Bacteriogenic and magmatic S sources in the Cabildo Cu District (Chile)

V. MORENO-RODRIGUEZ[1]*, J. CARRILLO-ROSUA[2], S. MORALES-RUANO[3], D. MORATA[4] AND A.J. BOYCE[5]

[1]Min & Petr. Dep. Univ. Granada. Spain (*correspondence: vmoreno@ugr.es)
[2]Education Faculty. Univ. Granada. Spain (fjcarril@ugr.es)
[3]Min & Petr. Dep./IACT. Univ. Granada-CSIC. Spain (smorales@ugr.es)
[4]Geology Dep. Univ. Chile. Chile (dmorata@cec.uchile.cl)
[5]SUERC. Scotland. UK (a.boyce@suerc.gla.ac.uk)

"Manto-type" Cu-(Ag) deposits, the third main source of Cu in Chile, have a controversial genesis (magmatic vs. metamorphic and syn vs. epigenic models [1]). These deposits are hosted in Jurassic to Lower-Cretaceous volcano-sedimentary rocks on the Coastal Range. The Cabildo district (lat 32°30'S; long 70°55'W) is unique in that "Manto-type" Cu-(Ag) and Cu (Mo)-skarn deposits coexist. The $\delta^{34}S$ range of Cabildo "Manto-type" sulphides is extremely wide (-30.8 to + 16.9‰). In contrast, in the Cu-skarn sulphides the same range is very homogeneous (-3.2 to -1.5‰). However, the $\delta^{34}S$ range of sulphides from the Mo-bearing skarn zone differs from the rest of the skarn showing more depleted values (-8.6 to -5.6‰).

A two-stage mineralization process in "Manto-type" deposits is proposed: 1) Bacteriogenic pyrite formed during an early diagenetic stage in a semi-closed system. 2) S re-mobilization and Cu input in a low metamorphic environment to produce bornite-chalcopyrite ores. The skarn formation could be coeval or at least close in time to the second mineralization event of the "Manto-type" deposit. The S source for Cu- skarn mineralization is dominantly magmatic. Nonetheless, a contribution of bacteriogenic S in the Mo-rich skarn zone also appears likely.

Supporting this hypothesis, further isotopic analysis $^{87}Sr/^{86}Sr_o$, C and O show two main sources of metallogenic fluids in the area, low-grade metamorphic fluids (which leach limestone with bacteriogenic pyrite) and magmatic fluids, with intermediate isotopic signatures (and sources) for Mo-rich skarn.

[1] Maksaev & Zentilli (2002) *PGC Publishing, Adelaide*, 185-205.

Vapor-buffered volcanic activity of southern Italy and mantle degassing

R. MORETTI[1], I. ARIENZO[1], P. ARMIENTI[2,1], L. CIVETTA[3,1], M. D'ANTONIO[4,1] AND G. ORSI[1]

[1]INGV-Osservatorio Vesuviano, Naples (moretti@ov.ingv.it)
[2]Dip. Sci. Terra, Università di Pisa
[3]Dip. Sci. Fisiche, Università di Napoli 'Federico II'
[4]Dip. Sci. Terra, Università di Napoli 'Federico II'

Widespread mantle degassing is active in many areas of Earth, contributing to both volcanic and seismic processes. The Italian territory is invested dramatically by deep degassing, at both volcanic and non-volcanic sites, with huge punctual as well as diffuse emissions of carbon dioxide. The peri-tyrrhenian area of Southern Italy is the place where these emissions are accompanied by active volcanism.

A global look at melt inclusions from southern Italian volcanoes, particularly from the Campanian Volcanic District, suggests that these volcanoes produce magmas under nearly common fluid buffered conditions that initiate in the mantle. Although the role and nature of components added to the mantle source is as debated as the mantle source itself, volcanic volatiles and the ensemble of petrologic evidences promote the prevailing hypothesis involving the subduction of an oceanic crust and sediments carrying pelagic, terrigenous and carbonatic fractions. The widespread mantle degassing suggests that volcanism is an 'occasional' consequence that pierces the surface at some preferential sites, depending on regional stress conditions and related geological structures, and veined mantle paths. Despite such a complexity, magma fluxes can be still used to test hypotheses on the nature and characteristics of the volatiles source metasomatising the local mantle.