paleoenvironmental condition of deposits. Moreover this have been discovered in other differents places close to the site of Ngebung 2.

By precisely defining the sedimentary facies and the associated paleoenvironmental conditions, we hope to help the spotting of new archaeological sites, and to precise as well the chronological changes of humans species/industry/faunal associations in the frame of the numerous ancient discovery. This is also very interesting because of the large chronological range covered by the Sangiran stratigraphy, from Lower to Upper Pleistocene (about 1.6 million years are represented).

Characterization of thermal treatment of fossil bones in prehistoric sites

Matthieu Lebon (PhD topic, 1st year)

Since 1994, a common research program has been established between the National Research Center for Archaeology in Indonesia (NRCA) and the *Muséum national d'Histoire Naturelle* (Paris). Thanks to this collaboration, many prehistoric sites have been excavated in Indonesia. One of them, the Song Terus cave, is located in the Gunung Sewu area, in the south of Java (Indonesia). It contains many archaeological levels of middle and upper Pleistocene age, dated between 300 Kyr and 11,2 Kyr by the ESR method (Hameau, 2004). In the Tabuhan levels, dated between 80 Kyr and 30 Kyr, many layers present black bones.

Do they contain manganese or are they burned? In order to answer this question, five samples were analyzed in infra-red spectrometry and electronic scan microscopy. With the first method, we have proved that one of the five samples has been heated between 300°C and 500°C.

During my Thesis, I will try to know which activity (cooking, heating, natural fire...) gives this type of material. It will be also possible to study the diagenetic transformations of bones under such a tropical climate.

Toothwear study on Asian hominid fossils

Alex Lee (PhD topic, 4th year)

The dental microwear data show the differences among southeastern Asian fossil human groups. *Homo erectus* and Holocene *Homo sapiens* samples are separated from the rain forest hunting/gathering and sea shore agriculture/fishing/hunting comparison groups that reveal diet and adaptation inferences but raise also new questions.

The dental microwears are the traces left on teeth due to usage. From 1970's the dental microwear study has been widely applied in anthropology, archaeology and paleontology/archaeozoology for the reconstruction of ancient diet and environmental adaptation in analyzing hominoids, mammals and primates, both in extinct and extant species. Traditionally researchers examine two enamel surfaces: occlusal and buccal. Occlusal microwear is often heavily influenced by mechanical effects of mastication, the shearing facets (phase I) and the crushing facets (phase II) show different microwear patterns. Microwear studies on phase II show the distinctions between the diet of hard objects and tough foods, and grazer and browser in certain mammal species.

The studies carried out on primates and small mammals present the distinctions between herbivorous and insectivorous groups. The aim of buccal microwear study is for the avoidance of mechanical influences from teeth contact. Buccal microwear studies reveal more complicated information than other surfaces. Some researches show the differences between agricultural and hunting/gathering human populations. Our study is carried out on 20 groups, 72 individuals from 6 southeastern Asian countries dated from middle Pleistocene to Holocene (4 *Homo erectus* and 68 *Homo sapiens*). Four groups are included for the comparison: one agriculture/fishing/hunting group of the Iron Age in Taiwan, the other three hunter/gatherer populations of the 17th to 18th century from Philippines tropical rain forests.

Two methods are used for the acquisition of raw data: scanning electronic microscope (SEM) images and 3D microtopography. The raw data are treated by the software "Microware 3.0 and 4.02" for SEM images and by the "Mountains Map" for 3D data. In Discriminant-canonical analysis, SEM data show the distinguishable results between some sample groups.

Most of *Homo erectus* individuals cannot be separated from Holocene *Homo sapiens* groups but are separated from hunting/gathering and agriculture/fishing/hunting comparison groups mainly by the scratch width and the microwear density variations. The two comparison groups are mainly distinguished by the influences of scratch width, pit width and pit/scratch proportion variations. Among the *Homo erectus* individuals, four of them are well distinguished by the characters of scratch width, pit/scratch proportion and microwear density variations. Data of 3D surface roughness method show less significant results than SEM method but still provide complementary information.

STUDENTS SEMINARS

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Specialisations in the dentition of Southeast Asian viverrids

Ulrike Anders

This study provides an overview on specialisations in the pre-carnassial and/or carnassial/post-carnassial tooth row of recent viverrids, i. e. unspecialised carnivores, with reference to their diet. Although viverrids in general rely on a wide variety of food items in their diet, three types of dietary preferences are differentiated according to the predominating food type. Meat (*Viverra zibethica*; *Viverricula indica*), fruit (*Arctictis binturong*, *Paradoxurus hermaphroditus*) and fish (*Cynogale bennettii*) eaters are recognized. These dietary preferences are reflected by specialisations in single tooth positions and the dentition.

Specialisations according to the preferred dietary type were identified in all studied species. Particularly a diet containing larger amounts of fish requires modifications.

The old Palaeolithic assemblages in Southeast Asia

Daniele Aureli

At this moment we have a lot of lithic industries records among lower Paleolithic, found in South-East Asia. The finds were principally from China, India, Pakistan, Nepal and Indonesia.

These lithic complexes seem to be distinguished in two techno-complexes: in one and the Acheulean, characterized by the predominance of bifaces in association with worked flakes industries, on the other hand, the Soanian distinguished by presence of chopper and chopping tools and rarefacted bifaces. These old industries complexes are dated approximately 2.0 Million years ago (Longuppo, Cina; Sangiran S27 e S31, Java).

For the analysis of Lower Asian Palaeolithic, it's important to focus on the relationship between chronology deepness, geographical distribution and archaeological record (average and conservation of the evidences), for an attentive historical reconstruction of these several cultural traditions.



Lithic artefacts discoveries on Flores Island

Antony Borel and Yann Sennecheau

The island of Flores, located between Southeast Asian and Australian continental areas, had never been connected to Asian mainland. Since the fifties, many series of excavations took place and revealed lithic industry.

The site of Mata Menge contained 14 stones artefacts identified as stone tools. A zircon fission-track datation yielded an age between 0.88 ± 0.07 and 0.80 ± 0.07 Myr.

The site of Liang Bua is searched in excavated Sectors:

- Sector VII contained 32 stone artefacts in the same level as *Homo floresiensis* (between 35 ± 4 kyr to 14 ± 2 kyr).
- Sector IV had delivered many stone artefacts, predominantly simple flakes, struck bifacially from small radial cores. Also, points, perforators, blades and micro blades have been found but only with

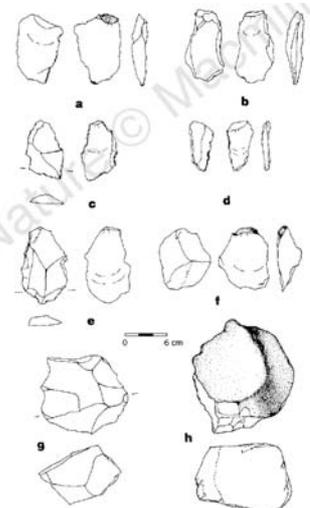


Figure 3 Stone artefacts excavated from Mata Menge in 1994. a, Chert flake; b, silcrete flake; c-f, basalt flakes; g, basalt multi-platformed core; h, basalt cobble 'chopper'.

Stegodon evidence. This assemblage was spread from the oldest cultural deposits (95 to 74 kyr) to the last level of *Stegodon* corresponding to an age of 12 kyr.

- Other kind of stone artefacts is present in the older deposits, produced by much heavier percussion. Some was found in river-laid conglomerates and dated by TIMS uranium-series older than 102.4 ± 0.6 kyr.

Those discoveries of lithic industry are really important in the way that they constitute the only trace of a probable presence of *Homo erectus* on Flores Island.

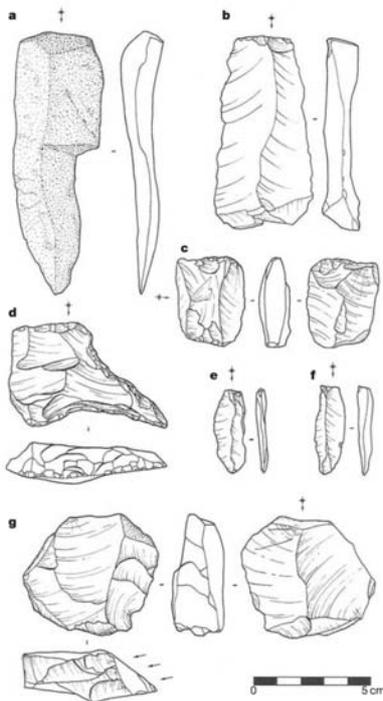


Figure 5 Range of stone artefacts associated with remains of *H. floresiensis* and *Stegodon*. a, b. Macroblades. c. Bipolar cores. d. Perforator. e, f. Microblades. g. Burin cores for producing microblades. Artifacts indicate evidence of technical proficiency. M. J. Morwood, R. P. Sospino, R. G. Roberts, T. Sutikna, C. S. M. Turney, K. E. Westaway, W. J. Rink, L. Zhao, G. D. van den Bergh, Rokas Awe Due, D. R. Hobbes, M. W. Moore, M. I. Bird, L. K. Fifield
 2004 « Archaeology and age of a new hominin from Flores in eastern Indonesia », *Nature*, vol 431, p. 1091



ESR dating of Asia hominids: China and Southeast Asia

Han Fei

Many materials found in archaeological sites are able to trap electronic charges as a result of bombardment by radioactive radiation from the surrounding sediment. The presence of these trapped charges can be detected by electron spin resonance (ESR) spectroscopy: the intensity of the ESR signal is a measure of the accumulated dose and thus of the age. Tooth enamel is ubiquitous at archaeological sites and is well suited for ESR dating, with a precision of about 10-20%. This method has now been used to date many sites critical to the biological and cultural evolution of modern human.

ESR dating method is also sometimes referred to as electron paramagnetic resonance (EPR) dating, was invented by Zeller (1968) who did not further develop it. This was left to M. Ikeya who, in a series of papers beginning in 1978, showed the utility of the technique in dating stalagmitic calcite, shells, animal bones, and teeth, all of which are found in archaeological sites. Reports on ESR dating of tooth enamel from archaeological sites began to appear in the 1980s. Grun (1989) and Rink (1997) has summarized the theory and applications of the ESR techniques.

Despite many difficulties found for ESR dating of bones and carbonates, tooth enamel dated by ESR has been proven as a reliable method in its application to fossil teeth and quartz. Both of the latter materials have allowed dating of Early and Middle Pleistocene sites which are not datable using other methods such as the Argon-Argon method.

ESR dating in China:

1. The problems in ESR dating of tooth enamel of Early Pleistocene and the age of Longgupo hominid, Wushan, China (Chen Tiemei et al. 2000)

ESR dating of tooth enamel quite often provides underestimated ages. The factors which may account for the age suppression are studied. For dating of the samples of Early Pleistocene, thermal fading of the $g=2.0018$ signal during the burial time may also lead to age underestimation. Isothermal annealing of the $g=2.0018$ line was studied in this work and a mixed first- and second-order kinetics was observed. Its implication to the practical dating purpose is discussed. It is suggested that if no uranium leakage is

detected, ESR EU ages of Early Pleistocene enamel samples should be considered only as the lower limits of the true ages. Combined ESR and magnetic dating of the Longgupo profile, Wushan, China, assigns the Olduvai subchron to the fossil hominid-bearing layers of 7-8 of this profile.

2. Coupled electron spin resonance (ESR)/uranium-series dating of mammalian tooth enamel at Panxian Dadong, Guizhou Province, China (H.J.Jones, W.J.Rink et al. 2004)

Panxian Dadong (Guizhou province, southwestern China) is an archaeological cave site within an elaborate multi-genesis karst system that contains three stacked caves. Collaborative Sino-American archaeological excavation and multi-disciplinary studies have been in progress since 1996. An Ailuropoda–Stegodon faunal assemblage along with lithics and human teeth has been recovered from the deeply stratified deposits. The represented taxa are generally indicative of a Middle Pleistocene biostratigraphic age. Fifteen mammalian fossil teeth were collected during the 1998–2000 excavations. The enamel was dated by conventional ESR and coupled ESR/U-series dating techniques. The ESR early uptake (EU) and linear uptake (LU) model ages range from 120–300 ka. Uranium–thorium results from four dentine samples depict a variety of uptake histories the samples have undergone throughout the entire 6-m depth of the excavation units. The coupled ages suggest that samples at Panxian Dadong demonstrate linear uptake model behavior and indicate the true burial ages for the tooth samples. The upper and lower unit has mean LU ESR ages of 156 ± 17 ka and 258 ± 47 ka, respectively.

ESR dating in south-east Asia:

1. Latest Homo erectus of Java: Potential Contemporaneity with Homo sapiens in Southeast Asia (C.C.Swisher III, W.J.Rink et al. 1996)

Hominid fossils from Ngandong and Sambungmacan, Centra Java, are considered the most morphologically advanced representatives of Homo erectus. Electron spin resonance(ESR) and mass spectrometric U-series dating of fossil bovid teeth collected from the hominid-bearing levels at these sites gave mean ages of 27 ± 2 to 53.3 ± 4 thousand years ago; the range in ages reflects uncertainties in uranium migration histories. These ages are 20,000 to 400,000 years younger than previous age estimates for these hominids and indicate the H.erectus may have survived on Java at least 250,000 years longer than on the Asian mainland, and perhaps 1 million years longer than in Africa. The new ages raise the possibility that H.erectus overlapped in time with anatomically modern humans(H. sapiens) in Southeast Asia.

2. Dated co-occurrence of Homo erectus and Gigantopithecus from Tham Khuyen Cave, Vietnam (Russell Ciochon et al. 1996)

Tham Khuyen Cave (Lang Son Province, northern Vietnam) is one of the more significant sites to yield fossil vertebrates in east Asia. ESR analyses address the S1-S3 suite as preserved within a small horizontal tunnel, intermediate between the cave entrance and the main sediment outcrop. Fifteen fossil teeth were extracted from poorly cemented sediment at two pocket-like sites within the tunnel. Age estimates are computed for EU and LU models (average EU= 404 ± 51 ka; average LU= 534 ± 87 ka) and averaged to give a general specimen estimate of 475 ± 125 ka. The four travertines contain significant amounts of flowstone/dripstone and even calcite crystals within a T2 speleothem are pure enough to analyze with U/Th methods, yielding an age estimate of 117 ± 30 ka. Consequently, the U/Th date for the T2 speleothem corroborates the average ESR date for the S1-S3 suite.

Funerary behaviours in Southeast Asian prehistory

Benjamin Decouret and Krystyna Irvine

The study of prehistoric burial sites has brought to light evidence of funerary rituals and traditions, which could presume an early spiritual perception and conscience of the dead in a community. Man appears to pose himself metaphysical questions, in an environment where symbolism plays an ever increasing role, noticeably in funeral traditions, in the form of urns, ornaments and offerings left with the dead. Unfortunately, the complexity of relations between man and death is much easier to imagine than to actually analyse.

However, in the time given us, we will try to illustrate the role of funerary rituals in South East Asia by giving a brief outline of several sites, namely Cave Maitum in the Phillipines and Kalimantan East in Indonesian Borneo. (Please note, these sites are provisional, pending further information. They may well change before next friday.)

We will also present examples of objects buried with the dead, varying from culture to culture.

With our presentation, we hope to bring a concise and clear introduction to this fascinating subject.

Pleistocene Suids from Southeast Asia

Silke Karl

Characterization, occurrence and distribution of some Pleistocene suid species from Indonesia.

Several fossil suid species are known from the Pleistocene of Indonesia. Their remains consist mainly of single teeth. The teeth show that suid species occurred in various sites.

The different species are characterized with the help of teeth size, shape and form.

The Movius Line

Arturo de Lombera Hermida and Leticia Menéndez Granda

In the decade of 1940 H. L. Movius, studying the lithic industries of the East of Asia, defined a border between the East of Asia and the West of Eurasia and Africa, the Movius' Line, based on the technological differences presented and identifying them like two "*exclusive cultural spheres*". Whereas in the West of Asia, Europe and Africa an Acheulean technology was developed during Middle Pleistocene characterized by the presence of handaxes and cleavers, in the Asian East less elaborated technologies, based on the operation and configuration of great cores, persisted, defined by Movius as "*Chopper-chopping tool tradition*". Ecological, technological an even conigitive interpretations have been proposed to explain this technological dichotomy.



Movius Line. The bordered area represents the Acheulean tradition whereas the pointed area references to the *Chopper-chopping tool tradition*.

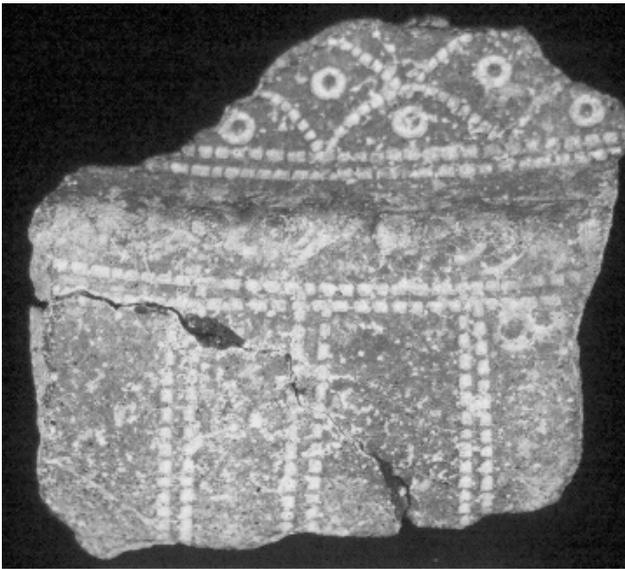
This Dividing line, despite being defined for sixty years, has been marking the Middle Pleistocene historiography in the Asian continent. Paradigme which several interpretations have been looked for and that begins to be questioned in accordance with the new discoveries in China (Lantian and Dingcun) and Korea (Bose Basin and Chongokni).

The Austronesian migrations

Elena Man-Estier

The question of recent indo-malaysian population origin has for long been raised by a lot of archeologists. Searches in other scientific fields, such as linguistics, were necessary to understand that different groups of populations of south-east Asia and Pacific, from Madagascar to Polynesia, were part of the same language family, belonging to a group now called "austronesian".

Of course this group shares more than just language proximity. It's their own origins and history, we are now trying to understand. Most of scientists now agree that the departure point must have been in Taiwan (where the earliest traceable location of Austronesian language is made), following the pioneers ideas of Peter Bellwood. But if archeologists can point out common cultures artifacts, such as pottery, geneticists and linguists can also bring their own approaches and tools to try to solve the question of "where" and "when" the migration(s) took place. Only a multidisciplinary approach will enable to understand how the Austronesian settlements progressed.



"Lapita" pottery, a great marker of Austronesian settlements

Brain evolution and speech ability for Asian *Homo erectus*

Guendalina Mantovani

The aim of this paper is a brief exposition about the brain evolution and the speech capability of Asian *Homo erectus*.

We start with a generally panoramic about the brain's evolution and his development in the human fossil record.

Then we studied the preadaptation of speech capabilities and we approach the case focusing on Asian *Erectus* hominids; in particular we talk about the endocast and we try to explain the guides lines of brain development, in relation with spoken language.

The Lithic Artifacts at *Kali Maron*

Andri Purnomo

Kali Maron is located near the Indian Ocean coast at the Southernmost part of the Gunung Sewu, a karstic hill range which is part of the Southern Mountains of Java. In that area, the Baksoka river, from which originates the well-known Pacitan Palaeolithic industry, flows Southward and is named *Kali Maron* along its lower course. Numerous Palaeolithic artifacts can be found in the riverbed.

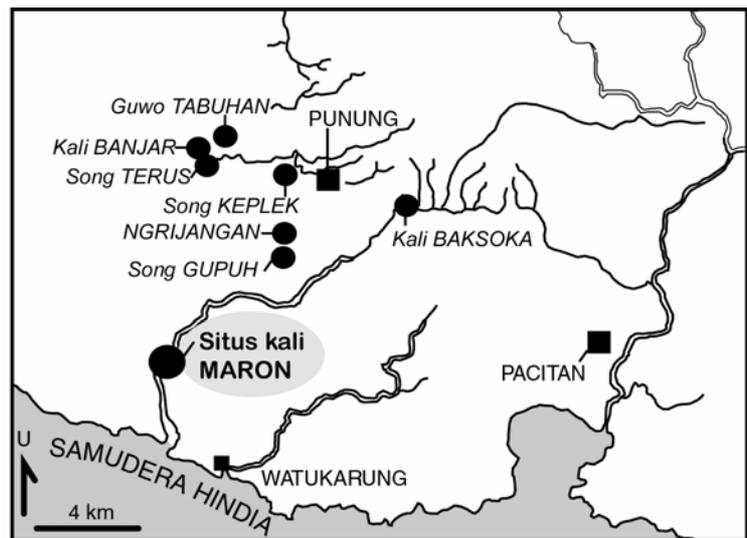
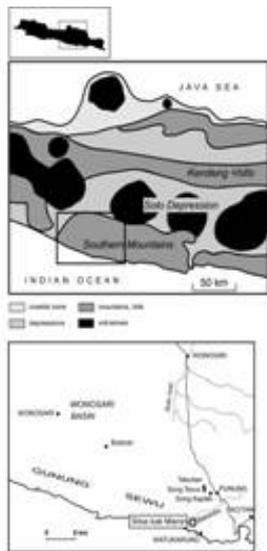
The geomorphological position (near the sea) doesn't allow to find clear artifact-bearing river terraces along the valley. This quite rich site is still unstudied and can therefore provide us with a statistically significant sample of its Palaeolithic industry.

Random sampling up to c. 5000 pebbles in the river proved to contain c. 8% of lithic artifacts, the main part of which are made of chert (locally named *rijang*), a petrographic category which reaches c. 35% of the whole stone collection and represents the major raw material in the Pacitan area.

Pebble size and granulometric analysis show that the Maron artifacts were reworked from various, more or less distant places and then normally deposited in well-sorted riverlaid alluvial. That uniform sedimentary context gives the Lithic industry sample a statistical significance about stone trimming at the local scale of the Maron river area.

Three kinds of implements were recovered: (1) heavily patinated artifacts; (2) heavily patinated artifacts showing more recent, non patinated flaking and (3) non patinated artifacts. The present study deals with the 'oldest', uniformly patinated collection, which contains 90 flakes, 68 flake tools and a few smaller pebble tools, nuclei and hammerstones. The size of the pebble tools is close to that of the flakes, and the Maron flake industry is definitely far different from the Pacitan one. The typological classification leads to group quite variously shaped implements in a single category. On the other hand, the dimensional and retouching processes analysis document a correlation between the shape of the flakes and the retouch. It points to an opportunistic implement making behavior where the "short" flakes were abandoned. The cortical flakes proportions are high (35%) in the artifacts as well as in the flake tools collection, pointing to a limited exploitation the chert blocks. Non cortical flakes were not preferentially chosen to make the flake tools.

At the first insight, the "old" Maron industry seems close to the one recovered near Punung in the Song Terus cave, which is provisionally dated between 80 and 200 Ky.



Sea level changes and Palawan Island Archaeology

Emil Robles

Recent dates of fossils from Palawan has confirmed Robert Fox's hypothesis that the island was inhabited by modern humans as early as 50 000 years ago. These new data show the importance of Palawan island as in the study of the evolution and culture of early man yet very little is known about the prehistory of the island, especially during the time when the "Tabon Man or Woman" inhabited the area.

Since a moderate change in sea levels entails a drastic change in land area, shorelines and environmental conditions in these parts of the world, it is important to know these changes and tie it with the archaeological record. Average sea levels with respect to radiometric dates acquired from archaeological specimens recovered from the island are statistically calculated using the ever so reliable MS Excel with the aid of VB macros. Dates published by Robert Fox in 1970 and recent dates from Tabon fossils and charcoal from Ille caves are used. It is seen that the transition from Pleistocene to the Holocene vies-a-vie the rising of sea levels has great effect on the behaviour of man particulrlaly in the exploitation of marine/estuarine resources and habitation on caves.

Circular earthwork sites of Cambodia

Heng Sophady

Cambodia is one of the places where prehistoric research in Southeast Asia began with the discovery of Samrong Sen in 1876. Since then, prehistoric archaeology has developed throughout the country. However, due to many factors, prehistoric research remains in a poorly developed state compared with neighboring countries in the region. Early research initiatives by the 1960s were cut off due to political problems lasting three decades. By the end of the 1980s, few professional archaeologists existed and most were not engaged in project research.

Kompong Cham is noted for circular earthwork sites, most of the local habitants knew and calls them (Banteay Kou) located in the Terra Rouge or Red Earth Plateau region of Ponnea Krek and Memot district. These site were research by Groslier in 1962 and Malleret 1959, and more recently by the Memot Centre crews, Heng Sophady, Sirik Kada, Vin laychour, Thuy Chanthourn, Dr. Gerd Albrecht, Miriam Noel Haidle, Hawaii team, Bion Griffin, Mike Dega and Sophia University Yashusi Kojo, Pheng Sytha with the cooperation of Faculty of Archaeology, RUFA. The sites are structurally characterized by earthen embankments, inner ditches and inner platforms. They often contain two "entrances" located in opposed directions. The diameters of the site embankments range from 150m up to 280m. Many cultural remains have been recovered on the inner platform edges (e.g., ceramic vessels, stone tools, glass and stone ornaments). Unfortunately, organic remains rarely survive due to high soil acidity. 30 circular earthwork sites have been documented in Memot and Krek and many others have been identified and researched in Vietnam. It is highly probably that many more exist and will be identified in the future.

The sites provide evidence of Neolithic to possibly early Metal Age settlement. Most artifacts consist of earthenware pottery and stone tools (adzes, axes, chisels, polishing stone, flake made of silex and stone bangles), glass bangles, carnelian bead, garnet bead, spindle whorls, clay balls and others). Up to 2005, 31 circular earthwork sites have been documented in the area of Krek and Memot and there many also found in vicinity of Vietnam. We believe that many circular earthworks and other prehistoric and historic sites will be discovered in near the future in that region.

The circular earthworks found in the red soil area of eastern Kompong Cham province were the central focus for the training program and future research projects. This is a unique area straddling eastern Cambodia and adjoining regions in Vietnam. Scores of earthwork sites have been identified in the past and man more are being discovered. It is unknown whether or not they represent a unique culture and/or were tied to other polities. Very little is known of their developmental history.

Reconstruction of preferred prey size of Pleistocene predators from Jawa

Rebekka Volmer

The body size of exploitable prey of recent predators depends among others on body size. If the body size of a fossil predator is known, it is thus possible to predict the preferred prey size. In this study body size and preferred prey size of large Pleistocene predators from Jawa are reconstructed and compared with those of recent predators.

Except of the Pleistocene tiger, which preferred larger prey than today, there are no differences between fossil and recent canids and hyaenids.

Quaternary sea level changes in Southeast Asia

Sun Xuefeng

The importance of changing sea levels over geological time has long been considered essential to our understanding the distribution of both aquatic and terrestrial organisms. In the long term, changes in basin volume, following the tectonical opening of the ocean floor, may be the primary control on global sea level, but in the relatively short term global climate change could be the most significant cause of sea level oscillations. In alternating glacial and interglacial periods, sea level is affected by variations in high latitude ice volume. Therefore, sea level changes in Southeast Asia, following glacial-interglacial cycles, should induce changes in the monsoon system that in turn modulates local or global climate systems. At present, paleoclimate research in Southeast Asia is concentrated on elucidating signals from uplifted coral reef terraces, from bottom sediments of the epicontinental platform, and from marginal marine environments.

This report provides Quaternary Sea-level curve of Southeast Asia Using chronostratigraphic and neotectonic data, combined with the Oxygen Isotope record from ODP Hole 667, a sea level curve has been constructed from 1.0 Ma to the present (W.S. Hantoro 1997). The maximum drop in sea level during the peak of the last glacial period varied from about 125 m to 150 m below present level. As a result, the Sunda and Sahul platforms of Indonesia were exposed and may play a significant role in stabilizing or promoting climate fluctuations in Southeast Asia.

Report also provides a series of Sea-level changes' maps associated with glaciation since Quaternary. These maps have been estimated by several research teams. The time estimates for the duration of particular past sea levels present here for 17,000, 125,000 and 250,000 yr BP (Harold K. Voris 2000). The time estimates for the past 17,000 yr BP presented are based on changes in oxygen isotope. Time estimates for the past 15,000 yr BP are based on figure 6.3 in Bloom & Yonekura (1990) which depicts sea levels grounded on data obtained from coral-reef terraces in Papua New Guinea. The estimates for the past 250,000 yr BP are based on figure 4B in Chappell & Shackleton (1986). The latter figure is based on data obtained from coral-reef terraces in Papua New Guinea. The ancient shorelines are based on the present day depth contours of 10, 20, 30, 40, 50, 75, 100 and 120 m (Harold K. Voris 2000). Estimates of the number of major sea level fluctuation events and the duration of time that sea levels were at or below the illustrated level are provided.
