Antimony in hydrothermal chimneys of Kolumbo shallow-submarine vent field (Santorini, Greece)

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Polymetallic sulfide/sulfate chimneys, collected during the NA014 expedition of the E/V *Nautilus* (2011) from the Kolumbo shallow-submarine hydrothermal field (Santorini, Greece), are exceptionally enriched in antimony (up to 2.2 wt%) [1]. SEM-EDS data show that colloform banded trace-element-rich zoned possibly biogenic Fe-sulfides show oscillatory zoning; zones "bright" in BSE are enriched in Sb (up to 11 wt%), and/or Pb, As and Si. However, preliminary SR μ-XRF elemental maps confirmed that Sb is mostly concentrated in the core relative to rim (Fig. 1).

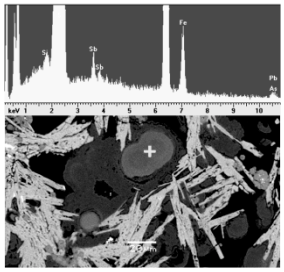

Figure 1. Colloform banded masses of amorphous trace-metal rich Fe-sulfides surrounded by barite blades

Subsequent μ-XAFS spectra, in micro-areas with accumulated Sb, have indicated a possible dominance of the relatively more toxic trivalent species (Sb^{3+}) rather than pentavalent species (Sb^{5+}) forms [2]. It is known that pyrites may accommodate Sb-ions and Sb-sulfosalt nanoparticles [3], but there are no particular studies on the nature of Sb in amorphous Fe-sulfides from recent submarine hydrothermal fields, unless stibnite is formed. Future work will include further evaluation and upgrading of the SR data in combination with microscopic investigation in nanoscale.

[1] Kilias *et al*. *Sci Rep* (2013-under review), [2] Filella *et al*. *Earth-Sci*. *Rev*. **80** (2007) 195, [3] Deditius *et al*., *Ore Geol*. *Rev*. **42** (2011) 32

Statistical Approach and Heavy Metal Analyses of Konyaalti (Antalya, Turkey) Coast Water

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The aim of the study conducted on Konyaalti (Antalya) coast, which is one of the important coasts of Turkey, is to determine the heavy metal (Ni, As, Cr, Pb, Cd, Cu) contents in the seawater along the coastline. In this study samples were taken systematically from 35 different coastal locations. According to the EPA method 3005A(EPA 3005A, 1992), pre-treatment was applied. The fact that the seawater is rich in the elements such as Na,Ca,Cl posed a problem of contamination. Coal gas was used to prevent the contamination (e.g.$^{40}Ar+^{35}Cl—^{75}As$).DRC(Dynamic Reaction Cell) method was applied firstly with %0.1 NaCl solution as being a matrix, then by spiking As so that it is to be 20 ppb into %0.1 NaCl solution. According to the recovery data, measurements were analyzed in the ICP-MS device by using EPA method 6020A(EPA 6020A, 1997). Calibration curve (R^2) chart was drawn with the standards of 2, 5, 10, 15, 25, 50 and 100 ppb from 100 ppm VHG multi-element standard. These values were between 0.9999-0.9993 through the whole study. In the recovery process the minimum and maximum values of the 6 spikes are as follows: As (14.152 - 16.415), Pb(14.540-16.483), Ni(14.719-16.621), Cr (15.498 - 16.937), Cu(14.999-16.138), Cd(14.349-15.844). According to this, the mean percentage values of the recovery were calculated as As(%101), Pb(101), Ni(104), Cr(108), Cu (101), Cd(99). The values were determined as <2 ppb in the locations of 7,8,10,13,19,28 and 31 for As; 3,6-8,10,13, 14, 18,19,21,23-27,29-34 for Pb; 1-3,5,6,8-27,29-35 for Ni; 3, 5-8,10,11,13,18-20,22,24-26,30,31 for Cu;2,7,9-16,18, 19, 21-27, 29-35 for Cd. Maximum values were observed in the stations numbered 35(11.19 ppb) for As;4(75.44 ppb) for Pb; 28(61.3) for Ni;5(114.82 ppb) for Cr;9(65.15 ppb) for Cu; 4 (243.63 ppb) for Cd. It is thought that there is an anthropogenic effect especially in the locations numbered 4,5 and 9.

[1] US Method EPA 3005 A, 1992, Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy, Revision 1, [2] US Method EPA, 6020 A, 1997, Coupled plasma mass spectrometry. Revision 1.

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