

BOOBYALLA SUB-BASIN : A CRETACEOUS ONSHORE EXTENSION OF THE SOUTHERN EDGE OF THE BASS BASIN

by W. R. Moore, P. W. Baillie, S. M. Forsyth,
J. W. Hudspeth, R. G. Richardson and
N. J. Turner

Geological Survey of Tasmania, Department of Mines,
Hobart, Tasmania

ABSTRACT

Geophysical methods, including gravity, magnetics, refraction and reflection seismic, together with drilling have revealed the presence of a steep, fault-bounded trough of Cretaceous age in the Boobyalla Plains area, northeastern Tasmania. The trough is at least 500 m deep and contains the first proven Cretaceous sedimentary sequence from onshore Tasmania in the Boobyalla Sub-basin. The Boobyalla Sub-basin is the southeastern extremity of the Bass Basin and is bounded by faults having NW-SE, N-S and NE-SW trends.

These Late Cretaceous sediments consist of poorly sorted boulder conglomerate, often containing dolerite boulders several metres in diameter, pebble conglomerate and poorly sorted ferruginous sandstone. Clast lithologies are variable but reflect local derivation. Away from the trough margins the infilling sediments become finer grained with conglomerate becoming a less prominent part of the sequence. The coarse-grained sequences are interpreted to have been deposited rapidly in close proximity to a fault scarp.

The sediments are biostratigraphic equivalents of and represent a proximal (near-source) facies of the Eastern View Coal Measures, which were encountered in Durroon 1, drilled in the Bass Basin and some 60 km northwest of Boobyalla Plains. A minor volcanic episode probably affected this section of the Bass Basin about 100 Ma B.P. This may be related to tectonic disturbances and could be responsible for an unconformity at the base of the Eastern View Coal Measures indicated by offshore seismic information.

INTRODUCTION

The purpose of this paper is to describe a previously unknown onshore extension of Bass Basin, here named the Boobyalla Sub-basin, and to relate the onshore stratigraphy and structure as far offshore as Durroon 1 (Fig. 1). The Boobyalla Sub-basin, lying beneath Boobyalla Plains and the mouth of the Ringarooma River in northeastern Tasmania, contains the only proven Cretaceous sediments known from onshore Tasmania.

The Bass Basin is located between the mainland of Australia and the north coast of Tasmania. It is adjacent to the Otway Basin in the west and is separated from the oil-producing Gippsland Basin on the east by the Bassian Rise. It contains sedimentary infill ranging in age from Early

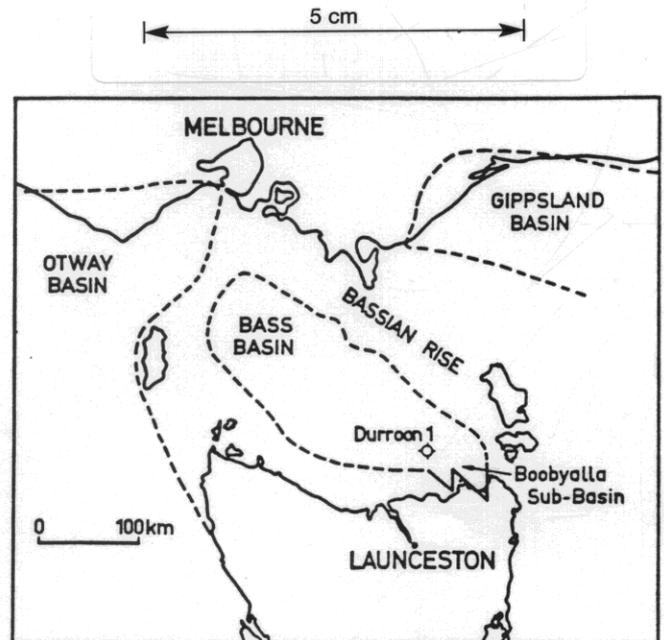


Figure 1 — Locality map.

Cretaceous to Late Tertiary and has an area of about 62 000 km² (Brown, 1976). Summaries of the geology exploration history and previous work are to be found in Robinson (1974), Brown (1976) and Nicholas *et al.* (1981).

In this paper pre-Cretaceous rocks are regarded as forming 'basement'. The rocks consist of folded Ordovician to Early Devonian Mathinna Beds which are intruded by post-tectonic Devonian-?Carboniferous granites unconformably overlain by flat-lying Permian-Triassic Parmeener Supergroup sediments (Williams, 1978; McClenaghan *et al.*, 1982). Substantial bodies of dolerite were emplaced during the Jurassic, marking the onset of the tensional phase that culminated in the breaking-up of Gondwanaland (Griffiths, 1971).

The Bass Basin began to develop in the Cretaceous when differential movement occurred between the Australian plate and a partially detached Tasmanian sub-plate (Griffiths, 1971). The southeastern end of the Bass Basin is the area of oldest tectonic activity (Early Cretaceous), and contains the oldest sediments known in the basin (Robinson, 1974; Brown, 1976).

BOOBYALLA SUB-BASIN

The Boobyalla Sub-Basin has been detected by means of drill holes and geophysics (refraction and reflection seismic, gravity and magnetics). A seismic refraction survey (Longman, 1969) was the first geophysical survey in the Boobyalla area and attempted to obtain basement profiles to explain unexpected basement depths obtained from a line of drill holes drilled in search of cassiterite-bearing sands. The western end of this seismic investigation failed to find a basement refractor (Longman, 1969). Gravity and magnetic surveys of the entire