Geochemistry of high Fe- tholeiites from the Ramagiri-Hungund greenstone belt of Eastern Dharwar Craton, India

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The Ramagiri-Hungund greenstone belt is a volcanic rock dominated linear belt in the Eastern Dharwar Craton (EDC). The importance of this belt is due to the presence of a variety of volcanic rocks, and the abundant occurrences of gold. Among the volcanic rocks in the belt, high Fe-tholeiites and adakites are most common. Most of these high Fe-tholeiites have flat REE patterns with no Eu anomaly. They are depleted in total REE, their $(La/Yb)_n$, $(La/Sm)_n$ and $(Gd/Yb)_n$ ratios are around 1. REE and HFSE abundance and their ratios indicate that the high Fe-tholeiites are arc basalts. Negative Zr and Hf anomalies against $(La/Sm)_n$ and the low order $(Nb/La)_{pm}$ ratios suggest that these arc tholeiites have been generated by melting of a mantle wedge above an oblique, low angle subducting slab. Dehydration and devolatilisation of the subducting slab appears to have generated these tholeiites. Adakites recorded from the northern part of the belt, and reported to be equivalents of the TTG of Western Dharwar craton, are also suggested to represent the melting of slab. These volcanic rocks of Ramagiri-Hungund greenstone belt reflect the eruption of greenstone belts in EDC in an intra oceanic subduction environment.

Volatile cycling throught the Central American Volcanic Arc from melt inclusion studies of Nicaraguan and Costa Rican magmas

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The Central American Volcanic Arc is an ideal site to study the impact of varying tectonic parameters on arc magma geochemistry. Nicaraguan (Nic) and Costa Rican (CR) segments of the subduction zone provide contrasting oceanic crustal input (EPR crust vs. CNS crust overprinted by the Galapagos hot spot) and slab dip (~70° vs. ~30°) in Nic and CR respectively. To determine the effects of these parameters on arc volatile output we have collected major-, and trace-element, and volatile data on melt inclusions in olivine phenocrysts from Cerro Negro, Mombacho, Masaya, and Nejapa volcanoes in Nic and Irazu and Arenal in CR. Nic has long been recognized as high in slab indicators, suggesting a high fluid flux into the mantle wedge. The cooler thermal regime underlying Nic would be expected to provide greater volatile flux to sub-arc depths.

Major-element conpositions of the melt inclusions and whole-rocks show that the Nicaraguan samples tend to have higher FeO_{tot} and lower SiO_2 than the Costa Rican samples at similar MgO, suggesting that Nicaraguan melts may be formed at greater depths. Trace element cocnentration and elemental ratios show that Nicaraguan magmas are formed from a mixture of a MORB-like source with fluids from the subducted slab, whereas Costa Rican magmas are more OIB-like, perhaps due to the influence of the Galapagos plume on the subucting input. Volatile comtent (H_2O, Cl, S) of the most mafic melt inclusions are very similar in the two areas (when corrected for magmatic fractionation). Primitive magmas have >3 wt. % H_2O, 0.14%S, and 0.17%Cl.

Similar volatile contents suggests that the elevated indicators of slab involvement in the Nicaraguan magmas are not indicative of the volume of water provided by the slab. Estimated magmatic fluxes through the arc are much higher in CR than in Nic. Therefore our estimated magmatic volatile fluxes are much higher in CR than Nic unlike predictions based on sediment input, thermal structure, and extremely high slab indicators in Nicaragua.