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Completing the eruptive record of Deception Island (South Shetland Islands, Antarctica) by characterizing ash layers in proximal marine sediments cores.

Antonio Polo Sánchez[1], Joaquín Hopfenblatt[1], Adelina Geyer[1], Meritxell Aulinas[2], Gemma Ercilla[3], and Antonio Álvarez-Valero[4]

[1]Geosciences , GEO3BCN - CSIC, Lluis Sole i Sabaris s/n, 08028, Barcelona, Spain (polosanchezantonio@gmail.com; joaquinhopfenblatt@gmail.com; ageyer@geo3bcn.csic.es)

[2]Departament de Mineralogia, Petrologia i Geologia Aplicada, University of Barcelona, Marti Franques s/n, 08028, Barcelona, Spain (meritxellaulinas@ub.edu)

[3]Instituto de Ciencias del Mar, ICM-CSIC. Continental Margin Group. Paseo Marítimo de la Barceloneta, 37-49; 08003 Barcelona, Spain (Instituto de Ciencias del Mar, ICM-CSIC. Continental Margin Group. Paseo Marítimo de la Barceloneta, 37-49; 08003 Barcelona

[4]Departamento de Geología, Universidad de Salamanca, 37008 Salamanca, Spain (aav@usal.es)

The chemical and textural characterization of ash layers allows relating them to their volcanic source, provides information regarding an eruptive event and its impact; and pictures more accurate scenarios in case of future activity. Deception Island, located in central Bransfield strait (South Shetland Islands, Antarctica), consists of a horseshoe-shaped composite volcano, whose central part is occupied by a collapse caldera (8.5 x 10 km). It is considered to be among the most active volcanoes in Antarctica and a future eruption is very likely to happen, affecting the military and scientific research stations located nearby. The characterisation of volcanic ash layers found in marine sediment cores outside Deception Island can provide valuable information to: (i) determine the size and explosiveness of past eruptive events, (ii) assess the extent of their related hazards; and (iii) complete the eruption record of the island. Here, we present results of the characterization of the ash layers found on five marine sediment cores (TG-40, 41,43, 48 and 50) drilled proximal to Deception Island (less than 40 km) during the Antarctic Campaign of the MAGIA project (ANT-584/97). The final aim is to trace isochronous tephra horizons between the studied cores and try associating them to their respective eruptive events on the island. First, we carried out a granulometry analysis of each sampled layer and characterized the morphology of the fragments using as parameters: elongation, sphericity, solidity, and length/width ratio. Results obtained indicate that most of the layers are moderate to well sorted coarse ash. Minor amounts of lapilli and fine ash appear in the shallower (0 to 50 cm depth) layers. The granulometry and the morphology indicate that the layers have been reworked by turbiditic currents after the eruption, but not enough to destroy the information necessary for correlation. The petrographical study via optical microscope has highlighted the presence of three different types of volcanic glasses based on: (i) the colour of the ash particles under non-crossed polarized light; (ii) microcrystal content; (iii) texture; and (iv) vesicle abundance. Type 1 glasses, with black colour and generally shard

shaped, show a low content in microcrystals and vesicles. Type 2, with brown colour and more spherical shapes, have a higher content in microcrystals and the fragments usually have a fluidal texture; the vesicle abundance is variable. Type 3, with yellow colour and variably shaped, are usually rich in microcrystals and vesicles, and have fluidal texture. In all families, the mineralogy of the microcrystals is mainly plagioclase (90%), pyroxene and olivine. The longest core (TG-48, 120 cm long) contains 15 layers, the deepest ones (113, 115 and 120 cm depth) may be correlated to the ones found in previous studies associated with a period of abundant volcanic activity around 2000 years BP.

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