Geophysical Research Abstracts
Vol. 16, EGU2014-15684-1, 2014
EGU General Assembly 2014

Evolution of the western segment of Juan Fernández Ridge (Nazca Plate): plume vs. plate tectonic processes

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The Juan Fernandez Ridge (Eastern Pacific, Nazca Plate) is thought to be a classic hot spot trail because of the apparent age progression observed in 40Ar-39Ar data. However, geological evidence and some thermochronological data suggest a more complex pattern with a rejuvenation stage in Robinson Crusoe Island, the most eroded of the Juan Fernandez Archipelago. In fact, a postshield stage at 900-700 ka separates the underlying shield-related pile from the post-erosional alkaline succession (Ba/Yb=38.15; La/Yb=15.66; Ba/Y=20.27; Ba/Zr=2.31). Shield volcanoes grew at high effusion rate at ca. 5-4 Ma erupting mostly tholeiitic to transitional magmas (Ba/Yb=18.07-8.32; La/Yb=4.59-9.84; Ba/Y=4.24-8.18; Ba/Zr=0.73-1.09).
Taken together, shield volcanoes form a continuous plateau with a base at ca. 3900 mbsl. However, a more complex structural pattern can be inferred from geophysical data, which suggest some intracrustal magma storage and a more extended area of magma ascent. A role for the Challenger Fracture Zone is hypothesized fueling the controversy between pristine plume origin and the effect of plate tectonic processes in the origin of intraplate volcanism.
This research is supported by FONDECYT Project 1110966.