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Geomythology as a Geotourism Attraction, Case Study: The Sangkuriang Legend in The Bandung Highland and Its' Surrounding Areas Based on Geological to Hermeneutics Interpretation

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ABSTRACT

The Bandung Highlands and its surrounding areas (BHLs) are rich in important geodiversity and geoheritage sites because of its values. They are of knowledge value, educational value, environmental value, cultural value, economic value, and others. An important one is the value of tradition in the form of legend, in this case the Sangkuriang in the Sunda community - the majority of the population is in BHLs even in the archipelago. All of them have made the BHLs area an important geotourism destination in West Java. Meanwhile, the development of a new sub-discipline called "geomythology" provides an opportunity to make the Sangkuriang legend important. In this paper, a study is conducted on the Sangkuring legend as a form of geomythology that is popular among the BHLs people, even throughout the West Java province. Aspects of geomythology as a branch of science in the Sangkuriang legend are dissected and related to the events of the formation of BHLs and some of the mountains that surround it, ancient Bandung Lake, and important geological outcrops in it. The results of the study found that the names and sequences of events in the Sangkuriang legend matched with the geographical names and geological history of the formation of BHLs and their environment. People often associate various natural phenomena in BHLs with these legends. This is seen from the point of view of public education in geotourism is very important. Furthermore, the legend has also been interpreted with and by hermeneutic approach where the results enrich the narrative of interpretation in geotourism (geo-interpretation) in BHLs.

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1. INTRODUCTION

Geotourism has recently become an issue that is developing very rapidly, both from the point of view of tourism, conservation, and geoparks. This can be seen from the results of studies, for example, Dowling, 2010; Farsani, 2012; Olafsdottir and Tverijonaite, 2018. These studies further strengthen the geotourism spectrum that extends from abiotic component to cultural component (Dowling, 2010; Dowling and Newsome, 2018). Cultural heritage is also listed by UNESCO in the 10 main focus areas (MFA) of activities in the UNESCO Global Geoparks (UGGp) (UNESCO, 2022).

One part of cultural heritage is intangible cultural heritage (ICH), which includes oral traditions (ibid). Furthermore, oral traditions that have been interpreted and taught through various media can become part aspects of knowledge and practices concerning nature and the universe of the ICH. Thus, the relationship between studies of ICH in relation to geotourism and geopark activities becomes very clear, namely: supporting the pillars of education and respect for culture in the MFA of geoparks.

The research location, namely the Bandung Highlands and its surroundings (HBLs) (Figure 1), has been geologically studied since the mid-19th century AD by Junghuhn (Ar Rahiem, 2021). In fact, an American naturalist, Thomas Horsfield, made an ascent to Tangkubanparahu volcano in July 1804, to, among other things, investigate the geological conditions (Kurnia, 2022). Here, the volcano is the heart of HBLs and topic of discussion from the location side.

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Figure 1: Map of the study site of BHLs area. The red circle indicates location of geotourism destination that mentioned in or can be interpretated to relate to the Sangkuriang legend

Geological research that spans a long time until now has provided a number of data and information on geological diversity (geodiversity) for geotourism, some of which have the potential for world-class geological heritage (geoheritage), so that this area can be proposed as a UGGp. Among the results of geological research in the HBLs, there are some citing folklore or legends of Sangkuriang associated with geological events, such as Bemmelen, 1949; Koesoemadinata, 1959, and Dam, 1994. This shows the importance of legends as sources of information. It also shows that the geological researchers really appreciate the culture of the people or ICH in the form of oral traditions. The development of relation between geology and ICH such as legends, myths and the like has now given birth to a new subdiscipline in geology called "geomythology".

Geomythology as stated by its initiator, Vitaliano, 1968, is the geology application of euhemerism. The geomythologist seeks to find the real geologic event underlaying a myth or legend to which it has given rise; thus he helps convert mythology back into history (ibid). This study also paying attention to the geomythological definition from Mayor, 2004, etc. As van Bemmelen, 1949, etc believed; and as will be seen in this paper, the Sangkuriang is a geomythology with folk explanations of notable geological features.

Geodiversity which is the basis for the development of geoheritage, geotourism, and geoparks, is a concept that similar with diversity concept in biology. The geodiversity is simply defined as the natural range (diversity) of geological (rocks, minerals, fossils),

geomorphological (land form, physical processes) and soil features and includes their assemblages, relationships, properties, interpretations, and systems (Gray, 2005). As for geoheritage, briefly interpreted as a geological phenomenon or part of the geodiversity that contains such value that it needs to be passed down from generation to generation for various conservation-based uses. The values include 31 values which are divided into four categories: intrinsic value, cultural value, aesthetic value, economic value, functional value, and scientific value (ibid). Thus, the geodiversity that has an oral tradition, especially the so well- known one, is a candidate for geoheritage.

About geotourism, according to Newsome & Dowling, 2010, there are two approaches or types of definition of geotourism, namely: geological approach or style and geographical approach or style. In connection with the topic of this paper, the notion of geotourism which will be further presented is the type of geographical approach. These include one as in National Geography (in Dowling and Newsome, 2010): "geotourism is defined as tourism that sustains or enhances the geographical character of a place - its environment, culture, aesthetics, heritage, and the well-being of its residents". Sangkuriang legend is one of the cultural character in geotourism in BHLs.

Interpretation in geotourism is very important as stated in definitions of geotourism from Solarska et al, 2013, etc. The meaning and principles of interpretation in general here refers to the definition of Tilden, 1977. The aim of an interpretation, in brief, is through interpretation, understanding; through understanding, appreciation; through appreciation, protection (ibid). In particular, Dowling and Newsome, 2006 stated that interpretation in geotourism (geo¬interpretation) is the art of storytelling with the aim of providing a truly great audience when it comes to geotourism. Furthermore, there are three specific objectives of interpretation in geosites (related to geotourism and geoparks), namely: cognitive objectives, emotional objectives, and behavioral objectives (Tetik, 2016). Overall, the interpretation goals in geotourism is expected to generate empathy for tourists to certain geosites in order to promote geoconservation.

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Based on the background above, several problems are formulated which will be answered in this paper. First, what is the summarize of geological history and its interpretation (geo¬interpretation) for geotourism in HBLs? Second, which geotourism track in BHLs are mentioned in or related to the Sangkuriang legend? Third, what are the toponyms that correspond to the legend so that the story deserves to be called a meaningful geomythology and what it does not correspond? Fourth, how to interpret the legend of in hermeneutic way? Fifth, what are the further findings of this study to enrich geotourism guidance materials?

2. DATA AND METHOD

The framework used in the research is formulated as follows. That the Sangkuriang legend is adequate as an example of a geomythological case as evidenced by the suitability of most of the time or sequence of events and toponyms with geological phenomena and the names of several places with their geological content in the HBLs. Then, the Sangkuriang story is further analyzed using hermeneutic methods to produce further meaning than just a story as in the legend narrative. Furthermore, the results is used for geotourism guidance materials.

The data used in this research is secondary in the form of geological data, both geological maps and descriptions in the form of books and papers mainly from van Bemmelen, 1949; van Dam, 1994; etc. Other secondary data in the form of geotourism paths or geo-treks / geo-tracks and guidance materials in the book, especially from Brahmantyo et al, 2006; a paper on hermeneutic interpretation from Suryalaga, 2004, which includes a summary of the Sangkuriang legend.

Hermeneutics is the theory and methodology of interpretation, especially the interpretation of biblical texts, wisdom literature, and philosophical texts. Suryalaga, 2004, in his paper, using the hermeneutic method by utilizing the value of Sundanese people called "Panca Curiga" (= five suspects/ knowledge) in interpreting the legend of Sangkuriang. The "Panca Curiga" consists of: (1) Silib, interprets something that is said indirectly but is alluded to in something else (allude); (2) Satire, the use of a different sentence structure (allusion); (3) Symbols: use of symbolic forms (symbol, icon, heraldica); (4) Siloka: Siloka: delivery in the form of a different presupposition or picture (aphorism); & (5) Sasmita: relates to the mood and feelings of the heart (depth aporism) (Suryalaga, 2004).

3. RESULT AND DISCUSSION

From the results of secondary data studies, it is found that HBLS is rich in geodiversity which reflects the earth's evolution process in that area. Further analysis, obtained dozens of geodiversity sites that have the potential to become geoheritage. Some of them which are located north of the HBLs and are related or mentioned in the Sangkuriang legend. Before showing geotourism track related to the Sangkuriang story (location, toponym, etc.), it is necessary to first state a brief geological history of the HBLs.

As formulated by Koesoemadinata, 2022 based on Van Bemmelen, 1934, 1949; the geological story began at Tertiary, 30-2 millions ago (m.a). In this time, BHLs was submerged below the sea; as indicated by the presence of coral rocks formation at Rajamandala ridge west of Bandung. Furthermore, in the Old Quaternary (OQ), 2 m.a to 11,000 years BP (11 k.a), the (ancient) Sunda super-volcano (as high as 3,000 m) was formed and developed. In the OQ, it occurred also others volcanic activities in the north of Bandung; the collapse of the old Sunda volcano and the formation of it's caldera, and it happened also the first activity of the Lembang Fault. Then, in the Young Quaternary (YQ) or 11 k.a to 6 k.a, it was formed and developed Pre- Tangkubanparahu volcano (PTPV) and the ancient Lake Bandung (ABL). In detail, in that period it happened the phase-A eruption or the birth of the PTPV in the caldera of Sunda volcano; the phase-B eruption or damming of ABL by the laharic or ash flow of the PTPV. In YQ also humans already lived around ABL and the phase- C eruption occurred, which produced large scale lava flow to the north (Kasomalang) and to the south along the Cikapundung river to the Dago water fall.

A more recent study by Dam, 1994, which involved the method of absolute age determination, provided some corrections to the results of the former study. The correction are that radiometric dating shows that the formation of the PTPV and ABL occurred much earlier and the initial formation of the lake is merely as the result of volcanic ash flow and laharic flow from the PTPV. However, the three



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catastrophic eruptions have influenced development of the ancient lake. Important event and time here are: genenis of Sunda volcano, 2 m.a; formation of ABL or declining of volcanic activity, 125 k.a; the first big explosion, stabilization of the ABL; the collapse of the Sunda volcano and the formation of the Sunda caldera; the birth of the PTPV, 100-75 k.a; the second explosion or stabilization of the ABL, the 3rd explosion, PTPV became Tangkuban Parahu volcano (TPV), 50-35 k.a; and ending of the ABL in 16 k.a. Furthermore, from the geological history mentioned above also Kartadinata, 2005, here we make one illustration (Figure 2). This is sufficient to fulfill one of the meanings of geo-interpretation.

Due to the abundance of HBL's biodiversity, it is reasonable that scientific visits accompanied by recreation or what we now know as geotourism to BHLs area actually started more than two centuries ago. The traces and research results from previous researchers are now enriching the material or substance of today's geotourism guidance. Those are especially for the geo+ box and geohistory box from six boxes of geotourism guidance materials from Brahmantyo, 2014 which are modifications from Newsome and Dowling, 2005. Geo+ is geotourism supporting factors, namely geoarcheology, legend or myth, history¬culture-social, and flora-fauna of geosite. Meanwhile, geohistory is a geological story of an event or character, especially a geologist who records certain places.



Figure 2. An illustration of the evolution of Tangkuban-parahu volcano (PTV) as a geointerpretation.

In 560 - 500 k.a, in the north of Bandung city grows an old volcano named Jayagiri which then erupted violently, forming a very large caldera and at 210 k.a, a volcanic cone emerged and grew in the caldera known as the Sunda volcano where it experienced three phases of catastrophic eruptions with one of its products at 105 k.a covered the ancient Citarum river in the Padalarang region (above). Due to the closure of the ancient river in the Padalarang area, the floodplain turned into a large lake, known as the ancient Bandung Lake (ABL); and, furthermore, the massive eruption of Sunda volcano, resulting a very large caldera, known as the Sunda Caldera where before 100 k.a, the pre-Tangkubanparahu volcanic (PTPV) cone was formed in this huge caldera (middle). The PTPV continues to grow with its eruptive activity lasting from 90 k.a to 10 k.a; and, as a result of a large eruption at around 10 k.a, the

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volcanic cone was trimmed to form an upside-down boat-like volcano, known as Tangkubanparahu volcano (PTV) which is still active and occasionally erupts until now (below).

There are 10 tracks or "geo-trek" that have been widely published by Brahmantyo et al, 2006, some of which have often been practiced as geotourism track/trails in HBLs. Two of the 10 geo¬treks, with some modifications and addition from author (oa), have been identified and we develop in this study as tracks that are closely related to the legend in terms of geological time series, location and toponym. The two geo-treks with their respective topics are: 1) Geotrek 2: Menembus Belantara Gunung Tangkubaparahu ("Penetrating the wilderness of Tangkubanparahu volcano") dan 2) Geotrek 4: Napak Tilas Peninggalan Prasejarah Perbukitan Bandung Utara ("Footsteps of the prehistoric relics of the hills of north Bandung"). The following are details from the two geo-treks.

Geotrek 2, across seven observation points that can become potential geosites, as follows: (see also Figure 1): 1. Bandung (Kol. Masturi street), 2. Kawah Ratu (Ratu crater), 3. Kawah Upas, 4. Kawah Domas, 5. Hutan Tropis (tropical forest), 6. Tea-walk. 7. Mataair panas Ciater (Ciater hot spring). At point 1 Geotrek 2 (GT2-1), to the north, you can see the landscape view of TPV and Mt. Burangrang. In GT2-2, Ratu crater is one of crater of TPV. Here, can be seen the landscape of the crater and the rock formations on the cliffs which are composed of lava and pyroclastic rocks; also, the history of the eruption can be told. The attraction in GT2-3 and GT2-4 are almost similar to GT2-2, except in GT2-3 can be seen the phenomenon of solfatara and fumarole. In GT2-5, there is a typical forest on the eastern slopes of the TPV which can be explored. Here you can also see the city of Lembang as a descending part of the Lembang fault (oa). The GT2-6 features a tea plantation tour in the northeast of TPV. In GT2-7, in the Ciater hot spring can be studied the occurrence of the hot spring and its benefits for healt.

The Geotrek 4 from Brahmantyo et al, 2006, tread a trajectory connecting points of interest, as follows: 1. Curug Dago (Dago Waterfall), 2. PLTA Kecil Dago Bengkok (Dago Bengkok small hydroelectric power plant), 3. Taman Hutan Raya Djuanda (Djuanda Grand Forest Park, 4. SD Inpres Kordon (Kordon elementary school), 5. Tugu Ciburial (Ciburial monument), 6. Cimenyan (names of a district) 7. Pasir Panyandaan (Panyandaan hills), 8. Batu Karembong

Dayangsumbi or Batu Batik (Dayangsumbi-scraf stone or Batik stone - oa), and 9. Lava Batunyusun (oa). Geotrek 4, point of interest 1 (GT4-1), presenting the landscape of Curug Dago, how it occurs, and its age. Thai inscriptions left by Kings Rama V & VI. GT4-2, containing attraction of the utilization water of Cikapundung river for electricity generation by utilizing the steepness of morphology (built in 1923, is the first power plant in West Java which is still maintained today - oa). GT4-3, also known as "Tahura Djuanda" presents Belanda cave and Jepang cave which are two manmade caves that carved in pyroclastic rock products of Sunda volcano. GT4-4 is also known as KQ 380 Triangulation Point where there was found obsidian stone tool by von Koenigswald. GT4-5, hills that are thought to be ancient settlements with defensive trenches. GT4-6 is site of obsidian stone tool and old graves. GT4-7 is a pre-Islamic and early Islamic burial sites. In the GT4-8 (oa) found pahoehoe lava which is of important because it is rarely found. Meanwhile GT4-9 (oa) is an evidence of magnetostratigraphic phenomena in ancient volcanic lava rocks of Sunda volcano (Sunardi, 2022).

The story of Sangkuriang as a geomythologist studied in this paper can be summarized as follows (Suryalaga, 2004): "King Sungging Perbangkara went hunting. In the middle of the forest he urinated and was accommodated in a coconut shell. A female wild boar named Wayungyang (W) who was imprisoned wanting to become a human drank the urine earlier. W is pregnant, giving birth to a beautiful baby. The beautiful baby was brought to his father's palace and named Dayang Sumbi (DS) alias Rarasati. Many kings asked for her hand, but none was accepted. Finally, the kings fought each other among themselves. DS also at her own request secluded herself on a hill accompanied by a male dog, namely Tumang (TM). While they were busy weaving, the toropong (traditional loom - oa) which was being used to weave cloth fell down. DS because she felt lazy, she said words without thinking about it, she promised that whoever picked up the fallen loom, if it was a male, would be made her husband. TM took the loom and gave it to DS. TM then became her husband. She finally gave birth to a baby boy named Sangkuriang (SK). When hunting in the forest, SK told TM to hunt for a female pig, W. Because TM disobeyed, he was killed. TM's heart was given to DS by him then she cooked and ate it. After DS found out that what she had eaten was TM's liver, her anger peaked and SK's head was immediately hit with a spoon so that it injured. SK went to wander around the world. After going east for a long time,

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he finally arrived in the west again and without realizing it had arrived at DS's place, where his mother was. SK did not know that the beautiful woman he had found was DS. There is a love story between the two people. One time, DS accidentally found out that SK was her son, with a wound on his head. However, SK still forced to marry her. DS asked SK to build a boat and a lake overnight by damming the Citarum river. SK agreed. So, he made a boat from a big tree that grew in the east direction. The stumps/tree logs turned into a mountain Bukittunggul, the branches were piled on the west and became Mt. Burangrang. When the dam was almost finished,

DS pleaded with God so that SK's intentions would not be realized. DS spread slices of boeh rarang (shroud, a woven white cloth), so that the dawn rose earlier. SK became furious, at the peak of his anger, he broke the dam at Sanghiyang Tikoro, he tore down the blockage of the Citarum river to the east and transformed into Mt. Manglayang. Talaga Bandung water has receded again. The boat he worked with a great difficulty was kicked to the north and turned into Tangkubaparahu volcano. SK also chased DS who suddenly disappeared in Mt. Puteri and turned into a Jaksi flower. As for SK, after arriving at a place called Ujungberung , he finally "ngahiyang" (disappeared into the unseen world)".

From the geological history (GH) and Sangkuriang legend (SL) mentioned above, there are several important toponyms related to Sangkuriang (SK) as geomythology, namely: "Mt. Bukittunggul (MBT)", "Mt. Burangrang (MBB)", "Tangkubanparahu volcano (PTV)", "Karembong Dayang Sumbi (KDS)", and "Lembang". In general, all the names are related to the GH of the mountains and volcano in north side of BHLs. The MBT and the MBB are remains of the tree logs to build the boat but could not be completed by SK as "tunggul" linguistically it means stump and "burangrang" from "bukit" (= hill) and "rangrang" (= branch). Tangkubanparahu, which means inverted boat, of course, fits perfectly with the culmination of the SK story. The presence of the ancient Lake Bandung in relation to the formation of PTV is based on geological research. Meanwhile, KDS is the local community's name for the pahoehoe lava phenomenon in Tahura Djuanda. In SK's story, this can be imagined as a DS shawl that falls and gets stuck in that location. This geologically corresponds to a time when Mt. Sunda lava thickened and flowed to the location where it is now exposed. Finally, the word "lembang" in the local language (Sundanese), means stagnant water, which is very relevant to the position of Lembang City in the Lembang Fault where the city is a descending part; related to the emptying of the magma chamber in the area to Mt. Puteri. This in the SK legend is related to the moment of the disappearance of DS.

Based on historical geology, there are some toponyms that do not coincide with the timeline in the Sangkuriang legend. These are all: Sanghyang Tikoro as the site of the collapse of Lake Bandung which was dammed by SK; Manglayang as a mountain that was formed due to the tearing down of a lake blockage by SK; and Ujungberung as the location for the cessation of SK' lust, which is geologically related to the fact that at that location the farthest Mt. Sunda lava flow was found (i.e in Batutemplek waterfall).

As a more in-depth interpretation, the table on page 6 presents a hermeneutical interpretation compared with the cultural comments on the story, accompanied by estimates of relevant geological events. With the descriptions and notes as previously mentioned, the material in the table can be used as literacy and interpretation material for geotourism guidance in HBLs, especially on Geo¬trek 2 and Geo-trek 4 routes from Brahmantyo et al, 2006, as mentioned above. One of the uses of this Sangkuriang geomythological interpretation is as an introductory material in the socialization of geological disaster mitigation, both the eruption of the TPV and the Lembang Fault, where the delivery can be integrated in the geotourism program.

4. CONCLUSIONS

The story or the legend of Sangkuriang (SK) is an example of geomythology from the West Java, especially the HBLs area. Interpretation is needed for that geomythology, both because of the strange content of the story, as well as a positive provocation material in order to achieve geotourism goals and other conservation-based and sustainable development goals. Several geotourism tracks (geo-trek) that have been officially used in the BHLs area are mentioned in the SK legend. The interpretation of the SK legend has been carried out both in geology and hermeneutics where the results provide material to enrich interpretations in geotourism in BHLs.



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