

## ELABORATIVE ANALYSIS OF CAVES AS SPECIFIED TOURISM DESTINATION IN MALANG REGENCY – INDONESIA

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**Abstract:** Malang Regency has variety of landscapes. In the southern part of Malang Regency, there is a karst landscape showed by the existence of caves scattered in Wonosari Formation. The existence of those caves holds an important potential as the environmental services, one of those is as a specified tourism destination. The aim of this study is to know the condition and to analyze the potential of the caves a specified tourism destination in Malang Regency. The data in this study was collected by observing the condition of the cave through the cave passage and by doing in-depth interview with the manager of tourism objects in Malang regency. Field documenting and literature studies were also being conducted in order to support the analysis of this study. Data analyzing was conducted by using interactive data analysis consisted of data reduction, data presentation, ended by conclusion drawing. The result of the study showed that 134 caves had been recorded and 49 caves been mapped. Caves in Malang Regency potentially support the specified tourism destination. This was showed by the passages varied into horizontal cave passage and vertical cave passage. Some of the caves also have long passage. Besides the variety of caves passages, the caves in Malang Regency also have variety of ornament and the condition brings the value of education to the tourists. Some of the caves have subterranean river which can be used by the people. Thus, it becomes tourists' attraction. The caves in Malang Regency are located close to coastal areas that become beach and marine tourism, so it will really support the development of caves as a specified tourism destination in the future. In order to acknowledge and enrich the society with skills dealing with the existence of caves as a specified tourism destination, the improvement of human resources should be carried out.

**Key words:** cave, cave tourism, specified tourism destination

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### INTRODUCTION

Tourism is an attraction for domestic and foreign tourists to visit an area. These visits can be carried out in various tourism destination according to the tourists' wish, whether nature tourism, religious tourism, education tourism, marine tourism, special tourism object attraction or others. The visits of tourists hold a significant impact on the social economic and the development of the tourism destination. The influence of tourist visits hold significant role in developing tourism industry and regional income, so the domestic and foreign tourists will come and visit. Besides, the large number of visits allows the potential tourism sector to increase the regional income (Purwanti, 2014). Malang Regency has various types of tourism potential, both natural and the artificial one. Based on topographical conditions, Malang Regency is located in a mountainous area which is influenced by the Tengger Mountains in the east, Mt. Kawi and Kelud in the west, and Mt. Arjuna and Welirang in the north. Then, based on the altitude preview, Malang regency is located between 0-2000 meters above sea level and shows very varied conditions, such as sloping conditions to mountainous conditions (RPIJM, 2015).

Therefore, Malang Regency has a supportive landscape. The landscape includes mountains, hills, lowland, karst and coasts. The diverse landscape conditions have the potential to create a tourism object attraction in Malang Regency. Coastal

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resource is one of potential nature tourism attraction which is distinguished into coastal water and coastal land by applying the sustainable coastal tourism concept. The concept of sustainable tourism is tourism that is able balancing the current needs of tourists and tourist destinations, while protecting and encouraging similar opportunities in the future (Tatali et al., 2018). Coastal tourism in Malang Regency is located in the southern part, which stretches across 6 sub-districts; those are Ampelgading District, Tirtoyudho District, Sumbermanjing Wetan District, Gedangan District, Bantur District, Donomulyo District. Coastal tourism in Malang Regency includes coastal and marine tourism. Beach tourism can be done with sunbathing activities, playing water and sand, doing beach sports, and others.

Meanwhile, marine tourism can be carried out by snorkeling, diving, rowing, underwater shooting, and so on. Coastal tourism can be done at Ngliyep Beach, Kondang Merak Beach, Balaikambang Beach, Tiga Warna Beach, Ungapan Beach, and many other beaches along the Southern Cross Line (*Jalur Lintas Selatan*) and the southern area of Malang Regency which attract tourists to come to Malang Regency. The rapid development of coastal tourism can also be supported by the existence of nature tourism and special tourism object attraction, one of which is cave tourism. Caves are characteristic of subsurface karst that has high value and potential as special tourism object attraction. The accessibility of the existence of the cave is not all easy to reach by vehicle, sometimes people have to walk. Therefore, to be able to enjoy this tourism attraction requires good physical conditions and the preparation of supporting equipment, as well as high costs so that not everyone can enjoy it (Harmony and Pitoyo, 2012). The form of this tourism object attraction such as in Gunung Kidul Regency provides alternative tourism other than coastal tourism such as Kalisuci Cave, Pindul Cave, Baru Cave and other caves. The cave also has its own charm to the tourists. These attractions include the uniqueness of cave ornaments, stalactite and stalagmite as well as the biota inside (Santosa et al., 2016). Basically, a specified tourism destination is related to adventurous and challenging activities found in remote areas, such as: tracking, hiking, mountain climbing, river rafting, and other activities (Brahmanto et al., 2017). In addition, the existence of cave tourism also has an impact on the economy of the surrounding citizen; for example tour guiding, toys and adventure equipment renting, food vendor, opening parking lots, and so on (Suparwi, 2017). The existence of caves also offers environmental services as seen in Kedawung Cave in Bogor which offers tourist attraction services, as fauna habitat, as a water source, and as carbon dioxide absorption (Mijiarto et al., 2014). In addition, the existence of caves on the island of Nusakambangan also has benefits for the surrounding citizen, including for irrigation activities, bats hunting and taking bats dropping (guano), and pilgrimages (Harmony and Pitoyo, 2012).

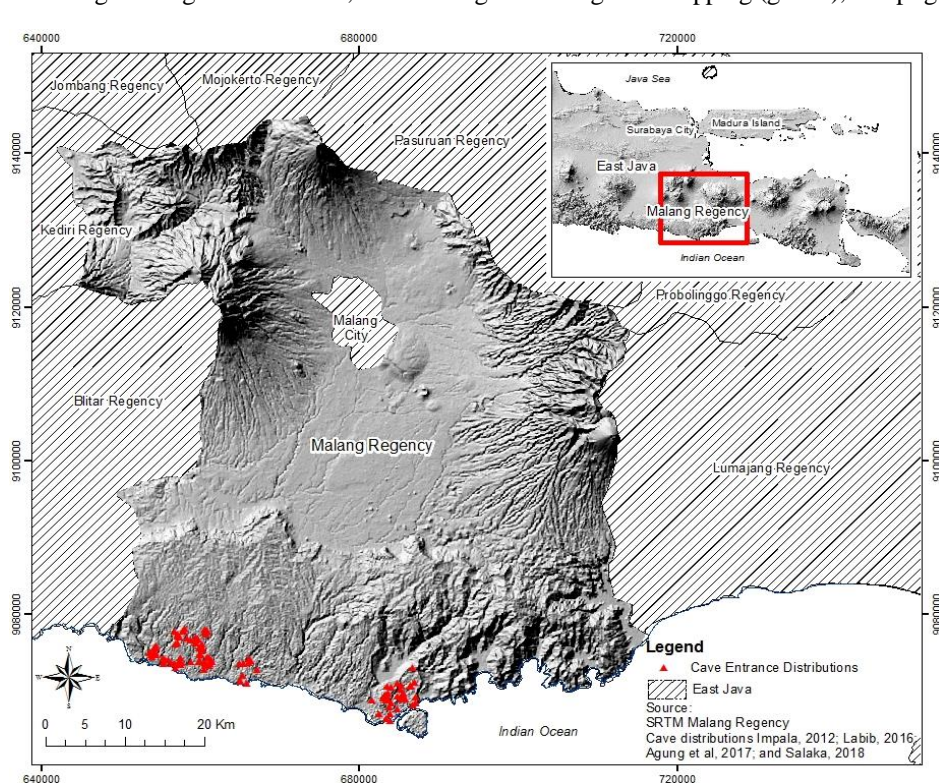


Figure 1. Cave Entrance Distributions Malang Regency (Source: Fauzi et al., 2015; Impala, 2012; Labib, 2016; Labib and Haryono, 2019; Salaka, 2018; Suprianto et al., 2017, and data collect by author, 2021)

So far, South Malang Regency is famous for its coastal and marine tourism. Tourism which is related a specified tourism destination, such as caves, has not been explored widely. Malang Regency has the potential to be developed into special tourism attraction. Malang Regency also has the potential for the existence of caves located near coastal areas. So far, there are 134 cave mouths in Malang Regency (Figure 1) that have been recorded (Fauzi et al., 2015; Impala, 2012; Labib, 2016; Labib and Haryono, 2019; Salaka, 2018; Suprianto et al., 2017) and 49 caves have been mapped. The existence of these caves has different characteristics, according to the conditions of the space in the cave. Of course the caves in Malang Regency have ornamental appearances like the condition of other caves that have been used as tourist attractions. The caves existence in the southern part of Malang regency Indonesia can be attraction object for the tourists,

for example Harta Cave, Coban Perawan Cave, Kedung Pitu Cave, Bagus-Jebrot Cave, etc. Elaborative analysis of caves and the mapping of cave passages are interesting to do before turning them into tourism destination, because the natural condition of caves is damage vulnerable so it needs mapping and deep analysis about it. The purpose of this study is to elaborate the condition of the cave and analyze the caves that have the potential to an ecotourism-based specified tourism destination.

## RESEARCH METHOD

This research method used in this research was descriptive qualitative. Data collection techniques were carried out by doing literature studies, observation, in-depth interviews, and documentation. The data collected then were identified based

on the caves existence. The writers did an observation of potential caves passage mapping and documenting to strengthen and support the data. The writers also conducted interview with the nature lovers and local tourism manager in southern part of Malang regency to dig their point of view about specified tourism destination. Furthermore, the data obtained were analyzed using interactive data analysis consisting of data reduction, data presentation, and conclusions drawing (Moleong, 2016). The collected data about caves conditions, caves mapping, documentation, and the result of interview were sorted based on the need of this research. The presentation of mapping data was in the form of map of caves conditions, photos, while the interview was analyzed descriptively. The research location can be seen in the following Figure 1.

**RESULTS AND DISCUSSION**

The things studied include the conditions of the cave, as well as the organisms in it. In addition, the cave is also a very important place in the course of human history. There are still many caves in Indonesia in particular that are not yet known and explored by humans (Suparti, 2019). This natural space can of course be entered by humans, so that humans can take advantage of and maintain conditions in the cave, considering that in the cave there are environmental services that are very important for humans such as tourist attraction services, as fauna habitat, as a water source, and as carbon dioxide absorption (Mijiarto et al., 2014). The caves in Malang Regency are still not used by the citizen, both in the use of water resources, as well as natural tourism services or special attraction tours.

The caves in Gunung Kidul Regency are designated as Geosites which is the part of National Geo-park the attract tourists (Cahyadi et al., 2017; Purnama et al., 2016) where the natural features such as subterranean river and cave ornaments inside the cave are used as visitors interactions. Besides, the caves in the area of Gunung Sewu regency geosite have vertical and horizontal passages. It also can be seen in Malang regency caves, which have the same characteristics such as subterranean river and cave ornaments (Impala, 2012; Labib, 2016; Labib et al., 2020; Salaka, 2018). The following will explain the condition of the cave on the coast of Malang Regency.

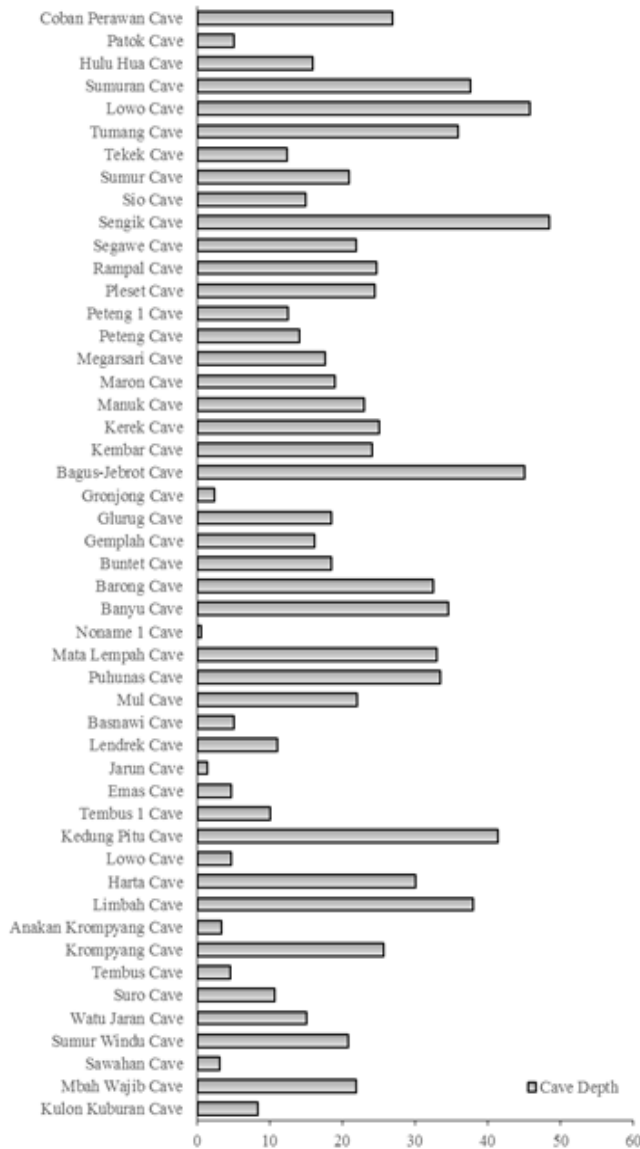


Figure 2. Cave Depth in Malang Regency (meters)  
(Source: Data Collect by Labib, 2016; Salaka, 2018)

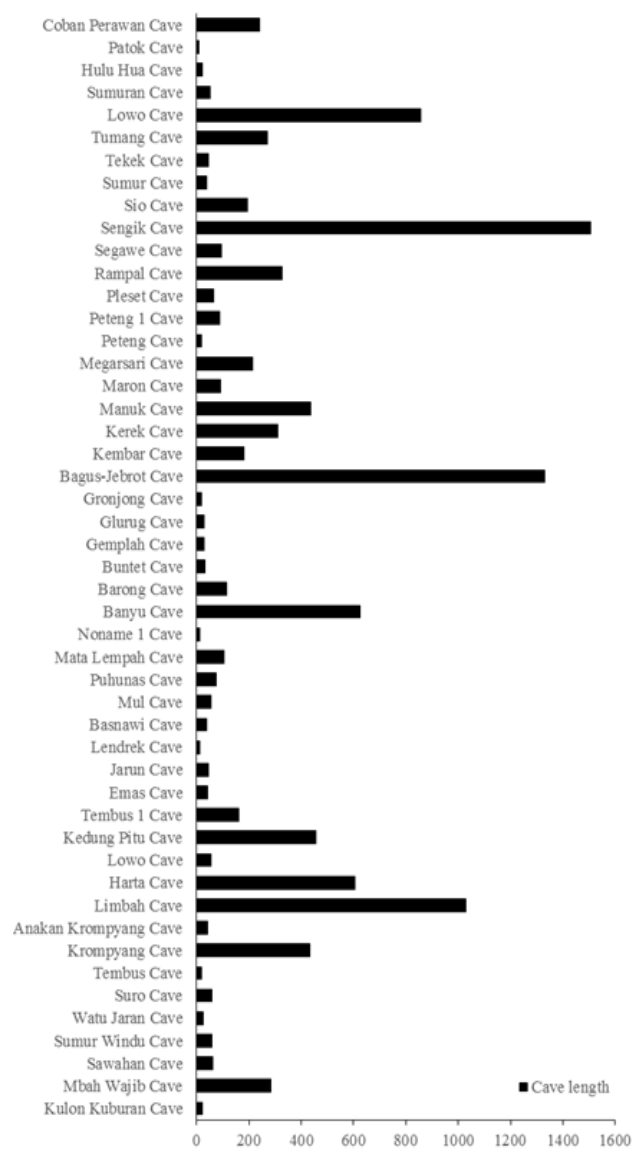


Figure 3. The length of the cave aisle in Malang Regency (meters)  
(Source: Data Collect by Labib, 2016; Salaka, 2018)



### Cave conditions in Malang Regency

The caves in Malang Regency are formed in the limestone area of the Wonosari Formation (Suyanto et al., 1992). The 134 caves that have been discovered so far and scattered in several sub-districts, including Dampit District, Sumbermanjing Wetan District, Gedangan District, Bantur District, Pagak District, and Donomulyo District. The discoveries of new caves will certainly increasing the number of caves considering the location of the wide distribution of limestone in Malang Regency. From the number that has been recorded, only 48 have been mapped by nature lovers or other communities. Only a little about the conditions in the cave is known. Quantitative information related to the condition of the cave is the length and depth of the cave (Figure 2 and Figure 3). In addition to these quantitative aspects, the condition of the cave passages, the presence of water resources, cave ornaments, and cave fauna are important aspects in the utilization of caves on the coast of Malang Regency. The cave tunnels that developed in Malang Regency have horizontal, vertical, and a mixture of vertical and horizontal passages. The existence of the passage forms the difference in elevation between the cave passages. Figure 2 shows the difference in elevation or depth of the cave passage from the highest point to the lowest point. From the picture, it can be seen that caves have a long cave system and have large elevation differences, such as Sengik Cave (48.39 m), Bagus-Jebrot Cave (45 m), Lowo Cave (45.8 m), and Kedung Pitu Cave (41.42 m) (Labib, 2016; Salaka, 2018).

Each cave has a pattern of variations in the form of a hallway in the form of a horizontal and vertical passage. In addition, caves those develop and only have vertical passages include the Sumuran Cave with a depth of 32 m, Sumur Cave with a depth of 25 m, Sumur Windu Cave with a depth of 12 m and other caves (Labib, 2016; Salaka, 2018). There are also multi-pitch caves such as Mata Lempeh Cave, Tumang Cave, and Buntet Cave. Caves are formed through a long process and have dynamics in their development. The difference in the cave passages can also be seen from the length of the cave passages. The length of this cave is calculated vertically and horizontally from the cave passage (Figure 3). Caves that have subterranean rivers appear to have long passageways such as Sengik Cave (1505 m), Bagus-Jebrot Cave System (1330 m), Limbah Cave (1029 m), Lowo Cave (858 m) (Labib, 2016; Salaka, 2018). Sengik Cave and Limbah Cave are still very possible to be mapped again considering that the mapping of the cave passage has not been completed.

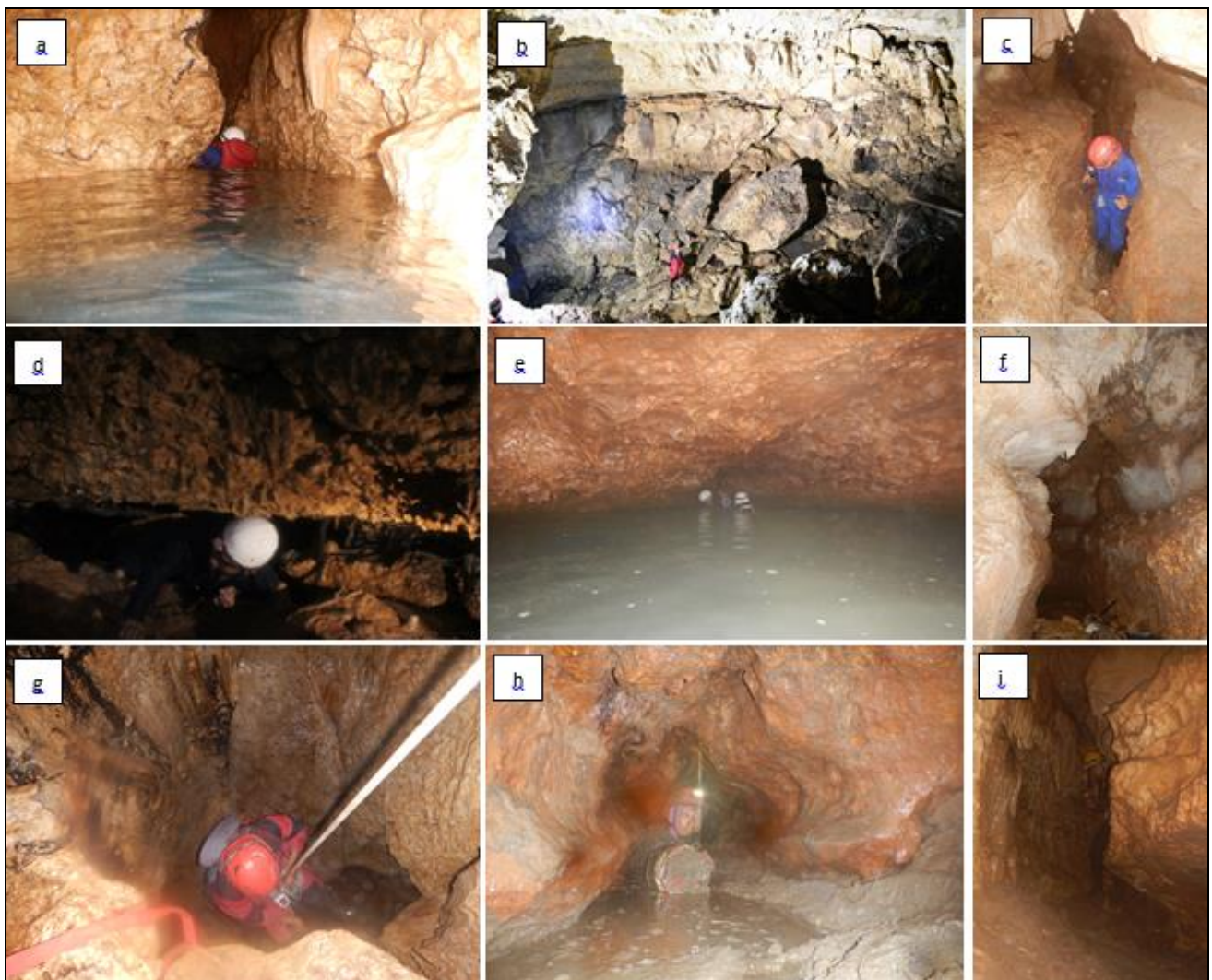


Figure 4. The Condition of the Cave Passage in Malang Regency, a- Groundwater in Kedung Pitu Cave; b- Chamber passage in Limbah Cave; c- Keyhole passage in Harta Cave; d- Small passage in Mbah Wajib Cave; e- Groundwater in Emas Cave; f- Canyon passage in Limbah Cave; g- Vertical passage in Kedung Pitu Cave; h- Small passage in Sawahan Cave; i- Kirek Cave with canyon passage (Source: Prepared by the authors, 2018-2021)



The short cave passages are generally in the form of overdrafts that do not have an subterranean river flow system. The condition of the cave passages in Malang Regency is shown in Figure 4. In Figure 4 there are caves that have subterranean rivers such as the Kedung Pitu Cave (Figure 4a), Emas Cave (Figure 4e), Lowo Cave, Bagus-Jebrot Cave, Limbah Cave, Mbah Wajib Cave, and Krompyang Cave. The presence of large chambers can also be seen in several caves, such as Limbah Cave (Figure 4b). These large rooms are generally located near the cave entrance, such as Mbah Wajib Cave, Kedung Pitu Cave, Sengik Cave, Kembar Caves, Pak Mul Cave, and generally dominated by rock debris. The existence of vertical passageways can also be seen in several caves. This vertical aisle is in various conditions of the aisle. There is also a cave which is only a single vertical passageway and does not have a horizontal passage. In addition, there is also a cave that has a multi-level passage. This indicates a significant change in the condition of the cave passage. Figure 4g shows a vertical passageway in the Kedung Pitu Cave. This passage is near the entrance of the cave and is the main access to the subterranean river. The narrowing of the passage also occurs in several caves. Figures 4c, 4f, and 4i are vertical narrowing of the cave passage, where the cave has a short passage width and a long roof. Figures 4d and 4h show a narrowing of the cave passage where the roof of the cave is low so that in conducting observations and tracing the cave passages the researcher must be in a crawling or crawling condition. Another appearance is the decoration of the cave passage in the form of cave ornaments. Ornament cave is the deposition of the dissolving process of carbonate rock. Cave ornaments can be formed in various conditions of cave rocks, both on the floor, ceiling, and cave walls. Caves in Malang Regency generally have cave ornaments, although sometimes these ornaments look dead. Common ornaments found in caves include stalactites, stalagmites, scarves, pillars, soda straw, flowstone, canopy, micro and macro-gours. These ornaments will keep developing, such as the presence of stalactites and stalagmites that are connected to become pillars. It is also common that cave ornaments are usually formed in groups due to the concentration of dissolving rock in the area. Figure 5 shows various visible cave ornaments, such as the presence of stalactite (Figure 5a), flowstone (Figure 5b, 5f, 5i), micro-gours (Figure 5c), soda-strow (Figure 5d and 5h), macro-gours (Figure 5e), and ornamentation clustered (Figure 5g).

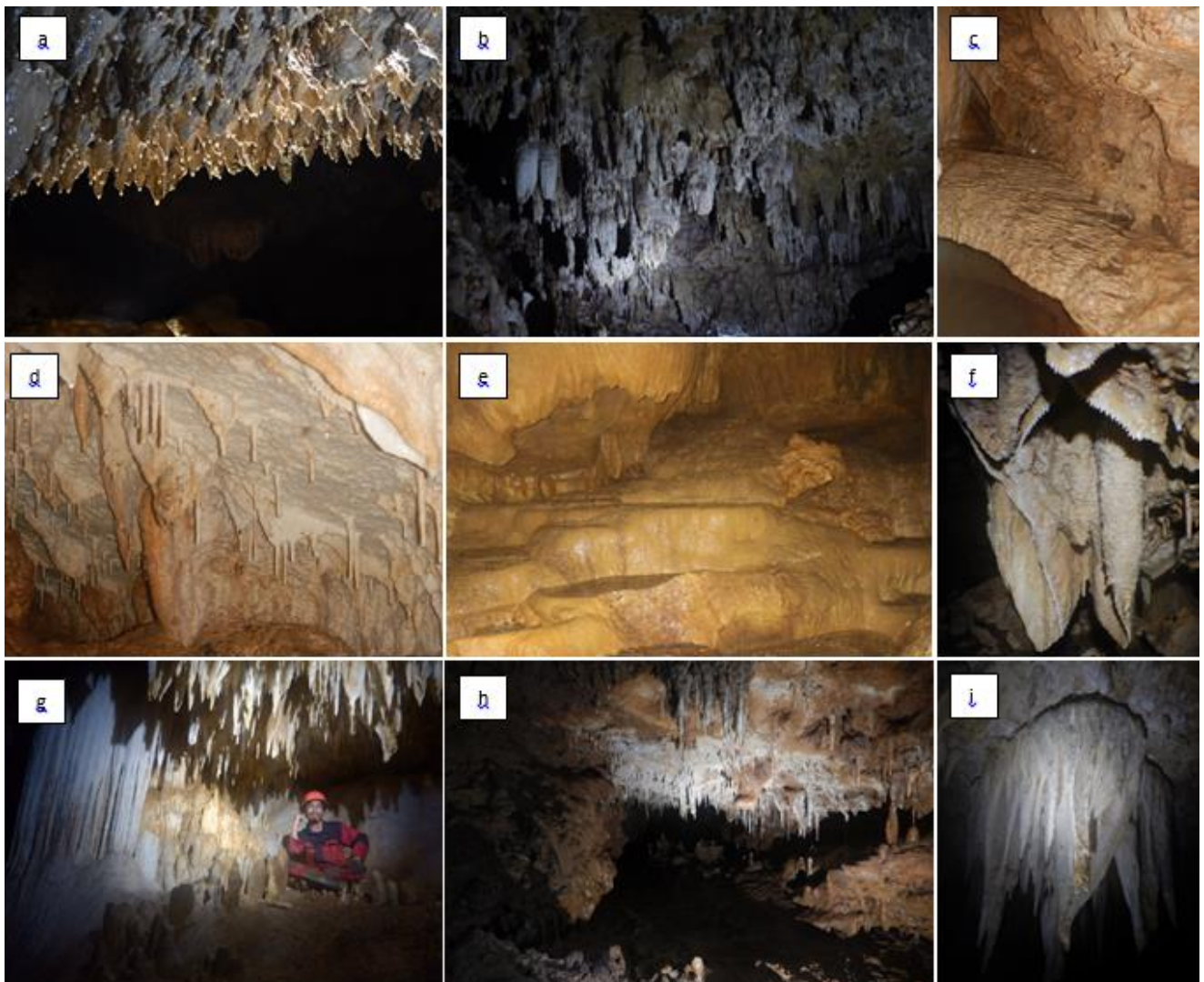


Figure 5. Appearance of Cave Ornaments in Malang Regency, a- Stalactite group in Tembus Cave; b- Flowstone features in Kedung Pitu Cave; c- Microgourdam in Lowo Cave; d- Drepery, Stalactite in Bagus-Jebrot Cave System; e- Macro gourdam in Krompyang Cave; f- Flowstone in Sumur Windhu Cave; g- Column, Stalactite, and Stalacmite in Harta Cave; h- Stalactite Sodastraw in Basnawi Cave; i- Flowstone in Harta Cave (Source: Prepared by the authors, 2018-2021)

### A potential specified tourism destination of South Malang Caves

The mapping result showed many characteristic of caves passage. A potential specified tourism destination caves have horizontal passage and offer attraction to the visitors. The caves conditions have various characterizations such as subterranean river (groundwater), caves ornaments, debris, vertical passage, horizontal passage, level of difficult and caves managers. Table 1 explains the caves conditions in Malang regency.

Table 1. Cave Passage Characterization in Malang Regency (Source: prepared by the authors, 2021)

No	Cave	Groundwater	Ornament	Debris	Vertical passage	Horizontal passage	Difficulty passage	Manager
1	Kulon Kuburan Cave			√		√	√	
2	Mbah Wajib Cave	√			√	√	√	
3	Sawahen Cave					√	√	
4	Sumur Windu Cave		√		√			
5	Watu Jaran Cave		√			√	√	
6	Suro Cave					√		
7	Tembus Cave			√		√		
8	Krompyang Cave	√		√		√		
9	Anakan Krompyang Cave					√	√	
10	Limbah Cave					√		
11	Harta Cave	√	√	√		√		
12	Lowo Cave							
13	Kedung Pitu Cave	√	√	√	√	√	√	
14	Tembus 1 Cave			√		√		
15	Emas Cave	√				√		
16	Jarun Cave			√		√		
17	Lendrek Cave				√			
18	Basnawi Cave		√			√	√	
19	Mul Cave			√	√	√		
20	Puhunas Cave			√		√		
21	Mata Lempah Cave			√	√		√	
22	Noname 1 Cave					√		
23	Banyu Cave	√	√			√		
24	Barong Cave			√	√		√	
25	Buntet Cave				√		√	
26	Gemplah Cave					√		
27	Glurug Cave				√		√	
28	Gronjong Cave					√		
29	Bagus-Jebrot Cave	√	√	√	√	√	√	
30	Kembar Cave			√		√		
31	Kerek Cave	√			√	√	√	
32	Manuk Cave			√		√		
33	Maron Cave			√		√		
34	Megarsari Cave			√		√		
35	Peteng Cave			√	√	√		
36	Peteng 1 Cave			√	√			
37	Pleset Cave			√	√			
38	Rampal Cave	√	√	√	√	√		
39	Segawe Cave		√	√		√		
40	Sengik Cave	√	√	√		√		
41	Sio Cave	√	√	√		√	√	
42	Sumur Cave				√		√	
43	Tekek Cave			√		√		
44	Tumang Cave	√	√	√	√	√		
45	Lowo Cave	√	√	√	√	√		
46	Sumuran Cave				√		√	
47	Hulu Hua Cave				√		√	
48	Patok Cave					√		√
49	Coban Perawan Cave	√	√	√		√		√

A special tourism attraction requires skills and knowledge in outdoor tourism activities. In addition, the equipment used must also fulfill the safety standards in carrying out the tour. Caves are part of a special tourism attraction, because doing cave exploration requires adequate skills, knowledge, and equipment. Visitors are expected to fully understand the safety standards in the cave because the cave is vulnerable to the environmental changes and is vulnerable to rock slide.

The condition of the cave passages offers important education for visitors/tourists. The existence of various cave ornaments, cave environments, and the development of cave passages that occurred in the past can provide additional knowledge for cave visitors who come to special tourism attraction sites. Generally, local people have the names of the halls that are considered sacred to be used as information to visitors. It is also one of the attractions for the tourists. In addition, the existence of alleys that are considered sacred is also one way to maintain the environmental conditions of the cave and cave ornaments from damage caused by tourism activities. The management of caves in Malang Regency by the citizen or agencies is still very low-graded. One of the caves that have been managed by the citizen is the Coban Perawan Cave in Gedangan District (Figure 6b). This cave is a horizontal cave and at the end of the cave passage there is a vertical passage, where water can enter the cave. In addition, to enter the cave, tourists must swim first and walk in exploring the cave. In addition, there is also a hallway that is not too big so tourists have to crouch. The Coban Perawan Cave tour manager provides complete cave tracking equipment such as shoes, buoys, flashlights, and helmets. In addition, there are guides who accompany tourists during their entry into the cave. The condition of the Coban Perawan Cave has a good ornament and there is a waterfall which is an attraction for tourists. Besides Coban Perawan Cave, the caves which located in coastal areas are also used as religious tourism such as Patok Cave and Cina Cave.

Both caves have short passages and the ornaments are not developed. Several caves in the Regency that have the potential to become a special tourism attraction objects are Harta Caves (Figure 6a). Figure 6a shows a map of the top view of the Harta Cave, where this cave has a long passage. The Harta Cave hallway has the potential to be used as a special interest tourist attraction along 70 m from the entrance of the cave, because it has abundant ornamental appearances and is safe for tourism activities. After that, it is a dangerous area, because the alley is narrow, slippery and prone to flooding during heavy rains. Thus, in its management, special policies are needed such as limiting the number of visitors who enter the cave and maintaining a distance between visitors and cave ornaments so that environmental conditions and cave ornaments are protected and tourists are also safe from potential dangers. In the management of the Harta Cave tourism attraction, a special model is needed. Harmony and Pitoyo (2012) made a management model for a special tourism attraction, where there is treatment for cave objects, surrounding communities, tourism managers, and tourists. The management of the cave is monitored on the conditions before the tour is carried out by knowing the natural conditions of the cave. For example: the humidity of the cave, air temperature, soil, and decoration of the hallway in the cave. In addition, there is a path for tourists to enter the cave passage and there are arrangements for entry and exit of visitors in the cave. If the condition of the cave contains many cave ornaments, then there must be a barrier between visitors and cave ornaments, so that visitors cannot hold the ornament. Another aspect related to the citizen around the cave must be given knowledge and skills so that they can become qualified workers and can open new jobs. Aspects of managing tourism objects, of course, also require the participation of the citizen as professionals in the field of a special tourism attraction, conducting comparative studies on existing special attraction tours, strengthening infrastructure, establishing close cooperation between the citizen, government, and private parties in promoting cave -a cave that will be used as a specified tourism destination. For tourists, this can be done by providing special tourism object tour packages that can provide education for visitors, so that visitors can receive benefits from their visits.

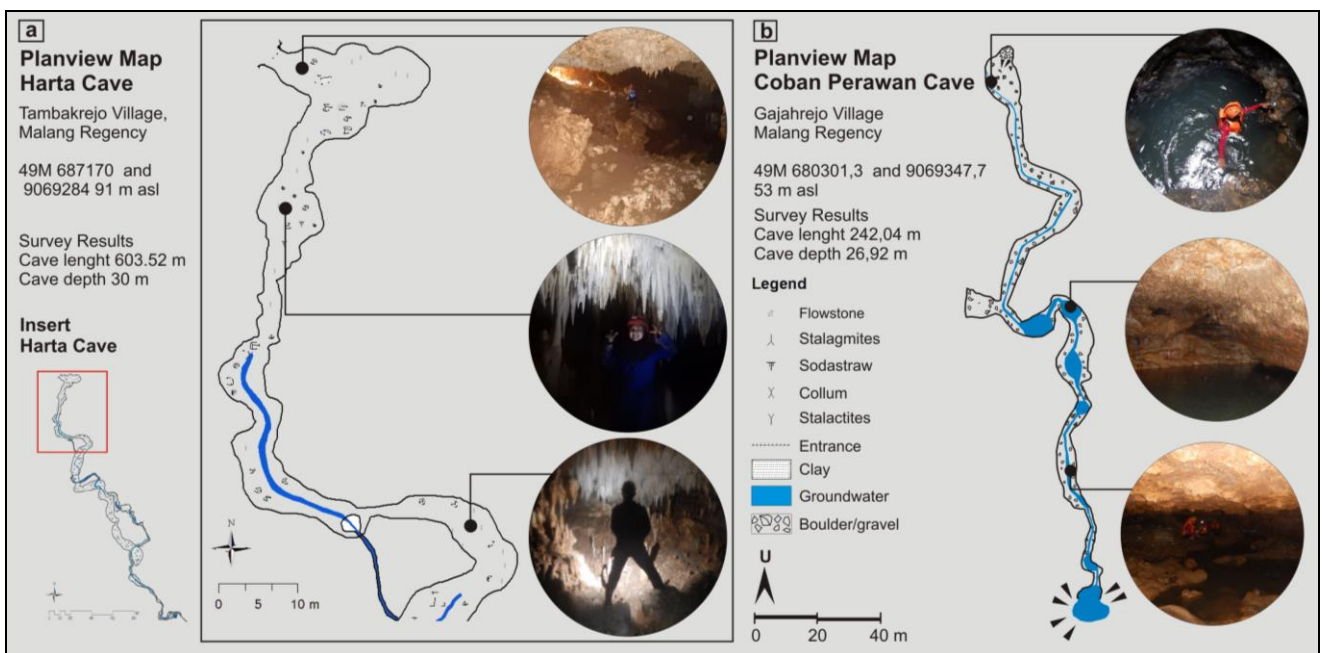


Figure 6. Map of Harta Cave (a) and Coban Perawan Cave (b) (Source: Modification of Salaka, 2018)

## CONCLUSION

The results of this study indicate that there are 134 caves that have been recorded and 49 caves that have been mapped in Malang Regency. The condition of the cave in Malang Regency has the potential to support it as a special

tourism object, for example Harta Cave and Coban Perawan Cave. This can be seen from the cave passages that have variations in horizontal and vertical passages and have long hallways. In addition to variations in cave passages, caves in Malang Regency also have a variety of ornaments and cave conditions are important educational values for tourists. Some caves in Malang Regency also have subterranean rivers that can be used by the citizen.

This potential can be an attraction for tourists who like to explore caves and tourists who have a love for the natural beauty contained in the ground surface. In addition, the caves in Malang Regency are adjacent to coastal areas which are coastal and marine tourism and are well known by the wider citizen. This is very supportive in the development of a special tourism attraction in the future. Improvement of human resources must be carried out to provide understanding and skills for the citizen regarding the existence and condition of caves, so that the management of special attraction cave tourism can be wiser and protect the environment.

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