

Tephra

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Tephra is fragmental material produced by a volcanic eruption regardless of composition, fragment size or emplacement mechanism.^[1]

Volcanologists also refer to airborne fragments as **pyroclasts**. Once clasts have fallen to the ground they remain as tephra unless hot enough to fuse together into pyroclastic rock or tuff.



Volcanic tephra at Brown Bluff, Antarctica (2016)

Contents

- 1 Overview
- 2 Classification
- 3 Etymology
- 4 Notes
- 5 External links

Overview

The distribution of tephra following an eruption usually involves the largest boulders falling to the ground quickest and therefore closest to the vent, while smaller fragments travel further — ash can often travel for thousands of miles, even circumglobal, as it can stay in the stratosphere for days to weeks following an eruption. When large amounts of tephra accumulate in the atmosphere from massive volcanic eruptions (or from a multitude of smaller eruptions occurring simultaneously), they can reflect light and heat from the sun back through the atmosphere, in some cases causing the temperature to drop, resulting in a temporary, "volcanic winter", climate change. Tephra mixed in with precipitation can also be acidic and cause acid rain and snowfall.

Classification

Tephra fragments are classified by size:

- Ash – particles smaller than 2 mm (0.08 inches) in diameter,
- Lapilli or volcanic cinders – between 2 and 64 mm (0.08 and 2.5 inches) in diameter,
- Volcanic bombs or volcanic blocks – larger than 64 mm (2.5 inches) in diameter.

The use of tephra layers, which bear their own unique chemistry and character, as temporal marker horizons in archaeological and geological sites is known as tephrochronology.



Tephra horizons in south-central Iceland. The thick and light coloured layer at the centre of the photo is rhyolitic tephra from Hekla.



A 2007 eruptive plume at Mount Etna producing volcanic ash, pumice and lava bombs.

Etymology

The word "tephra" and "pyroclast" both derive from Greek: τέφρα *tephra* means "ash", while the word *pyroclast* is derived from the Greek πῦρ (*pyr*), meaning "fire", and κλαστός (*klastos*), meaning "broken in pieces".

Notes

1. This is the broad definition of tephra (Greek *tephra*, "ash") proposed by the Icelandic volcanologist Sigurður Þórarinnsson (Sigurdur Thorarinsson) in 1954, in connection with the eruption of Hekla (Thorarinsson, "The eruption of Hekla, 1947-48II, 3, The tephra-fall from Hekla, March 29th, 1947", *Visindafélag Íslendinga* (1954:1-3).

External links

- Media related to Tephra at Wikimedia Commons
- How Volcanoes Work (http://www.geology.sdsu.edu/how_volcanoes_work/Tephra.html)
- Volcanic Materials Identification (<http://facweb.bhc.edu/academics/science/harwoodr/GEOL101/Labs/VolcanicMaterials/>)



Rocks from the Bishop tuff, uncompressed with pumice on left; compressed with fiamme on right.



Volcanic breccia in Jackson Hole.

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Categories: Igneous petrology | Tephra

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