

Teluk Gedang wood fossil on the Airbatu Geo-heritage of the Merangin Jambi UNESCO Global Geo-park, insight geo-history and storytelling concept

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Abstract. In the moment of Merangin Jambi Geo-park in sustainability UNESCO Global Geo-park. Therefore, it is necessary to socialize the current situation and development of geopark, through publications in the form of geohistory and storytelling at each geosite. One of those geosites is the Teluk Gedang Wood Fossil. The located in the Air Batu Village and Near Batang Merangin River. Taking data at the stage of geological survey on geological outcrop of Teluk Gedang Wood Fossil, and then important information from the public regarding the folklore that developed at the geological site. Geological data and analysis will be information geological characterized, such as rock type, stratigraphic succession, structural geology as deformation, tectonic story through global tectonic basement approach, and those get geohistory. The folklore obtained from public information will be deep information of unique of geological site. A integration of these two points of view to acquire storytelling concept. On the Teluk Gedang is the beginning of Mengkarang facies stratigraphy. It consists of sediment-volcanic rock, which are lacustrine facies and shallow marine facies of claystone and tuffaceous sandstone with Araucarioxylon, carbonifereous claystone, tuffaceous claystone, silstone, and tuffaceous sandstone with limestone with brachiopods and gastropods fossils intercalation. Araucarioxylon Wood Fossil is a uniqueness of this geological site, which has geometry about 2.6 m high and 1.4 m wide diameter. This fossil has grown in sediment-volcanic rock, so it has a shape like a large backrest. According to folklore there, this geological site used to be a bathing place for the lost princess of the Air Batu village a long time ago. With the uniqueness of this geological site, it really meets the criteria as geoheritage with geohistory to build a narrative between geoheritage and folklore that produces a storytelling concept

1 Introduction

Merangin Regency is one of the regencies in the Jambi Province which is geologically setting in the Barisan Range reach the border eastern edge of this zone Basin. This area is a geologically still zone leaving traces of basement from the Cathaysia Island, there is part of West Sumatra Terrane [1-2]. Geological process in the paleo-tectonic the resulted of arrangement in this area is very complex, such as the presence of fossils that characterize of shallow marine environments Fussuline fossil and also lacustrine environmental fossils such as ferns and ancient leaves, like Calamintes and Chordierite [2-5]. Geological picturesque have been exposed in this regency as if major site on the Air Batu, Merkeh, and Bedeng Rejo as geosite international value. One of the international geosite that are Teluk Gedang Wood Fossil on the Air Batu (Fig. 1). There is part Merangin Jambi UNESCO Global Geopark (MJUGGp). This fossil shows the age of the Permian approximately

299 Ma [5-7]. To be easily understood by the public community marked as 300 Ma.

The presence of Teluk Gedang Wood Fossil on the Air Batu is indicates, that are remnants of ancient land “Cathaysia Land”, it is older than the formation of Sumatra Island which approximately 95 Ma early Cretaceous specify Cenomanian age [8-10]. Certainly, this geosite will gives a lot of geological history for geoscience or geotourist in the Merangin Jambi Geopark territory as a geopark management body in the sustainability Merangin Jambi UNESCO Global Geopark.

The Teluk Gedang Wood Fossil geosite has an interesting geological history about basement stratigraphic and structure in Sumatra [11-15]. There is many interesting evidence revealed from ancient stratigraphy of the mainland of Sumatra Island through understanding the concept of geological history (geohistory), but from the most important explanation of a geosite, that connecting geological narratives with

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culture story through storytelling concept. However, cultural information from the geosite has not yet been available. While for to become a geosite in a geopark area must fulfill all three aspects including its biodiversity, so that tourists can enjoy the visit travel every geosite with geological history, cultural stories, and biodiversity. This approach can be translated using the concept of storytelling, which provides insight to tourists regarding geological site, includes geological history, biodiversity, cultures, and currently related to the geological site, and of course the mystical nature or supernatural of the geosite. Basically, tourists are more interested in the concept of Storytelling like this.

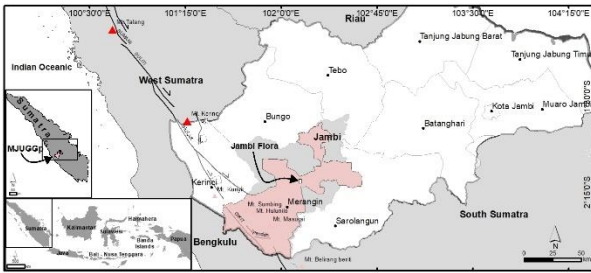


Fig. 1. The study area is located on Teluk Gedang, Air Batu Village, Renah Pembarap Sub-district, Merangin Regency, Jambi and located on the western edge of Bangko Basin. MJUGGp Territory (pink polygon). Delineation of Sumatran Fault System based on research by [1,29]. This study area is part of the Barisan Range Zone

2 Regional Geology

Air Batu Geosite of Teluk Gedang Wood Fossil is the peak part of the Bangko Basin. This basin is a form of depression zone which relatively gentle slopes between the Barisan Range bounded by the height of the Sunda Oroclinal or the western highlands of the back-arc Paleogene sedimentary basin [2, 16, 17, 18, 19, 30]. This

basin is a type of pull-apart basin, where its formation is a continuation of the Sunda Orocline pathway from the formation of Ombilin Basin in West Sumatra [14, 19, 20, 21]. This basin in the east is boundary by the height of the fault structure and folds of Duabelas Hills directly adjacent to the sedimentary basin of Paleogene back-arc, while the north-northwest is restricted by basement height the of the Ngaol Formation, Palepat Formation, Mengkarang Formation, Tabir Formation, and Jurassic Granitoid with left thrust fault structure rising from the Tabir Fault [12, 14, 18, 20, 21]. In the west-southwest it is confined by the metamorphic complex height and meta-sedimentary of Asai Formation, Peneta Formation, and Mersip Formation, Tantan Granitoid, as well as the Permian Mengkarang Formation by forming the fault structure is horizontal to the dextral fault and the thrust fault relatively of Tantan Fault. In the southeast it is bounded by anticlinorium and thrust of Paleogene sediments of Gumai Formation, Airbenakat Formation, and Muaraenim Formation Miocene [14, 18] (see Figure 1).

Stratigraphic consist of Teluk Gedang Wood Fossil is Mengkarang Formation which interlude of agglomerate and tuffaceous sandstone, tuffaceous siltstone, tuffaceous claystone, sandstone, siltstone, claystone, limestone fussuline [1, 2, 4, 14, 25]. Presence of agglomerate as product of Paleovolcanic Karing of Pennsylvanian Carbon age [1, 19, 26, 27, 29, 31, 32]. Which means, it is older than the formation of Mengkarang Formation that the began of Wood Fossil sedimentary sequence on the Teluk Gedang. In generally, the stratigraphy composed surrounding this geological site of Conglomerate Telukwang Formation, Airbatu Batholith, Tantan Granitoid, Metamorphic Asai, Meta-sedimentary Peneta, Epiclastic Kasai, and volcanic product of Masurai Volcanic Complex (Fig. 2).

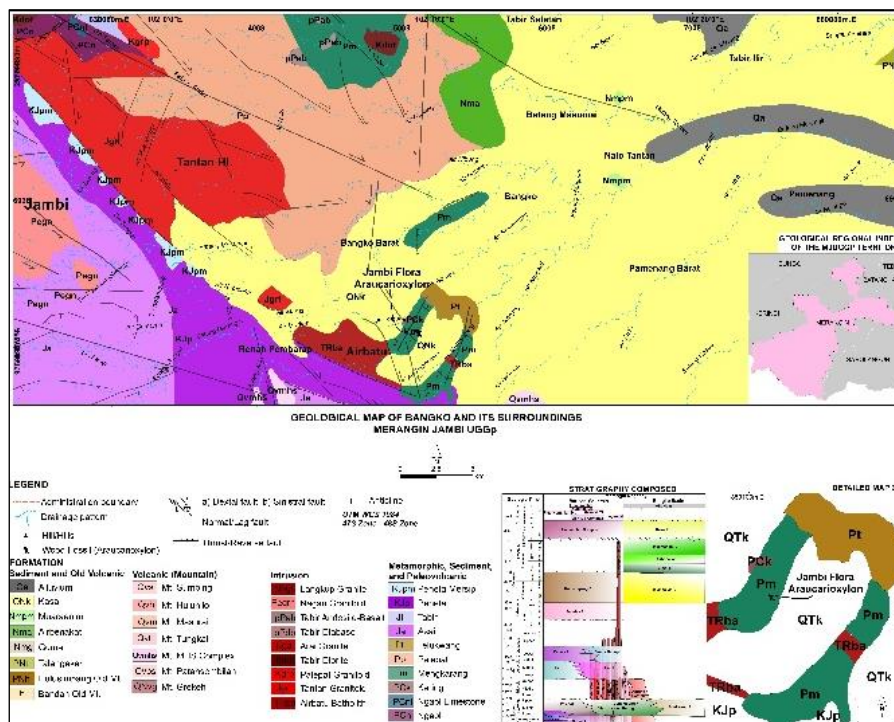


Fig. 2. Geological map of the study area on the MJUGGp (pink polygon), modified [21, 24, 28, 29, 31]

The tectonic episode of the formation of Sumatra Island provides information about the presence of Teluk Gedang Wood Fossil, because only one at this location could we find fossilized ancient wood. This means that there are differences in the geological environment of their formation and it is also believed that there are differences in the basement. There are three episodes of the formation of the island of Sumatra [1, 8, 14] (Fig. 3).

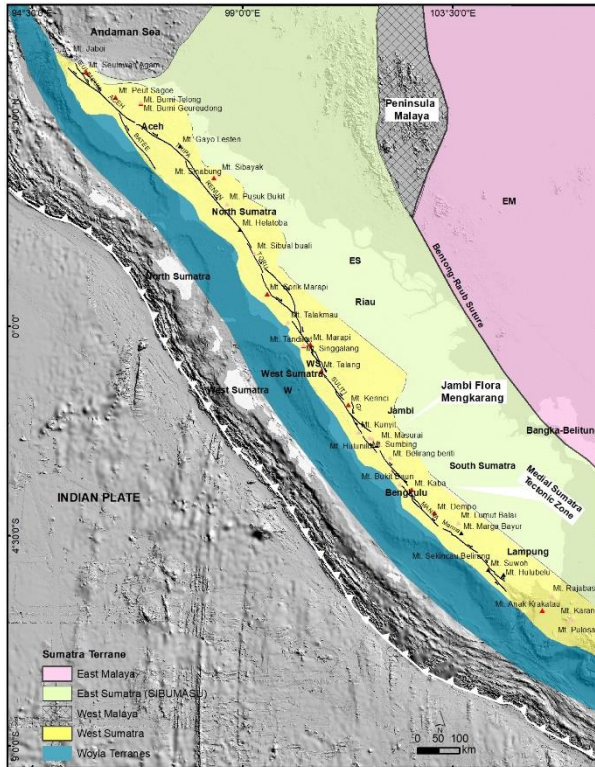


Fig. 3. Distribution of Sumatra terrane covering East Sumatra, West Sumatra, and Woyla Arc, reference adapted from [1, 8, 14]. West Malaya and East Malaya are part of Indochina Block

- i. First episode the collision between of East Sumatra terrane (SIBUMASU) against East Malaya during Permian to generate Raub – Bentong suture, while West Sumatra terrane was at the equatorial line the consequence of warm climate, so that it was very possible for flora to growth “Jambi Flora”. With this feature, it is believed of West Sumatra terrane come from/delivered of Cathaysia Land [1, 14, 19]. In this situation the West Sumatra terrane the associated subducted of Paleo-Pasific plate continued of Meso-Tethys opening.
- ii. Second episode, where West Sumatra terrane has been approaching to the East Sumatra terrane od early Jurassic the formation of Central Sumatra Tectonic Line suture [1, 14, 22, 23]. This process has followed by Meso-Tethys subduction against West Sumatra terrane edge the formation of magmatic belt along active edge of West Sumatra terrane [14, 15, 17, 24].
- iii. Third episode began with the subducted of Ngalau Plate against oceanic crust the formation Woyla Arc [8, 14]. The continued

subducted both of them gave the impact of approaching Woyla Arc agisnt active edge of West Sumatra terrane, which causes obduction on Cenomanian Cretaceous age [6, 7, 8, 14, 28].

3 Data and Method

This study was based on field work activity using sedimentary profile on the Teluk Gedang Wood Fossil. We conducted collecting data from local people, traditional people about cultural story related of wood fossil on the Teluk Gedang.

The detailed stage in the beginning of geological investigation of Air Batu Geological site on the Teluk Gedang Wood Fossil. This stage includes analyzing geological history and accumulation datas of biodiversity. Geological analysis of course integrated with previous studies. Seeking information from the local community to look for values the existing culture on this site.

Culture includes art, related traditions, worship and so on. In the past, locations that were considered attractive generally closely related to cultural values. Look for supernatural or cystic information from any geosite. Generally, location like this become a lot of mystical stories, especially related to rocks stratigraphic, sometimes used as a place of meditation, a place of mystery asking and worshipping. This information will get from the local community with contributions from Travel Awareness Organization, traditional people, guider on the trip, and other people from Air Batu Village.

The integration of all of these data to provide a geological site that has geological history, cultural, and supernatural values. Certainly also equipped with biodiversity, it is hoped that this information will be derived from a geological site story and contribute to the sustainability of Merangin Jambi UNESCO Global Geopark.

4 Result and Discussion

Observation of field activities from the nearby Teluk Gedang Wood Fossil Geosite traversed by Merangin River in Air Batu Village (Fig. 4). Teluk Gedang Wood Fossil Geosite is stratigraphically compiled by agglomerates believed to originate from the Carboniferous Karing Paleovolcanics of Pennsylvanian Carboniferous, metamorphosed claystone (metapelite), metapsamite, sandstone, siltstone, claystone, tuffaceous sandstone, tuffaceous claystone, and insert by coal. The continued of stratigraphy exposed, would seen Fussuline limestone, Brachipods limestone. This straiographic has relatively hard physical properties. These sediments were identified as forming in a lacustrine environment to delta. This means that there is only one wood fossil that was revealed in situ, in the past formation time is in the lacustrine to delta environment.

This Merangin apart from being a medium for exposed of basement rock formation constructing, but there is also used as a place for rafting. This geological

site has biodiversity growing on the land of resulted from eroded and sedimentation the stratigraphic of Mengkarang Formation on the Teluk Gedang Wood Fossil. The biodiversity like durian tree, mangosteen tree, bamboo tree, cinnamon tree, palm tree, and herbal plantation. There is part of customary forest.



Fig. 4. Overview of the Teluk Gedang Wood Fossil outcrop which is the beginning of the formation of the Permian-aged Formation. a) siliclastic rock outcrop sandstones, siltstone, claystone, tuffaceous sandstone, tuffaceous claystone with coal inserts have a dip direction to the northeast, where at this section found a wood fossil outcrop, b) close-up photo of the Araucarioxylon wood fossil [2, 3, 4, 5, 6] or Agathoxylon [19], c) side west of the sedimentary outcrop of the Mengkarang Formation, there is consist of agglomerate Karing Paleovolcanic, tuffaceous sandstone, siltstone, and claystone

Specifically Wood Fossil Araucarioxylon or Agathoxylon has diameter of 1.6 m wide, 3.3 m from the root base, 1.9 m in diameter at the distal end and 2.4 m in diameter at the proximal base was found encased in alternating layers of tuff and tuffaceous claystone on the western bank of the Merangin River. Additional this wood fossil exposed in-situ, almost half of the newly collected wood fossil were found as exsitu (western part of insitu fossil on the Teluk Gedang).

The wooden shape is like a backrest, it is said that the story is from an interview with the party a tour guide who also has tour services in Air Batu Village and is also included in the village's traditional people, namely Mr. Samsul Huda explained that, here as a princess bathing place that was once lost and doesn't know where it is, but it's believed long ago every Friday night the princess showed her form until she appeared to Air Batu Village which is almost 1 km from that location. On the other hand, before Entering the Holy Month of Ramadan, this location is often used as a place of purification by the people

Muslims before performing worship in the Holy Month of Ramadan and also known as a balimau bath. This story provides cultural information that is still preserved until now, but needs to be preserved through storytelling. Apart from culture presented, there is also vegetation or biology variety or biodiversity that emerged from the sedimentation the outcrop, like the herbal plantation on the slope rock outcrops, the mangosteen tree on top, and diversity biological life that emerges from the natural cycle of sedimentation of this geosite which signifies presence of biodiversity (Fig. 5).

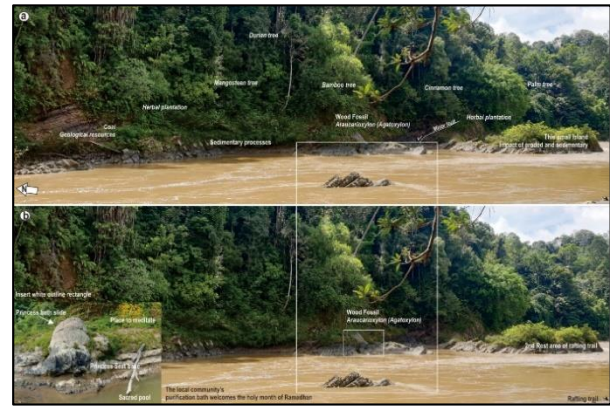


Fig. 5. View of properties Teluk Gedang Wood Fossil of International Geological site. a) properties consist of biodiversity as growing on the land as produce of geological processes of eroded and sedimentary, b) the detailed component of the fossil with formation connected to folklore or community history on the become storytelling

These three aspects include geodiversity, biodiversity, and culture as the most important thing in a geological site in the Geopark Area, especially sustainability of Merangin Jambi UNESCO Global Geopark. The outcrop formation resembling a ladder or sloping ladder was a produce of geological processes the fault structural deformation (see Fig. 5a). Small island around the geological site as a resulted of eroded and sedimentary processes. This site become second shelter of rest area for people rafting the beginning on the Air Batu Village.

On the building a geological history of the geological site for geopark, the geological site must be connected geological history, biodiversity growing on the land as a produce geological processes, and then connected to folklore or community story. It can be mystic, supernatural, spiritual, or culture story (Fig. 6).

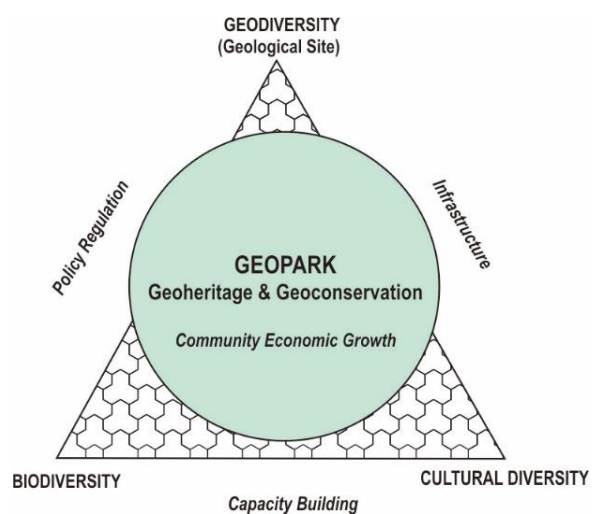


Fig. 6. The proposed conceptual model to construct and relate the geological and cultural stories of the geological site

5 Conclusion

- 1) Teluk Gedang Wood Fossil is one of three international geological site on the Merangin Jambi UNESCO Global Geopark.
- 2) Teluk Gedang Wood Fossil is one only Permian fossil 300 Ma exposed in the world. It has delivered of Cathaysia Island
- 3) This fossil has 1.6 m wide, 3.3 m from the root base, 1.9 m in diameter at the distal end and 2.4 m in diameter at the proximal base and grown in sediment-volcanic rock, such as agglomerate, tuffaceous sandstone, sandstone, siltstone, claystone, and insert of coal
- 4) According to folklore there, this geological site used to be a bathing place for the lost princess of the Air Batu village a long time ago. With the uniqueness of this geological site, it really meets the criteria as geo-heritage with geo-history to build a narrative between geo-heritage and folklore that produces a storytelling concept.

Authors wishing to acknowledge for PNPB Faculty of Sains and Technology Universitas Jambi Research Grant 2022 for permit and financial support to conduct this research. We are grateful to local people Air Batu Village and Merangin Jambi Geopark Management, Jambi for their kind support during research and specially to Laboratory of Earth Engineering and Department of Geological Engineering, Faculty of Science and Technology, Universitas Jambi.

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