Geochemical and mineralogical studies on the Fe-Mn deposits of Dehbid area, Fars province, South Iran

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The Dehbid Fe-Mn deposits are located at about 260 Km of northeast of Shiraz (Fars Province), in the Sanandaj- Sirjan metamorphic zone. The deposits are hosted by shale and limestone of the Lower Devonian and thick massive limestone of the Middle and Upper Devonian. The studied area is affected by two metamorphism phases, therefore, the sequence of limestone and shale sediments in the Devonian have been transformed to garnet mica schist - amphibolites and marble.

The main ore bodies are accommodated as lenticular and vein, which are concordant to the host rock bedding. Some 5 veins have been mapped in the area; they are classified in two groups with 2-8m wide, and 20-850m long. Mineralogical studies show that the ores are including magnetite, hematite, goethite, pyrite, pyrolusite, and psilomelane. Gangue minerals include quartz and carbonate. The values of the Fe_2O_3 and MnO vary between 30 to 80 wt% and 2-13 wt%, respectively. Co/Ni ratios in the hydrothermal iron deposits are between 0.2-7 and in the Dehbid area the ratio ranges 0.1 to 3.6 that characterizes hydrothermal origin of magnetite.

Geology, petrography and sedimentology aspects indicate the Fe- Mn prospect of the Dehbid which is a strataband type deposit. Moreover, giving the influence of volcanic phase occurred in the lower Devonian and the combined geochemical evidences; the origin of the materials is considered distal Sedimentary- Exhalative.

Chemocline oscillations in the Black Sea documented by sedimentary iron isotopes and trace metal patterns

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The reconstruction of chemocline fluctuations in the Black Sea basin using sediment archives is challenging. Thus a reliable and ubiquitous proxy is required, which can be applied to samples independent of their location and water depth in the basin. Recently sedimentary Fe/Al ratios combined with $\delta^{56}Fe$ values served as a promising proxy for redox interface fluctuations in marine settings. Elevated Fe/Al ratios coupled with low $\delta^{56}Fe$ values in Black Sea sediments document periods when significant transfer of isotopically light reactive Fe from the shelf to the euxinic basin occurred. The suboxic chemocline, impinging margin sediments allows the lateral transport of Fe^{II}_{aq} across the deep basin. However, to date no published dataset provides high-resolution Fe/Al records of sediment cores from different sampling locations across the Black Sea. Here we show major/trace element data from seven sediment cores sampled at millimeter scale from key locations throughout the entire Black Sea. Synthetic depth profiles were generated by merging the single cores. Furthermore, selected cores were analyzed for $\delta^{13}C$, $\delta^{56}Fe$, $\delta^{97}Mo$, $\delta^{238}U$, and isorenieratene derivatives.

Our results show two distinctive peaks in the vertical distribution of Fe/Al accompanied by lower $\delta^{56}Fe$: 1) at the boundary of lithological Units II to III (marine ingression), and 2) in the centre of sapropelic Unit II. The same geochemical signatures reappear throughout Unit I. Our results point towards repetitive chemocline fluctuations owing to changes in the proportion of marine and riverine input into the Black Sea. The rise of the chemocline results from higher input of marine waters, while increased riverine input presumably lowers the redox interface. These results compare quite well with the Eemian sapropel (MIS 5e). Geochemical data from this second sapropel also document a dramatic change from limnic to marine conditions.