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Characterization of volcanic ashes in cores from the Bransfield Strait and their correlation with volcanic eruptions from Deception Island, Antarctica.

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The study of volcanic ash (tephrochronology) is a very powerful tool that requires tephra characterization for dating or linking different events, like volcanic eruptions. The aim of this work is the description and analysis of volcanic ash samples in marine sediment cores located at the Bransfield Strait. For such purpose, volcanic ash from five cores located close to Deception Island are geochemically and morphologically characterized. Morphological results show grain size variation from fine ash to lapilli and two types of morphology: blocky and curve. The petrographic results show four types (I, II, III and IV) of ash fragments. With regard to their chemistry, glass compositions are similar in the four types of fragments being mainly classified as basaltic andesite and basaltic trachyandesite, whereas, mineral phase compositions are more variable. Plagioclases range from andesines to bytownites with An36-86, pyroxenes are mostly augites with Wo29-44, En36-55, Fs11-21, diopsides with Wo45-46, En39-41, Fs12-15 and minor pigeonites with Wo5-6, En55-66, Fs29-40. Olivines show a wide variety of chemical composition with Fo58-85. The chemical composition of glass is very similar to those displayed by the post-caldera stage in Deception Island except for SiO_2, which is lower. Yet, both exhibit the same magmatic evolution trend. These results suggest that the studied ash samples could represent older magmas erupted earlier in the post-caldera stage. Mineral chemistry of ash samples reported in this work is also very similar to those displayed by post-caldera Deception samples. This research was supported by de MICINN projects POSVOLDEC (CTM2016-79617-P) (AEI/FEDER, UE) and VOLCLIMA (CGL2015-72629-EXP) (AEI). Analyzed tephra samples and sediment cores were provided by the rock repository of the Instituto de Ciencias del Mar del CSIC (ICM-CSIC) (http://gma.icm.csic.es/ca/dades).