Geochemical variations in the Central Southern Volcanic Zone, Chile (38-43°S): The role of fluids in generating arc magmas

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We present new major and trace element, volatile and Sr-Nd-Pb-Hf-O isotope data from the Central Southern Volcanic Zone in Chile (CSVZ; 38-43°S). The satellitic and between stratovolcano cinder cones display different geochemical characteristics from the stratovolcanoes. The cinder cone samples have lower HREEs contents and U/Th, Pb/Ce and Ba/Nb ratios, but higher LREE, Nb and Ta abundances, and La/Yb and Nb/Yb ratios. As in the Transitional (T) SVZ (34.5-38°S), S and Cl contents are elevated in some small cinder cones of the CSVZ relative to the stratovolcanoes. They also extend to less radiogenic Pb and Sr isotopic compositions and higher $\delta^{18}O_{olivine}$ compared to the stratovolcano samples, but almost completely overlap in Nd and Hf isotopic composition. These variations are consistent with the lower-volume cinder cones forming through lower degrees of melting as a result of a lower fluid flux from the subducting slab than at the stratovolcanoes. When compared to the TSVZ ([1]Jacques *et al*.., in press), the magmas feeding the CSVZ stratovolcanoes have experienced higher fluid flux released from the subducting slab, resulting in higher degrees of melting and larger magma production.

[1] Jacques *et al*., (in press), *GCA*

Microbial transformations of dissolved organic matter in crustal aquifer fluids at North Pond

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While recent studies have established the existence of a deep subsurface biosphere, little is known about their activity, or their influence on biogeochemical cycles. Near the Mid-Atlantic Ridge, at a site called the “North Pond”, deep ocean seawater circulates through the basaltic crust, supplying the aquifer-hosted microbial community with organic matter and electron acceptors. Studies have shown that these crustal fluids contain both oxygen and nitrate, potentially enabling a variety of microbial organic matter transformations that could have implications for the composition and source of dissolved organic matter to the deep ocean. To investigate the transformation of dissolved organic matter (DOM) in crustal aquifer fluids at North Pond, we sampled fluids from CORK (Circulation Obviation Retrofit Kit) observatories. These fluids were incubated at ~ *in situ* pressure and temperature, as well as at atmospheric pressure. Comparative analyses by Fourier Transform Ion Cyclotron Resonance Mass Spectrometry (FT-ICR-MS) generated high-resolution profiles of the molecular composition of DOM, and shed light on the transformations of DOM taking place within these fluids. Molecular analyses of the microbial community and incubations with ^{13}C-labeled substrates further illustrated the potential for these microbial communities to alter the geochemical regime via their collective metabolic activity.

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