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Petrographic Temper Provinces of Prehistoric Pottery in Oceania

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ABSTRACT. The mineralogical compositions and petrological character of non-calcareous mineral sand tempers in prehistoric potsherds from Pacific islands are governed by the geographic distribution of geotectonic provinces controlled by patterns of plate tectonics. As sands from different islands are not mingled by sedimentary dispersal systems, each temper sand is a faithful derivative record of parent bedrock exposed on the island of origin. Tempers are dominantly beach and stream sands, but also include dune sand, colluvial debris, reworked volcanic ash, broken rock, and broken pottery (grog). From textural relations with clay pastes, most tempers were manually added to clays collected separately, but naturally tempered clay bodies occur locally. Calcareous temper sands derived from reef detritus are widely distributed, but ancient potters commonly preferred non-calcareous sands for temper. Consequently, beach placer sand tempers rich in diagnostic heavy minerals are typical of many temper suites. Distinctive temper classes include oceanic basalt, andesitic arc, dissected orogen, and tectonic highland tempers characteristic of different geologic settings where contrasting bedrock terranes are exposed. Most Oceanian sherd suites contain exclusively indigenous tempers derived from local island bedrock, but widely distributed occurrences of geologically exotic tempers document limited pottery transfer over varying distances at multiple sites.

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This paper focuses on regional patterns of compositional variation, in terms of mineralogy and petrology, observed for sands contained in prehistoric earthenware pottery of island Oceania. The sands imbedded in the clay bodies are commonly called "temper" because their presence improves the behaviour of the clay during the fabrication of ceramic wares. Conclusions are based on petrographic study, over a span of three decades, of approximately 1200 thin sections made from sherds collected by numerous archaeologists (see acknowledgments) working in island groups of both the southern and western Pacific Ocean (Fig. 1). Although ceramic petrography is notoriously underutilised in archaeology (Schubert, 1986; Stoltman, 1989), it is a powerful tool for the study of Oceanian tempers (Dickinson & Shutler 1968, 1971, 1979). Generically distinctive temper provinces are both theoretically predictable and empirically definable in terms of the sands available to island potters within different geotectonic realms. Indigenous pottery can be identified from the provenance stamp of local island bedrock as reflected in the nature of temper sand grains. Pottery transfer can be detected from the occurrence of exotic