LACUSTRINE DELTAS IN THE MIOCENE MANUHERIKIA GROUP OF CENTRAL OTAGO

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Abstract

Manuherikia Group strata incorporate large wedge-shaped deltaic bodies constructed at the major points of sediment entry into a large freshwater lake (Lake Manuherikia) which extended in excess of 5,600 km^2 and accumulated a sediment pile approximately 700 m thick.

The description and environmental interpretation of delta plain strata (up to 100 m thick) is determined from outcrop, core and E log patterns of Miocene Manuherikia Group, Blackstone Member and Teviot Member strata. Two distinctive delta-forming environments are recognised, and are represented by a lower delta plain succession and an underlying upper delta plain succession. Lower delta plain strata consist of repetitive, interdigitating sequences of a fine-grained, predominantly carbonaceous succession of clay, silt, lignite and fine sand indicative of relatively short-lived peat swamps, well drained swamps, interdistributary bays, levees, crevasse splays and distributary channels. Upper delta plain strata are dominated by thick, economically significant coal seams indicative of extensive peat-forming swamps.

Manuherikia Group deltas typify a receding, but constructive, vertically accreting delta system. Lower delta plain strata progressively onlapped over the upper delta plain strata, as the delta receded in response to the transgressing lake shore. Peat accumulated almost continuously in the upper part of the delta plain farthest from the lake margin. Development of the Manuherikia Group lacustrine deltas therefore differs from classical continental shelf deltaic models in which the delta progrades as a clastic wedge over offshore strata.

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BARRY DOUGLAS holds M.Sc. (1975) and Ph.D. (1986) degrees from the University of Otago. Between 1975 and 1985 while at the University of Otago, he was funded by a New Zealand Energy Research and Development Committee contract to investigate the lignite resources of Central Otago. In the course of this work he established a stratigraphic framework for Central Otago fluvial and lacustrine strata, constructing depositional models of use for designing exploration strategy.

He presently runs a geological consultancy in Dunedin. His current research interest relates to the economic significance and detailed facies analysis of terrestrial and shallow marine sediments.