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TECTONICS AND HYDROCARBONS IN IRIAN JAYA, CONSTRAINTS FROM ZIRCON FISSION TRACK ANALYSIS

Kevin C. Hill*
Paul B. O'Sullivan*
Kaspar Lumbanbatu**
Richard D. Kendrick*
Edy Sutriyono*

ABSTRACT

Zircon fission track analysis of 52 Plio-Pleistocene to Precambrian samples revealed several provenance populations which can be correlated to regional tectonics or volcanism. Upper Miocene-Pliocene-aged zircons in the Buru Formation of the Bird's Head and western Fold Belt but not in the central and western Fold Belt, indicate volcanism in the Birds Neck, but not in the Fold Belt. Paleocene provenance ages in the eastern or central Fold Belt, suggest Paleocene tectonism and magmatism consistent with opening of the Coral Sea and formation of the oceanic marginal basins along the north coast of New Guinea. Middle Cretaceous zircons probably originated from volcanics predating the early stages of Coral Sea breakup. Alternatively, the volcanics may have been derived from an arc along the northern margin of PNG, as indicated by the Mount Victor granodiorite.

Late Triassic - Early Jurassic zircons probably originated from contemporaneous volcanism in the west and central Fold Belt and Bintuni Basin associated with breakup of the northwestern continental margin of Australia, and possibly from Triassic plutonism in PNG. The data suggest significant denudation of Triassic-Lower Jurassic strata in the Late Cretaceous-Paleogene and in the Mio-Pliocene. Early Permian to Late Carboniferous zircons suggest that significant denudation of volcanic strata of that age occurred during the Cenozoic, depositing sediment throughout Irian Jaya. Proterozoic to Early Palaeozoic zircons suggest significant denudation of a Proterozoic-Early Palaeozoic hinterland, particularly in the Cretaceous. These zircons probably represent reworked grains originating from the Australian craton that indicates that the Bintuni Basin was NOT far removed from its present location in the Early Mesozoic.

The results suggest a dominant influence of NW Australian tectonics in the Palaeozoic-Jurassic, but NE Australia tectonics from the Cretaceous to the Recent. When combined with AFT analysis and balanced cross sections, the results constrain tectonic models for Irian Jaya and hence hydrocarbon potential (see poster).

* La Trobe University
** Geological Research and Development Centre