

THE MIDDLE PERMIAN BRENTON LOCH FORMATION, FALKLAND ISLANDS: MACROFOSSILS, PALEOENVIRONMENT AND STRATIGRAPHIC CORRELATION

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ABSTRACT: The Middle Permian Brenton Loch Formation is part of the 8km thick Carboniferous-Permian succession of the Lafonia Group that crops out in the central to southern region of the East Falkland Island. The group encompasses, from base to top, the Bluff Cove, Fitzroy Tillite, Port Sussex, Brenton Loch and Bay of Harbours formations. The Brenton Loch Formation comprises a 70 m thick succession made-up of rhythmic claystones and sandstones of the Terras Motas, Cantera and Saladero members. The Brenton Loch Formation is marked by the upward decrease in the proportion of sandstone beds and an upward increase in the abundance and thickness of rhythmite units, composed of intercalations of sandstone, siltstone and mudstone. The increase in the proportion of fine-grained suspension deposits relatively to turbidite beds indicates that sedimentation was progressively more distal in the upper portions of the Saladero Member. The presence of black siltstone and shales also suggest a day-by-day sedimentation under anoxic conditions. Macrofossils found by the authors in the upper part of the Saladero Member include *Paleophycus*, *Vagorichnus*, *Cruziana* and *Planolites* ichnofossils, typical of the *Mermia* association and indicative of freshwater lacustrine environments. Their preservation in sandy facies suggests that hyperpycnal fluxes may have contributed to the sporadic oxygenation of the bottom water, allowing colonization by bioturbators. Sparse carbonized leaves of *Glossopteris* cf. *G. communis* preserved in dark claystones suggest deposition under redox conditions. The rhythmic alternation of those claystones and sandstones reflects fluctuations in the prevalence of oxidizing and reducing bottom conditions. Nearly at the same stratigraphic level, bivalve shells were found in muddy facies, commonly disperse and splayed open in a convex-up attitude. These features suggest rapid (but not abrupt) burial, normally under dysoxic bottom conditions AND? low energy conditions after the exhumation event. The specimens show “intraspecimen” morphological variations which probably reflects tectonic deformation (see Quaglio *et al.* in this volume). Those are anthracosiid bivalves showing close affinity with *P. dubia*, a species found in the Mid- to Upper Permian of the Kilombero Rift Basin, Tanzania, and correlated with the top of the Eccia Group and the base of the Beaufort Group in South Africa. A progradational tendency after the deposition of Brenton Loch formation is recorded by the the Bay of Harbours succession. This new regressive cycle in the upper portion of the Lafonia Group might be correlated to contemporaneous, regional Permo-Triassic units in South America and Africa. In this sense, the upper succession of Brenton Loch Formation can be correlated with the top of Passa Dois Group in Paraná Basin (Teresina and the base of Rio do Rasto formations), as well as with the top of Eccia Group (Fort Brown Formation) of the Karoo Basin.

KEYWORDS: PERMIAN, FALKLAND ISLANDS, BRENTON LOCH FORMATION