

WEATHERED HORIZONS AND INTRABASALT SEDIMENT FROM THE TERTIARY OF WEST ANTARCTICA: IMPLICATIONS FOR THE EOCENE-OLIGOCENE CLIMATIC CHANGES

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Resumo: Outcrops of Tertiary volcanic and sedimentary rocks on King George Island, West Antarctica showing evidence of paleoclimatic variation were examined during field work in the summer of 2005. The outcrops include a succession of at least eleven few meters thick basaltic lava flows overlain disconformably by diamictite and sandstone. The basaltic section is correlated with the Mazurek Point Fm., radiometric dated as Eocene, and the diamictite and sandstone correspond to the Krakowiak Glacier Mbr. of the Polonez Cove Fm., dated as Early Oligocene, on paleontological and radiometric basis. The two units are beautifully exposed around the Low Head escarpment. Each tholeiitic basalt layer exhibits a lower, thicker (1 to few meters) fresh zone, transitionally followed up by a zone of saprolith, varying from decimeters to 1-1.5 m in thickness. The entire basalt package of around 60 m, is tilted 25° to the East. The succession has been recently exposed due to fast retreat of the present Wispianski Glacier. The initial field evidence suggests that the succession represents the geological record of paleoclimatic variation from mild to glacial conditions, that could correlate with the change from the late Eocene optimum to ice-house conditions in the Oligocene, as recorded on the Cenozoic paleotemperature curve established by $\delta^{18}O$ determinations on calcareous foram tests. The objective of this work is to characterize in detail the paleoclimatic variation interpreted from field evidence, through the use of stratigraphic, sedimentological, petrographical and geochemical techniques (XRD, XRF and ICP-MS). Data obtained consistently showed that the supposed transition from unaltered to altered zones observed in each basalt layer may in fact be assigned to the moderated action of weathering processes on top of each flow. They also demonstrates a glacial origin for the overlying diamictites, that were probably deposited subglacially in terrestrial to glacial-marine setting. The mild paleoclimatic conditions responsible for weathering of the basalt lasted until the emplacement of the highest lava horizon, followed by tectonic movement that tilted the package. These events indicate a relatively long paleoclimatic mild conditions during the Eocene, preceding the establishment and displacement of the Oligocene ice-sheet in this part of Antarctica.

Palavras-chave: West Antarctica; paleoclimatic changes; Eocene-Oligocene.