Space Composition of Mesolithic Caves Habitation in Karst Area “Bukit Bangkai” Tanah Bumbu, South Kalimantan: Wetland Archaeological Study

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Abstract. Geologically, the karst area of “Bukit Bangkai” is located in the southeastern part of the Meratus Karst Mountains, South Kalimantan. The landscape of the “Bukit Bangkai” karst area is partly in the form of karst hills and is inseparable from the swamp landscape which is adjacent to the river and the coast. In the karst area of “Bukit Bangkai”, numbers of cave habitations and rock shelters have been found. In the cave habitations area, numbers of Mesolithic devices have been found, food scraps which accumulate in kitchenmidden, the distribution of cave paintings and burials. Based on the research data, it can be stated that numbers of habitation caves and niches are Mesolithic residential caves. As a Mesolithic residence cave site, it has not yet been studied about the space composition of residential cave spaces that carry out the distribution of cave habitation for the sake of residential space, kitchenmidden space, rock paintings and burial space. In this research, it stated the structuring residential cave space in conjunction with the swamps or swamplands landscape. The renewal of the results of this study is about spatial planning of Mesolithic caves habitation in swamp environments. Previous research on structuring Mesolithic caves habitation was associated with dry land landscapes, such as Mesolithic cave habitation in the Maros-Pangkep area, South Sulawesi. Thus, the renewal of this research can be used as a reference for Mesolithic cave patterns in the swamp landscape environment or swamplands.

1. Introduction

The “Bukit Bangkai” karst area is one of the Meratus Southeast Mountains karst areas, located in the Dukuhrejo Village area, Mentewe, Tanah Bumbu, South Kalimantan. The “Bukit Bangkai” karst area consists of several karst hill groups, including the Bukit Liang Bangkai karst cluster, Liang Batu Ukir, Liang Susu, and Bukit Liang Jago [3]. Based on Bemmelen’s report [3], the karst hill cluster was formed in the Quarter and when the Holocene is continuous with swamp deposits and this environment is categorized as karst which is in a wet or wetland swamp environment. As one of the karst hill clusters in the wetland environment, based on archaeological data sources, the Bukit Bangkai karst area was inhabited by humans about 6,000 years BP, namely at the level of Mesolithic culture. It can be traced from the Mesolithic tools, remnants of kitchen waste, and human remains or Mesolithic graves findings in the Bukit Bangkai karst area.

The distribution of the Mesolithic cultural heritage mentioned above, among others, are found in numbers of residential caves located in the Liang Bangkai karst, the Liang Batu Ukir karst cluster, the Liang Susu karst cluster and the Liang Jago karst cluster. All of these karst clusters are the Bukit Bangkai karst area [3]. The distribution of Mesolithic culture which is around 6,000 years BP, is found in several Mesolithic rock shelter, namely Liang Bangkai number 13. The cavernous Mesolithic rock shelter, Mesolithic niches number 12, caverns of Mesolithic rock shelter number 10 and the caverns of Mesolithic rock shelter number 13. Mesolithic rock shelter in the cluster of Liang Batu Ukir karst, namely Liang Batu Ukir Sector 1, Liang Batu Ukir Sector 2 and the Liang Batu Ukir Sector 3 [25]. The distribution of Mesolithic rock shelter in the Bukit Liang Susu karst cluster, namely Liang Susu and Ceruk 1 of Liang Susu. The distribution of Mesolithic rock shelter in the Bukit Liang Jago karst cluster,
namely Liang Jago Mesolithic rock shelter: Liang Susu Mesolithic rock shelter: Ceruk 1. The
distribution of Mesolithic rock shelter in the Bukit Liang Jago karst cluster, namely Liang Jago
Mesolithic rock shelter: Ceruk 1.

The findings of archeological remains in the form of Mesolithic stone tools, food scrapes that
accumulated in kitchen waste, various numbers of cave wall paintings types, and Mesolithic grave
remains are indicated as the main markers of a Mesolithic rock shelter in the karst area. Based on
numbers of Mesolithic karst cave dwellings research in Indonesia conducted by [28], it can be stated
that there are certain patterns or certain conditions that must be met as rock shelter. In other words, not
all caves in the karst area can be used as residential or half-settled dwellings in the Mesolithic period.
The results of Truman Simanjuntak's research [28], numbers of Mesolithic rock shelter caves in the karst
area of the Sewu Mountains, East Java are known to the umbrella cave type among the others. Rock
shelters are free from runoff rainwater and wind, cave dwellings are adjacent to water sources and the
cave rooms must be exposed to sunlight throughout the day and close to food resources both from the
land and aquatic environments [28].

Based on the aforementioned brief review, this paper will discuss the spatial arrangement of
Mesolithic housing caves in the Liang Bangkai karst area in the wetland environment of South
Kalimantan. Up until now, this research has never been done, especially cave karst rock shelter in the
South Kalimantan environment. This is based on a theory that a rock shelter including a Mesolithic karst
rock shelter has a spatial pattern. This study covers the description of the location of the Mesolithic
Karst cave occupancy, the direction facing the cave, the position of the cave towards sunlight, cave
humidity and the cave environment in relation to the natural environment [30].

2. Methods
Systematic research methods are needed to answer the problem. Steps of work or research methods in
archeology, namely data collection, data processing (analysis) and interpretation of data (conclusions).
The data collection phase consists of field observations and literature studies. A literature study includes
the collection of bibliography relating to research. Data collection is the stage of interpretation or
analysis of data. At this stage, data processing has been carried out previously collected. The stage after
data collection is the stage of interpretation of data analysis. At this stage, data processing has been
carried out previously collected. The final stage is the stage of interpreting the data. At this stage, the
analyzed data is summarized to produce a conclusion. The conclusions generated are based on the
problems and research objectives that have been stated previously.

Data collection methods are ground level surveys based on macro-scale, semi-micro and micro
scale [6]. The research objectives include a number of Mesolithic karst cave rock shelter with some
requirements, namely rock shelter containing the findings of Mesolithic tools, food debris accumulated
in kitchen waste and the distribution of cave wall paintings. In line with this paradigm, the Mesolithic
karst rock shelter caves that became the research base were the Mesolithic karst dwelling caves in the
Bukit Bangkai karst cluster is the Mesolithic karst rock shelter cave Liang Bangkai 1, Liang Bangkai
rock shelter caves: Ceruk 11, caves of Liang Bangksi: Ceruk 12, Linag Bangksi caverns of Mesolithic
karst rock shelter Liang Bangkai 1, Liang Bangkai rock shelter: Ceruk 11, Liang Bangkai rock shelter:
Ceruk 12, Ceruk 12, Cave of the Liang Bangkai: Ceruk 10 and cave of the Liang Bangkai: Ceruk 13.

The rock shelter in the cluster of Bukit Batu Ukir karst includes the shelter of Liang Batu Ukir:
sector 1, Sector 2 and Sector 3. The cave of rock shelter in the cluster of karst Liang Susu are cave Liang
Susu rock shelter and Liang Susu rock shelter cave: Ceruk 1. Cave of Mesolithic rock shelter in the
Bukit Liang Jago karst cluster which is Mesolithic karst rock shelter cave Liang Jago: Ceruk 1. Ceruk 1.
Matters of concern of this research are the arrangement of the cave space of Mesolithic tools,
*kitchenmidden* of Liang Jago which is the cave of Mesolithic karst occupancy, cave wall paintings and
living rooms. Cave lesions occupy Mesolithic karst in water sources, sunlight and the natural
environment.
3. Results and Discussion

3.1. Description of Mesolithic Karst Residential Room Arrangement in Liang Bangkai Karst Area

3.1.1. Cave of Mesolithic karst Liang Bangkai 1

Cave of Mesolithic Karst settlement Liang Bangkai 1 is one part of numbers of Mesolithic karst dwelling caves in Bukit Liang Bangkai. The rock shelters are categorized as umbrella caves consisting of cave rooms, cave passages 1 and cave passages 2. The cave faces towards the west (W270°). The residential cave room consists of the inner cave room, the cave yard, the mouth of the cave and the ceiling of the cave. In the room of the cave yard, there is a distribution of Mesolithic tools and kitchen waste in the form of Gastropod’s shellfish remains, such as Tiaridae, Pupinidae, Limmaidae and Tiaridae. Also, there found to have the remains of carapace turtles, poultry and vertebrate animals. The distribution of Mesolithic tools consists of shale tools, core stone, molding axe, and tools as well as taper tools. The inner cave room is used as a semi-permanent residence, given the condition of the roar of the cave is very dry and not humid. The entire floor of the cave is a cave yard, the mouth and the room of the cave are in dry conditions and not humid. The entire room of the cave are all-day-exposed to the sunlight thus the intensity of sunlight is appropriate for the development. The cave is well-ventilated, resulting in the condition of the cave that is not moist and dry throughout. The high cave ceilings form umbrellas extending and forming a niche, so that the cave yard, the mouth of the cave and cave rooms are protected from runoff and gusts of wind [25].

The condition of the passageways is very dry, receive less sunlight intensity, not well-ventilated and the hall is difficult to reach. In the hallway cave room 1 and cave passage 2, there is a distribution of cave wall paintings in the form of black geometric paintings. It, also, took the form of cave wall paintings that were half human and half animal. It is assumed that this painting serves as a marker for religious ceremonial facilities related to the worshiping of the ancestral spirits. In addition, there are also human paintings and parallel lines that cannot be identified yet.

The condition of the room’s floor surface in the cave, cave passageways, the mouth of the cave and the cave yard are higher than the surrounding ground surface. Thus, the floor of the cave yard, the mouth of the cave and the floor of the cave room are free from puddles of water from the surrounding environment, which suits well for a long-period habitation. The cave room environment of the Liang Bangkai 1 is adjacent to the underground river flow and the river water is available all year. The river acted as the water resource for daily needs in Mesolithic times. On the other hand, the residential cave environment is inseparable from the karst and wetland environment. The wetland environment enables the availability of food resources in the form of various types of water shells, river shells, marsh shells and various poultry that live in the wetland environment.

From the description of the room condition of the Mesolithic karst residential Liang Bangkai 1, it can be stated that the arrangement of the residential cave space consists of cave rooms, cave passageways, the mouth of the cave and the courtyard of the cave. The cave yard was used to put leftover food, but it was also used as a workshop for the Mesolithic tools manufacture such as shale tools, taper tools, shaved tools and shaved stone tools. Also, it was functioned as a burning place because many charcoals remain were found. In a room that is dry and receive a good amount of sunlight intensity, it seems to be used as a temporary residence. In cave passages that are difficult to reach, it was intended to present cave wall paintings and functioned as a place for religious ceremonies.

The cave of the Liang Bangkai 1 Mesolithic settlement was chosen as a residential cave, the cave room environment is adjacent to the water source and the karst and wetland environment. This is related to a reason that the cave dwelling must be close to water and food sources in the form of haunted animals and plants [25],[28].

3.1.2. Cave of Mesolithic karst residential Liang Bangkai: ceruk 11

The cave of Mesolithic karst settlement Liang Bangkai: Ceruk 11 is one part of the cave niches that located in the eastern part of the Bukit Liang Bangkai, the cave occupies the east forming a 90° azimuth towards the cave mouth and yard. The floor of the cave yard is not protected by the ceiling so the condition is not dry. There are two mouth of the cave, which is the entrance to and exit from the cave. There is a large room in the cave which floor is higher than the surrounding environment. Its ceiling is an umbrella-shaped, so that the cave is protected by runoff and wind. On the ceiling and walls of the
cave, there are various distributions of cave wall paintings of poultries (i.e. partridge, horn bills, bats) and human. All paintings are black in color [25].

Based on the ground surveys, there were no discovery of *kitchenmidden* and Mesolithic tools remnants in the cave mouth and yard rooms. Same case also happened in the room inside the cave, but it has various forms of paintings in the walls and ceilings, namely paintings of wetland animals and human [25]. Moreover, the space arrangement of the Mesolithic karst residential cave of Liang Bangkai: Ceruk 11 is presence, consisting of space in the cave, cave mouth space and cave yard space. The space in the cave is intended to be wall-painted and used as a temporary shelter, based on the absence of kitchen scraps and Mesolithic devices [25].

3.1.3. Cave of Mesolithic karst residential Liang Bangkai: ceruk 12
The Mesolithic Karst Residential Cave of Liang Bangkai: Ceruk 12 is adjacent to the Liang Bangkai Ceruk 11 rock shelter cave and this rock shelter cave faces to the east with the azimuth of E95°. The cave occupancy room consists of rooms in the cave, cave mouth rooms, and cave room. The condition of the surface of the cave floor is higher than the surrounding land surface. The inner room of the cave consists of several shallow niches, the cave passage and the cave room are partly a source of water. In the cave recesses and cave passages, there are a variety of cave wall paintings, namely paintings of animals from the wetland environment: paintings of partridges, *burung enggang* as ancestor conveyance, reptiles, and fish paintings. It also took the form of various types of human face paintings, human paintings of bee hunting and several geometric paintings [25].

Based on ground level surveys in the cave courtyard room, there were no kitchen scraps and Mesolithic remnants. Likewise, in the cave mouth room, there were also no remains of kitchen waste or Mesolithic tools. In the room in the cave also found no remnants of kitchen waste and Mesolithic tools. Considering the condition of the room in the cave is part of the water source and in small niches, the ceiling and cave walls are filled with the distribution of cave wall paintings, presumably the occupancy of Mesolithic karst Liang Bangkai: Ceruk 12 is not functioned as a temporary dwelling place, but intended as media presentations of various types of cave wall paintings as well as my Mesolithic karst dwelling Liang Bangkai: Ceruk 11 [25].

Based on the description above, it can be stated that the arrangement of the cave room is a Mesolithic occupancy of Liang Bangkai: Ceruk 12, consisting of a room in the cave, the room of the mouth of the cave and the room of the cave yard. The room in the cave is used for painting various animal paintings from the wetland environment and various types of human paintings. This Mesolithic karst dwelling cave does not seem to function as a temporary residence, because based on ground level surveys there are no remnants of *kitchenmidden* and Mesolithic tools. Thus, the use of Mesolithic karst is only used as a medium for the presentation of cave wall paintings, as well as a source of water for daily use.

3.1.4. Cave of Mesolithic karst residential Liang Bangkai: ceruk 10
Mesolithic Karst Residential Cave Liang Bangkai Ceruk 10 is a cave niche located above the Mesolithic Karst Residential Cave. The arrangement of the cave room of Mesolithic Karst occupancy consists of the roar in the cave and the cave mouth space. This dwelling cave does not have a cave yard space, because the rock shelter is integrated with the karst hill cliffs. The location of the residential cave is 5 metre above the cave of Mesolithic karst Liang Bangkai Ceruk 12, so that the existence of the cave is difficult to reach and free from wild animals.

In the room in the cave functioned as a place for graves and in the room in the cave there are several individual human graves. The corpse was buried in a longitudinal position, to the east side and facing upwards. The position of the corpse was buried in a pile and on the sides of the corpse were found remnants of kitchen waste, namely the shellfish of the order type *Gastropod Tiaridae, Pupinidae, Limmaidae and Tiaridae*. The roar in the cave is very dry, not humid and in the form of shallow niches. The ceiling of the cave room was not found the distribution of the cave wall paintings and on the floor of the room in the cave also found no remnants of Mesolithic instruments. In the room of the mouth of the cave was found the distribution of the remnants of kitchenmidden in the form of shells of the order *Tiaridae, Pupinidae, Limmaidae and Tiaridae* [25].

Based on a palaeoanthropological analysis, it can be seen that for a while there were 4 human corpses, consisting of two human individuals buried intact, one adult individual and one individual child
whose context cannot be buried. Height is estimated at around 160 cm and has affiliation with the Australo-Melanesoid race and is more dominant towards the Mongoloid affiliation. Based on the above description, it can be seen that the cave of Mesolithic Kart Liang Bangkai Ceruk 10 is a Mesolithic Karst cave which is designated as a place for Mesolithic graves. Spatial planning is divided into rooms in the cave and cave mouth space. The room in the cave is considered a sacred space and is specifically designated as a place to bury a dead body associated with religious ceremonies, namely the phase of life after death.

3.1.5. Cave of Mesolithic karst residential Liang Bangkai: ceruk 13
The cave of Mesolithic Karst Liang Bangkai Ceruk 13 is a cave niche located on the north side of Bukit Bangkai. This niche faces north which is N.15° E and consists of a room in a cave, a cave mouth room and a cave courtyard room. In the room in the cave in the form of a cave that extends to the south and on the walls and ceiling of the cave there are paintings of partridges and horn bills as human ancestor conveyance [25]. In the mouth of the cave I found a distribution of kitchenmidden in the form of the remains of the Gastropod Ordo Tiaridae, Pupinidae, Limmaidae and Tiaridae.

In the cave yard space in the form of a flat floor and its surface is higher than the surrounding land surface, thus making this residential cave free from standing water. Based on this description, the cave is used as a temporary residence and at the same time as a place of religious ceremonies associated with the release of the spirits of the dead into the natural world of spirits. Spatial planning is divided into rooms in caves for the purpose of housing and religious ceremonies, cave mouth rooms and cave yards for kitchenmidden or disposing of food scraps and processing food [28].

3.2. Arrangement of the Room of the Resident Room of Karst Mesolithic Liang Batu Ukir

3.2.1. Cave of the Mesolithic karst Liang Batu Ukir: sector 1
Cave of Mesolithic karst shelter Liang Batu Ukir: Sector 1 consists of shallow niches and is divided into rooms in caves, mouth caves and cave yards. On the walls of the room in the cave there is a distribution of cave wall paintings, namely deer paintings, paintings of people and paintings of partridges. In the room of the mouth of the cave and the cave yard, there were no remnants of kitchenmidden and Mesolithic tools. The dwelling cave faces west (W275°) and the cave room is exposed to sunlight throughout the day. Based on this description, it can be stated that this residential cave is only intended to place cave wall paintings, not as a temporary residence [25].

3.2.2. Cave of the Mesolithic karst Liang Batu Ukir: sector 2
Cave of Mesolithic karst shelter Liang Batu Ukir Sector 2, its spatial location is the same as the condition of the cave of Mesolithic karst shelter of Liang Batu Ukir 2. The cave dwelling faces towards the west namely N.275° E and the entire roar is exposed to sunlight throughout the day. The arrangement of the cave room is divided into rooms in the cave in the form of shallow niches, cave mouths and cave yards. On the walls and ceiling of the room in the cave there is a distribution of cave paintings in the form of paintings of partridges, humans, and paintings of turtles. In the mouth of the cave room and the cave yard room, there were no remnants of kitchen waste and Mesolithic tools. Thus, it can be found that this residential cave is not functioned as a temporary residence, but is intended to place a cave wall painting [25].

3.2.3. Cave of the Mesolithic karst Liang Batu Ukir: sector 3
Cave Mesolithic rock shelter Liang Batu Ukir Sector 3 is divided into rooms in the cave, the mouth of the cave and the cave yard. The room in the cave is in the form of shallow recesses and stalagmite, the roar of the mouth cave is in the form of open space and the courtyard space becomes a water resource. The direction facing this residential cave is to the east i.e. E95° and because the cave mouth space is an open space, the room inside the cave is exposed to sunlight throughout the day. Because the sun's rays occur throughout the day, the cave walls and ceiling are full of various paintings. The cave wall painting in question is a painting of partridge, various birds from the wetland environment, various creeping things like monitor lizards, crocodiles and flying frogs and some human paintings in several poses.

In the mouth of the cave I found a distribution of kitchenmidden and Mesolithic tools. The remnants of kitchenmidden in the form of the remains of the Gastropod ordo Tiaridae, Pupinidae, Limmaidae
and Tiaridae, the remains of poultry bones and bone remains of vertebrate animals. The remnants of kitchen waste are found in abundant condition as well as the remnants of kitchenmidden in the cave of Mesolithic shelter Liang Bangkai 1. The cave yard space is integrated with underground river water sources. From this description, it is known that the cave of Mesolithic Karst settlement Bukit Ukir: Sector 3 is a residential cave as a temporary residence, a workshop and as well as a cave for the presentation of a number of cave wall paintings. This statement is supported by the discovery of kitchenmidden in abundant quantities and residual remnants of stone chips in the context of processing Mesolithic tools such as shale tools, taper tools, shaved and core stone tools [25].

3.3. Arrangement of the Residential Room of the Mesolithic Karst of Liang Susu

3.3.1. Cave of the Mesolithic karst residential Liang Susu

The condition of the cave is that the Mesolithic karst Liang Susu is in a damaged condition, most of the bottom has been heavily eroded from underground streams. In the room in the cave that is on the wall of the cave there are paintings of animals and allegedly boat paintings. Boat paintings have experienced vandalism, so it is difficult to be re-identified. Residential cave spatial planning is very difficult to recognize [25].

3.3.2. Cave of the Mesolithic karst shelter of the Liang Susu: ceruk 1

Cave of Mesolithic karst dwellings Liang Susu: Ceruk 1 consists of space in the cave, the mouth of the cave and the cave yard. This dwelling cave faces towards the east at E95° and the sunshine intensity reaches all rooms in the cave. On the ceiling and walls of the room in the cave there are paintings of animals and in this room found kitchenmidden or Mesolithic tools. The condition of the cave floor in the room inside the cave is very dry and the surface is higher than the surrounding ground surface.

In the mouth of the cave there is a distribution of remnants of kitchenmidden and Mesolithic tools consisting of flake tools, point tools and core stones. The ceiling of the cave is elongated in shape, forming an umbrella so that the mouth of the cave's space and cave yard are protected from rainwater runoff. In accordance with these conditions, it allows the cave to function as a temporary residence. The cave yard room consists of several limestone hills and this allows the cave to avoid dwelling by wild animals. Besides that, the mouth of the cave is also adjacent to the underground river water source. Based on the description above, the karst dwelling cave is categorized as a Mesolithic karst dwelling cave for temporary dwellings and as a cave wall painting presentation. This is supported by the findings of kitchenmidden, Mesolithic tools, cave walls and residential cave environment adjacent to water sources [25].

3.4. Arrangement of the Residential Room of the Mesolithic Karst Liang Jago

3.4.1. Cave of Mesolithic Liang Jago karst residential cave: ceruk 1

Cave of Mesolithic karst shelter Liang Jago: Ceruk 1 is one of the residential caves located in the Bukit Liang Jago cluster, located on the western side of the Liang Bangkai karst hill cluster. The cave of this Mesolithic cave residence leads to the northeast i.e. N30°E and the sunshine intensity throughout the day reaches the cave room. The arrangement of the cave room is divided into rooms in the cave, the mouth of the cave and the room of the cave yard. The floor space in the cave is dry and the condition is higher than the surrounding land surface, so that the entire cave room is free from rainwater runoff and wind gusts. On the walls of the cave room in the cave there is a distribution of half human and half animal paintings, human paintings and animal paintings.

The room of the mouth of the cave is in the form of a wide plain and the ceiling of the mouth of the cave is shaped like an umbrella and this allows the cave room to be avoided from rainwater runoff and wind gusts. In the mouth of the cave there is an abundant distribution of kitchen waste. The kitchenmidden consists of Gastropod shells ordo Tiaridae, Pupinidae, Limmaidae and Tiaridae and the remnants of the land turtle carapace. On the ceiling of the cave’s mouth space there are paintings of animals namely birds and paintings of partridges. In the cave yard space, there is a distribution of kitchen waste consisting of the remains of Gastropod ordo Tiaridae, Pupinidae, Limmaidae and Tiaridae. The cave yard space is adjacent to underground river water sources and around the underground river is in
the form of a wetland environment that provides food resources such as various types of Gastropod shells ordo Tiaridae, Pupinidae, Limmaidae and Tiaridae [25].

3.5. Discussion
In line with the explanation of the data above, it can be said that the macro area of the Bukit Bangkai karst area is a Mesolithic karst cave inhabited by Mesolithic Austro-Melanesoid Race humans around 6,000 years BP. In utilizing the karst hill area as a residence, it is known that on a semi-micro scale, they occupy the karst caves as temporary dwellings leading to one karst area namely the karst hill cluster. Thus, the karst hill cluster which was used as a temporary shelter cave is the Bukit Bangkai karst hill cluster, Bukit Batu Ukir cluster, Liang Susu cluster and Bukit Liang Jago cluster [6].

At the micro-scale level, each cluster of karst hills is divided into Mesolithic karst rock shelter caves for burial, temporary shelter, workshop for making stone tools, as a place for pouring cave wall painting activities and as a place for religious activities to respect the origin, their ancestors. As a space for Mesolithic activities, it can be stated that at the micro level, the caverns of the Mesolithic karst are divided into rooms in the cave, the mouth cave and the cave yard. Each cave room of Mesolithic karst is functioned according to the character of each cave room. The space in the cave that is difficult to reach and hidden functions as a cave wall painting that is related to religious ceremonies such as places for painting spirits and paintings of human handlers and half animals [13].

The space of the mouth of the cave that is reached by the sun all day, is intensively used to express art activities, which are places for painting various types of cave wall paintings such as poultry, partridge, reptiles and various human paintings. The cave mouth room which is protected and in the form of a niche is functioned as a kitchen trash bin and to heat food. Residential caves adjacent to water sources, such as underground rivers and the floor surface of the mouth of the cave are higher than the surrounding environment functioned as a cave cave Mesolithic dwelling for temporary shelter. Meanwhile the caves which are located on the edge of the karst hill and protected niches function as a place for the Mesolithic grave. Generally, the burial pattern is longitudinal and with a stack system. Thus, the cave grave room was specifically chosen and intended for re-burial. This can be seen in the cave of Mesolithic Karst dwellings in Liang Bangkai Ceruk 10 [24]. From the observations it is known that the selection of Mesolithic rock shelter cave in the Bukit Bangkai karst area is inseparable from the natural environment in the form of a watery or wetland swamp environment. The consideration is that the cave of Mesolithic karst is close together and fused to the availability of food resources in the form of game animals and various types of plants that are consumed daily [5].

4. Conclusions
Based on the brief description above, it can conclude the spatial arrangement of the Mesolithic karst residential space in the Bukit Bangkai karst area, Tanah Bumbu, South Kalimantan. At a macro level, Bukit Bangkai karst area which consists of the Bukit Bangkai karst cluster, Liang Batu Ukir, Liang Susu and the Liang Jago karst hill cluster are Mesolithic cashiers inhabited by Austro-Melanesoid people around 6,000 years BP. At a semi-micro level scale, each cluster of karst hills was used as a temporary shelter, a workshop for making Mesolithic tools, religious ceremonies, burial sites and places for expressing art activities, namely cave wall paintings. On a micro level scale, each cave of Mesolithic in the karst area are divided into cave rooms, cave mouth rooms and cave yard rooms. This research reveals new finding about the spatial pattern of Mesolithic karst dwelling caves which are adjacent to the water resource in the wetland environment. This is supported by the findings of kitchenmidden and cave wall paintings of animals originating from the wetland environment.

Acknowledgments
Lembaga Penelitian dan Pengabdian Kepada Masyarakat (LP2M) Universitas Negeri Malang funded by PNBP UM 2019.
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