

Permian non-marine bivalves of the Falkland Islands and their paleoenvironmental significance

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Abstract

We describe the occurrence of non-marine bivalves in exposures of the Middle Permian (Capitanian) Brenton Loch Formation outcrop on the southern shore of Choiseul Sound, East Falklands. The bivalves are associated with ichnofossils and were collected from beds in the upper part of the formation, within a 25 cm thick interval of dark siltstones and mudstones with planar-lamination, overlain by massive sandstones. The shells are articulated, with the valves either splayed open or closed. At the top of the succession, mudstone beds nearly 1.5m above the bivalve-bearing layers yielded well-preserved *Glossopteris* sp. cf. *G. comminis* leaf fossils. The closed articulated condition of some shells indicates preservation under high sedimentation rates with low residence time of bioclasts at the sediment/water interface. However, the presence of specimens with splayed shells is usually correlated to the slow decay of shell ligament in oxygen-deficient bottom waters. The presence of complete carbonized leaves of *Glossopteris* associated with the bivalve-bearing levels also suggests a possibly dysoxic-anoxic bottom environment. Overall, our data suggest that the bivalves were preserved by abrupt burial,

possibly by distal sediment flows into a Brenton Loch lake, and may represent autochthonous to parautochthonous fossil accumulations. The shells resemble those of anthracosiids and are herein assigned to *Palaeonodonta* sp. aff. *P. dubia*, a species also found in the Permian succession of the Karoo Basin, South Africa. Our results confirm that (a) the true distributions in space and time of all Permian non-marine (freshwater) bivalves are not yet well known, and (b) there is no evidence for marine conditions in the upper part of the Brenton Loch Formation.

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