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## PRELIMINARY RESULTS OF A PLURI-DISCIPLINARY FRANCO-INDONESIAN PROGRAM ON THE HUMAN OCCUPATION PROCESS IN EAST-KALIMANTAN KARSTIC ENVIRONMENT

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### Abstract

Karstic environments provide a large range of rock-shelters and cave-nets and have always been „goldmines“ for archaeologists, since they allow a better conservation of remains. Therefore, the first investigations conducted in East Kalimantan by Franco-Indonesian teams have focused on the numerous and impressive karst ranges and outcrops. More than 150 caves and rock-shelters have been surveyed since 1992 in the East Kutai district only, including 36 ornate caves containing a very specific rock art expression.

Archaeological excavations, since 2003 in cooperation with central and local Indonesian authorities, have provided important insights into human history from the past (from 12,500 YBP) until the proto-contemporary periods, in a large triangular area (Sangkulirang-Bengalone-Merapun).

After seven years of investigations in the deserted area of Gunung Marang, our project has moved 50km northwest towards the Merabu district (south of Berau Province), where large karstic outcrops and a complex rock art expression are present. In addition, Lebbo' local communities are still occupying these remote territories, with a relatively traditional way of life.

Excavations conducted in Liang Abu, since 2009, have been an exceptional opportunity to combine complementary approaches, including ethno-historical, ethno-linguistic, archaeological (ceramic, lithic, archaeozoology) and genetic investigations. This aims to explore genetic and cultural links between Lebbo' communities and their living neighbours, their putative ancestors buried or deposited in caves and rock cracks and broader issues related to the settlement processes, origin and dispersal of the Lebbo' communities linked to karstic environment.

**Key words:** Caves, Rock Art, Prehistory, Karst, Borneo

### Introduction

#### A recent discovery

Since 1992, and thanks originally to the exceptional interest of one of the cavers trekking across Kalimantan provinces from West to East in 1988<sup>1</sup>, a large amount of archaeological discoveries has been later gained. Being eventually and mostly involved into the survey of caves and rock shelters of East Kalimantan's karstic outcrops, a Franco-Indonesian team, has since regularly let merge some parts of the deep past of that area which was still an archaeological blank. Altogether years after years more than 130 caves have been visited and

checked, within which, more than 30 contain totally unexpected and determinant Rock Art paintings.

During the last decade, more precisely, the last 5 years, French and Indonesian archaeologists and cavers, have chosen to mainly survey two large karstic areas located, one North of Sangkulirang (along the Sungai Baii), the second Northwest of Sangatta (along the Sungai Marang)<sup>2</sup>. Since 2007 another important karstic area, some 50 km towards NW of Gunung Marang (along the Sungai Lesan) has begun to be surveyed and archaeologically studied (see Fig. 1).

The first two large areas, each roughly spread over a 40 by 20 kms space each, appeared to be especially geologically well enough structured and rich concerning archaeological remains of all kinds. These large karsts,

uplifted from tectonic pressure movements after the Myocene, some 60 millions years ago, have developed a common feature consisting in three main geomorphological networks of cavities and galleries. The third one, has not been that much uplifted and being lower, comprises more or less only two main nets of cavities.

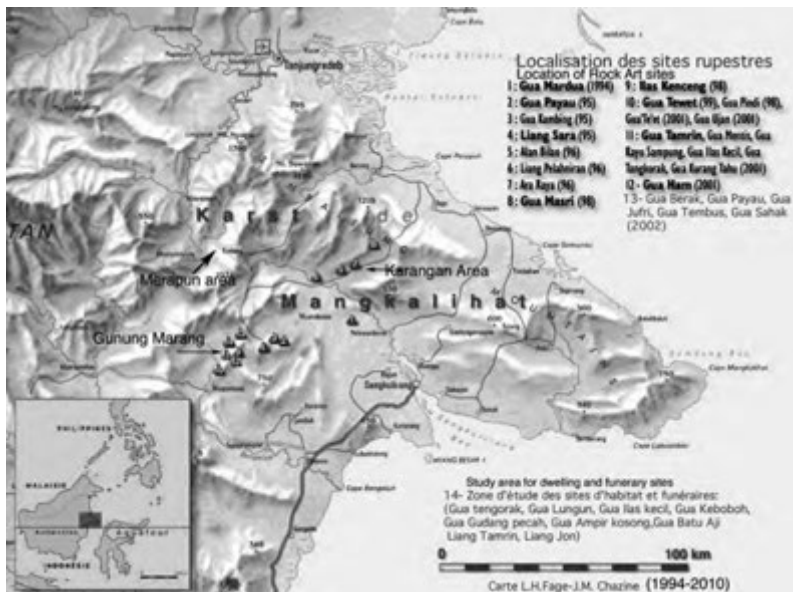


Fig. 1. A complex hierarchical cavity net use

<sup>2</sup> After many years devoted to random cavers surveys in karstic outcrops, a MOU was signed with the Puslit Arkenas, which precised the cooperation frame and level, for engaging our Franco-Indonesian teams into archaeological surveys, excavations and technical researches. We owe our warmest thanks and acknowledgment to all members of the Puslit –then Pusbang- Arkenas in Jakarta and Banjarmasin as much as Pindi Setiawan from the ITB, without whom the main bulge of our discoveries would have never happened. Thanks and regards to the many official or private authorities for their financial or logistic supports: French Ministry of Foreign Affairs in Paris and SCAC in Jakarta (2001-2010); Total-Indonesia (2001-2003); Rolex Awards (2001); Société de Protection des Banques (2002-2003); National Geographic Society (2003) and all Institutions involved without local aides, guides and boat drivers, who have permitted these discoveries.

These superposed strata, located differently in the uplifted outcrops have proved to be dwelled and used differently along the time. At a broad level of description (see Chazine, 2005, for a more precise insight), the lower one has been usually used as common or daily dwelling places since oldest periods, i.e. before 10.000 years ago, at least, before the end of Pleistocene. It contains all the classical occupation remains: food remains (bones and shells), stone tools workshops with their waste piles, charcoals and fireplaces. Ceramics are often present from surface to the upper or latest levels (surface to minus 40 to 60cm), corresponding to post-Austronesian occupation phases. Within many of the adjacent cracks or crevices, funerary ceramics associated with human bones are neighbouring with some late “Dayak” or similar cultural communities who have settled around in the vicinity and left their wooden mortuary coffin burials and displayed personal items.

An intermediate net of cavities, located between 50 to 150 m higher in the cliffs, has had various or composite uses. In a few cases, a punctual dwelling has happened, presenting smaller occupation clues than the lower level. These latter may have been used as refuge places in case of threaten from neighbouring or invading enemies. Nevertheless, the main use of these intermediate caves, cracks or dry rock shelters has been devoted towards succeeding funerary purposes.

There, a very large amount of earthen funerary urns presenting a large set of differentiated decorations had been regularly observed during 2001” to 2007” field sessions. During 2004’ field session, while extending a new test pit in Keboboh caves complex, our colleagues Jatmiko and Udin have also unexpectedly unearthed two burials. Once unveiled from surrounding deposits, they appeared to be in a flexed position, a feature, which would correspond to a pre-Austronesian inhumation process, i.e. before 3.500 years B.P. These two burials have been completely extracted with the contribution of Dr. Harry Widiyanto late 2006”, but DNA and C14 determinations have not yet been successful, postponing thus any common substantial report.

The third level of cavities, practically located up to 300 m high, has not provided until now, any if almost no occupation remains but paintings. Some of these caves contain a totally specific Rock Art expression (see [www.kalimanthrope.com](http://www.kalimanthrope.com) website for detailed pictures), which induces to interpret these places as having had a very specific function. We will see later in this paper, what kind of activities the particular isolation, remoteness and emptiness of these caves and rock shelters would have had in the past.

This natural stratigraphy, which has been selectively exploited for cultural and precise goals, is one of the specificities observed in East Kalimantan's (inasmuch as Palawan's) karstic outcrops (see locations on Fig. 2). The regularity of that distribution (29 positive cases upon a total of 32) makes it a noticeable landmark, which local communities have themselves emphasised.

### **Ethno-historic surveys**

The short summary below presents the results of recent ethnographic surveys late 2009/2010. Basically it will relate the spatial and geographical dimensions of the Mangkalihat Karstic range to the cultural background/ethnicity of these people in order to distinguish them from their Dayak and Punan neighbours (who all came from the interior of East Kalimantan, the Apo Kayan /Bulungan areas).

Therefore, the different uses of the caves/rock faces by Ulun Lebbo’ in the Lesan valley based on the 14 different locations surveyed have been more precisely sorted:

1. The openings in the upper parts of the caves were used in the past as observation sites (especially Liang Ketepu, GuaBadak/Liang Tengkorak...), as the smoke coming from the neighbouring Dayak raiding parties could be seen from above ;
2. A refuge area from the head-hunters during the same period. The Lebbo' living in scattered swiddens locations would move temporarily to lower mouths and openings in the Karstic caves to hide themselves (they would do the same during rainy, bad weather spells, from December to February and in May);
3. Cavities were used as burial sites for monoxyle log-coffins (*lungun*) and the dead rolled in bark cloth, pandan and rattan mats (*kelasa*'), circa 1840s-1960s ;
4. A sample of the grave goods has been checked, it include trade items (Malay brass objects, Chinese/Dutch/English ceramics, glass beads...) and local Dayak goods (*parang* blades, *beliung* head...) besides items produced or gathered by the Lebbo' themselves (dart quiver (*telo*'), carved wooden implements, wickerwork, animal teeth...).

Practically, the former beliefs, mortuary practices and cosmological concepts of the Lebbo' interviews have provided stories, myths, legends, ritual practices...etc related to their previous hunter-gatherers background providing links with some Rock Art representations (i.e. bees nest paintings and dances).

**Material Culture.** Currently, the main handicraft activity is basketry/wickerwork with a large range of types (storing baskets, carrying-baskets, backbaskets, pouches, bird's cages...). Both man and women do it. Most of these is made from rattan, some from bamboo, and show an elaborate decoration, in black dyed rattan – and more rarely dyed in red - on a light color ground. Geometrical and stylized patterns are varied, also of smaller size than the similar Dayak type, and the many patterns are nicely integrated in the general ornamentation of the artifacts. It will be worth comparing these patterns to those of the decorated pottery found in the caves in the Karst area. Wood carving has been studied from a small sample of log-coffins' ornamental patterns and ritual sculptures.

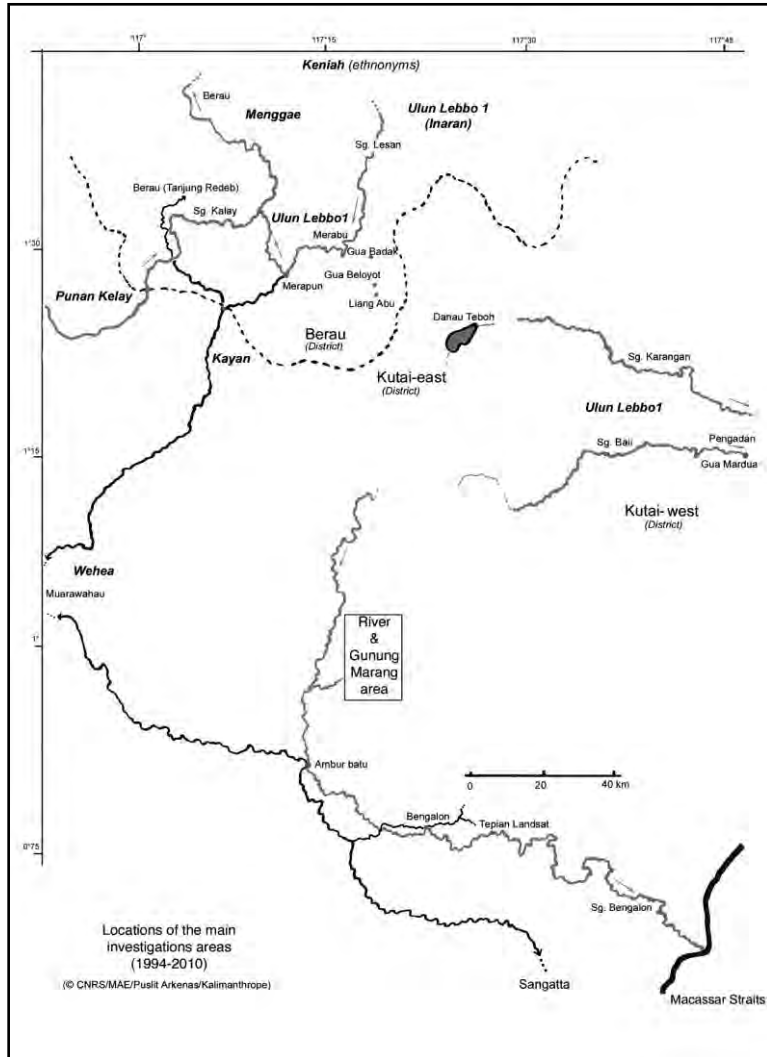
**Language.** Overall the everyday speech looks like a creolized form of Malayu/Dayak trade language - the so-called *basaumum* -, while the specialized lexicons and the oral literature retain more distinctive features, lexical links to the *Rejang-Sajau* grouping which span from the Western Coast to the Eastern coast of Borneo. Items recorded during the survey include a Swadesh basic world-list (SWL 200 words), phonology, verbal system and affixation, sets of simple sentences, adjectives, superlatives, conjunctions, interrogatives, kinship terminology, animals and plants names, personal names. Samples of oral literature, an invocation (*jampi*), sections of an epic (*tenar*), *tiva*' songs have been taped but not yet transcribed. The recent changes (lexicon, phonology) from the Lesan'Basap' isolect to the current Lebbo' speech have been documented.

**Settlements patterns and history.** The oral history of the people in Merapun, Merabu and Mapulu shows that they have come most probably from the coastal area of Talisayan. Three main routes connecting the Eastern and Western areas of the Karstic range are known, from North to South :

- The Tabalar River route to the Tintang area and then in directions of the North (Inaran) the West (Lesan) and East (Perondongan) ;
- The Dumaring to Sangkulirang route ;
- The route from BatuPutih reaching the upper Manumbar River and down to the sea

In the past, these forest paths and river courses were used also as trade routes for the forest products (guttaperca, bird's nests, damar...) collected by the former Basap peoples - now

UlunLebbo<sup>o</sup> and UlunDarat territorial groups - in the former Kutai and Berau sultanate<sup>o</sup>s areas. The three present Lebbo<sup>o</sup> villages in the Lesan have split from a single, central, settlement, named BatuMelintang, about the 1920s (see Fig. 2).



Clearly during the last centuries these meek, non-violent hunter-gatherers, have been pushed and squeezed up by the speakers of Kayanic and Kenyahic languages, who have moved in large numbers from the Western Coast to the North Eastern coast of Borneo.

Besides the possibility of an invading population in the Talisayan-BatuPutih coastal strip, the occurrence of piracy and forest fires may have been a factor in the scattering of a hunter-gatherer/horticulturist population into the Karstic range during the last 2000 years.

Probably the people – the first settlers in the region – have been going back and forth between the coast, the coastal highlands and the rugged interior, exploring every valleys and mountains, Karstic peaks and caves. They do have a preference for walking in the range rather than using dugouts. This knowledge was stored and passed upon from one generation to another in the different communities. They still make use of it when hunting, fishing or collecting forest products, especially honey and bird's nests. Currently the whole population of the remaining Basap/Lebbo' and UlunDarat, would be about 4,000 individuals when all territorial groups in the greater region around the Karstic mountains are considered.

### **Anthropo-biological background**

Island Southeast Asia has become a key in the processes of migration, dispersal and contact from an early time period. In the late Pleistocene, these regions were situated within a southern dispersal corridor, enabling a rapid dispersal of modern humans across the Old World. Many millennia later, the development of long-distance seafaring technology eventually placed the region, and particularly its island components, at the centre of new maritime corridors that traversed vast swaths of the Indian and Pacific Ocean (e.g. Holocene expansion of Austronesian speaking populations), and reached regions as far as Madagascar to the west or Pacific Islands to the east. These exchanges have been intensified during the last millennia with the development of commercial strategies involving Arabia, East Africa, South India and Island Southeast Asia.

Within this context, the population history of Borneo (Kalimantan) is relatively unknown. Due to its location at a strategic crossroads (Indian Ocean/Pacific Ocean/Australasia/South Asia), a multidisciplinary approach, including archaeological, linguistic and genetic studies, appeared to be necessary to establish the spatial and temporal pattern of settlements and the relationship between the different settlement waves. This will be conducted through biological data collection:

We should begin soon to collect high quality biological samples in the form of saliva (and/or blood) from populations speaking three different Lebbo'' dialects (Lesan River), and two neighbouring population groups of non Lebbo'' speakers for comparisons. We plan to sample around 100 unrelated individuals per group. Samples will be collected using the most efficient kit available on the market: Oragene DNA Self-Collection kit. All samples will be collected and analyzed with informed consent protocols approved by each individual and the local community leaders. Likewise, in the second phase, populations from eastern Kalimantan will be sampled.

Linguistic/demographic data collection :

To provide an interpretative framework we will collect basic linguistic/demographic information for each biologically sampled individual, using a standard questionnaire. Information gathered will include place and date of birth, current and pre-marital community affiliation, number of children, and language(s) spoken (where spoken and in which context). Parental and grandparental affiliations will also be recorded when possible.

At a very small scale approach, contacts and explanations have begun to be provided to the local people to let them understand the interest of searching their ancestry and check it with the burial remains as much as some living samples. As far as we may appreciate their welcoming, it should be possible to verify how near –or far- from anthropological truth, their oral traditions have remained.

There too, differences between karstic environment and low land communities practices may probably reveal variations in cosmogonies and rituals associated with natural elements.

### **The importance of earthenware**

Amongst all dwelling and occupations remains largely found in the lowest, and -less frequently- in the median levels, comprising all kinds of lithic and bone remains (to be more precisely presented later in this paper), the earthen wares are bearing a large amount of directly readable data. As it is limited to the "Austronesian techno-culture" phase, starting around 3,500 years ago, it is too early to consider it as a general objective "leading fossil" or "chronological marker". Nevertheless, at least for East-Borneo prehistory, its main characteristics may be used for discriminating styles and periods, inasmuch as local firing processes.

Since our cooperative archaeological Franco-Indonesian program has started last 2003, implying excavations conducted in selected caves and rock shelters, findings of different kinds of earthen wares ceramics both on surface and within stratigraphied dwelling places layers, have enabled us to separate common and/or funerary items.

Apart and after the very first surface findings from the Sungai Baii sites (1994 to 1996), the most complete assemblage has been gathered in the Karangan, then the Marang rivers areas (1998 to 2008).

Broadly speaking, the display of motives and shapes of pots which have yet been sorted are very similar to those which had previously been excavated or collected in Sarawak, Sabah and even Palawan island and the North-Western part of South East island Asia. Some of them being directly similar to the basis reference from "Sa Huynh-Kalanay style" long ago analysed then proposed by Pr. Solheim II (Solheim II, 1964).

They show eventually not much difference with many of those which have been studied long time ago also in Sarawak", Brunei" or Sabah" sectors, by numerous and well known previous archaeologists (Harrison, Solheim, Bellwood... etc). In East Kalimantan, styles vary from the oldest periods (around 3,500 BP) to the most recent surviving influences (Iban or so-called communities), not older than 200 to 100 BP. Decorations vary from paddle and anvil technology using different cord, square carved, mat and granulated motives, to all the possible numerous incised decorations. Some cases present also geometric excised designs or motives. Stamped features (including linear "grain rice-like" impressions) may also be combined within variable incised schemes. The incised motives comprise geometric, curvilinear and/or stencilled/stamped impressions. The use of specific tools, producing sinuous designs obtained from bivalves shells (cardium-like) which has been yet found only once in Sarawak (Solheim II & Tweedie, 1959), has been now also collected within two caves (GuaTengkorak and GuaKeboboh) along the Marang river (see location map). Macro-observations show that the prints differ one from the other, indicating at least two different shells/tools and probably makers.

A different motif implying two or three narrow parallel scratching flat points has been regularly observed in the Liang Abu and the vicinity presenting a different style of decorations. From the Liang Abu" excavation squares ceramic was present from surface until some 30cm depth, whereas the mean value of the appearance of ceramics may reach 60cm. Unfortunately C14 datings are not yet converging enough to fix with enough precision the chronological spread of ceramic, be it borrowed or self masterised. Broad results show a predominance of open and flat lips but not many carinated bellies. From forms, shapes, variety of decorations (incised, stamped, paddle impressed, punctuated...etc) sizes and distribution, it is still almost impossible to decipher precisely the different uses of these ceramics. The fact is that they do not differ much from jars, which have been observed in funerary cavities or shelters. This would express a noticeable difference with the Marang area, where funerary sherds are not that much well fired although heavily decorated.

### **Lithic Technology: the “Kutai” flaking process**

Until now, compared to Gunung Sewu for instance, no real important flaking or exclusive workshop place has been uncovered, which may probably be explained by the local extreme paucity of raw materials. As observed in Marang and Merabu’s sites, the large display of geologic components (up to 10) does not mean that it was easy to find a large amount of stuff to knap with. The rather large variety is not converging towards a large amount of raw stuff. Therefore, the lithic management economy had to be adapted to the local possibilities.

They are mostly flakes, whose statistical distributions appear to vary slightly. As first stressed by J. Espagne (see 2003” and 2004” reports), then totally confirmed in Liang Abu test pits, the frequency of Kutai flakes remains proportionally high, and lasts from buried ancient levels (above 12.000 y. B.P.) to sub-surface locations. This special flake is characterised by a diminishing flaking action from the external face of the bulb, which provides an especially strong sharp curb edge, different from the Kumbewa flaking strategy. Besides this sharp edge, it provides a point in 70% of the cases. The uses of this microlith-like flake would have been mostly intended towards rattan or vegetal matters.

Nevertheless, the main bulk of the lithic technology would confirm that the “Pleistocene knapping technology” has lasted until very recent periods (some centuries ago) although ceramic technology was spread all over Kalimantan. It shows some seemingly contradiction concerning the acceptance or borrowing of foreign technics, by prehistoric hunter-gatherers. They have clearly conserved or adopted only what was corresponding to their needs and logically culturally acceptable.

Another unexpected and puzzling discovery corresponds to some lapita-like remains including teeth decorated motif and burial features similar to the Teouma cemetery recently discovered in Vanuatu, i.e. a skeleton whose head and one forearm bone have been extracted a couple of years after first burial (Spriggs & Bradford, 2005). These surprising discoveries far inside East Kalimantan may be related to the Bellwood’s obsidian flakes findings from Sabah and connected to the very first lapita-like influences, which have possibly happened and followed (somehow like a retroverse action from R. Green & A. Noury pers. comm. 2005) the complete Lapita expression eastwards of Nusantara area (Bellwood, 1984) and Papua new-Guinea (for more precise descriptions see Chazine & Ferrie, 2008).

### **Bones preliminary survey from Liang Abu**

Species represented at Liang Abu are mainly local wild boar (*Sus barbatus*) and Kanchil (*Tragulus sp.*). According to butchery marks, these species both have made up for the usual diet of the rock shelter’s inhabitants. More than 70% of breakage patterns were made on fresh bone. More than 30% of bones were burnt. Beside cooking activities (probably collecting bone marrow for broth), handicrafts have taken place on the premises such as tool making on bone (needles and spatula or awls). Fragments of ocre-tinted tortoise shell might have been used as containers or mortars for this material. Small pieces of crocodile skulls have probably been used for decorative purposes, such as stamping ceramic artefacts found on the site.

It is not yet possible to specify the kind of human settlement we are dealing with in Liang Abu, whether it is a shelter for temporary stops devoted to specific activities, seasonal occupation or permanent dwelling. An excavation should be undertaken in that aim.

Surface findings on the ground of near rock shelters in the Merabu area have provided a similar distribution of crushed, burnt and selected bones signifying that hunting games –at least during the recent periods- have been based upon the same mean animals. The numerous tiny

dry galleries and cracks opening at the level of the ground provide a huge number of shelter-holes for many animals, rather easy to trap.

### **Ornate caves**

Equally important by their number inasmuch as by their contents are the ornate caves which have been discovered since 13 years in that area. Being established by now that the oldest representations are older than the end of Pleistocene (10.000 years BP), they constitute a determining core of the South East Asian prehistory.

Mainly characterized by a high number of negative hand prints, it shows also different manners of using not only combinations but also overpainted hand stencils (for a large set of pictures see <http://www.kalimanthrope.com>). That late characteristic let it differs from all surrounding cultural expressions, and even of all worldwide examples. Its origins are not yet clearly established but analyses have proved to be dated from more than late Pleistocene (10.000 BP). Being unique in that part of the world, and presenting more links with its far neighbours from Australia, than with the closest islands (Sulawesi, Moluccas and Western New Guinea, mainly described by Kosasih, O'Connor, Delanghe&Arifin) this would induce to consider differently the settlement and cultural diffusion of Rock Art in that large area. One new hypothesis would be that long time before the end of Pleistocene (10.000 years ago) and during its move towards Australia, a group would have settled –or escaped- in that remote –and protecting because of its karstic morphology- area of East Kalimantan and locally kept that painting tradition and its usages. The fact is that there is no apparent aesthetic, neither figurative link, between the rock art painted in these caves and any ethnographic "Dayak" style figurations.

Although the presumption of a specific "Austronesian" origin has been proposed and would for many cases fit there with the local "prehistory of history", mainly in East Nusantara, by some scholars (Ballard, 1992), that explanation does not match observations for East Kalimantan.

The presence of a few general figures in some caves, presents some analogies, with some common symbolic "ideograms", in frequent use in South East Asia. For instance, the arborescent feature found in GuaTewet linking a minimum of 9 differentiated negative hand prints, may evoke possibly the universal "tree of life" scheme.

Apart that possible reference with some "Dayak" cultural expression, it would possibly also be perceptible in what seems to represent the large bees hive and the "honey tree" painted in Kerim cave. It is known from ethnography (Van Geddes, 1959; Hopes, 1997), that much respect was paid to any honey tree and a specific dance used to be performed by communities, after or against bad or difficult events or periods.

Would these representations ("tree of life/honey tree") and customs (honey tree dance) pre-exist before the arrival of Austronesians, followed themselves later by generic Dayak cultures, is still a possible hypothesis. This late one is forming the bulk of possible eventually consequences of the contacts between Pleistocene populations, long time settled in South East Asia. Samples from Niah or Tabon, show that peoples -Homo sapiens sapiens- were already living there since 30 to 50.000 years, compared to newcomers like Austronesians, some 5.000 years ago only. What kind of exchanges or inter-influences have thus and then happened, and in which directions, is still a puzzling question, breeding discussions between specialists.

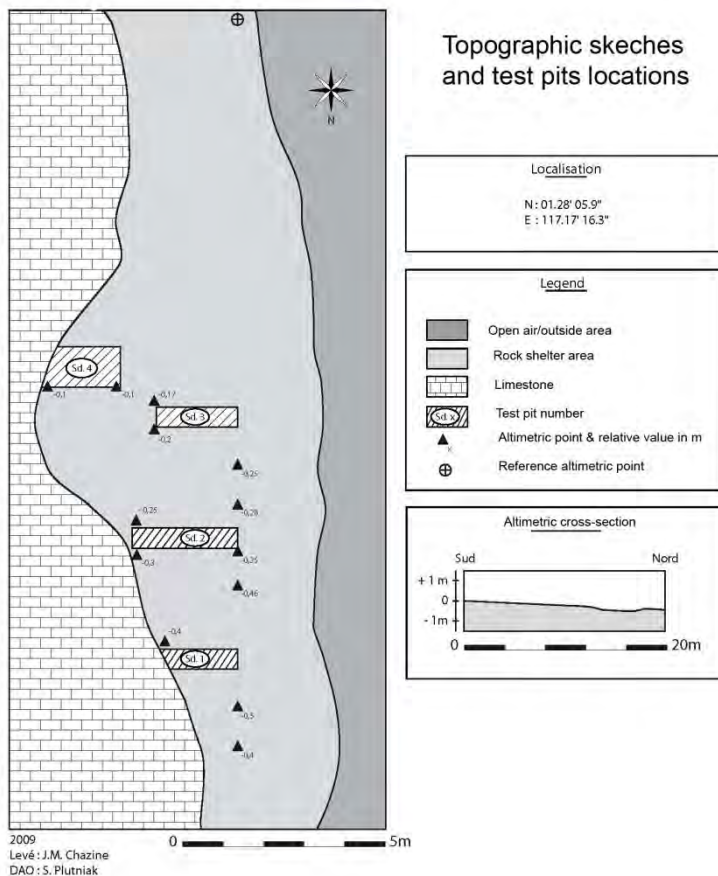
The amazing number of cavities, automatically related to any karstic environment has provoked a specific adaptation from the dwellers and somehow framed beliefs and rituals slightly different from their original featuring molders.

## Conclusions

As a matter of fact, birth origins of "Lapita cultural complex" inspiration is still a question debated between scholars (see the numerous Lapita and IPPA Symposia held since the past decades). It broadly varies from Eastern to Western sides of New Guinea, and our late discovery is more precisely trending towards the Western origin or clustering area. Other sites from insular SEA have also provided somehow lapita-like ceramics, although not using the very specific dentate stamped technique.

Some of the most well-known originate from Kalumpang area (Sulawesi) and Talaud islands, or even in and around Taiwan, have already been described by Bellwood (1997). The appearance of such ceramics in East Kalimantan, corresponding simply to the extension westwards of its possible influence, is just enlarging the probabilities area and does not present any contradiction with already established hypothesis.

## Liang Abu



The very remote location of these human dwellings and occupations may be directly linked to the specific karstic environment. During the settlement process, these places have probably been first explored for their numerous hidden places and then occupied for safety reasons as emergency refuges. That process would explain that not all -and even a very small number of- "Austronesian" technico-cultural items have been adopted and definitely influenced, i.e. changed the life of previous Borneo forests Aborigines. The remoteness of all karstic outcrops has probably had an important influence, functioning not only as emergency refuge places, keeping thus their tracks in caves as much as themselves under protection but transforming them too into a somehow "living heritage" area. This has many incident consequences forcing the whole contemporary community to study and protect it as much as possible.

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