



Why Some Volcanoes Erupt Explosively and Others Don't

KS4 GEOGRAPHY

PLATE TECTONICS

NATURAL HAZARDS

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What Makes a Volcano Erupt?

Volcanoes erupt because hot **magma** (melted rock) beneath Earth's surface rises and pushes upward. But not all volcanoes explode the same way. Some erupt gently with flowing lava, while others blast explosively into the air. The difference comes down to what the magma is made of and how easily it can escape.

Thick Magma Versus Thin Magma

The most important factor is how **thick or viscous** the magma is. Thick, sticky magma moves slowly and gets trapped underground, building up pressure like a shaken fizzy drink bottle. When pressure becomes too great, it explodes violently. Thin, runny magma flows easily out of the volcano, releasing pressure gradually with gentler eruptions.

Think of it like squeezing a toothpaste tube. If the toothpaste is thick and sticky, you need to squeeze hard and it comes out in bursts. If it's runny, it flows out smoothly with gentle pressure.

Gas Bubbles Make the Difference

Magma contains dissolved gases like **water vapour**, **carbon dioxide**, and **sulphur dioxide**. These gases are trapped in the magma under pressure, just like bubbles in a carbonated drink. As magma rises and pressure decreases, gases expand rapidly. If gases escape easily through cracks, the eruption is calm. If gases get trapped in thick magma, they build up enormous pressure and cause a violent explosion.

Think of it like opening a fizzy drink can. If you open it slowly, the bubbles escape gradually. If you shake it first and open it quickly, the bubbles explode everywhere!

Two Main Types of Volcanoes

Shield volcanoes have thin, runny magma that flows easily down gentle slopes. They erupt frequently but gently, like Hawaii's **Kilauea**. **Composite volcanoes** have thick, sticky magma that traps gases, causing explosive eruptions. **Mount Vesuvius** in Italy is a famous example—it buried the Roman city of **Pompeii** in **79 AD** with a catastrophic explosion.

Understanding these differences helps scientists predict which volcanoes are most dangerous and warn people living nearby.