LATE CRETACEOUS TO QUATERNARY SEDIMENTARY DEVELOPMENT OF THE LORD HOWE RISE AND THE DAMPIER RIDGE

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ABSTRACT

Approximately 3,500 km of continuous seismic reflection profiles and the stratigraphy at Deep Sea Drilling Project (DSDP) Sites 207 and 208 from Leg 21 have been used to interpret the Late Cretaceous to Quaternary sedimentary development of the Lord Howe Rise and the Dampier Ridge. During the Late Cretaceous, the Lord Howe Rise was part of a broad continental margin off eastern Australia. The acoustic basement under the Lord Howe Rise and the Dampier Ridge resembles volcanic terrain composed of lava flows and volcanic cones. Under the Southern Lord Howe Rise a rhyolite composition for the basement is inferred from the stratigraphy of DSDP Site 207; however, this composition cannot be extrapolated to the Northern Lord Howe Rise or the Dampier Ridge.

From Late Cretaceous to Early Tertiary time the Southern Lord Howe Rise underwent an interval of tectonic activity characterized by faulting of the acoustic basement, subsidence from shallow shelf to middle bathyal depths, and volcanism. During this same interval, the Northern Lord Howe Rise and the Dampier Ridge were tectonically stable.

A regional disconformity, centered in the Middle Tertiary, is identified paleontologically at DSDP Sites 207 and 208 and is traced geophysically through the transparent sediment of the Southern Lord Howe Rise and through the opaque sediments of the Northern Lord Howe Rise and the Dampier Ridge. A late Cretaceous to middle Tertiary "circumpolar" current, controlled by plate motions between Australia and Antarctica and intensified during the Middle Tertiary glaciation of Antarctica (Kennett and others, 1972), may be the cause for this regional disconformity.

From Late Tertiary to Quaternary time 300 m to 500 m of undisturbed pelagic ooze was deposited above the acoustic basement. These sediments have smoothed the topography of the Lord Howe Rise and the Dampier Ridge. Bottom currents, slumping, and differential compaction have modified the sediment distribution on the crest of the Southern Lord Howe Rise and on the slopes of the Lord Howe Rise and the Dampier Ridge, as well as sediments adjacent to basement outcrops.