

LATE CENOZOIC MAGMATIC EVOLUTION OF THE GULF OF CALIFORNIA RIFT SYSTEM

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Volcanism in the Gulf of California Extensional Province (GEP) records the transition from subduction to continental rifting (15-4Ma), and to oceanic rifting in the last 3.5Ma. This transition is accompanied by a change in the eruptive processes and magma composition from dominantly calc-alkaline dacitic-andesitic volcanoclastic aprons to alkaline and tholeiitic basalt and andesitic flows. Coeval calc-alkaline rhyolite to dacite dome complexes, caldera-type ignimbrite deposits, and composite andesitic volcanoes occur along the eastern margin of the Baja Peninsula and several islands within the Gulf. From ~12Ma up to present alkali basalt erupted intermittently in Baja California to the west of the main Gulf escarpment, and to a lesser extent, on the opposite side in central Sonora. These alkalic lavas have distinctive geochemical patterns apparently inherited from subduction with Nb-Ta negative anomalies, and high LILE concentration, principally Ba, Sr, and light REE. In Quaternary times more typical intra-plate alkaline basalts have erupted in a few places on both rift sides. Low-K sub-alkaline basalt, and differentiates erupted from 10 to 5Ma along both margins and over a broad region in southern Baja California. Later (5Ma), these sub-alkaline rocks erupted in a more restricted area within the Gulf, and evolved into MORB-like lavas in the nascent spreading centers.