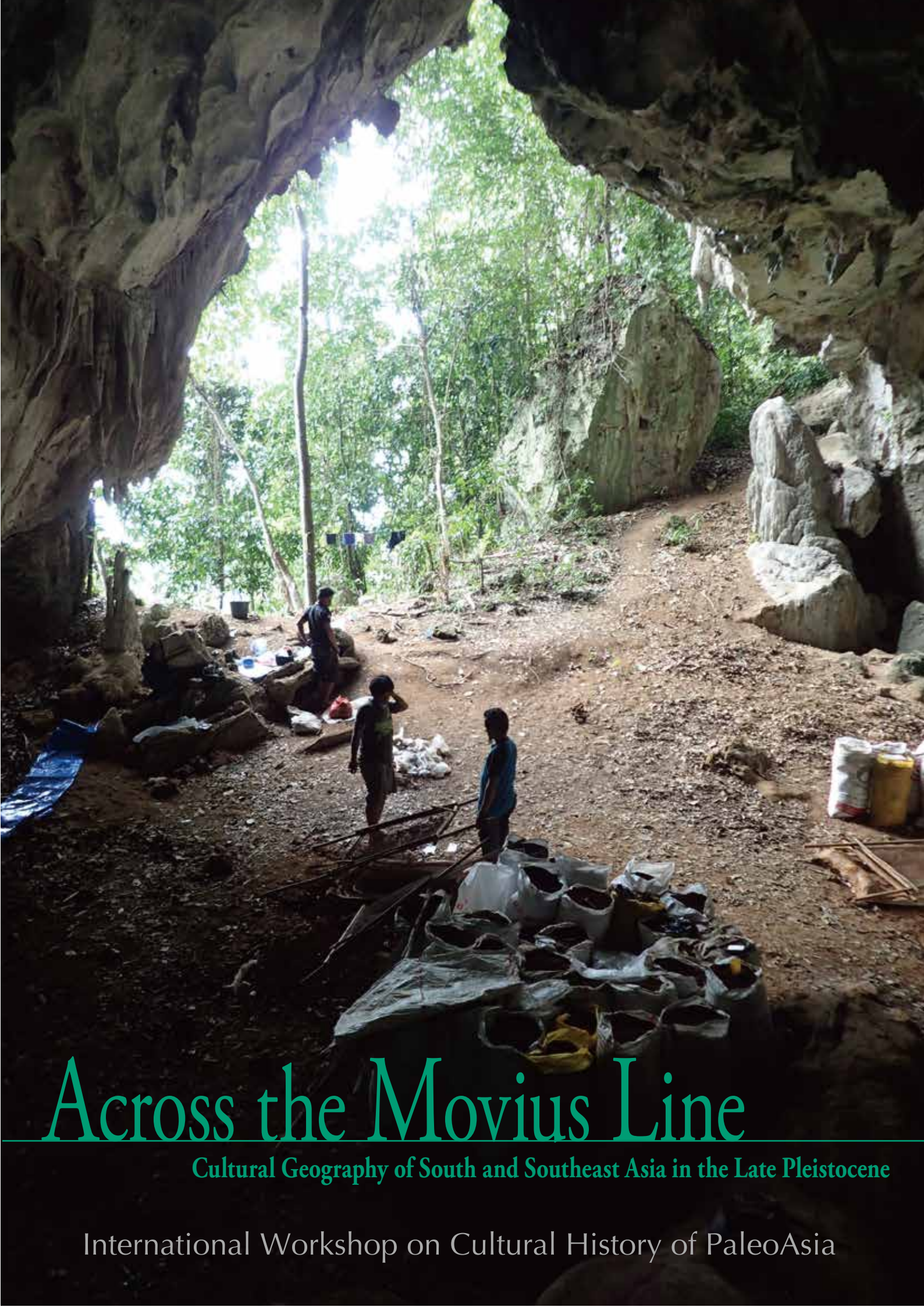

Across the Movius Line

Cultural Geography of South and Southeast Asia in the Late Pleistocene

International Workshop on Cultural History of PaleoAsia

Date: November 18–19, 2017
Venue: INTERMEDIATHEQUE, JP Tower Museum, Tokyo (http://www.intermediatheque.jp/en)
Organizers: Yoshihiro Nishiaki (The University Museum, The University of Tokyo, Japan)
Seiji Kadowaki (Nagoya University Museum, Nagoya University, Japan)
Atsushi Noguchi (The University Museum, The University of Tokyo, Japan)
Rintaro Ono (Tokai University, Japan)
Miho Suzuki (The University Museum, The University of Tokyo, Japan)

Abstract papers for the International Workshop
"Across the Movius Line – Cultural Geography of South and Southeast Asia in the Late Pleistocene"
Edited by Yoshihiro Nishiaki, Atsushi Noguchi and Rintaro Ono

CULTURAL HISTORY OF PALEOASIA- Integrative Research on the Formative Processes of Modern Human Cultures in Asia
Scientific Research on Innovative Areas, a MEXT Grant-in-Aid Project FY2016 – 2020

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Preface

Research on Lower and Middle Pleistocene archaeology of South Eurasia often addresses contrasts in cultural evolution between South and Southeast Asia, which represent a geographic boundary often referred to as the “Movius Line”. The original definition of this line proposed in the 1940s, which noted the absence of hand axes and Levallois technology in the eastern archaeological record, received repeated critiques based on ever increasing levels of evidence mainly from the east and can no longer be corroborated with presently available evidence. Nevertheless, most researchers still accept the existence of differences in a wide range of archaeological records between eastern and western regions, most notably in lithic technology. The background and mechanisms that underlie these distinctions, although they likely reflect different biogeographic and historic factors, remain a key archaeological research area when dealing with the Lower and Middle Pleistocene of South Eurasia and are certainly worthy of further attention.

In the context of this research background, this workshop emphasizes a less well-studied archaeological period, the Upper Pleistocene, when anatomically modern humans first appeared within the regions of interest. It is clear that modern humans dispersed across the Movius Line and changed the biogeography of humans, but less clear are when and how they impacted the cultural geography in the regions. The first aim of this workshop is to present the latest archaeological records in order to evaluate whether a geographic dividing line exists in this formative period of modern human cultures. The second aim is to compare diachronic changes in lithic and subsistence technologies of South and Southeast Asia throughout the period of modern human arrival. Thus, this workshop provides an opportunity of comparative perspectives to address the formative processes that shaped modern human cultures in this part of Asia. It is hoped that comparisons of cultural patterns across the Movius Line, if present, in the periods before and after the arrival of modern humans will enable an improved understanding of their behavioral characteristics.

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Across the Movius Line
- Cultural Geography of South and Southeast Asia in the Late Pleistocene

Program

Saturday November 18th, 2017

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14:15–14:45	Behind the lines: technology, adaptation and interaction of humans in the maritime environments of prehistoric Island Southeast Asia (A. Pawlik)
14:45–15:30	*Coffee break*
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16:00–16:30	Emergence of bladelets in the Levant and its behavioral meanings (S. Kadowaki)
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11:45–12:15	Megafauna extinctions and the arrival of anatomically modern humans in Southeast Asia (G. van den Bergh)
12:15–12:45	Environments, resource use and maritime adaptation in Wallacea in the Late Pleistocene: comparison of modern human migration routes into Oceania (R. Ono)
12:45–14:00	*Lunch*
14:00–14:30	The Late Pleistocene environment in South and Southeast Asia (H. Kitagawa)
14:30–15:00	Dispersal of prehistoric hunter-gatherers and roles/materials of beads: an ethnoarchaeological approach (K. Ikeya)
15:00–15:30	Theoretical models of cultural drift, effective population size, and iterated founder effect (J. Y. Wakano)
15:30–16:00	*Coffee break*
16:00–17:00	Discussion 2: Context of regionality and changes
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Session 1: Regional Variability in Lithic Technologies

Environments and cultural change in the Indian Subcontinent: implications for the dispersal of *Homo sapiens* in the Late Pleistocene

James Blinkhorn
Liverpool University, Liverpool, UK; Max Planck Institute for the Science of Human History, Jena, Germany

South Asia lies on a key east-west corridor for hominin expansions across Asia, leading it to play a prominent role in debate surrounding the dispersal of modern humans. A number of significant changes occur at the western boundary of South Asia. The Indian subcontinent is bound by extreme altitude mountain chains that resulted from the collision of the Indian and Eurasian tectonic plates, marking a major change in topographic relief. This has also resulted in both the Asian monsoon system, the dominant climatic feature of both South and South-East Asia, and significant differences in geology between the Indian subcontinent and adjacent regions. The distinct patterns of precipitation and seasonality that the monsoon brings results in discrete differences in environmental conditions and ecology, that separate the Oriental biogeographic zone, encompassing South and South-East Asia, from adjacent regions. Crossing from the Saharo-Arabian desert belt into the Oriental zone marks the first major biogeographic boundary encountered by modern humans dispersing eastwards from Africa and across Asia. Although part of the same biogeographic zone, several factors may have also led the boundary between South and South-East Asia to be similarly stark to dispersing populations.

Unlike regions further east, South Asia shares a common pattern of Palaeolithic culture history with western Eurasia and Africa, with the succession of Acheulean, Middle Palaeolithic and Late Palaeolithic industries. Over the past decade, the chronological framework of the transitions between these phases has come into focus. This has shown that although the overarching pattern of cultural change in South Asia is similar to other regions of western Eurasia and Africa, the timeframe in which these changes occurs differs substantially. In this presentation, I will summarise the most recent evidence for patterns of cultural change between the Late Acheulean, Middle Palaeolithic and the Late Palaeolithic and place this within the context of inter-regional debates regarding modern human dispersals.

Due to my research focus on the region, particular emphasis will be placed upon the archaeological record of western India, correlating with the transition from the Saharo-Arabian desert belt to the Oriental zone. It is within the Thar Desert that patterns of technology comparable with the Saharo-Arabian belt are most likely to occur, prior to the potential requirement to adapt to the monsoonal mosaic of habitats that lie beyond in the Indian subcontinent. Recent survey of the coastal areas of this region have been conducted and are the first to directly appraise evidence for coastal dispersals into South Asia. Additional emphasis will be placed upon regions that share similar ecological conditions to South-East Asia as a means to explore patterns of adaptation to forested environments that may have facilitated eastward expansions.

The Late Acheulean to Middle Palaeolithic transition appears to occur in the early Late Pleistocene, significantly later than regions to the west, but whether this was a gradual transition or marked an abrupt change remains debatable. Middle Palaeolithic occupations of the region span the timeframe in

which modern humans first appear in West, East, North, and South East Asian fossil records, as well as the colonisation of Sahul. The absence of a fossil record associated with these industries in South Asia ensures debate regarding their authorship continues, although mounting evidence supports suggestion that some Middle Palaeolithic industries were produced by modern humans in the region. Evidence from a number of sites supports a gradual, local development of Late Palaeolithic industries, as well as patterns of regional diversity in their manifestation. Contrasting with earlier hypotheses, direct inter-regional comparisons reject direct associations between South Asia's Late Palaeolithic industries and those of southern Africa, suggesting that any similarity is the result of technological convergence.

Behind the lines: technology, adaptation and interaction of humans in the maritime environments of prehistoric Island Southeast Asia

Alfred Pawlik
University of the Philippines, Quezon City, The Philippines

The timeline and nature of early human migration and maritime interaction is a key issue in the prehistory of Island Southeast Asia. While past research focused dominantly on the hypothesis of migration of agriculturally and technologically advanced 'Austronesian' groups from Taiwan into the Pacific, increasingly new data indicate the importance of technological and ecologic changes in pre-Neolithic societies in context with adaptation to maritime environments already during the Late Pleistocene. Early long-distance movements and open water crossing in Island Southeast Asia by modern humans 50,000 years ago is evident in the permanent colonization of Sahul (Australia and New Guinea) and maybe even earlier on the Wallacean islands of the Philippines where recent excavations in Callao Cave, northern Luzon have delivered the remains of a hominin directly dated through U-series to a minimum age of 66,700 ± 1000 BP.

In this paper, the current archaeological record in the context of our developing understanding of human adaptation to the fast-changing environmental conditions, and the cultural and technological changes that were occurring across Southeast Asia since the late Pleistocene are reviewed. Especially, the terminal Pleistocene and early Holocene appear to have been periods of significant technological innovation and social change as illustrated by the emergence of diverse burial traditions and the appearance of new organic and inorganic technologies across Southeast Asia. This included sophisticated fishing strategies, techniques of hafting and composite tool production, and long-distance interaction reaching as far as near Oceania. The successful adaptation to coastal and marine environments and the efficient exploitation of its diverse resources provided a refined subsistence to those early islanders, allowing them to continue their foraging lifestyle after the arrival of the first Austronesian-speaking farmers in the archipelago.

The anatomically modern human colonisation of Island Southeast Asia and Sahul 65–70kya

Chris Clarkson and Kasih Norman
The University of Queensland, Brisbane, Australia

Controversy and sparse archaeological evidence has plagued attempts to place a firm age on the colonisation of Island Southeast Asia (ISEA) and Sahul (the Pleistocene Landmass of Australia and New Guinea) by anatomically modern humans (AHMs). Recent research at Madjedbebe (Clarkson et al. 2017) and in Island Southeast Asia (Westaway et al. 2017) now provides firm evidence for AMH presence in Sumatra and Australia by 65–70kya. In Sahul we also see comprehensive evidence for fully modern human behaviour in association with the oldest sites in the form of technological, symbolic and subsistence behaviours. This paper will present the recent evidence for a modern human presence in Sahul by 65–70kya, and will examine routes and processes by which Sahul was likely colonised at this early time, as well as implications for the apparently relatively slower occupation of the rest of Sahul by 50kya.

Emergence of bladelets in the Levant and its behavioral meanings

Seiji Kadowaki
Nagoya University Museum, Nagoya University, Aichi, Japan

The Levant has been known to show a complex relationship between hominin biogeography and cultural dynamics in the Late Pleistocene. This is exemplified by the appearance of anatomically modern humans (AMHs) and Neanderthals during the Middle Palaeolithic, followed by a major cultural change to the Upper Palaeolithic and the demise of Neanderthals. Although such a complicated, long-term process was conventionally regarded peculiar to the Levant, similar processes may also have occurred in other regions, particularly South/Southeast Asia and Sahul, where early dispersals of AMHs around 70–60 ka are suggested by increasing new studies of fossil remains and archaeological sites. If this is the case, it raises a new research question about cultural characteristics and their dynamics of AMHs since the time when archaic hominins still existed. How were cultural/behavioral dynamics among AMHs related to the demise of archaic hominins? This question is also relevant to the Levant, where more data are available.

From this perspective, this paper discusses issues related to the appearance and behavioral meanings of bladelet technology in the Levant. The bladelet technology does not mark the first appearance of AMHs in the Levant but is regarded as representing a fully-fledged Upper Palaeolithic technology that most likely developed among AMH populations in the final stage or immediately after the demise of Neanderthals. The paper examines when and how this technology emerged from preceding lithic technology characterized by the Levallois methods. This study mainly uses archaeological records from the Jebel Qalkha, southern Jordan, where several sites, concentrated in an area of few kilometers,

yielded lithic assemblages of the late Middle Palaeolithic (Tor Faraj), the Initial Upper Palaeolithic (Wadi Aghar, Tor Fawaz), and the Early Upper Palaeolithic/Early Ahmarian (Tor Hamar, Tor Aeid, Jebel Humeima). Comparing morpho-metric data among these assemblages, the paper suggests a gradual process in the emergence of bladelet technology in the southern Levant rather than a sudden appearance. The paper also discusses its behavioral meanings by presenting data on the rates of cutting-edge production and by referring to studies on hunting practices over the transition from the Middle to Upper Palaeolithic.

Session 2: Resource Environments and Behavioral Adaptations

Plastic pioneers: hominin biogeography across the Movius Line during the Late Pleistocene

Patrick Roberts
Max Planck Institute for the Science of Human History, Jena, Germany

While the "Movius Line" may no longer represent a valid cultural division between Early and Middle Pleistocene hominins in South and Southeast Asia, it still offers a useful geographical and ecological window into changing processes of colonization by different members of the genus *Homo*. In this paper, I initially review the Early and Middle Pleistocene palaeoenvironmental and cultural record associated with *Homo erectus* and *Homo floresiensis* to argue for a relatively homogeneous adaptive strategy utilised by these hominins on either side of this notional line. I then contrast this to the rapid dispersal of *Homo sapiens* into South Asia, Southeast Asia, and Melanesia, from at least 45,000 years ago, associated with specialized subsistence and technological adaptations to a huge variety of environmental settings. While earlier members of our genus appear to have followed riverine and lacustrine corridors, whose situation varied with periods of climate change, *Homo sapiens* pioneered specialized survival in tropical rainforests, faunally depauperate island settings, high-altitude environments, and deep-water marine habitats. After evaluating whether this distinction may be one of taphonomic and survey bias, as well as potential methodological developments that may facilitate further investigation, I suggest that the adaptive and cultural plasticity of our species enabled pioneering colonization and occupation not previously seen in this part of the world. This plasticity enabled our species to remain in this region through ever-increasing climatic instability and become the last surviving hominin in Late Pleistocene South Asia and Sahul.

Megafauna extinctions and the arrival of anatomically modern humans in Southeast Asia

Gerrit van den Bergh
University of Wollongong, Wollongong, Australia

One of the main questions in the prehistory of Southeast Asia is how the transition from premodern hominins to anatomically modern humans took place. The youngest occurrence of *Homo erectus* in the region is dated around 150 kyr (Ngandong). For a long time the earliest known record of modern humans in the region came from Niah cave (~40,000 kyr), but recently a number of studies reporting on earlier modern human sites (e.g. Majedbebe in northern Australia: ~65 kyr and Lida Ajer in Sumatra: ~ 63-73 kyr) are closing the gap between the presence of archaic and modern hominins in the region. On the island of Flores the corrected age of ~60–50 kyr for *Homo floresiensis* suggests that modern humans overlapped in time in the region for at least 10,000 years.

It is assumed that modern humans with their package of cultural and technological innovation were

better able to exploit the available resources, and they appear to have utilized a wider range of animals locally available. It can be argued that higher population densities would have led to increased pressures on local faunas as compared to earlier times when premodern hominins were around. For example, on the island of Flores there appears to have been faunal stability for a period of almost one million years until modern humans arrived at the scene, coinciding with the extinction of *Stegodon* and *Homo floresiensis*.

Here we explore the extinction patterns of megafauna in the region and try to assess if the arrival of modern humans could have significantly contributed to the demise of megafauna elements.

Environments, resource use and maritime adaptation in Wallacea in the Late Pleistocene: comparison of modern human migration routes into Oceania

Rintaro Ono
Tokai University, Shizuoka, Japan

The colonization of Sahul (Australia and New Guinea) represents the earliest evidence of intentional and relatively long-distance, over 80 km seafaring by anatomically modern human (AMH), now possibly back to 65,000 to 50,000 years BP(cf. Clarkson et al. 2017). Recent archaeological studies and findings in Wallacea region support the hypothesis that such early maritime migration by modern human to Australia/Sahul continent could be done from islands in Wallacea (cf. O'Connor et al. 2011).

For such early migrations by ANH, mainly two major migration routes have been discussed hypothetically as (1) Northern route from Sulawesi- Maluku- the Bird Head's of New Guinea and (2) Southern route from Sumatra/Java to Banda Islands and Timor to Northern Australia (cf. Birdsell 1977; Irwin 1992; Sondaars 1989). In terms of island to island visual connectivity, Northern route has much higher connectivity than that in Southern route. On the other hand, recent archaeological studies found much older traces by AMH along the Southern route and so far all the early sites over 40 kya in Wallacea region are located along this Southern route. Overall, the specific pathways, gateway regions, level of maritime adaptation and rate of migration remain unknown.

With such understanding and current situation, I would like to compare the past environments and pattern of both marine and terrestrial resources use in the Paleolithic sites both along the Northern and Southern routes in Wallacea. The major sites I focus here are (A) Golo cave on Gebe Island (37kya–), Leang Sarru on Talaud Islands (35kya–), Topogaro caves on eastern coast of Central Sulawesi (30kya–), and Leang Leang on South Sulawesi (35kya–) for the Northern route, and (B) Laili Cave (44kya–) and Jerimalai (42kya–) on East Timor, Tron Bon Lei on Alor Island (40kya–), and Leang Bua on Flores (50kya– for AMH occupation).

Among them, Lang Sarru and Topogaro caves were or have been excavated by Ono and Pusat Arkeologi Nasional Indonesia, thus I can report the detail results of our excavation and analysis here. Interestingly, Leang Sarru only provided large number of marine shellfish and stone artefacts (cf. Ono et al. 2011), while Topogaro caves provide both freshwater, estuarine and marine shellfish with small

sized invertebrates as well as large number of stone artifacts. Yet limited number and volume of large to middle sized mammals against the larger number of shells in the site may indicate the past human subsistence strategy with strong relay on aquatic resources rather than terrestrial resources around the site. Such resources use and subsistence strategies may also cause the selection and use of lithic tools in Island Southeast Asia, and I will compare these results with other sites in wider aspect to discuss the possible co-relation between the past island environments, available resources, and AMH technology.

The Late Pleistocene environment in South and Southeast Asia

Hiroyuki Kitagawa
Nagoya University, Aichi, Japan

Climate is frequently highlighted as a key driver of biological evolution and cultural innovation in our species, *Homo sapiens*. The climate influence on technology, subsistence and cultural behavior has been examined in parts of the world with well-studied Late Pleistocene archaeological and palaeoenvironmental information, such as Europe, South Africa and the Middle East. The researchers are demonstrating that the climate have played in the structuring of human demography, innovation, and occupation of various regions during our species' expansion within and beyond Africa. However, the archaeological and palaeoenvironmental studies are lacking in certain region such as South Asia and Southeast Asia. In the last two decades, the computer modeling of past climate and vegetation has developed significantly in the temporal resolution and the credibility. To examine the hypothecated relationships between environmental condition and human behavior, particularly in the context of technological development across the boundary of the eastern and western cultural complexes, we summarized the model-based climate and vegetation reconstruction in the south and southeast Asia during the Late Pleistocene time.

Dispersal of prehistoric hunter-gatherers and roles/materials of beads: an ethnoarchaeological approach

Kazunobu Ikeya
National Museum of Ethnology, Osaka, Japan

Introduction

It is said that human beings (*Homo sapiens*) created beads around 100,000 years ago. This inference derives from the fact that shells with a hole were excavated from the Es-Skhul-a prehistoric cave site situated on the coastal region of Israel and from Qafzeh Cave on the inland area of Israel, and also from

archaeological sites in northern Africa. It is noteworthy that Qafzeh Cave is situated in an inland region that is 40 km distant from the coast. Therefore, people of that time must have brought shells from the coast by themselves. Alternatively, it is also possible that shells were obtained through trade or exchange. Furthermore, beads made of seashells or ostrich eggshells produced about 40,000–70,000 years ago have been found in Africa. Tens of thousands of years ago, human beings dispersed throughout Eurasia. They dispersed from South Asia through Southeast Asia across the Movius Line. Their beads followed along with them. This report specifically examines interactions between beads and hunter–gatherers societies during the prehistoric period, addressing issues of human dispersal and their relationships with beads. From the perspectives of ethnoarchaeology and ethno-history, the author has conducted fieldwork to investigate two societies of modern hunter–gatherers located east and the west of the Movius Line, i.e., in Southeast Asia and in Africa, respectively. Short-term fieldwork was conducted in Thailand (Southeast Asia) three times: once in August 2016 and twice in September 2017.

Results and Discussion

1) Bead Materials and the Movius Line

After arranging earlier studies of hunter–gatherer societies in Eurasia, the distribution and materials of beads can be assessed in chronological order. Subsequent observations suggest that ostrich eggshells dispersed widely through Africa, South Asia, and China. No regional difference is apparent between regions east and west of the Movius Line in terms of ostrich eggshells. They were more likely to be common in dry land environments: the habitat of ostriches.

2) Materials and Roles of Beads in Hunter–gatherer Societies

Two examples of bead utilization among modern hunter–gatherers are introduced to elucidate the materials and roles of beads. One example is that of San society of the Kalahari Desert, where people live on dry land. There, various materials are used as beads, including ostrich eggshells. People make not only necklaces but also bracelets and head-dresses using beads. The other example is the Mani society of wetland, mountain forests of the Malay Peninsula. In Mani society, fruits, roots, animal bones (Civet) and animal teeth (Hog badger) are used for necklaces. What is notable is that one necklace is made using several materials. They wear beads not only for decoration but also to show their personality or to enjoy the scent of the materials.

Results show that bead materials of prehistoric hunter–gatherers do not differ between regions east and west of the Movius Line. They differed between dryland Savannah and wetland forest as a result of ecological adaptation. Moreover, beads were surmised to be first worn for self-decoration, pleasant scents, and as charm (example of Pygmy…magical meaning). At this early stage, plant and animal materials were used as beads (example of Mani). Later, ostrich eggshells or seashells were used as materials. They required more effort and labor to produce necklaces. They were traded. At this stage, beads were possibly used also with the purpose of forging social relationships among groups or to show a group identity (example of San).

Theoretical models of cultural drift, effective population size, and iterated founder effect

Joe Yuichiro Wakano
Meiji University, Tokyo, Japan

A term in archaeology, *tradition*, may be defined as “a particular behaviour (e.g., tool manufacture and use) that is repeated over generations, and is learned and passed on between individuals via a process of social interaction” (Lycett and Norton 2010). On the other hand, in the field of cultural evolution, a term, *culture*, is used to present a similar concept to tradition. Recently, some researchers have developed theoretical models, including mathematical models, to understand cultural evolution observed in archaeological sites. Some of these studies use concepts that were originally invented in population genetics. In this talk, I will first introduce these concepts (e.g., genetic drift, effective population size, founder effect, coalescent time, fixation probability) in terms of cultural evolution or archaeology.

Lycett & Norton (2010) is an important research paper that somehow reviews previous theoretical studies in light of cultural evolution. They suggest three modes, which are termed by Demographic Level 1/2/3 (see their Fig.2). Their claim is partly based on a series of mathematical analysis (e.g. Shennan 2001; Henrich 2004). In their Table 1, these modes are hypothesized to be Oldowan, Acheulean, and Levallois, respectively. When we interpret a mathematical model and apply to archaeology data, we need to correctly understand the assumptions and structures of the model. The definition of “effective population size” (N_e) depends on the context even in population genetics. Only a vague definition of “number of skilled craft practitioners” is given in their paper. Population size is a totally different concept from population density. When archaeologists estimate population size by observed artefact density, this point is also very important. As a specialist in mathematical models of cultural evolution, I would like to comment on possible applications and extensions of the theoretical part of their study.

Lycett, S. J. and C. J. Norton 2010. A demographic model for Paleolithic technological evolution: The case of East Asia and the Movius Line. *Quaternary International* 211: 55–65.

Shennan, S., 2001. Demography and cultural innovation: a model and its implications for the emergence of modern human culture. *Cambridge Archaeological Journal* 11: 5–16.

Henrich, J., 2004. Demography and cultural evolution: how adaptive cultural processes can produce maladaptive losses: the Tasmanian case. *American Antiquity* 69: 197–214.

Invited speakers

James Blinkhorn

Post-Doctoral Researcher, Liverpool University, UK

Jimbob (James) Blinkhorn is a Palaeolithic archaeologist, whose primary focus is examining the expansions of modern humans out of Africa and into South Asia. Over the past eight years, he has led an interdisciplinary research project in the Thar Desert, western India, incorporating excavations (at the sites of Katoati and Sandhav) with widespread archaeological and palaeoenvironmental survey and sampling programmes. Recently, he has collaborated upon new studies of classic Late Pleistocene cave sites from Sri Lanka, including conducting new excavations at Kitulgala Beli Lena in 2017. This research builds upon a long-standing background of prehistoric research in South Asia, including survey and excavations as part of the Kurnool District and Middle Son Valley archaeological projects. Currently, he is working as part of the Chew Bahir project (Human Site and Palaeolake Drilling Project), synthesising and analysing patterns of Middle Stone Age behaviour in East Africa to explore dispersals from Africa.

Alfred Pawlik

Associate Professor, University of the Philippines, the Philippines

Alfred Pawlik researches the fields of Prehistoric Archaeology and Quaternary Ecology and the analysis of stone tools. His expertise covers the Prehistory of Europe and Southeast Asia, prehistoric technology and human behaviour.

He is currently an Associate Professor 7 at the Archaeological Studies Program, University of the Philippines and its Coordinator of Research. He is a multiple recipient of the Centennial Professorial Chair Award and the only archaeologist being conferred the title of University of the Philippines Scientist. He leads several multidisciplinary research projects on early human migration, adaptation and interaction in maritime environments, and the technological and behavioural advancement.

He has held positions and fellowships at universities in Europe and Asia, the Academy of Science in Tatarstan, and is Maître de Conference Associé at the Muséum National d'Histoire Naturelle, Paris. He is author of two books and co-author of three volumes, and published over 80 papers in peer-reviewed journals.

Chris Clarkson

Associate Professor, Department of Archaeology, the University of Queensland, Australia

Associate Professor Chris Clarkson obtained his PhD in Australian archaeology and lithic technology from the Australian National University in 2004. After completing postdoctoral fellowships at the University of Cambridge, the Australian National University and University of Queensland, he took up a tenured position at the University of Queensland. His expertise lies in stone tool analysis, human migrations and the archaeology of Sahul, South and Southeast Asia.

Patrick Roberts

Team Leader, Group Leader of the Stable Isotope Laboratory, Department of Archaeology, Max Planck Institute for the Science of Human History, Germany

Patrick Roberts received his BA in Archaeology and Anthropology, MSc in Archaeological Science and DPhil, entitled ‘Fruits of the Forest: Human stable isotope ecology and rainforest adaptations in Late Pleistocene and Holocene Sri Lanka’, at the University of Oxford. As group leader of the new Stable Isotope Research Laboratory at the Department of Archaeology, Max Planck Institute for the Science of Human History in Jena, Patrick is committed to applying stable isotope methods within multidisciplinary research programmes that are focused on human palaeoclimates, palaeoenvironments, palaeodiets, and palaeomobility. In particular, Patrick specialises in the study of the adaptations of Late Pleistocene humans expanding into South, Southeast Asia, and Melanesia, and wider discussions regarding the viability of tropical forest habitats for long-term use and occupation by our species. Patrick is also interested in using archaeology to inform the modern conservation of ecological and cultural heritage in different global tropical environments.

Gerrit van den Bergh

Lecturer, the Centre for Archaeological Science, the University of Wollongong, Australia

Gerrit van den Bergh obtained his PhD at the University of Utrecht, The Netherlands, on a study of the Quaternary fossil fauna succession of the islands Java, Sulawesi and Flores in Indonesia. His research interests comprise the evolution of the *Proboscidea,* taphonomy, megafauna extinctions, palaeoanthropology and the transition of archaic hominins to modern humans. His current research focusses on the island of Flores, where he leads an international team of earth scientists and archaeologists who try to unravel the origin, environment and evolution of the enigmatic *Homo floresiensis*.

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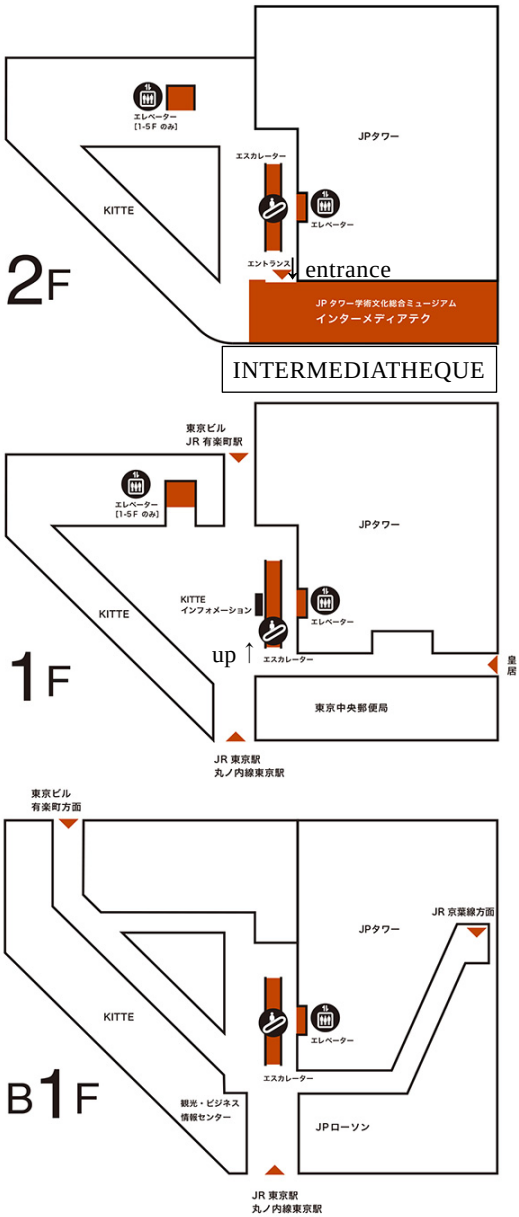

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