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Dataset in Focus

Unveiling Geotourism of Mayon Lava Wall Natural Geological Land Formation

Elizabeth E. Alfane
Extension Management Division, Bicol University, Philippines
elizabeth.alfane@bicol-u.edu.ph/impresscafranchise@gmail.com

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Abstract

Geotourism today is essentially a cultural response to the physical landscape. More specifically, it combines geologically-based tourism in suitable locations with interpretation, education, and awareness raising to foster geoconservation and sustainable economic benefits for local communities based on their geoheritage (Gordon, 2018). Volcanic eruptions draw pyroclastic materials that could create various volcanic landforms. These natural events provide a connection between the cultural and natural processes of nature. This cultural mapping research was conducted to account the natural geological and physiographical land formation in the geographical landscape of Legazpi City through purposive cultural mapping. The study uncovered that the Barangay Mabinit, Legazpi City is a place where the awe-inspiring natural land formation from the Mayon Volcano molten lava can be found – the Mayon Lava Wall or what others call, Mayon Black Lava. The said place has become a favorite destination among local and foreign tourists considering its distinct rock formation, spectacular scenic view, green foliage, and the breathtaking perspective of the Albay gulf. The study recommends the development of a geotourism plan for ecological conservation and protection of the site. The study further emphasizes the role of the local government in conserving and safeguarding the integrity of the site's ecosystem to produce more economic benefits for local communities. Future researchers may conduct similar studies on volcanic landforms around the world.

Keywords – volcanic tourism, cultural mapping, geoheritage, ecotourism, Legazpi City, Albay

BACKGROUND OF DATASET

Picturesque land formations have become the interest of tourists in different parts of the world. Some interestingly visit even the geological extremes that found to be vulnerable to disaster. One example is the eruption of the volcano Eyjafjallajökull in 2010, which brought attention to Iceland. Tourism had been slowly growing before that but since the eruption, the number of international tourists has had a 25% annual average growth (Heimisdóttir et al., 2019). Volcanic disasters became a tool to leverage economic development.

The Mabinit Channel is a 5-kilometer-long, 15 to 70 m wide, and 2 to 22 m deep formed by lahars on the southeastern slope of Mayon Volcano during its 1984 eruption. Sediment-budget calculations from surveys conducted in 1985 and 1986 corroborate inferences from other volcanoes that lahars can grow significantly in volume by eroding their channels. This demonstrated how easily lahars can change the courses of channels on the upwardly convex debris apron of a stratovolcano, with serious consequences for farmland and communities (Rodolfo, 1989). The existence of the natural geological land formation in Mabinit, Legazpi City has become a part of the social, cultural, and environmental life of every Mabinit folk. This cultural heritage is an indispensable natural phenomenon that existed and is now associated with the people's day-to-day existence. Being part of this land formation also poses threats to the lives of the community. It is where the protection and conservation of the site and its surroundings play an important role so as not to affect the ecosystem, livelihood, and properties of the residents. According to Stronza et al. (2019), community residents gain economic benefits through conservation without changing the ecosystem, and tourists increase their understanding of culture, environment, and natural history.

Cultural mapping sets one's sight on the preservation and conservation of anything that denotes the heritage of a certain group of people. Rashid (2015) defined cultural mapping as a systematic approach to identifying, recording, classifying, and analyzing a community's cultural resources or assets that traced the historical, economic, social, geographical significance of a site. One recent study that memorialized horrible events caused by Mayon Volcano's lahar flow was written by Alfane (2022). It underscores the sites of remembrance in Legazpi City that were built to commemorate the victims of two disasters. The devastation had created potential cultural values, beliefs, and traditions to the communities in the locality.

There were potential cultural values on how communities around Mayon Volcano have generally adapted to the constant activity of the volcano. This is also complemented by the way these communities use land for specific purposes for agriculture, mining, landscaping, and even infrastructure development as seen in the use of volcanic materials to build iconic churches around Mayon. The introduction of the cultural landscapes' category allows the integrated approach to cultural and natural heritage which emphasizes the relationship people have with their respective landscapes.

Through the survey instrument form from the NCCA Sub Commission on Cultural Heritage Cultural Mapping Program, the researcher gathered the data needed in the mapping of the natural geological land formation. From the surveyed seven barangays located at the foot of Mayon Volcano, there is only one barangay that prides itself for being endowed with nature's gift which is a natural land formation formed from the molten lava during the continuous eruption of Mayon Volcano in 2007. The researcher conducted an ocular visit on the site and observed the unique geological formation. It is surrounded with several plant species, with Agoho Pine tree (*Casuarina equisetifolia)* species as the abundant plant. They add to the beauty of the ecosystem of the place. The lava wall looks like a long polygon black plateau from the top view measuring 371,688.39 sq. m (within the polygon). It was also observed that the surroundings of the lava wall are perfect for nature lover tourists. The researcher had a walk through the lava wall's surroundings and experienced climbing the top of the wall. The researcher discovered that the nicest view is at the peak of the lava wall. From the top, tourists enjoy spectacular sightseeing and thrill on the 380-degree top view even at midday. The long queue for the Mayon Black Lava zip line adventure and for the All-terrain Vehicle (ATV) trail ride set people undisturbed due to the cool temperature and windy weather. Interviews with the key informants from the Barangay Mabinit, told stories about the formation of the lava wall and on how it opened opportunities for the community through geotourism.

This study sought to account the natural geological and physiographical land formation in Legazpi City with significance to Mayon Volcano. Through the purposive cultural mapping format, the land formation's background information, description, stories associated with it, its significance, the conservation measures, constraints, threats, and issues were documented. The scope of the study is limited to the research instrument used by the researcher which is a purposive cultural mapping form provided by the NCCA. The mapping of the Mayon Lava Wall site was presented through georeferencing using ArcGIS Arcmap 10.5 to visualize its exact location.

According to Legazpi City Tourism Office, they have no record yet of the site's blueprint for geotourism or environmental policies that emanated from the local government agencies that will protect biodiversity of the place, the tourists, and the residents nearby.

The dataset may be requested from the author. You may correspond to her through the email address shown on the first page of the manuscript.

RESULTS OF DATA ANALYSIS

During the 2007 Mayon Volcano eruption, a natural geographical and physiographical land formation was formed in Barangay Mabinit, Legazpi City, Albay from the solidification of tons of molten rock materials which flowed from the crater of the volcano to the surface of Mabinit Channel. The lava had flown down slowly for several

months according to the barangay folks thereby, which gradually formed a distinct land formation like a plateau. The rock formation composing of extrusive rocks occupies a land area approximately 371, 688.39 sq. m. and a height of 100 to 150 ft. above the ground. The Mayon Lava Wall or Mayon Black Lava is the first-ever recorded natural physiographical land formation in Legazpi City and in the province of Albay.

Figure 1 presents photos of the Philippines, Mayon Volcano, and Mayon Lava Wall to visualize the location where the land formation is situated. Figure 2 shows Georeferencing with the use of ArcGIS Arcmap 10.5 with its coordinates of 123°42'37.61"E, 13° 12'15.34"N, while Figure 3 showcases the helipad at the top of the Lava Wall fronting the eastern direction, the zipline amenity, the Albay gulf, and the greenery. Figure 4 exhibits the other sides of the Mayon Lava Wall. In Table 1, it describes the stories associated with the land formation, its significance, conservation measures, constraints, and threats. Table 1 is a summary of the significant findings from the mapped natural resource.

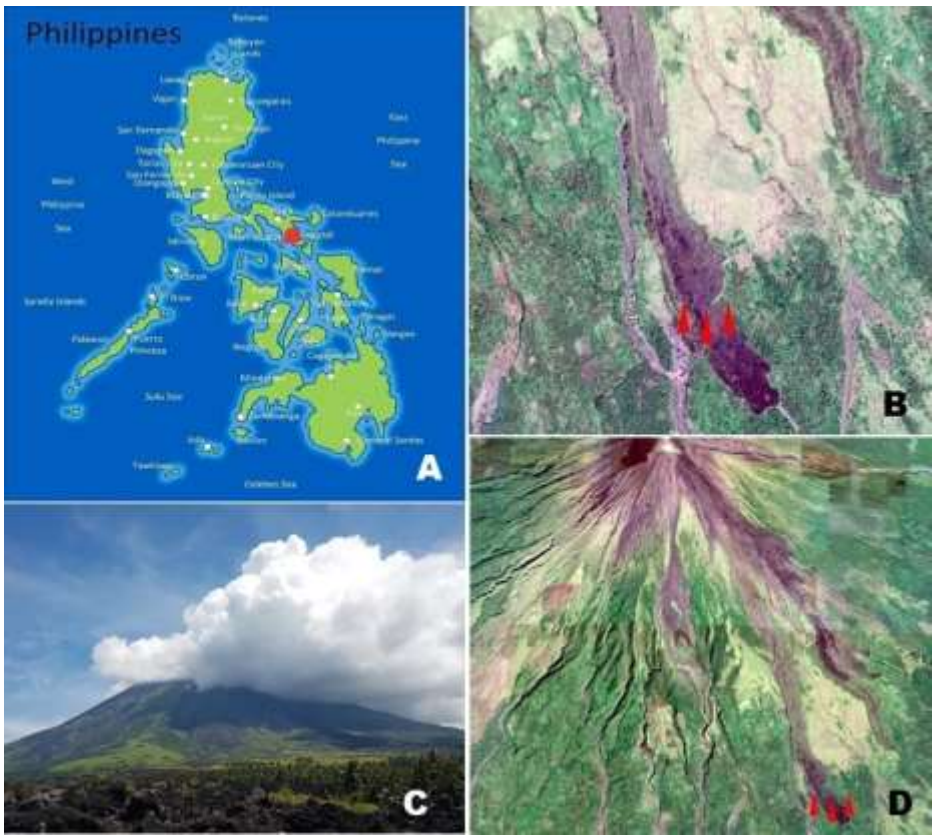

Figure 1. A (Philippine Map), B (Mayon Lava Wall), C (Mayon Volcano) and D (Top View of Mayon Volcano with the Mabinit Channel)

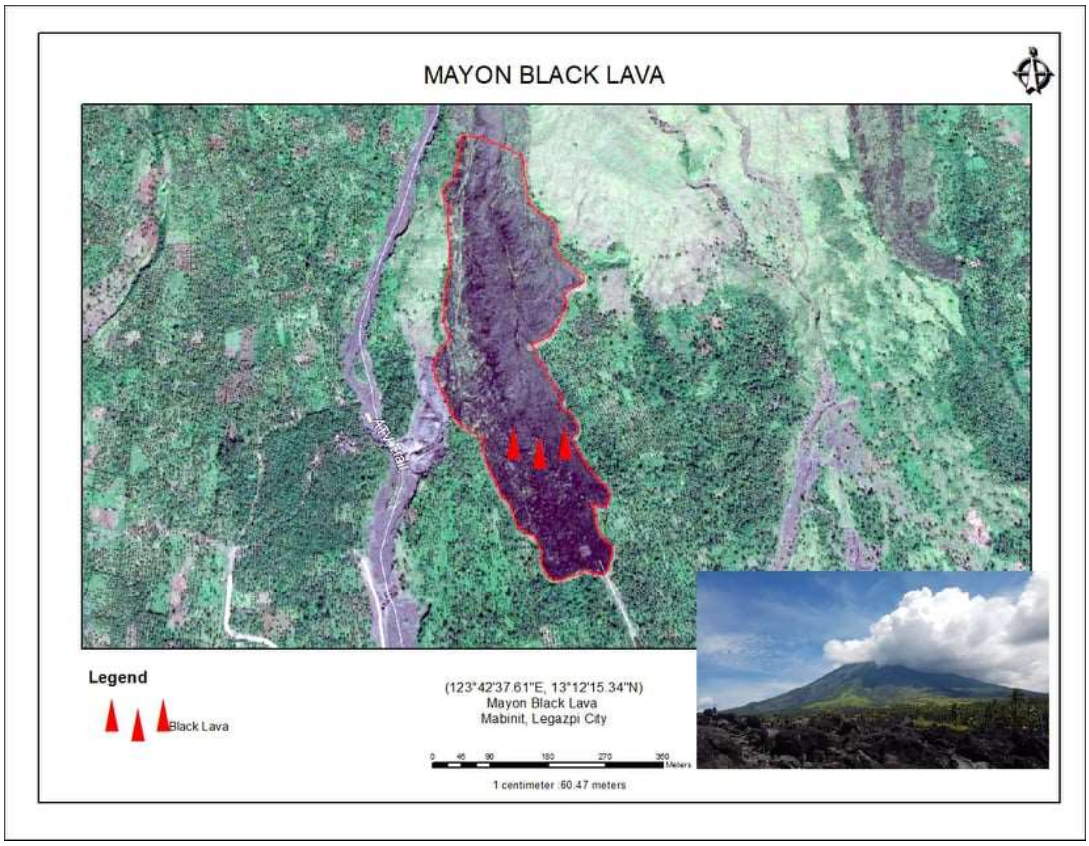

Figure 2. ArcGIS Arcmap 10.5 of Mayon Lava Wall

Figure 3. The Surrounding Areas of the Mayon Lava Wall

Figure 4. The Mayon Lava Wall Stretch

Table 1. Description of the Mayon Lava Wall

Description	Stories associated with the land formation	Significance	Conservation Measures	Constraints/threats
The Mayon Lava Wall is made-up of extrusive rocks situated along the vast agricultural land of Mabinit, Legazpi City. The lava wall serves as "protector" and "barrier" to the future flow of pyroclastic materials that may endanger the lives of the residents in the barangay. It is the only geological formation that was created from the molten lava of Mayon Volcano in the city of Legazpi. It has an estimated height of 100-150 ft above sea level and a polygon shaped plateau approximately measuring 371,688.39 sq m.	According to the Mabinit folks, the Mayon Lava Wall was formed from the lava flows coming from the Mabinit channel during the Mayon Volcano eruption in 2007. The lava dried up quickly and solidified over time. The Mayon Volcano eruption took long months. It spewed pyroclastic materials that created a unique land form.	The Mayon Lava Wall has its significance to culture, environment, and society. Its existence has become part of the day-to-day lives of every resident. It serves as a reminder for the folks that not every eruption means damaged properties and lives claimed, but this land formation is a cultural asset. It can bring livelihood and vast economic development in the local and regional level.	The place is under the jurisdiction of the Barangay Mabinit, Legazpi City. There is no intervention ever reported regarding conservation and protection of the site from the local level or from the DENR Mines and Geosciences Bureau regional office.	Mayon Volcano, being one of the most active volcanoes in the world, posed threats of eruption in the future. It is therefore not safe to visit the Mayon Lava Wall site unless there is a clearance from the PHIVOLCS. There is also a huge quarrying site near the area operated by a large private quarrying company which poses threat in the ecosystem of the site.

CONCLUSION AND RECOMMENDATIONS

For many parts of the world, geotourism promotes economic development. Exploring programs on geotourism for the Mayon Lava Wall ecological site would benefit both the community and the environment. Thus, ecotourism programs are necessary to systematically preserve, manage, and utilize the ecological assets surrounding the lava wall. The lava wall's current situation and challenges lie in defining what most residents and administrative authorities want to preserve the natural resources. Khavarian-Garmsir, & Zare, 2015) emphasized that tourism activities should center on a type of resources management in which all economic, social, and aesthetic requirements are considered alongside cultural integrity, essential ecological processes, and biological diversity. Rashidi (2018) emphasized the importance of all aspects of tourism for comprehensive planning. These strategies for sustainable development must be made and implemented in a realistic, effective, and lasting way (Khavarian-Garmsir & Zare, 2015).

It can be deduced that the researcher was able to map a natural geological and physiographical land formation associated to Mayon Volcano in a purposive cultural mapping research conducted in the seven barangays (Bonga, Arimbay, Bigaa, Buyuan, Matanag, Padang, and Mabinit) of Legazpi City, Albay. The Mayon Lava Wall's natural formation in 2007 opened tourism opportunities as a unique geological landscape attraction to local and foreign visitors alike. However, the researcher perceived an absence of a conservation and protection plan of the site which may be the cause of poor tourists' influx. The Mayon Lava Wall is a cultural asset and as a cultural heritage, it requires not only the protection and conservation of the site but of the living organisms surrounding it. The Mayon Lava Wall can be lined-up with the frequently visited tourist destinations in the world when fully developed just like the Madeira islands in Portugal, a culture rich destination located in the archipelago of a volcanic origin in the North Atlantic Ocean. Ecotourism must account for social, economic, and environmental implications to succeed (Kiper, 2013).

Geotourism spans a range of visitor interests which provides economic, cultural, relational, and social benefits for both visitors and host communities (Gordon, 2018). Thus, the researcher recommends exploring geotourism programs for ecological conservation and cultural tourism development around the Mayon Lava Wall's site. These would enhance the people's understanding of nature and culture in the area, will prevent the adverse effects of commercialism, and will regulate the large quarry being operated by a private company nearby that is a threat to locals' homestead and biodiversity. A geotourism development plan would forge community involvement as local businesses, local government units, and like-minded individuals will collaborate to provide a unique and authentic visitors' experience. A sustainable geotourism plan can be potentially developed just like the Sahn-Yang Gotjawal's Lava Stony Forest of Jeju Island, Korea (Hong et al., 2020). Importantly, if sustainability is a goal to attract more tourists, environmental tourism planning is imperative to achieve economic growth and efficiency,

ecological protection and conservation, and social equity. Finding the right balance among these three dimensions is necessary to ensure comprehensive long-term sustainability (Padin, 2012).

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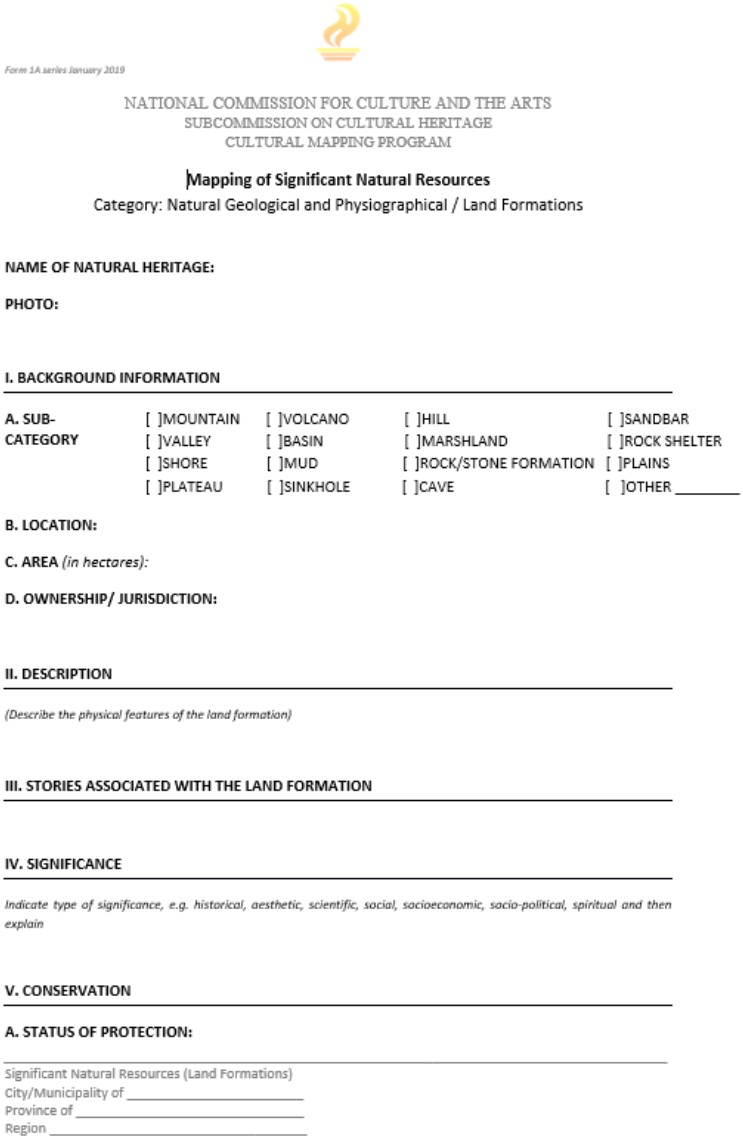
APPENDICES

Appendices A and B are a two-page Form 1A which were used in the mapping of natural resources under the category: natural geological and physiographical land formations. They are the standard method and survey form of the NCCA Sub Commission on Cultural Heritage Cultural Mapping Program.

Appendix A



Form 1A series January 2019

NATIONAL COMMISSION FOR CULTURE AND THE ARTS
SUBCOMMISSION ON CULTURAL HERITAGE
CULTURAL MAPPING PROGRAM

Mapping of Significant Natural Resources
Category: Natural Geological and Physiographical / Land Formations

NAME OF NATURAL HERITAGE:

PHOTO:

I. BACKGROUND INFORMATION

A. SUB-CATEGORY	[ ]MOUNTAIN	[ ]VOLCANO	[ ]HILL	[ ]SANDBAR
	[ ]VALLEY	[ ]BASIN	[ ]MARSHLAND	[ ]ROCK SHELTER
	[ ]SHORE	[ ]MUD	[ ]ROCK/STONE FORMATION	[ ]PLAINS
	[ ]PLATEAU	[ ]SINKHOLE	[ ]CAVE	[ ]OTHER _____

B. LOCATION:

C. AREA *(in hectares):*

D. OWNERSHIP/ JURISDICTION:

II. DESCRIPTION

(Describe the physical features of the land formation)

III. STORIES ASSOCIATED WITH THE LAND FORMATION

IV. SIGNIFICANCE

Indicate type of significance, e.g. historical, aesthetic, scientific, social, socioeconomic, socio-political, spiritual and then explain

V. CONSERVATION

A. STATUS OF PROTECTION:

Significant Natural Resources (Land Formations)
City/Municipality of _____
Province of _____
Region _____

Appendix B

B. CONSTRAINTS/THREATS/ ISSUES:

C. CONSERVATION MEASURES: *(Describe the conservation measures taken at the level of the community, provincial and/or national)*

VI. REFERENCES

KEY INFORMANT/S:
REFERENCE/S:
NAME OF MAPPER/S:
DATE PROFILED: