Determine of regional metamorphical setting in the road of Hamadan – Sanandaj, Sanandaj – Sirjan belt, west of Iran

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The studied area is located at Sanandaj – Sirjan belt, west of Iran. Metamorphism is an important phenomenon at this area. Field & petroghraphic observation indicate regional metamorphism in Green schist- Amphibolit facies. With considering available mineralres, type of regional metamorphism is LP/ HT and best correlation with Miyashiro Andalusite- Sillimanite series. The comparsion relation between regional tectonical processes with metamorphical & morphological setting at this area, are indicated L-P-T series of paired metamorphic belt.

Contribution of sulfur isotope to metallogenic studies in the SE Afar Rift, Republic of Djibouti

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The Republic of Djibouti, located at the SE part of the Afar volcanic Triangle, is characterized by intense tectonic and bimodal volcanic activity. It is emplaced over an earlier magmatic rift system, as old as 25-30 Ma. Hydrothermal mineralization were recently discovered in this area. Here, we present the first isotope study on sulfides and sulfates minerals associated with these mineralization. Twenty samples from hydrothermal quartz, sulfides, gold, ± carbonate veins and breccias were studied from 8 different sites representative of 4 major volcanic events ranging in age from early Miocene up to Present. Sulfides and sulfates were analyzed by Elemental Analyzer-Isotope Ratio Mass Spectrometry (EA-IRMS) methods. Values of $\delta^{34}S$ for all samples range between -9.20‰ to 21.32‰. Three groups of $\delta^{34}S$ values are identified (i) Gypsum with $\delta^{34}S$ values are 21.32‰; (ii) Gypsum with $\delta^{34}S$ values ranging from 1.08 to 16.33‰; (iii) Pyrite grains with $\delta^{34}S$ values from –9.20‰ to 5.8‰. For the first group, $\delta^{34}S$ values indicate gypsum from marine origin (sulfate in the modern ocean is 21‰). In the second group, the lower gypsum $\delta^{34}S$ values (1.08 to 16.33‰) are not common (lower than seawater sulfate). They are likely due to the disproportionation of magmatic SO_2 leading to enrichment of ^{34}S in the sulfate [1, 2]. For the third group, the $\delta^{34}S$ values of pyrite close to 0‰ are typically reported to volcanic rocks. However, the negative $\delta^{34}S$ values of sulfides can be explained by the disproportionation of magmatic SO_2 that causes the enrichment of ^{32}S in the sulfides [1, 2]. These values classically indicate a source of sulfur from magmatic fluids. The wide ranges of $\delta^{34}S$ values observed in the continental rift system at Djibouti are similar to those related to epithermal gold deposits [3]. The discovery of epithermal mineralization in a recent-active continental rift system is unique and supplies new insights about hydrothermal processes associated with volcanic activity in a back-arc system.

[1] Ohmoto & Rye (1979) 509–567. [2] Ohmoto & Lasaga (1982) *GCA* 1725–1745. [3] Richards (1995) *Miner. Assoc. of Can. Short Course Series* **23**, 367–400.