

List three factors that determine the nature of a volcanic eruption and what role does each plays? Also, explain how volcanic bombs differ from blocks of pyroclastic debris?

The volcanic eruption depends on three factors. Magma chamber's excess pressure built up, magma chamber's depth, and most importantly, the magma's nature. The major magma characteristic also influences the eruption. For instance, volatile gases content, viscosity, composition, and temperature. Explosive eruption of the lava is more likely in silica-rich and volatile, highly viscous, and cooler magmas. Lava fountains that are non-explosive commonly erupt due to basalt, poor volatility, silica, more fluid, and hotter magmas. Explosive eruption of the lava chances also increases due to excessive pressure built up under the depth of the volcano (Cassidy et al., 2018). The explosive chances increase as a result of the magma body's high internal pressures, which occur because of high viscosity and high volatile content.

Moreover, the low-pressure buildup in the magma chamber leads to the non-explosive eruption, which occurs due to low volatile contents. Additionally, these lower volatile contents reduce magma viscosity and develop reduced internal pressure among the fluid particles.

Caldera-forming and explosive eruptions are triggered by rich felsic, more volatile, more silicic, and deeper intrusion of hot magma into cooler parts of the volcano. Felsic magma heats up by the mafic magma and moves towards the higher volcano spots. Explosive eruption likelihood increases by alleviating the overpressure of magma which is achieved by upward movement and heating. Earlier tuffs have low mafic character than Crater Lake (Zuccaro et al., 2018). Crater lake formed by Calder-forming eruptions, smaller volume of ash-flow tuffs. Shallower magma is less mafic and hotter than the deeper chamber's magma.

The volcanic bombs and pyroclastic debris are considered pebble size and fragments. The volcano bomb emits in the form of molten rock and then cools from blobs when been ejected; on

the other hand, the pyroclastic debris is emitted as solid material. Volcanic bombs are also called lava bombs, and they are rounded fragments more prominent than 64 mm in diameter and absorb solid particles when they reach the ground exhibiting the surface pattern. Volcanic bombs are produced mainly by Vulcanian and Strombolian eruptions and are essentially vesicular to a greater extent. The volcanic bomb is the incandescent lava. Volcanic bombs have a different shape, containing spindle bombs, spheroidal bombs with twisted ends (USGS, 2022).

On the other hand, the block of the pyroclastic debris is the block of lithic clast broken from the pre-existing rocks. Their shape is angular and has no morphological feature associated with solidifying liquid magma masses. They are non-vesicular, having no interior or edges that are amygdaloidal. The block's debris is made of hardened lava. It is also called a volcanic eruption. The example of pyroclastic debris contains lava blocks, lava blocks, pumice. These blocks of pyroclastic move at high speed, moving down the volcanic slope. Ash is also considered pyroclastic debris, and the most spectacular pyroclastic debris is ignimbrites formed by ash (pyroclastic flow event) and gas at high temperatures (Fisher & Schmincke, 2012). Hence, properties of volcanic bomb and pyroclastic debris are unique with different geographical location.

References

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