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Companion Document for “Volcanology: Native knowledge and colonial powers”

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Keywords: volcanology, European colonialism, environmental determinism, Indigenous peoples

Location: Antarctica, Aotearoa New Zealand, France, Guatemala, Indonesia, Martinique, Montserrat, Netherlands, Papua New Guinea, Solomon Islands, South Georgia and the South Sandwich Islands, Spain, Trinidad, UK

People: Charles Stehn, Karl Sapper, Cecil King Wungi

Last updated: August 15, 2021

This companion guide accompanies the slides for “Volcanology: Native knowledge and colonial powers” We provide a list of references for the content in the slides. For accessibility purposes, we also provide alternative text for images.

Slide 1 | Overview

The first slide consists of keywords, locations, and people covered in the slide pack to help with indexing and to make it easy for teachers to decide if the material would be useful in their course. Slide 2 (*European colonisation of volcanic regions*) aims to show why volcanic regions were colonised by Europeans and hence why Europeans were visiting volcanoes. Slide 3 (*Volcano observatories*) aims to showcase direct involvement of colonial powers in volcano research as they set up volcano observatories. Slide 4 (*Records of historical eruptions*) aims to highlight the different ways volcanologists’ piece together the eruptive record of volcanoes, showing that colonial archives are an important information source but are the direct consequence of colonialism and that Indigenous Knowledge has direct applications in this research. Slide 5 (*1995 eruption of Monserrat*) is a short case-study about the role of the UK in the 1995 eruption of Monserrat – a British overseas territory – including setting-up and running the volcano observatory and heavily influencing UK volcanology at the time. Slide 6 (*Native Names*) is aimed at showing how, like many features in the landscape, volcanoes were renamed by European colonisers using examples from Aotearoa New Zealand and the USA. Slide 7 (*Karl Sapper*) is another short case-study about the Germany volcanologist Karl Sapper to highlight that researchers at this time held racist and colonial views. He used his research (both geological and ethnological) for coffee plantation management in Guatemala and believed in anthropogeography, which fed into Nazi ideology.

Slide 2 | European colonisation of volcanic regions

Europeans often colonised volcanic regions:

- Volcanic areas often have fertile soils due to the volcanic eruptions, which are good for agriculture – they were often turned in plantations worked on by enslaved people (e.g., sugar in Martinique)
- Volcanic islands can be constructed in the middle of oceans and can therefore be strategic assets, such as harbours, outposts, refuelling stations, and military bases. Additionally, they provide a claim to additional land (e.g., South Georgia and the South Sandwich islands volcanic arc are a British Overseas Territory, extending a claim of the British Antarctic Territory) and the seafloor (e.g., Heard Island and the McDonald Islands volcanic group, which are Australian territory) around them and exploitation of resources within these areas¹.
- Volcanoes can be mined for direct resources – e.g., sulphur, which can be used in the vulcanisation of rubber and the manufacture of matches, dyes, pharmaceuticals, and gunpowder. Volcanoes are also linked to the formation of diamonds and copper.

Image caption: Some examples of volcanic regions colonized by Europeans (highlighted in orange): Indonesia, Papua New Guinea, Solomon Islands, Caribbean, South Sandwich Islands.

Credit: [U.S. Geological Survey](#).

Alt text: Map of the world centered on the Pacific Ocean showing the continents and the oceans – the high mountain belts are highlighted in green on the continents and the bathymetry of the oceans is also shown. The location of the plate boundaries are included, and the red triangles indicate the location of Holocene volcanoes. Indonesia, Papua New Guinea, Solomon Islands, Caribbean, and the South Sandwich Islands are highlighted roughly in orange.

Slide 3 | Volcano observatories

Early volcano observatories were often set-up by universities (e.g., Vesuvius, Italy) – but some were set-up by colonial governing bodies in response to volcanic crisis – some of these observatories are now run by local governing bodies. A few examples are detailed on the slide. Reference 2 has a beautiful artistic drawing of the interior of a stratovolcano in a traditional Melanesian style by C.K. Wungi on page 381.

Slide 4 | Records of historical eruptions

Colonial archives can provide detailed reports of volcanic eruptions, including eyewitness accounts, official correspondence, government documents, ship logs, etc. – data that cannot be derived solely from geological evidence⁴. These archives exist because of detailed recording keeping across the world by colonial powers.

Hutchison et al. (2016)⁵ use such records to understand the 1717 eruption of Volcán de Fuego, Guatemala. Spanish colonisation resulted in extensive written records and using a compilation of documents from these archives, the authors were able to gain geological information about the eruption, as well as event timings and impacts.

However, oral traditions and pictorial documents from Indigenous peoples also provide detailed accounts of volcanic activity that can go beyond these written, colonial documents, which are sometimes overlooked in favour of written records^{6,7}.

Image caption: Strombolian eruption of Volcán de Fuego, Guatemala. Credit: [Wikimedia Commons/Kevin Sebold](#).

Alt text: Erupting volcano in front of a night sky with stars. Fountains of white-yellow-orange-red magma erupt from the summit of the volcano, and the lava can be seen to be running down the flanks of the volcano, which is mostly black as the photograph is taken at night.

Slide 5 | 1995 eruption of Montserrat

The 1995 eruption of Soufriere Hills volcano, Montserrat, was an important eruption in volcanology, displaying a huge number of people and creating a lot of knowledge. Montserrat is a British Overseas Territory, with a large population of enslaved people in 18th century to work on the sugar plantations, which was near to being independent when the eruption began⁸. The British Geological Survey (BGS) set up the Montserrat Volcano Observatory when the eruption began, which was mainly staffed by British volcanologists at the time. Now the observatory is run by the Seismic Research Centre, University of the West Indies, Trinidad⁹. British volcanologists held a lot of power during the eruption, and gained a lot of knowledge from this eruption⁸.

Image caption: Map of Montserrat in the Lesser Antilles with the location of Soufrière Hills. Credit: [Wikimedia Commons](#).

Alt text: Map of the volcanic island of Montserrat, which is ~8 km wide and ~16 km long, located in the Lesser Antilles between the Caribbean Sea and the Atlantic Ocean. There are two peaks – Centre Hills in the north and Soufrière Hills Volcano in the south, the latter is indicated on the map with a red triangle outlines in white. Topography is shown with colour, where the lowlands are in light green and the tops of the peaks in yellow-brown. Rivers are shown as thin blue lines and radiate out from both peaks.

Slide 6 | Native names

European colonizer's often renamed features in the landscape, including volcanoes.

Cook renamed volcanoes in Aotearoa New Zealand, although many of these volcanoes have now had their Te reo Māori names restored or officially incorporated. Examples include:

- Tuhua is a pantelleritic volcanic island in the Bay of Plenty, named after the volcanic glass/obsidian found on the island (mata tuhua is obsidian in Māori) – it was renamed Mayor Island, potentially because Lord Mayor's Day (for the Lord Mayor of the City of London, UK) was a few days after it was observed by Cook¹⁰.
- Whakaari (Te Puia o Whakaari, meaning The Dramatic Volcano) is Aotearoa's most active volcano, also located in the Bay of Plenty – it was renamed White Island, potentially in relation to the dense white steam it emits or because it was covered in guano¹¹.

- Putuaki (potentially meaning smoke or higher-than-most) is located in Okataina, one of the active calderas in the Taupō Volcanic Zone – it was renamed Edgecumbe, potentially after the sergeant of marines on the Endeavour¹².
- Taranaki (meaning shining mountain peak) is located outside the Taupō Volcanic Zone – it was renamed Egmont, potentially after the Lord of the Admiralty¹³.

Similarly, the Cascades, which run along the west coast of the US, were known as Yamakiasham Yaina (Mountains of the Northern People) – the volcanoes have been renamed, erasing the Native American names¹⁴. Reference 14 has a great image of this.

Image caption: Te reo Māori names of Aotearoa’s (New Zealand) volcanoes. Edited from [Wikipedia Commons](#).

Alt text: Satellite image of the North Island of Aotearoa New Zealand, showing the locations of the volcanoes with their Te reo Māori names. Red triangles indicate the volcanoes, where Tuhua (Mayor Island) and Whakaari (White Island) are in the Bay of Plenty; from North to South – Putuaki (Edgecumbe), Tarawera, Taupō, Tongariro, Ngauruhoe, and Ruapehu – run NE-SW along the middle; and Taranaki (Egmont) is on the west coast.

Slide 7 | Karl Sapper (1866–1945)

- Karl Sapper (1866–1945) was a German geologist, who travelled and researched extensively in Central America and Southern Mexico and “... is considered one of the first volcanologists worldwide in the strict sense of the word... one of the best geologists and volcanologists of the time...”¹⁵.
- In volcanology, he produced a scale of eruptions based on total quantity for erupted material¹⁶, which compromises ~30 % of the data¹⁷ in the “dust veil index” of Lamb (1970)¹⁸.
- Sapper’s research ranged from geology, volcanology, to ethnology, which he used to blend scientific knowledge with coffee plantation management in Guatemala, where Indigenous peoples were forced to work for German settlers¹⁹.
- Sapper wrote his dissertation with, and believed in the ideologies of, Friedrich Ratzel: anthropogeography or environmental determinism, which sets a direct link between soil, race, climate and history and is linked to Nazi ideology²⁰. These ideas can be seen across other disciplines in geology, such as those highlighted in the Landscapes and Oceanography slides.

Image caption: Karl Sapper (1866–1945). Credit: [Wikipedia Commons](#).

Alt text: Black and white photograph of a white man wearing small-oval glasses; with dark hair and a full, dark moustache that spans the width of his slim face. He is wearing dark, double-buttoned jacket with a white collar visible at the top.

References:

1. <https://www.boell.de/en/2017/05/30/ocean-governance-who-owns-ocean>
2. Johnson, R., 2013. Fire Mountains of the Islands: A history of volcanic eruptions and disaster management in Papua New Guinea and the Solomon Islands. *ANU Press*. DOI 10.26530/OAPEN_462202
3. Van Padang, M.N. and Van Padang, M.N., 1983. History of the volcanology in the former Netherlands East Indies. *Rijksmuseum van Geologie en Mineralogie*.
4. Pyle, D.M., Barclay, J. Historical records of volcanic eruptions deserve more attention. *Nat Rev Earth Environ* **1**, 183–184 (2020). [doi 10.1038/s43017-020-0044-z](https://doi.org/10.1038/s43017-020-0044-z)
5. Hutchison, A. A., Cashman, K. V., Williams, C. A., & Rust, A. C. (2016). The 1717 eruption of Volcán de Fuego, Guatemala: cascading hazards and societal response. *Quaternary International*, *394*, 69–78. [doi 10.1016/j.quaint.2014.09.050](https://doi.org/10.1016/j.quaint.2014.09.050)
6. Swanson, D. A. (2008). Hawaiian oral tradition describes 400 years of volcanic activity at Kīlauea. *Journal of Volcanology and Geothermal Research*, *176*(3), 427–431. [doi 10.1016/j.jvolgeores.2008.01.033](https://doi.org/10.1016/j.jvolgeores.2008.01.033)
7. Martin-Del Pozzo, A. L., Rodríguez, A., & Portocarrero, J. (2016). Reconstructing 800 years of historical eruptive activity at Popocatepetl Volcano, Mexico. *Bulletin of Volcanology*, *78*(3), 18. [doi 10.1007/s00445-016-1010-y](https://doi.org/10.1007/s00445-016-1010-y)
8. Donovan, A. (2021). Colonising geology: volcanic politics and geopower. *Political Geography*, *86*, 102347. [doi 10.1016/j.polgeo.2021.102347](https://doi.org/10.1016/j.polgeo.2021.102347)
9. Aspinall, W., Loughlin, S. C., Michael, F. V., Miller, A. D., Norton, G. E., Rowley, K. C., Sparks, R. S. J., & Young, S. R. (2002). The Montserrat volcano observatory: Its evolution, organization, role and activities. In T. H. Druitt, & B. P. Kokelaar (Eds.), *The eruption of Soufrière Hills Volcano, Montserrat, from 1995 to 1999* (Vol. 21). London, Memoirs: Geological Society. [doi 10.1144/gsl.mem.2002.021.01.04](https://doi.org/10.1144/gsl.mem.2002.021.01.04).
10. <https://www.nzgeo.com/stories/the-obsidian-island/>
11. <https://gazetteer.linz.govt.nz/place/6961>
12. <https://en.wikipedia.org/wiki/Putauaki>
13. https://en.wikipedia.org/wiki/Mount_Taranaki
14. <https://www.discovermagazine.com/planet-earth/lets-return-the-cascade-volcanoes-to-their-original-names>
15. Alvarado and Patino (2016) The history of volcanology in Costa Rica: from the Amerindian legends to the beginning of the twenty-first century. From Mayer, W., Clary, R. M., Azuela, L. F., Mota, T. S. & Wołkowicz, S. (eds) 2017. *History of Geoscience: Celebrating 50 Years of INHIGEO*. Geological Society, London, *Special Publications*, *442*, 127–140. [doi 10.1144/SP442.35](https://doi.org/10.1144/SP442.35)
16. Sapper, K. (1927) *Vulkankunde*, Engelhorn Verlag, Stuttgart.
17. Newhall, C. G., & Self, S. (1982). The volcanic explosivity index (VEI) an estimate of explosive magnitude for historical volcanism. *Journal of Geophysical Research: Oceans*, *87*(C2), 1231–1238. [doi 10.1029/JC087iC02p01231](https://doi.org/10.1029/JC087iC02p01231)
18. Lamb, H. H. (1970) Volcanic dust in the atmosphere; with a chronology and assessment of its meteorological significance, *Phil. Trans. R. Soc. London*, *266*:425–533.
19. Gibbings, J (2020) “Their debts follow them into the afterlife”: German settlers, ethnographic knowledge, and the forging of coffee capitalism in nineteenth-century Guatemala, *Comparative Studies in Society and History*, *62*(2):389–420. [doi 10.1017/S0010417520000092](https://doi.org/10.1017/S0010417520000092)
20. Kophamel, W. (2020). Race and soil. *Geography, ethnology, and Nazism*. *Mètode Science Studies Journal*, *10*. DOI: [10.7203/metode.10.13560](https://doi.org/10.7203/metode.10.13560)