

# Very low-grade hydrothermal metamorphism of Cenozoic volcanics in Fildes Peninsula, King George Island, Antarctica

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Fildes Peninsula is located at the southeast of the King George Island, which is the biggest island of the South Shetland Islands at the northwest of Antarctic Peninsula. The archipelago and the Antarctic Peninsula were part of the continental crust block affected by several tectonic processes related to the subduction since the Early Mesozoic to the Cenozoic times. Fildes Peninsula is comprised by basaltic and andesitic lavas and tuffs related to Paleocene-Eocene arc volcanism.

These volcanics present secondary minerals such as zeolites, mafic phyllosilicates, epidote, pumpellyite, celadonite, adularia, titanite and calcite. It is very usual to see in the archipelago some of these assemblages in the volcanic rocks [1] [2]. Particularly in Fildes Peninsula it occur in amygdules, veinlets, and as replacement of phenocrysts and groundmass.

Fieldwork and petrographic, XRD and SEM analyses were performed to study these assemblages. The mineralogy suggest a tendency of increase the metamorphic grade to the southeast. This tendency shows no pattern with the stratigraphy, which suggest that the burial processes are not controlling the formation of the minerals, in the other hand porosity and permeability play a significant role. Secondary mineral assemblages suggest low fluid pressures and that metamorphic temperatures reached ca. 230°C.

The features suggest a hydrothermal metamorphism as the main responsible of the heat, although the source is not clear. Following actual models proposed to Livingstone island in the archipelago [2], we propose that this hydrothermal metamorphism is related to the geothermal activity generated after the cessation of the subduction and through the extensional volcanism in the Cenozoic.

*The research is funded by the project RT0614 (INACH) and UNAB.*

[1] Armstrong (1995) *MinMag* **47** 851-870 [2] Bastias et al. (2013) *MinMag* **77** (5), 666.