

A STRUCTURAL AND TECTONIC STUDY OF THE
LAU-HAVRE - SOUTH FIJI BASIN REGION

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Abstract

A geophysical study of the South Fiji - Lau-Havre Basin region was carried out. Seismic reflection profiles obtained during two cruises of Kana Keoki 1971 (Univ. of Hawaii) were analyzed. Magnetics data from these two cruises as well as data obtained by New Zealand ships and Project Magnet flights were consulted. It was found that basic morphological trends exhibited in the two basins may be related to the crustal extension opening the basin. Latitudinal variations in basin character are linked to extension rate differences up and down the basin, a response to the shoaling of the Benioff Plane south to north. An additional temporal parameter controlling initiation of the extensional process may be operative, explaining variations in volcanic activity along the length of the basin. Magnetic lineations are proposed in the South Fiji and Lau Basins, whose source is believed to be linear dike-like intrusions responsible for opening of the basin. These same dikes may also account for the distinct regionalization of anomaly wavelength across the Lau-Havre Basin, short wavelengths dominating the bulk of the basin intruded by the dikes, longer wavelengths characterizing the flow built Tonga-Kermadec Ridge. East of the Kermadec Trench, magnetics and seismic profiles indicate the presence of numerous topographic highs which may form a continuous ridge. This ridge, an extended segment of the Eltanin Fracture Zone, is believed to represent a zone of weakness where the Pacific Plate is sheared upon subduction. Loss of trench type bathymetry and aseismicity back arc from the Tonga-Kermadec Trench junction indicate the absence of subducted crust. Finally, seafloor spreading lineations are suggested

as marking the seafloor east of the Tonga Trench, perhaps related to a later stage of the same spreading which produced the Phoenix Lineations to the north.

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