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Artefact geochemistry demonstrates long-distance voyaging in the last thousand years from Polynesia to western Pacific islands.

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Polynesian populations, characterized by strong cultural and genetic differentiation, used their advanced navigational skills to colonize the eastern Pacific islands between 1000 and 1250 AD. This expansion resulted in the settlement of most of the islands located within the Polynesian Triangle - a geographic area between Hawai'i, New Zealand, and Easter Island (see Figure). However, about twenty Polynesian societies, known as the Polynesian Outliers, have been found in the western Pacific, outside of the Polynesian Triangle, particularly in the Bismarck, Solomon, Vanuatu and Caroline islands. The distinct linguistic and sociocultural traits of Polynesian Outliers point to a strong connection to the populations of the Polynesian Triangle, yet limited hard evidence exists regarding their origin, and their migration, and inter-island interactions remain unclear.

This study presents a comprehensive geochemical sourcing analysis of a set of stone artefacts from Polynesian Outlier sites in islands of the Solomon, the Caroline, and Vanuatu. In addition, geological samples were analyzed from Emae (Vanuatu) to provide contextual geochemical information as no prior data exists for this particular island. All chemical procedures of dissolution, chromatography, and sample preparation were performed in a clean laboratory at IPGP. Isotopic compositions of strontium, lead, and neodymium were analyzed using a MC-ICP-MS, and trace and major element compositions were determined using ICP-MS and ICP-AES, respectively. The source assignment was facilitated by using SQLite versions of the GeoRoc and Pofatu databases, which compile geochemical data from geological and archaeological literature respectively. By performing PCA analyses, elemental and isotopic biplots, as well as multielement plots, we demonstrate the occurrence of long-distance voyages of stone materials transported up to 2 500 km from their sources to their destination (*e.g.* Samoa-Solomon). We also demonstrate the importation of material from non-Polynesian islands (*e.g.* Banks islands-Emae), as well as the use of local material to manufacture stone tools more typical of Polynesian industries. These results provide the first high-resolution geochemical fingerprint of artefacts from Polynesian Outliers, offering new insights into migration processes and the extent of contacts between the Polynesian Outliers, neighbouring societies, and the Polynesian triangle.