Episodes of intraplate magmatism in the Andean SVZ mantle wedge

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Changes in plate convergence are thought to cause the mantle wedge processes which result in contrasting geochemistry of mafic magmas behind the Andean Southern Volcanic Zone arc. In the Quaternary Payénia backarc both subduction zone enriched and intraplate type magmas have erupted. Neogene volcanism additionally includes arc magmatism, assigned to an eastward migration of arc magmatism during a flat slab interval in the Late Miocene. Pleistocene EM1-type OIBs have been ascribed to upwelling of South Atlantic type mantle with recycled oceanic crust during slab roll-back or break-off. Similar type magmas erupted in the Early Miocene may indicate the upwelling under Payénia of such mantle.

New ^{40}Ar-^{39}Ar age and geochemical data from these Early Miocene rocks reveal a geographical compositional variation from Agua Escondida (AE) via Matancilla to Fortunoso, reflecting inhomogeneity in the mantle source, which is distinct from the Quaternary.

All intraplate magmas have higher Nb/U and Ce/Pb, and lower Th/Nb and Ba/Nb than arc magmas, which have lower FeO and CaO/Al_2O_3 than both types of backarc magmas. Except for AE, the intraplate magmas are isotopically (Sr, Nd, Pb) distinct from the arc and other backarc magmas.

AE magmas are isotopically similar to an end-member for subduction zone enriched backarc magmas, which therefore possibly acquired their incompatible trace element pattern through percolating fluids reacting with AE mantle. The last recorded intraplate magmatism of the Early Miocene, at 18 Ma, has relatively low $^{207}Pb/^{206}Pb$ and $^{208}Pb/^{206}Pb$, unradiogenic Sr and radiogenic Nd, suggesting a Pacific MORB mantle component not recorded elsewhere in Payénia.