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OBSIDIAN DEPOSITS AT HURUIKI, NORTHLAND

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Huruiki, a prominent hill (459 m) overlooking Helena Bay, near Whangaruru Harbour, is one of only four known sources of flake-quality obsidian in Northland. Ward (1973) described the source as consisting of "nine apparently distinct deposits of bomb material over an area of approximately 4 km^2 west of Huruiki Trig", but none of the deposits were individually identified. As part of a wider study on obsidian sourcing being undertaken by Bruce McFadgen and myself, two days were spent at Huruiki in January 1982. Five discrete deposits were located, and detailed descriptions are presented in Table 1.

The main obsidian deposits occur along a prominent ridge, over 390 m high, extending for nearly 3 km south-west of Huruiki Trig (Fig. 1). One deposit (HU-3) was located in a valley on the south side of the ridge, and undoubtedly further searching could reveal others.

The Huruiki deposits consist of scattered lumps of black obsidian up to 20 cm diameter (but usually 5-10 cm diameter) in yellow-brown clay. The majority are located on farm tracks. Geological observations indicate that all except one of the deposits (HU-3) occur at, or close to, the contact between highly weathered 'greywacke' (sandstone and argillite) and overlying, relatively fresh basalt (probably Horeke Basalt; Kear and Hay, 1961: Fig. 1). At HU-4, for example, obsidian occurs in yellow-brown clay directly below basalt, and at HU-1 lumps of obsidian appear to be largely derived from a 2-3 m thick clay layer which probably underlies basalt, although some pieces are also found in the soil horizon overlying basalt. At HU-5, lumps of obsidian occur within 20 m of the edge of a basalt flow.

Since obsidian is normally associated with acidic volcanic rocks, such as rhyolite and dacite, the occurrence of deposits along a contact between greywacke and basalt is particularly unusual. No outcrops of rhyolite or dacite were found in the immediate vicinity (although a small area of Parahaki Volcanics is shown on Kear and Hay's (1961) map, 2 km north-west of Huruiki Trig), and it would seem that the parent rock has been entirely removed by weathering. The obsidian, therefore, probably represents a residual or 'lag' deposit which is essentially in situ. The occurrence of obsidian in weathered clay along a high ridge

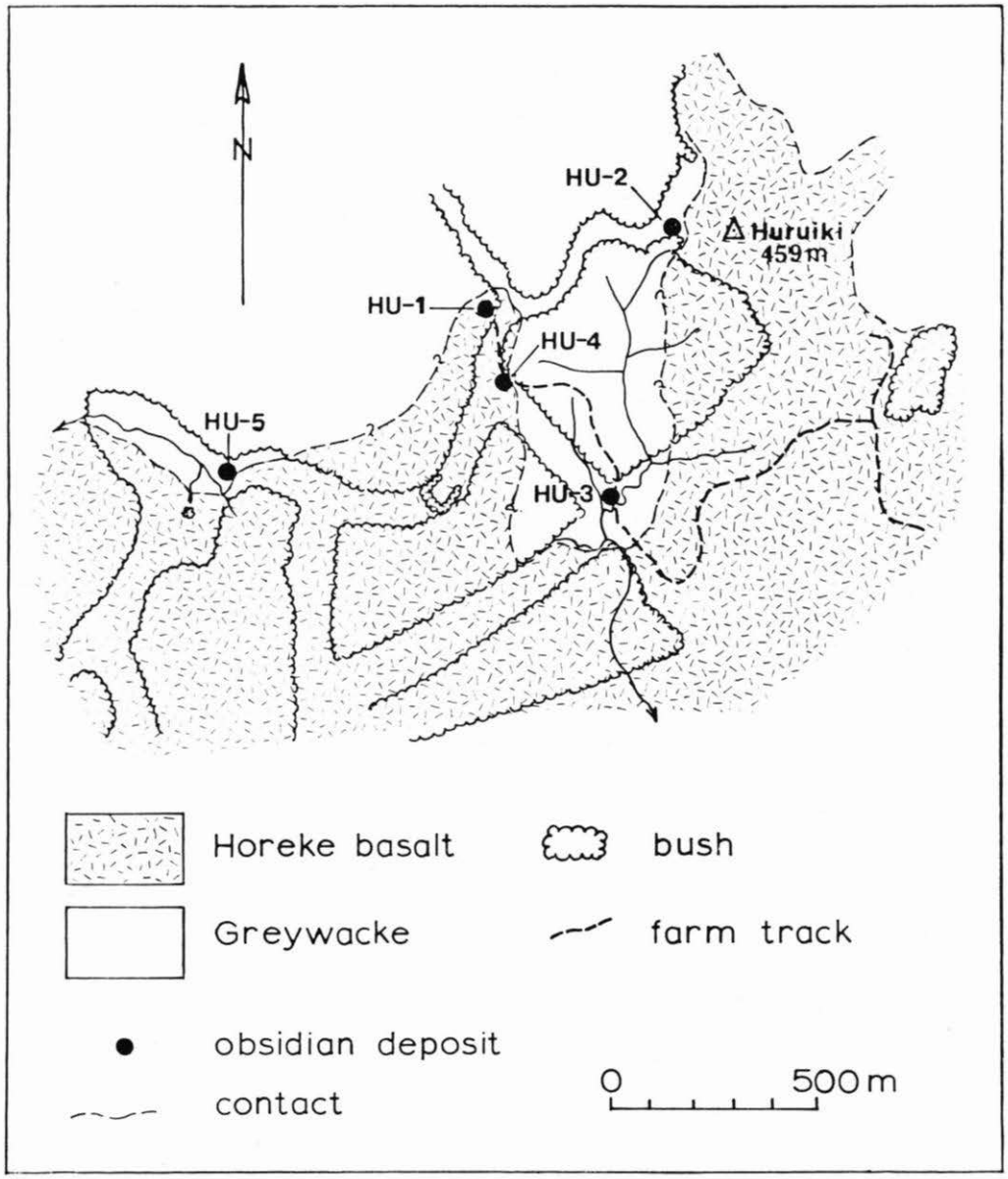

FIGURE 1. Simplified geological map of Huruiki area showing location of obsidian deposits. Base map drawn from air photos (Run 552/Nos. 84-86).

indicates that an alluvial origin is unlikely, although some deposits could be partly colluvial. Material at HU-3, however, is almost certainly alluvial.

The presence of pieces of obsidian in soil overlying both yellow-brown clay and basalt at HU-1 can be explained by reworking, for example, through tree root activity, burrowing, forest clearance, etc.

Physical characteristics

Pieces of Huruiki obsidian generally have a pitted and 'combed' outer surface (cortex), typical of material in colluvial or 'lag' deposits elsewhere. The 'combed' (or striated) appearance results from differential weathering of thin, flow-banded layers in the obsidian.

All of the material collected is black to grey-black (in reflected light), and grey in transmitted light. Some samples also show a silky grey sheen in strong sunlight. Freshly broken pieces have a vitreous to semi-vitreous lustre, are vaguely to strongly flow-banded, and usually contain a few small (1-3 mm) crystal inclusions. No spherulites were observed, and are probably completely absent in Huruiki obsidian.

Chemical analyses

Analyses of obsidian from three of the Huruiki deposits (Table 2) show that composition is remarkably uniform (reflected in the small standard deviations for most elements). Only Pb, Cu and Cr show any significant variation.

Ward (1974) and Reeves and Ward (1976) obtained very similar values for Fe, Ti, Mn, Zr, Sr and Zn, but Ward's Rb concentration is considerably higher, and Reeves and Ward's Na and K are higher and lower respectively. Uranium is slightly higher than that determined by Leach et al. (1978), but Th values are similar.

Compared to other Northland deposits, Huruiki obsidian has much lower Zr, Mn, Rb and Ti concentrations than Pungaere and Waiare, but much higher Sr, and higher Zr, Mn, Ti and Sr than Weta (Otoroa) (Ward, 1974). Uranium and thorium concentrations in Pungaere, Waiare and Otoroa obsidians are extremely high compared to Huruiki (Leach et al., 1978).

Chemically, Huruiki shows greater similarities to Minden Rhyolite obsidians from Coromandel Peninsula than other Northland sources, and Ti, Fe, Ca, K, Rb, Sr, Zr, Y and Zn values all

No.	Grid refs	Location	Description	Nature
HU-1	N16/818309* Q06/297389†	Huruiki; on farm track through corner of bush.	Very common lumps of obsidian up to 30 cm diam. (commonly 5-10 cm) for 50-60 m along track. Also in soil horizon.	In situ? or 'lag' deposit?
HU-2	N16/822311 Q06/301391	Huruiki; on bulldozed track 200 m west of Huruiki Trig.	Scattered pieces up to 10 cm diam. in yellowish clay, also in soil.	In situ? or 'lag' deposit.
HU-3	N16/822304 Q06/300384	Huruiki; on farm track, at stream crossing.	Scattered pieces up to 20 cm diam.	Alluvial?
HU-4	N16/819307 Q06/298387	Huruiki; near top of track leading onto main ridge west of Huruiki Trig.	Common pieces up to 20 cm diam. (mostly c.5 cm) weathering out of yellow-brown clay in bank.	In situ
HU-5	N16/811304 Q06/290385	Huruiki; on NW-trending spur from main ridge west of Huruiki Trig.	Few lumps of obsidian (up to 20 cm diam.) on cattle trails.	In situ?

* NZMS 1 Sheet N16 'Whangaruru' (3rd Ed.)

† NZMS 260 metric sheet Q06.

TABLE 1. Descriptions of Huruiki obsidian deposits, Northland.

(%)	HU-1	HU-2	HU-5	Mean	S.D.
SiO_2	76.09	76.14	76.44	76.12	0.04
TiO_2	0.09	0.09	0.09	0.09	-
Al_2O_3	13.12	13.07	13.10	13.10	0.03
Fe_2O_3	1.43	1.38	1.44	1.42	0.03
MnO	0.04	0.02	0.02	0.03	0.01
MgO	0.1	0.1	0.1	0.1	-
CaO	0.76	0.77	0.76	0.76	0.01
Na_2O	4.24	4.22	4.18	4.21	0.03
K_2O	3.90	3.90	3.93	3.91	0.02
P_2O_5	0.02	0.01	0.01	0.01	0.01
H_2O	0.20	0.30	0.20	-	-
Total	99.99	100.00	100.26	-	-
(ppm)					
Ba	382	389	386	386	3.5
Rb	143	143	144	143.3	0.6
Sr	36	35	34	35.0	1.0
Y	41	42	42	41.7	0.6
Zr	160	155	159	158	2.7
Nb	9	11	10	10	1.0
Pb	20	19	30	23	6.1
Zn	44	46	48	46	2
Ga	19	18	19	18.7	0.6
Cu	6	5	10	7	2.7
Ni	3	3	2	2.7	0.6
Cr	12	15	19	15.3	3.5
V	<2	<2	<2	<2	-
U	4.4	4.1	4.5	4.3	0.2
Th	13.9	12.1	13.0	13	0.9

TABLE 2. Analyses of obsidian from Huruiki deposits. Analyses by K. Palmer, Victoria University of Wellington.

fall within the range of variation established for Coromandel-Great Barrier obsidians (Rutherford, 1978; Moore, (in prep.). Barium, which has a much lower concentration than in any Minden Rhyolite obsidians, may be one of the few elements useful in distinguishing Huruiki obsidian from Coromandel sources.

Discussion

Huruiki obsidian has no unique physical characteristics, although it can probably be distinguished from other Northland sources on the basis of crystal inclusions (abundant in Otoroa material) and colour (olive green in Pungaere and Waiare obsidian). The absence of spherulites means that Huruiki obsidian can be separated from Coromandel Peninsula and central North Island spherulitic varieties, but since spherulites are a highly variable factor in most deposits, this distinction is not particularly useful.

Chemically, Huruiki can be distinguished from other Northland sources on the basis of Sr, U and Th concentrations in particular, and possibly from Coromandel-Great Barrier obsidians using barium. However, sourcing of archaeological material on chemical criteria alone has had its problems in the past. For example, several 'green' flakes from Southland and Palliser Bay sites have been allocated to a Huruiki source (Ward, 1974; Leach and Anderson, 1978), despite the fact that none of the obsidian collected from Huruiki deposits is 'green'. This emphasises the need for more detailed study of potential obsidian sources, before routine analysis of archaeological assemblages is attempted.

References

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