

Investigation of platinum group minerals (PGM) from Falcondo Ni-laterite deposit (Dominican Republic) using hydro-separation concentrates

T. AIGLSPERGER^{1*}, J. A. PROENZA¹, F. ZACCARINI²,
G. GARUTI², F. LONGO³

¹University of Barcelona, Dept. Crystal. Mineral. Ore Deposits, Barcelona, Spain (*thomas.aiglsperger@ub.edu)

²University of Leoben, Dept. Appl. Geol. Sci. Geophysics, Leoben, Austria

³Falcondo Xstrata Nickel, Santo Domingo, Dominican Republic

Two samples, one saprolite and one limonite, with total platinum group elements (PGE) contents of 62 and 212 (ppb) respectively, were processed by the innovative hydro-separation (HS) technique, with the aim to determine the presence of PGM and to understand their origin.

The studied samples were collected in the Falcondo Ni-laterite deposit, developed over the Cordillera Central serpentinized peridotite, located in the central part of Dominican Republic.

Two different types (I and II) of PGM were recognized. Type I PGM form grains less than 10 μm , occurring enclosed in fresh chromite (laurite and an unnamed $[(\text{Rh}, \text{Ir}_3)\text{S}_4]$) or included in altered awaruite (Os-Ru-Ni-Fe compound). PGM of type II consist of free grains, bigger than 10 μm . They comprise laurite and compounds of Pt-Ir-Fe-Ni, Ru-Os-Ir-Rh and Ru-Os-Ir-Fe-O characterized by porosity, irregular shape and complex chemical zoning. Type II PGM have been found only in the saprolite sample.

Composition and shape of both types I and II laurite and the unnamed $[(\text{Rh}, \text{Ir}_3)\text{S}_4]$ suggest a magmatic origin. Other type II PGM may represent the alteration product of pre-existing PGM formed at high temperature. The process that altered the magmatic PGM probably started with the serpentinization and continued during weathering and lateritization.

Our results, although preliminary, indicate that the HS technique can be successfully applied to concentrate PGM also from relatively PGE poor samples, thus providing useful information regarding their distribution and genesis.

Interpreting CO₂ measurements in volcanic gas plumes: The need for integration with geophysical data

ALESSANDRO AIUPPA^{1,2}

¹Dipartimento DiSTeM, Università di Palermo, Italy, (aiuppa@unipa.it)

²Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Palermo, Italy

Measuring CO₂ concentrations and fluxes in volcanic gas plumes has long remained a challenge for volcanologists. Because CO₂ is the second most abundant gas species in volcanic emissions, and among the first to exsolve and separate from ascending magmas in the crust, the paucity of CO₂ plume data has prevented us from obtaining more in-depth information on magmatic degassing processes. The recent advent of new techniques, and more particularly of the MultiGAS (Multi-component Gas Analyser System), has given new impulse to CO₂ plume measurements, however, and has allowed the acquisition of unprecedented long and robust CO₂ flux datasets. Observations made over the last 6 years at Etna and Stromboli (in Italy) have, in particular, demonstrated an unexpectedly large time variability of composition (e.g., CO₂/SO₂ plume ratios) and CO₂ fluxes, which interpretation still remains open and somewhat controversial. Here, I show that integrated analysis with geophysical data (volcanic tremor, deformation data) is key to interpret the dynamic processes operating in volcano's plumbing systems, which produce the observed large variations in plume composition and flux. At Etna, in particular, I demonstrate that the cyclic variations in plume CO₂/SO₂ ratios, systematically observed in 2007-2009, were paralleled by variations in tremor amplitude and location, and by inflation-deflation cycles captured by the GPS network [1]. These combined (multidisciplinary) observations have offered a more robust understanding of processes operating at depth inside Etna, which I here review. Since permanent networks for semi-continuous gas plume observations are becoming more and more in use at volcano observatory worldwide, integrated geochemical-geophysical observations will likely represent a key target of volcanic gas studies in the years to come.

[1] Aiuppa *et al.* (2010) *Geochem. Geophys. Geosyst.* **11**, doi:10.1029/2010GC003168