

III. STRUCTURAL AND SEDIMENTARY FRAMEWORK

1. General

The continental margin south of Australia is dominated everywhere by a primary tension-fault system that has caused areas of continental elevation to subside to deeper structural levels. The grabens and half-grabens that were formed during this subsidence have been filled with thick sequences of continental and deltaic sediments. At a later date these sediments were themselves deformed by renewed tension faulting, often giving rise to slump or synsedimentary fault patterns. The area is not at present undergoing deformation, the last major movements having occurred in early Tertiary times.

The Petrel survey was conducted with the object of investigating the structure of the transition zone between the continent itself and the ocean basins that flank it.

It was found that a considerable part of the continental margin of southern Australia overlies a linear depocentre that includes sediments up to 10 kms thick : on the shelf the sediments usually overlie shallow basement, but on the slope and continental rise a thick wedge or lens of sediment is present (isopach maps, Encl. 13-15). Below the outer parts of the continental rise and the abyssal plains the basement again becomes shallow and is of oceanic character. The portions of the surveyed area that lie to the west of Perth and east of Tasmania do not contain areas with thick sedimentary fill.

Plate tectonic models suggest that the south and east coasts of Australia were bordered by landmasses during the Palaeozoic to early Mesozoic (e.g. Griffiths, 1973) and that the ocean basins that now surround the continent arose as a result of the drifting apart of the Australian, Antarctic and New Zealand continental blocks during the late Mesozoic and Tertiary. It has been suggested that the tension fault systems that control the continental margin are related to collapse that accompanied the inception of this rift process.

2. Basement

It is possible to recognise two types of acoustic basement on the seismic sections:

- (i) The first, which is considered to represent older continental rocks such as Pre-Cambrian or Palaeozoic metamorphics, is typified by a rough but flat, continuous and well defined bounding reflection, often displaced by normal faults (mainly antithetic).