



Crustal structure of the basin and ridge system west of New Caledonia (Southwest Pacific) from wide-angle and reflection seismic data

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The geodynamic history of the Southwest Pacific has been characterized since the Cretaceous by the fragmentation of Gondwanaland. During an extensional period from ca. 120 to 52 Ma three subparallel marginal basins were created, the Tasman Sea, the New Caledonia Basin and the Loyalty Basin separated by two aseismic rides, Lord Howe Rise and the New Caledonia-Norfolk Ridge. During the Zonoco 11 cruise two deep reflection and wide-angle seismic profiles were acquired in the basin and ridge region west of New Caledonia. The objectives of this survey were the determination of the crustal structure and the identification of the nature of the crust in this region.

On the northern profile, the Lord Howe Rise has a crustal thickness of 23 km and seismic velocities characteristic of continental crust. The crust thins to 12-15 km in the neighbouring Fairway Basin, which is interpreted to be of thinned continental origin. Crustal thickness of the Fairway Rise is 20 km and it is also interpreted to be of continental origin. The Fairway Basin is underlain by crust of 10 km thickness, characterized by velocities higher than found in either thinned continental or oceanic crust. On the southern profile, the Norfolk Rise is also found to be of continental origin. Here, the New Caledonia Basin shows velocities and crustal thickness as well as a basement roughness characteristic of oceanic crust. The crust in the Fairway basin shows higher velocities than on the northern profile, possibly caused by volcanic intrusions. It can be concluded, that the thinned continental Fairway Basin formed by splitting of the continental Lord Howe Rise and the Fairway Rise, with rifting complete by the end of the Cretaceous. In the east the New Caledonia Basin opened during the late Cretaceous. Oceanic spreading started only in the central New Caledonia Basin.