

Geochemistry and Sources of Stone Tools in South-west New Britain, Papua New Guinea

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ABSTRACT. The capacity to trace the movement of region-specific materials across landscapes is a key archaeological theme in investigations of community interaction and exchange. In this study I investigate the scale of raw material and artefact procurement and exchange of a range of stone tools from southwest West New Britain Province, Papua New Guinea using a non-destructive geochemical technique—portable x-ray fluorescence (pXRF) spectrometry. The complex geochemistry of the Bismarck Archipelago and previous ethnographic and archaeological studies provide data that allow opportunities to explore the role of stone tools made from igneous rocks by flaking, hammer-dressing and grinding, particularly axe and adze blades, within intra- and inter-island exchange networks. The results indicate that groups residing on the southwest coast of New Britain obtained their stone tools from source regions on the north side of West New Britain, the Gazelle Pen. of East New Britain, and probably even from islands in the Vitiaz Strait and off the north coast of New Guinea. Inclusion of these south coast tools in models of past regional exchange networks, such as down-the-line exchange, greatly expands our knowledge of the role of stone tools in social interactions in the Bismarck Archipelago from the Lapita pottery period onwards.

Introduction

Throughout the Pacific Islands the growth of compositional provenance studies of lithic artefacts continues to refine our understanding of patterns of inter-island and intra-archipelago exchange networks, social interaction, and potentially craft specialisation, especially for artefacts made of basalt, andesite and obsidian (e.g., Weisler and Kirch, 1996; Summerhayes *et al.*, 1998; Summerhayes, 2009; Mills *et al.*, 2011; Kirch *et al.*, 2012; Kahn *et al.*, 2013; Clark *et al.*, 2014; Weisler *et al.*, 2016). The relatively recent adoption of non-destructive portable XRF has enabled a new phase of sourcing studies for a wider range of samples within both the Pacific Islands and Australia (Sheppard *et al.*, 2010; Attenbrow *et al.*, 2017; Richards, 2019). Within Near Oceania, the region encompassing New Guinea, the Bismarck Archipelago and Solomon Islands, pottery and volcanic glass (obsidian) have been the primary subjects of sourcing studies using various techniques. In the case of obsidian this has been particularly effective (Bird *et al.*, 1997; Torrence and Summerhayes, 1997; Summerhayes,

2009; Shaw *et al.*, 2020). For Near Oceania, pXRF has been used exclusively for obsidian sourcing (e.g., Torrence *et al.*, 2013; Specht *et al.*, 2018), though my analyses of archaeological and ethnographic assemblages of stone axes and adzes on the Willaumez Pen. on the north coast of West New Britain Province, Papua New Guinea has extended the range of applications of pXRF (Pengilley *et al.*, 2019). By taking advantage of legacy geochemical data from that region, many of these tools have been successfully grouped into potential source regions and integrated into existing models of regional trade.

The present paper builds on that work to expand our knowledge of the likely geological origins of stone tools in New Britain during the Lapita pottery and post-Lapita periods. It again takes advantage of the legacy data from geological fieldwork undertaken on New Britain by Dr. R. W. Johnson and others at the Bureau of Mineral Resources, Canberra (now Geoscience Australia) in the 1960s and 1970s. Similar to other regions, New Britain stone axes and adzes are comprised almost exclusively of igneous rocks. Whilst there is currently no field evidence of axe and adze

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