

1984/46. A radiometric age for volcanic rocks at Musselroe Bay,
north-eastern Tasmania.

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Abstract

A radiometric date from potassium-rich basalt at Musselroe Bay extends the known area of mid-Cretaceous volcanism in the south-eastern sector of the Bass Basin, which is currently being actively explored for hydrocarbons. A whole-rock sample of basalt, that had been thought to be possibly of Permian age, from Department of Mines Borehole 1A, Musselroe Bay, has yielded a K/Ar age of 98.7 ± 0.8 Ma.

INTRODUCTION

As part of an investigation into the resources of the Musselroe Bay area, three boreholes were drilled in an attempt to elucidate the Permian stratigraphy of the area (Baillie, 1983). Two of the boreholes revealed the occurrence of intrusive and extrusive shoshonites, the presence of which were not suspected prior to drilling. Although chemically similar to dated Cretaceous rocks in the Cape Portland area, the lack of hydrous-phase minerals and degree of alteration led to the suggestion that the rocks might be Permian in age (Baillie, 1983).

Three core samples were examined for possible K/Ar dating; one was selected by Dr D.C. Green and a prepared sample was forwarded to Amdel for dating.

The sample subsequently dated was from 34.2-34.3 m, Department of Mines Borehole 1A, Musselroe Bay.

RESULTS

Standard techniques were used to determine the potassium content in duplicate and for the extraction and isotopic analysis of the argon.

The analyses and calculated age are given below:

% K	Ar* ($\times 10^{-10}$ moles/g)	Ar*/ $^{40}\text{Ar}_{\text{total}}$	Age ($\times 10^6$ years)
2.545	4.483	0.975	98.7 ± 0.8
2.555			

* Denotes radiogenic Ar

Constants used:

$$\begin{aligned}
 ^{40}\text{K} &= 0.01167 \text{ atom\%} \\
 \lambda_{\beta} &= 4.962 \times 10^{-10} \text{ Y}^{-1} \\
 \lambda_{\epsilon} &= 0.581 \times 10^{-10} \text{ Y}^{-1}
 \end{aligned}$$

DISCUSSION

The determined age is in close agreement with K/Ar ages obtained from hornblende occurring in an intrusive complex (102.3 ± 2.6 Ma), and as dykes (101.3 ± 2.6 Ma) in the Cape Portland area (McDougall and Green, Appendix 3 in McClenaghan et al., 1982).

On the basis of evidence from Cape Portland, the Boobyalla area and Durroon 1 (drilled by Esso in 1973), Moore et al. (1984) suggested that a minor volcanic episode affected the south-eastern sector of the Bass Basin at about 100 Ma, and that the volcanism was related to the possible tectonic disturbances which produced the marked unconformity between the Early Cretaceous Otway Group sediments and the Late Cretaceous to Eocene Eastern View Coal Measures.

Evidence presented herein extends the known extent of mid-Cretaceous volcanism in north-east Tasmania, although isolated small dykes of hornblende lamprophyre had previously been known from Great Musselroe Bay, Cod Bay and George Rocks (Baillie, 1984; Sutherland and Corbett, 1974).

REFERENCES

- BAILLIE, P.W. 1983. The Parmeener Super-Group at Musselroe Bay: Drilling results and possible Permian volcanic rocks. *Unpubl.Rep.Dep.Mines Tasm.* 1983/58.
- BAILLIE, P.W. 1984. Geological atlas 1:50 000 series. Sheet 25 [8516S]. Eddystone. *Department of Mines, Tasmania.*
- McCLENAGHAN, M.P.; TURNER, N.J.; BAILLIE, P.W. et al. 1982. Geology of the Ringarooma-Boobyalla area. *Bull.geol.Surv.Tasm.* 61.
- MOORE, W.R.; BAILLIE, P.W.; FORSYTH, S.M. et al. 1984. Boobyalla Sub-basin: A Cretaceous onshore extension of the southern edge of the Bass Basin. *APEA Journal* 24:110-117.
- SUTHERLAND, F.L.; CORBETT, E.B. 1974. The extent of Upper Mesozoic igneous activity in relation to lamprophyric intrusions in Tasmania. *Pap.Proc. R.Soc.Tasm.* 107:175-190.

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