

FISSION TRACK THERMO-CHRONOLOGICAL STUDY OF THE BARNARD POINT PLUTON (LIVINGSTON ISLAND, WESTERN ANTARCTICA)

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Livingston Island is a part of the South Shetland Archipelago, a Mesozoic - Cenozoic island arc located at the Northwest of the Antarctic Peninsula, between an inactive subduction zone (the South Shetland trench) and an incipient back-arc basin (the Bransfield basin). In the Southeastern coast of the Livingston Island, the Barnard Point tonalite pluton presents Rb-Sr and K-Ar (whole rock and mineral) ages in the 46-40 Ma range. Its cooling below 400°C is estimated to have occurred 40.9±2.7 Ma ago (W. Kelley, 1999). We dated by fission-tracks the apatites of four tonalites taken between sea level and an altitude of 400 m. The four central ages are concordant at 18.7±1.2 (mean and standard error) Ma. Confined track distributions and optimisation of the data indicate that track recording started about 27-28 Ma ago. This is concordant with an $^{40}\text{Ar}/^{39}\text{Ar}$ age of 29.3±0.7 Ma found for the biotites of a pegmatitic dyke, which suggests a mid-Oligocene cooling from 300°C to less than 120°C within a few Ma. From 18-13 Ma to 4-3 Ma, a slight temperature increase occurred, probably related to the extension processes in this region. During the Plio-Quaternary, an acceleration of the cooling rate is probably related to the beginning of the Bransfield basin formation and rifting and the fast uplift and denudation of this region.