SYNSEDIMENTARY TECTONICS IN THE PERMOCARBONIFEROUS GLACIAL DEPOSITS OF WEST FALKLAND-MALVINAS: EVIDENCE FOR AN EXTENSIONAL MARGIN ALONG THE SOUTHERN WEST GONDWANA

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Resumo: The Falkland Islands and their continental shelf are part of a small continental piece originally situated along the south-east coast of South Africa. During the Gondwana break up and the opening of the South Atlantic, the continental fragment rotated about 180 degrees and was dragged to the South American plate. That part of the southern margin of Africa is now the northern part of the Falkland Islands.

Permocarboniferous glacial deposits in the northern part of West Falkland reach about 850 m in thickness of diamictite and minor sandstone bodies encompassed in the Fitzroy Tillite Formation. In the Hill Cove region, sandstone occurs as intercalations of cross-bedded coastal near-shore deposits and as tabular sub-vertical clastic dykes of massive sandstone within diamictite. The dykes range from a few centimeters to more than 2 m in thickness, with thinner dykes wedging upwards. Some bodies exceed 150 m in length and they form an orthogonal network with a main and more continuous E-W direction. Contacts of the sandstone dykes with diamictite are undulated probably as the result of compaction. Roughly parallel arrays of coarser grains in the sandstone near the dyke walls are interpreted as flow structures. Flow structures and wedging observed in some of the studied dykes indicate that unconsolidated sand was forcefully injected upwards, following the hydraulic gradient. Cross-bedded sandstone intercalations like those observed in this study are the most probable source of these intrusions. Liquefaction of the water-saturated sand was probably related to earthquake activity, as the overlying sediments show no evidence of slumping. Dyke intrusion occurred when fluid pressure in the sand exceeded the minimum principal stress plus the tensile strength of the diamicton. The orientation of the dykes is compatible with a regional stress field with E-W maximum and N-S minimum horizontal stress directions.

Synsedimentary E-W-trending normal faults with centimetric to decimetric offsets observed in Foot Point, and listric growth faults with decimetric to metric offsets and N-S-trending striations at Port Purvis, both affecting the Fitzroy Tillite Formation, are also compatible with a regional stress field with E-W maximum and N-S minimum horizontal stress directions.

Data from clastic dykes and synsedimentary faults indicate an active N-S-oriented extension during Late Palaeozoic glaciation in northern West Falkland, and consequently along the southern margin of West Gondwana.

Palavras-chave: synsedimentary tectonics; permocarboniferous; falkland islands.