He isotope variations in Nicaragua and Costa Rica

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This work targeted mafic phenocrysts and tephra from a number of volcanoes along the strike of the southern segment of the Central America Volcanic Front in order to address questions of crustal influence on He isotope ratios and the optimum sampling media that can be utilized for volatile studies. We found that crustal thickness had a negligible effect on $^3He/^4He$ ratios and that there was generally good agreement in $^3He/^4He$ values between different sampling media (geothermal fluids, phenocrysts, tephra). Slight variations in $^3He/^4He$ were likely caused by late-stage He exchange of fluids with pyroxene crystals. The results are important in that they endorse our multi-sample approach in defining volatile variations along the entire volcanic front.

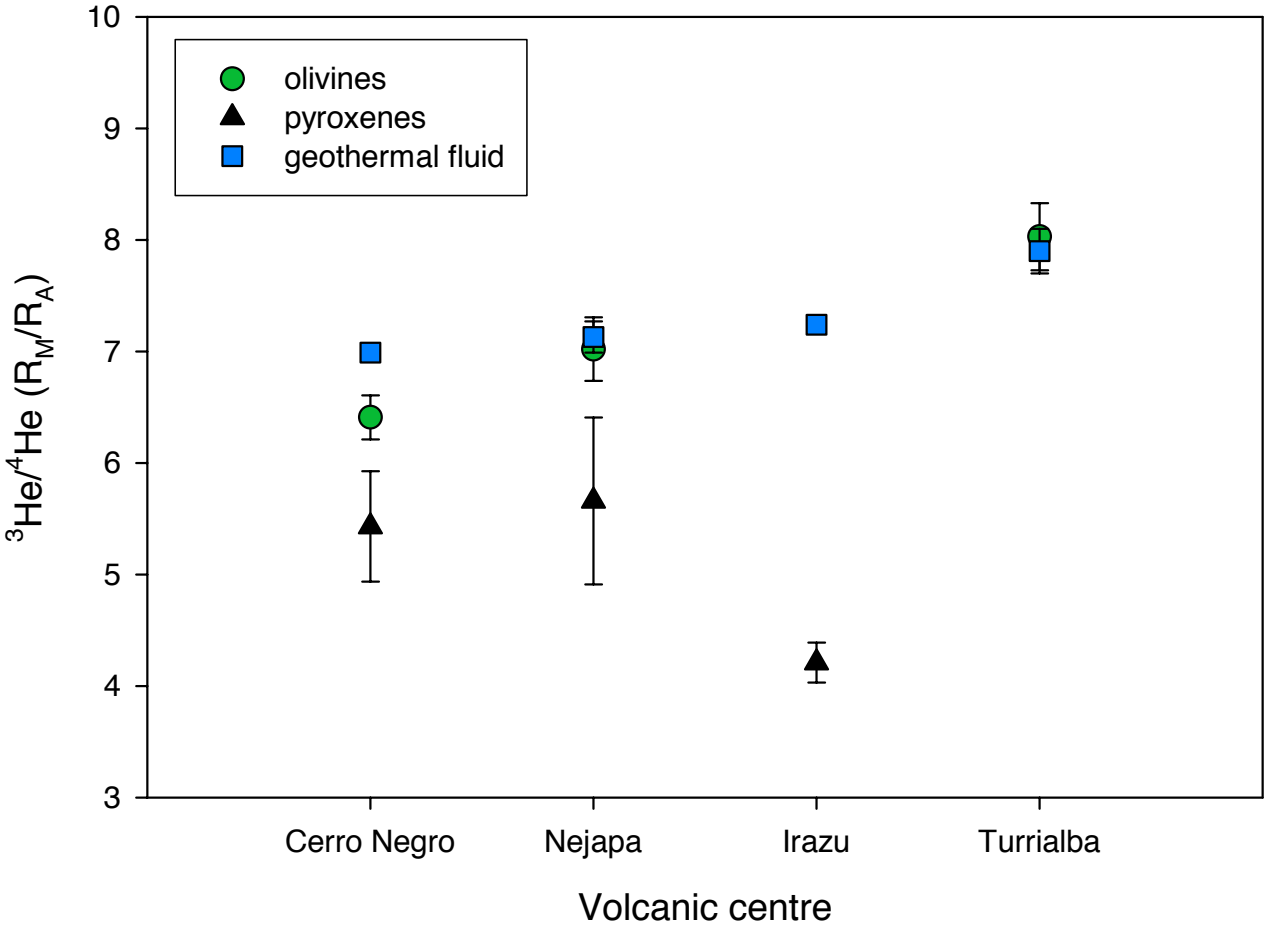

Figure: Intercomparison of $^3He/^4He$ ratios obtained by targeting different sampling media (from Shaw et al., 2006).

Shaw, A.M., Hilton, D.R., Fischer, T.P., Walker, J.A. and De Leeuw, G.A. (2006) Helium isotope variations in mineral separates from Costa Rica and Nicaragua: Assessing crustal contributions, time scale variations and diffusion-related mechanisms. Chemical Geology 230, pp 124-139.