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GEOCHEMISTRY AND ORIGIN OF BASALTIC LAVAS FROM MARQUESAS ARCHIPELAGO, FRENCH POLYNESIA (SOUTH CENTRAL PACIFIC OCEAN)

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The Marquesas Archipelago is one of four volcanic island chains in French Polynesia in south-central Pacific Ocean. It consists of twelve islands and several seamounts which are the tops of large submarine volcanoes rising more than 4,000 m from the ocean-floor. The dominant rock-type of the chain is olivine basalt with subordinate and variable amounts of differentiated rocks including trachybasalts, trachytes and phonolites. The intraplate basaltic rocks range in composition from tholeiites through transitional to alkali. Tholeiites occur together with either transitional or alkali basalts in most of the islands. The

model calculations using the total inverse method imply that the basalts were derived by variable degrees of partial melting from a heterogeneous source. Compared to estimates of a primordial upper mantle the source of most Marquesas basalts was enriched in incompatible elements and had higher than chondritic ratios of several elements such as La/Yb, Ti/V and P/Ce. Metasomatic enrichment event is also suggested by the sequence of element enrichment in the source relative to the primordial mantle (Ba Nd La Ce Sr Sm Eu Zr = Hf Ti Y Yb). On the other hand, some basalts both tholeiitic and alkali, were probably derived from a depleted source. In some cases, the three magmatic types - tholeiitic, transitional and alkali basalts were produced by variable degrees of melting from a common source.

