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SOURCES OF OBSIDIAN ARTEFACTS FROM POUERUA,  
BAY OF ISLANDS DISTRICT

|                     |     |                     |
|---------------------|-----|---------------------|
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Two hundred and eighty seven obsidian artefacts were recovered from archaeological sites during Phase I of the Pouerua Archaeological Project in the summer of 1982/83. The artefacts are from six undefended sites in the vicinity of the Pouerua volcanic cone in the inland Bay of Islands. The sites and the excavations are described by Sutton (1983).

There are four known obsidian sources within 40 km of Pouerua. Ward (1973:98) describes three source locations in the Kaeo area. The closest of these, Pungaere, is approximately 23 km from the Pouerua sites. The other two, Weta and Waiare, are within 30 km of Pouerua. There is, however, some doubt as to whether flake quality obsidian is present at the Weta source (Ward, 1973:98), and it appears that Waiare obsidian may not have been available during the prehistoric period (Ward, 1973:96). A further source of flake quality obsidian exists at Huruiki, 37 km south-east of Pouerua (Ward, 1973:98; Moore, 1982).

One hundred and eighteen of the obsidian artefacts recovered have been analysed to determine the source of the obsidian. All other pieces were too small to be analysed. The analysis was carried out at Otago University using energy-dispersive XRF spectroscopy in accordance with the procedure outlined by Bollong (1983). The samples were analysed for 4000 seconds and assigned to sources using the computer programme SCREEN. The SCREEN programme is based on a test applied by Nelson *et al* (1975). The method involves the use of a screening process which attempts to reject an unknown spectrum as having been potentially derived from any given source in the reference configuration (see Bollong, 1983:119, for further details on this procedure). A number of samples were initially rejected. In some cases it was not possible to differentiate between more than one alternative source.

In order to reduce the number of ambiguous allocations and increase the total number of pieces which could be assigned to sources, an attempt was made to fit flakes back together. This also functioned as a check on some of the XRF allocations. It was possible to reassemble several groups of flakes to form cores. In three cases inconsistencies were found. That is,

flakes which had been assigned to Mayor Island fitted other pieces sourced to Kaeo. The spectra produced by these flakes were re-examined visually. The three flakes which had earlier been assigned to Mayor Island, but which were suspected of being from a Kaeo source, appeared to be from the latter source area.

The reason for the incorrect allocations was that the Kaeo sources were inadequately represented in the reference matrix used by the programme SCREEN compiled by Bollong (1983). An attempt was made to reduce this sampling error by analysing 30 additional source samples from Waiare and Pungaere. The additional source material was taken from the comparative collections in the Otago University archaeometry laboratory and Auckland University Anthropology Department. The additional material was not obtained by systematic resampling, and no obsidian from the Weta source was readily available. It is therefore unlikely that it represents the full range of variation within the Kaeo sources. However it was hoped that increasing the number of reference samples would help to correct the sampling problem.

New mean and standard deviation values were calculated for the Kaeo sources matrix and the Pouerua artefacts were re-examined using a modified programme called SELECT. This resulted in several changes from the earlier allocations and the results shown in Table 1 include the amendments based on this revision. Some of the pieces that had previously been rejected were now assigned to the Kaeo source area. The theoretical statistical probabilities assigned to the allocations are uniformly high at 95% or better. Visual examination of the spectra of the remaining artefacts allowed these to be assigned to specific sources.

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| Site no.<br>N15/ | KAE | MAY | KAE<br>or MAY | Not KAE<br>or MAY | FAN | HUR<br>or GBA | FAN<br>or HUR |
|------------------|-----|-----|---------------|-------------------|-----|---------------|---------------|
| 236              | 4   |     |               |                   |     |               |               |
| 237              | 1   |     | 1             |                   | 4   |               |               |
| 255              | 2   | 6   | 1             |                   |     |               |               |
| 501*             | 13  | 9   | 2             |                   |     |               |               |
| 505              | 33  | 4   | 2             | 1                 | 6   | 2             | 1             |
| 507*             | 19  | 5   | 6             |                   |     |               | 1             |
| Surf.coll.       |     | 1   |               |                   |     |               |               |
| Total            | 72  | 25  | 12            | 1                 | 10  | 2             | 2             |

\* = informal site numbers. KAE Kaeo area, MAY Mayor Island, FAN Fanal Island, HUR Huruiki, GBA Great Barrier Island.

TABLE 1. Source allocations using revised programme SELECT.

## Discussion

The XRF results indicate that obsidian from at least four sources was being used at Pouerua. This is also suggested by the hand specimen appearance of the samples. It is not surprising that more than one source is represented since this is frequently the case in New Zealand archaeological sites (Davidson, 1981:114). This is the first time, however, that Kao obsidian has been found to be dominant over material from other sources. In the Mount Camel site Bollong (1983:148) showed that Kao was a significantly used local source, but that Mayor Island was dominant in that early assemblage. In this (later) assemblage a lesser but significant proportion of Mayor Island obsidian is indicated, again suggesting that proximity alone was not a determinant of which sources were being utilised. Obsidian from Fanal Island has not previously been reported from an archaeological context.

The discovery of incorrect allocations warns against the unquestioning acceptance of the results of sourcing studies. Until more systematic sampling of sources has been carried out obsidian source allocations (including those reported here) should be regarded with caution, and independent confirmation sought where possible using a supplementary technique if available (e.g. neutron activation analysis).

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