

1988/07. Completion report: Sub-basalt Drilling Project Hole 9

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Abstract

SBDP Hole 9 penetrated approximately 262 m of Tertiary basalt unconformably overlying sedimentary rocks correlated with the Florence Quartzite (Upper Silurian - Lower Devonian) of the Zeehan area.

INTRODUCTION

This report is the fifth in the series being written for each of the holes completed in the Department of Mines Sub-basalt Drilling Project (SBDP). The hole is located on Hatfield Road, south of Moory Mount (fig. 1) at:-

Easting	387 915 mE
Northing	5 401 907 mN

Chemical analyses were performed by the Department of Mines Laboratories, Launceston, and down-hole logging by J. V. Wright.

STRATIGRAPHY

The first 63 m of the hole was precollared; a lithological log of the fully-cored section (63.45 - 346.0 m) is presented as Appendix 1.

Basalt, often vesicular or brecciated, was encountered between 63.45 m and 261.9 m. Fresh basalt suitable for dating was not seen, and some degree of deuteric alteration is ubiquitous. Some basalt flows (e.g. 104 m, 253 m) have weathered tops and probably indicate extrusion under subaerial conditions. Other flows (e.g. 187.0 - 204.0 m) show strong evidence of having been formed under water. Inclusions of sediment or coal may be present within zones of brecciation, and presumably formed by incorporation of sediment at the base of a flow.

Basement rocks were encountered below 261.9 m and consist dominantly of white or grey coloured, fine-grained to very fine-grained quartz sandstone or quartzite, sometimes containing zones of shelly fossil debris consisting of crinoid ossicles, brachiopods and trilobites. The succession is correlated with the Florence Quartzite (Eldon Group; Upper Silurian - Lower Devonian) of the Zeehan region of western Tasmania.

In thin section (e.g. 101654, 101655) very fine-grained sandstone is seen to be extremely well sorted, but the shape of the original grains is hard to determine because of deposition of siliceous cement. Most grains are composed of monocrystalline quartz; a minor chert component is also present.

From 328.5 - 330.7 m a zone of reddish-coloured coarse-grained sandstone is present. The colouration is due to the presence of a ferruginous cement, and may indicate subaerial exposure of the original sediments, perhaps on an upper shore face. Detrital grains (thin section 101656) are sub-angular to very well rounded, and are predominantly of metasedimentary (Precambrian) origin. Some chert is present and may show evidence of alteration to glauconite (for discussion of glauconitisation see Hughes and Whitehead, 1987).

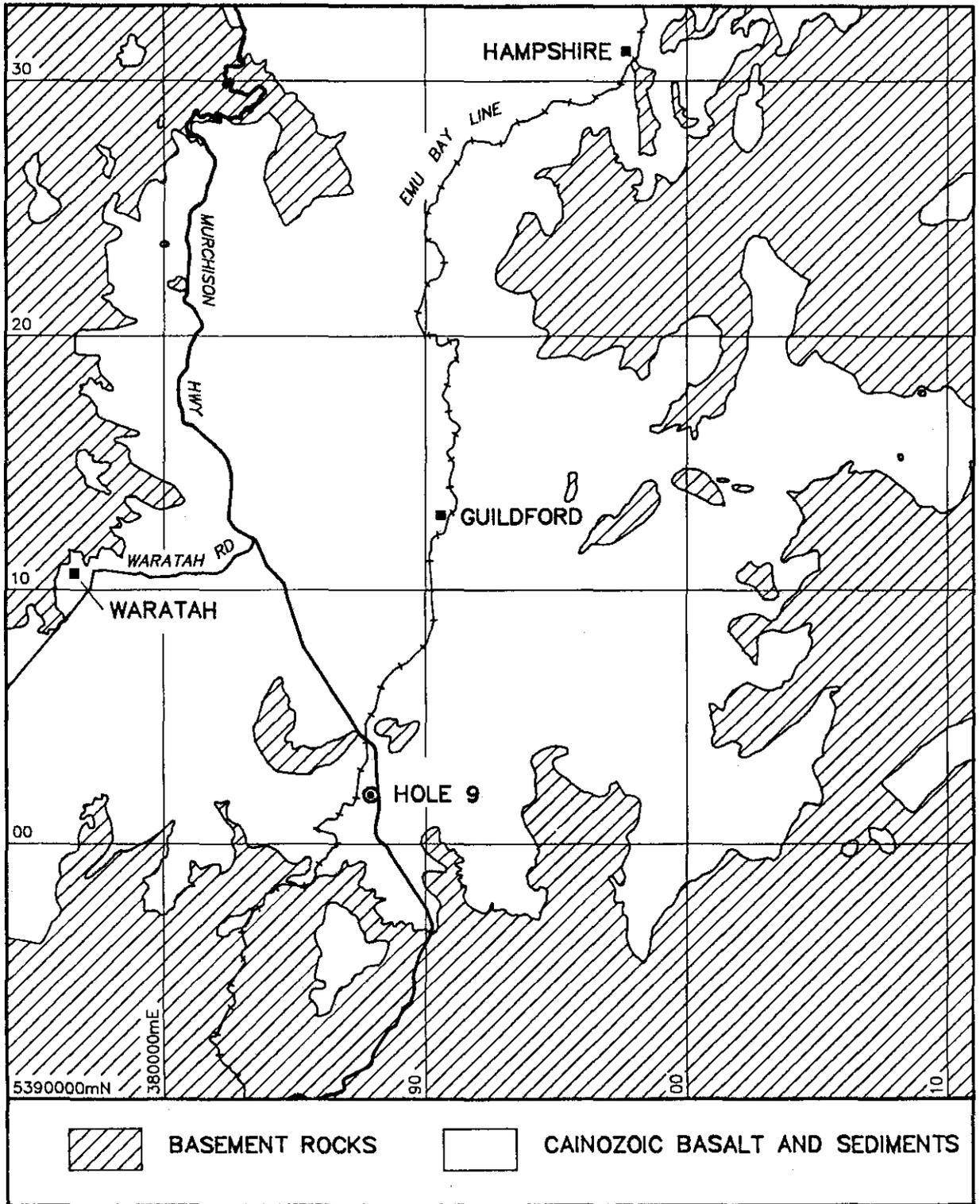


Figure 1. Location of Hole SBDP 9.

Rocks in the zone 330.7 - 335.5 m have a slight green colouration due to the presence of a significant glauconite component.

GEOPHYSICAL LOGGING

A gamma ray (GR) tool was run in the upper 330 m of the hole. Figure 2 shows the GR log; this log clearly shows the basalt/basement contact and also confirms that no sedimentary horizons are present within the basalt pile. Higher GR counts within the basement succession are probably due to the presence of clay-rich finer-grained sedimentary rocks.

WHOLE ROCK ANALYSES

Analyses of four relatively fresh basalt samples (872455-58) are shown in Table 1. Figure 3 is an alkali-silica diagram (constructed after Brown, 1986), and shows that the basalts from this hole are dominantly marginal between alkali-olivine basalt and tholeiite, but in general are similar to other basalts from the region.

SUMMARY

The hole has important implications from a regional geological perspective and has demonstrated the (unsuspected) presence of Eldon Group correlates between the Cambrian successions of the Upper Hatfield region (Barton et al., 1966) to the south and the Ordovician Moina Sandstone correlates exposed in the Mt Pearse Syncline to the north. Because both the Cambrian and Ordovician rocks are deformed into gently to moderately NE-plunging folds, complex faulting is required to explain the Palaeozoic rock distribution as now known.

A summary geological log is:-

- 0-262 m Tertiary basalt (probably Oligocene/Eocene)
- 262-346 m Florence Quartzite correlates

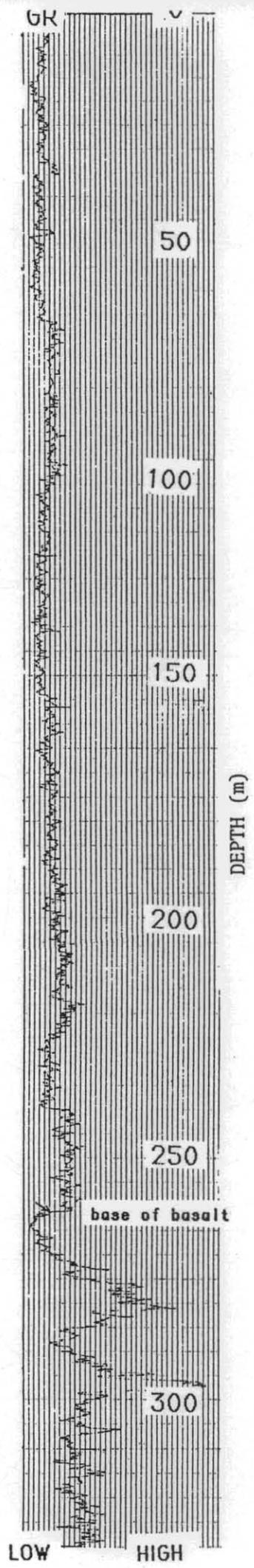
REFERENCES

BARTON, C. M., et al. 1966. Geological atlas one mile series. Zone 7 sheet 44 (8014N). Mackintosh . *Department of Mines, Tasmania.*

BROWN, A. V. 1986. Geology of the Dundas - Mt Lindsay - Mt Youngbuck region. *Bull. geol. Surv. Tasm.* 62.

HUGHES, A. D.; WHITEHEAD, D. 1987. Glauconitisation of detrital silica substrates in the Barton Formation (upper Eocene) of the Hampshire Basin, southern England. *Sedimentology.* 34:825-835.

[8 March 1988]



5 cm

Figure 2. Gamma-ray log, SBDP Hole 9

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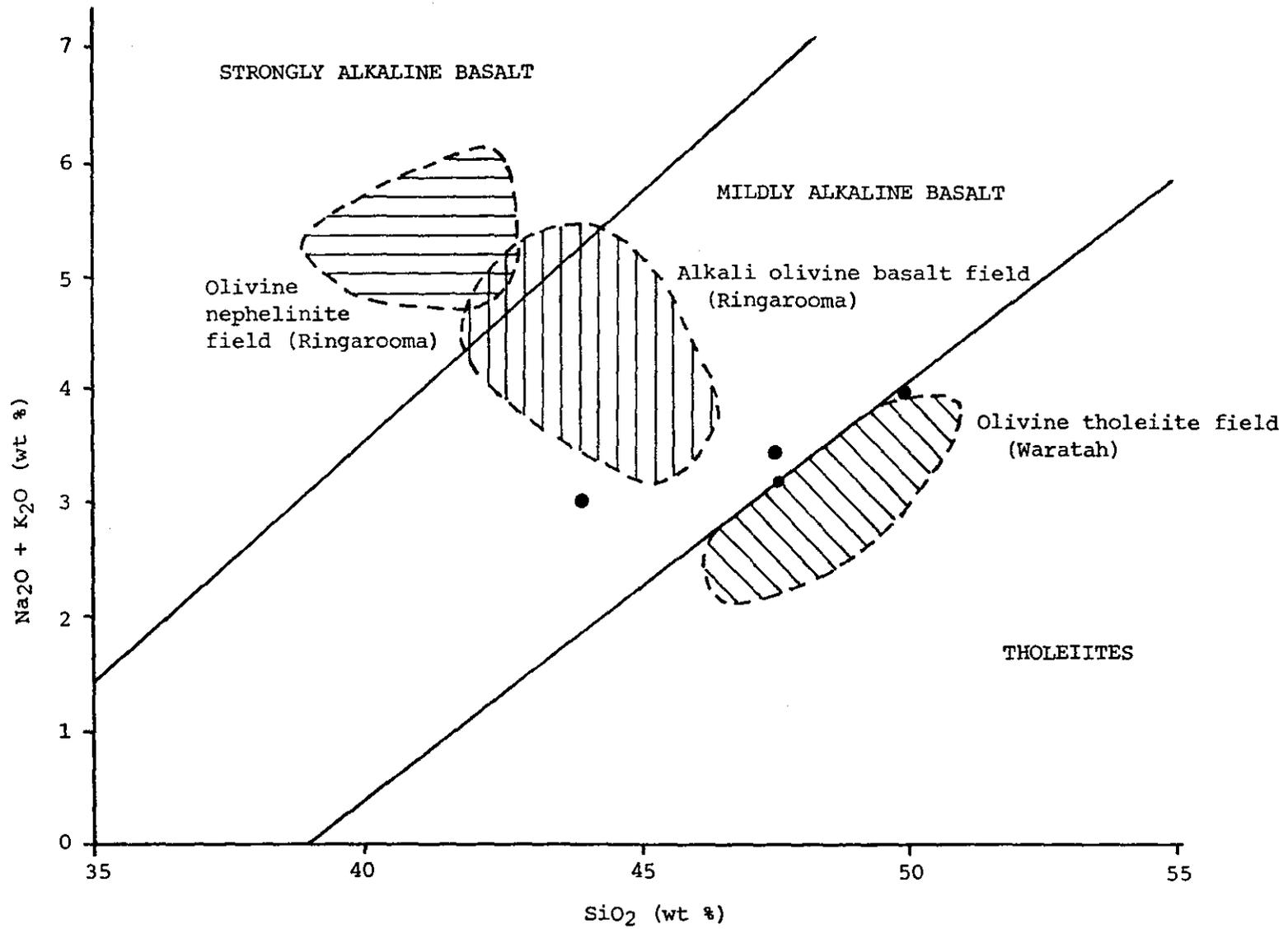


Figure 2. Alkali-silica diagram (after Brown, 1986), Tertiary basalt, SBDP Hole 9.

5 cm

Table 1. CHEMICAL ANALYSES OF BASALTS; SBDP HOLE 9

Analysis no.	872455	872456	872457	872458
Field no.	101650	101651	101652	101653
Depth (m)	115.5	129.0	213.5	237.6

Oxides (%)

SiO ₂	49.85	47.46	44.05	47.54
TiO ₂	1.44	1.44	2.12	1.95
Al ₂ O ₃	14.08	15.51	12.69	12.93
Fe ₂ O ₃	3.63	2.70	3.87	2.66
FeO	8.02	8.84	7.92	8.82
MnO	0.16	0.16	0.17	0.17
MgO	8.16	8.87	12.71	9.89
CaO	8.39	7.98	9.83	8.55
Na ₂ O	3.14	2.52	2.33	2.58
K ₂ O	0.78	0.62	0.76	0.81
P ₂ O ₅	0.27	0.25	0.68	0.36
H ₂ O ⁺	0.63	3.29	3.04	3.04
CO ₂	1.48	0.21	0.17	0.52
Total S	<0.05	<0.05	<0.05	<0.05

Trace elements (g/t)

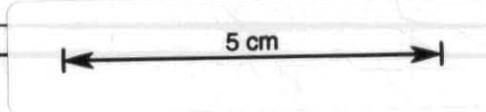
Ag	6	<5	<5	<5
As	13	<10	13	21
Ba	55	57	160	58
Bi	<5	<5	8	<5
Ce	50	54	91	56
Co	50	51	55	59
Cr	330	320	460	280
Cu	64	70	100	82
Ga	18	19	17	19
La	11	11	31	12
Mo	3	<2	4	2
Nb	12	10	42	20
Nd	15	16	25	17
Ni	190	210	360	250
Pb	<4	6	<4	5
Rb	19	14	16	14
Sc	19	20	19	19
Sn	5	<4	9	17
Sr	290	280	710	350
Ta	<9	<9	<9	<9
Th	4	<4	<4	<4
U	<5	<5	<5	<5
V	140	155	210	170
W	29	37	38	25
Y	18	18	22	21
Zn	115	125	120	125
Zr	105	105	160	120

APPENDIX 1

Lithological log of Hole SBDP 9

INTERVAL		REC. (%)	Core lift	Core loss	Depth (m)	Graphic Log	Min	DESCRIPTION	SPECIMEN		
From (m)	To (m)								Number	Depth	Prep'n
					60						
								63.45 - 261.9 m Dark coloured, massive or vesicular basalt. Some flows brecciated at base. Inclusions of sediment, coal often present in brecciated zones.			
					70						
					80						
					90						
					100						
								103.5 - 104.5 m Red weathered zone, probably palaeosol			
					110						
					120						
					130						
					140						
					150						
					160						
					170						

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