

Fossils survive volcanic eruption to tell us about the origin of the Canary Islands

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The most recent eruption on the Canary Islands – at El Hierro in 2011 – produced spectacularly enigmatic white "floating rocks" that originated from the layers of oceanic sedimentary rock underneath the island. An international team of researchers, led from Uppsala University, use microscopic fossils found in the rocks to shed new light on the long-standing puzzle about the origin of the Canary Islands.

Despite being violently transported through the volcano, some of the rocks produced by the El Hierro eruption contain [microscopic fossils](#) of delicate single-celled marine organisms, making the survival of these fossils all the more extraordinary.

A new study published today in *Scientific Reports*, an open access journal of the Nature Publishing Group, by a team of scientists from the universities of Uppsala, Las Palmas de Gran Canaria, Lisbon, and the Research Council of Spain, uses these fossil time-travellers to date the sedimentary layers beneath El Hierro and, in turn, shed new light on the long-standing puzzle about the origin of the Canary Islands.

The origin and life cycle of oceanic volcanoes, such as the Canary Islands, has long been a source of debate among natural scientists. There are two competing models for the origin of the Canaries – one in which ocean floor fractures control the location of volcanic activity, and another in which an anomalously hot plume of molten rock from the Earth's mantle feeds island growth from below.

A cornerstone of the debate concerns the validity of an age-progression along the island chain. A fixed mantle plume under the roughly eastwards moving African tectonic plate would cause the islands and the pre-volcanic ocean sediments underlying them to become progressively younger towards the westernmost island of El Hierro. The fracture model, in turn, would give rise to randomly distributed island ages.

"Fossils and volcanoes are not usually compatible with each other, which is what makes these samples so special," says Valentin Troll, professor at the Department of Earth Sciences at Uppsala University, who led the study that is now being published in *Scientific Reports*.

The study offers a unique perspective on the plume versus fracture model debate for the origin of the Canary Islands. The fossils are de facto witnesses of the pre-island environment. Researchers can now place constraints on the ages of the sedimentary strata present before island-building and, indeed, on the initiation of island-building itself. In combination with known sediment ages from the east of the archipelago, it is now clear that the oceanic sediments become younger towards the west of the island chain, thus verifying an age-progression among the islands. These findings are in strong agreement with the [mantle plume](#) model for the [origin](#) of the Canary Islands and thus contribute to our wider understanding of ocean island volcano genesis.

More information: Zaczek, K., Troll, V. R., Cachao, M., Ferreira, J., Deegan, F.M., Carracedo, J.C., Soler, V., Meade, F.C., Burchardt, S. 2015. "Nannofossils in 2011 El Hierro eruptive products reinstate plume model for Canary Islands." *Scientific Reports* 5:7945. [DOI: 10.1038/srep07945](https://doi.org/10.1038/srep07945).

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