Peridotite- derived sulfides in pyroxenites from the Lanzo and the Lherz ultramafic massifs?

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In the upper mantle, the abundances of highly siderophile elements (HSE: Os, Ir, Ru, Rh, Pt, Pd, Au, Re) are mainly controlled by Fe-Ni-Cu-bearing sulfides and platinum group element alloys. In order to assess the role of melt migration on the HSE distribution in mantle rocks and to constrain the HSE composition of secondary sulfide melt in mantle rocks, *in situ* LA-ICP-MS and whole rock HSE analyses on pyroxenite samples from the Lanzo (northern Italy) and the Lherz (southern France) peridotite massifs have been obtained.

More than 95% of the analysed sulfides from pyroxenites of both peridotite bodies show a pentlanditic composition with some showing subsolidus exclusions of chalcopyrite. Websterites and Al-rich clinopyroxenites display no systematic differences in HSE compositions of sulfides. Sulfides from both locales are variably depleted in Pt and Au, whereas the bulk rocks are not, indicating the additional presence of Pt-rich alloy phases and presumably native Au. Sulfides from Lanzo pyroxenites show Os, Ir and Ru abundances at 1-10 x CI chondrites, and variable $Pd/Ir_{(CI)}$ of 1-7. Compared to Lanzo, sulfides (and whole rocks) from Lherz pyroxenites are more enriched in Os, Ir and Ru, with $Pd/Ir_{(CI)}$ of 0.5-5. The variations of Pd/Ir in sulfides from the same thin section mostly reflect large variations of Ir abundances (in contrast to grain boundary sulfides in lherzolites, which tend to have variable Pd abundances). The presence of sulfides with suprachondritic Pd/Ir (or Pd/Os) and Re/Os in the same section as sulfides that show chondritic to subchondritic ratios of these elements is indicative of small- scale disequilibrium during magmatic processes. The compositional range of sulfides in some pyroxenites is most easily explained if sulfide melt with chondritic to subchondritic Pd/Ir and Re/Os from peridotite became mobilized during infiltration of sulfur saturated basaltic melt containing sulfide melt with high Pd/Ir and Re/Os.

Cosmogenic Nuclides, River Geochemistry, and Lanforms Reconstruction methods to estimate erosion rates in Reunion Island

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Understanding mechanisms that modify landscapes is essential for risk assessment in tropical islands. Because measurements of erosion rates are critical for understanding landform evolution, the use of cosmogenic isotopes in river sediments or the use of river load geochemistry, both to estimate average erosion rates of drainage areas have grown rapidly in recent years.

In this study we aim to estimate erosion rates of highly eroded drainage areas of the Réunion Island and we compare 3 methods of measurment : i) from cosmogenic ^{3}He concentrations [^3He_c], ii) from river geochemistry and iii) from landforms reconstruction.

The first drainage area under invistagation is Cilaos Cirque, located on the south flank of the Piton des Neiges Volcano (PdN). Helium concentrations and isotopic ratios have been measured in olivine rich sands from the Grand Bras River. [^3He_c] have been calculated using: (i) the $^3He/^4He$ ratio measured by crushing and (ii) the ^{3}He and ^{4}He concentrations measured by melting the resulting powder. Dissolved and suspended loads in Grand Bras River have also been analysed for their major and trace elements contents in order to characterise both chemical and mechanical erosion products. Finally, digital elevation model derivatives and K-Ar geochronological data have been used to reconstruct the PdN morphology and calculate the volume of material eroded over the past 70Ka. Initial results indicate average erosion rates of 1.02±0.40 and 0.47±0.16 mm/yr for the cosmogenic and river geochemistry methods respectivly, while erosion rates from PdN morphology reconstruction range from 4 to 12 mm/yr. Cosmogenic and river geochemistry results show a reasonable agreement but their discrepency with the landform reconstruction results suggests 2 questions: are the cosmogenic and river geochemistry methods suitable to quantify fast erosion rates (>>1mm/yr)? does the cosmogenic isotopes method actually provide short-term erosion estimation in fast erosion environment? Further measurments along the Grand Bras River and over other drainage areas will allow to answer these questions.

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