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VS15/VS30/VS34 Water and Magma / Volcaniclastic Sediments: Modern Applications for Marine and Earth Sciences / Effects of Water on Subaerial Volcanic Eruptions and Ash Dispersal



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Abstract content:

Hyaloclastite fragmentation below the glass transition: example from El Barronal submarine volcanic complex (Spain)

Submarine felsic volcanoes are dominated by hyaloclastic piles hundreds of meters thick, the origin of which, in terms of how and when they form, is far from being completely understood. Here we present a study of the thermal remanent magnetization of the Miocene high- K dacitic El Barronal hyaloclastites (Cabo de Gata, Spain), showing that their formation is dominated by in situ fragmentation with small or negligible transportation and/or rotation of different clasts after their formation. Data indicate that fragmentation progressed down to 210–390 °C, well below the glass-transition temperature estimated at 560–750 °C depending on the water content of the high-K dacite. Hence, hyaloclastite fragmentation in thick lavas may occur over most of the cooling history, as a result of the progressive access of sea water toward the lava interior by development of a complex network of contraction fractures.

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