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EFFECTS OF LAVA ON OUR ECOSYSTEM AND SURROUNDINGS

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ABSTRACT

Lava is a type of composite fluid material made up of solid minerals (mostly silicates) and gas bubbles suspended in a silicate melt matrix. It is the result of partial melting within the Earth. The composition of igneous rocks visible at the surface is interpreted from their composition, and while they have a wide range of compositions, they are ultimately formed by melting in the Earth's mantle or crust. Basalts are formed mostly from the mantle, whereas granites are derived from the crust. Fractional crystallization, magma mixing, and other processes that alter the original magma composition result in different compositions. When hiking on the Big Island, you must always be cautious. Hiking near active lava in Hawaii Volcanoes National Park, however, necessitates even greater caution. You must wear proper safety clothing, carry and drink plenty of water to stay hydrated, heed official warning signs, and follow a leader who is responsible and knowledgeable about the area.The abundances of major and trace elements are frequently related to the plate tectonic environment in which igneous rocks are found, and their abundances can be utilised to determine the origins of magmas.

INTRODUCTION

Molten rock (magma) that has been ejected from the interior of a terrestrial planet (such as Earth) or a moon is referred to as lava. Magma is created by the planet's or moons internal heat, and it erupts as lava at volcanoes or through cracks in the crust at temperatures ranging from 800 to 1,200 °C (1,470 to 2,190 °F). Lava is the term used to describe the volcanic rock that forms after cooling. Because rocks are so hard, melting them is extremely difficult. Lava flows typically reach temperatures of 700° to 1,250° Celsius, or 2,000° Fahrenheit. The temperature is heated enough deep into the ground, usually around 150 kilometers, that certain minor parts of the rocks begin to melt. The magma (molten rock) will rise to the surface as a result (it floats). The temperatures are so intense deeper inside the planet that the entire outer core is molten. Because the inner core is made up of several substances, it is not molten. Lava flows are described using a variety of terms. The rate of flow front advancement, temperature, and geochemistry of a lava flow, for example, can all be described. These characteristics have an impact on the flow's shape and the danger it poses. They can also be used to detect whether one lava flow is similar to another. Some of these characteristics must be recorded during the eruption because they fluctuate over time (for example, the temperature of the lava flow core at a specific point), whereas others can be monitored after the eruption has ended (e.g. bulk geochemistry, final flow dimensions).

There are some journals and books written about the topic volcanic eruptions but there are many more to the topic of lava and how it can cause the damage to its surrounding. Mostly the lava is seen as a source of creating land and other things but it come with a price. The amount of toxic gases released during eruption and volcanologists are still trying to find the best possible way to reduce its consequences and how the destruction can be limit.

HAZARDS CAUSED BY LAVA FLOW

Volcanologists are constantly trying to figure out how volcanic dangers behave and how to prevent them. Here are some of the more common risks, as well as some of the ways in which they originate and act. Everything in the path of a lava flow will be knocked

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over, engulfed, buried, or ignited by the lava's extraordinarily high temperature. Meltwater from the ice and snow can cause far-reaching lahars when lava erupts beneath a glacier or flows over snow and ice. If it gets into a body of water, or if water gets into a lava tube, the water may boil furiously, resulting in an explosive shower of molten spatter over a large area. When lava buries vegetation, methane gas can travel into underground cavities and explode when heated. Fast-moving pyroclastic flows can arise when thick viscous lava flows, especially those that form a dome, collapse. Volcanic carbon dioxide contributes to the natural greenhouse effect. Because sulphur dioxides are transformed to sulphuric acid in the stratosphere, which is the principal cause of acid rain, they cause environmental difficulties. Sulphate aerosols are also generated, which reflect solar radiation while absorbing heat, cooling the earth. Chemical reactions in which sulphate aerosols participate result in the formation of ozone-depleting material.

Lava flows wreak havoc on the property of those caught in their path. Casualties are uncommon, however, because lava flows are normally slow enough for people and animals to flee, albeit this depends on the viscosity of the lava. Nonetheless, injuries and deaths have happened as a result of people being cut off from their escape path, getting too close to the flow, or, more rarely, the lava flow front moving too swiftly. This happened most famously during the Nyiragongo eruption in Zaire (now Democratic Republic of the Congo). A crater wall was breached on the night of January 10, 1977, and a fluid lava lake emptied out in just an hour.

Volcano ejects pyroclastic flow from a collapsing lava dome, lahars, poisonous gases that move ahead of lava, or explosions created when the flow comes into contact with water are all examples of deaths attributed to volcanoes. Volcanoes also create carbon dioxide (CO2), sulphur dioxide (SO2), hydrogen sulphide (H2S), fluorine gas (F2), hydrogen fluoride (HF), and other gases, the majority of which is comparatively harmless water vapour (H2O). This was the situation in 1986, when the overturn of Lake Nyos in Cameroon, Africa, smothered more than 1,700 people and 3,500 cattle in adjacent villages due to a CO2 eruption from the lake. In the correct circumstances, all of these gases can be dangerous, even deadly. Sulfur dioxide and hydrogen sulphide are both sulfur-based gases with a characteristic acidic, rotten-egg odour, unlike carbon dioxide. SO2 can react with airborne water vapour to generate sulfuric acid (H2SO4), a caustic acid; H2S is also exceedingly acidic and toxic even in small doses. Both acids irritate soft tissues (eyes, nose, throat, lungs, and so on), and when the gases combine with water vapour to generate fog, or volcanic fog, which is toxic to breathe and can cause damage to the lungs and eyes. Sulfur-based aerosols can block sunlight and interfere with ozone in the high atmosphere, affecting climate in both the short and long term. A lava bench is a particularly hazardous place. Fluorine gas is one of the most dangerous gases released by volcanoes, despite its rarity (F2). This gas is a caustic, deadly yellowish brown gas. It is denser than air, like CO2, and prefers to concentrate in low locations. Hydrogen fluoride (HF), its partner acid, is very corrosive and poisonous, causing severe internal burns and attacking calcium in the skeletal system. Fluorine can be absorbed by plants even after visible gas or acid has faded, and it can kill people and animals for lengthy periods of time after an eruption. Fluorine poisoning and starvation killed more than half of Iceland's cattle and nearly a quarter of its population following the eruption of Laki in 1783.Long after the lava has cooled, areas of recent lava flows remain dangerous. Land is more unstable and can break off into the sea where juvenile flows have built new places. Falling into a lava flow is analogous to falling into shattered glass because flows often split deeply, forming hazardous chasms. When crossing lava flows, rugged hiking boots, long pants, and gloves are recommended.

There are few organization and NGO (non-governmental organization) which are doing their best to spread awareness of the volcanic eruption and how it can be fatal, can cause a lot lives. American Red Cross is organization which operates mainly in the united states of America but it do help in the neighboring countries with funds around the area where volcanoes are active or area where the eruption could happen .WHO has been doing excellent work in the field of providing aid to seekers in these kinds of situation .In recent years ,Hawaii is the area where most volcanic eruption have occurred ,so there are number of organization ,observatory, world heritage sites in and around the volcanoes . Volcanic carbon dioxide contributes to the natural greenhouse effect. Because sulphur dioxides are transformed to sulphuric acid in the stratosphere, which is the principal cause of acid rain, they cause environmental difficulties. Sulphate aerosols are also generated, which reflect solar radiation while absorbing heat, cooling the earth. Chemical reactions in which sulphate aerosols participate result in the formation of ozone-depleting material.

Diverting a lava flow is highly difficult, although it can be done in specific conditions, as it was

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in Vestmannaeyjar, Iceland, once. The best design of simple, low-cost barriers to redirect lava flows is still being studied.

Towns destroyed by lava flows

- Kalapana, Hawaii was destroyed by the eruption of the Kīlauea volcano in 1990. (abandoned)
- Koae and Kapoho, Hawaii were both destroyed by the same eruption of Kīlauea in January, 1960. (abandoned)
- San Sebastiano al Vesuvio, Italy Destroyed in 1944 by the most recent eruption of Mount Vesuvius during the Allies' occupation of southern Italy. (rebuilt)
- Cagsawa, Philippines buried by lava erupted from Mayon Volcano in 1814.
- The Nisga'a villages of Lax Ksiluux and Wii Lax K'abit in northwestern British Columbia, Canada were destroyed by thick lava flows during the eruption of Tseax Cone in the 1700s.
- Garachico on the island of Tenerife was destroyed by the eruption of Trevejo (1706)

CONCLUSION

Although lava flow emergencies draw worldwide attention, they have not been as thoroughly documented by scientists as other volcanic hazards, nor have they been systematically compared to identify research gaps, best practices, or vulnerability models. Additionally, in some cases the few cities and towns have been destroyed by the lava flow but all this destruction can be prevented by scientist if the communities were aware of lava and how it can cause damage to the nature and its surrounding. Furthermore, lava flow attribute data, as well as the context and decision-making surrounding lava flow modeling carried out during a crisis, are not always released. As a result, we advocate a bigger community debate about how to collect and categorize the requested data, which can help in gathering knowledge regarding lava flow impacts and societal effects, as well as best practices for dealing with lava flow disasters. There are few problems during the volcanic eruption and it can take care by following safety protocols and by taking some preventive measure during the volcanic eruption and after it. Our research also revealed that some evacuation protocols are more effective than others, that some lava flow mitigation techniques have worked, and that submerged land can be repurposed.