Banded iron formations of the ~ 2.7 Ga Manjeri Formation, Belingwe greenstone belt, Zimbabwe: An anoxic carbonate- and sulphide-rich depositional environment

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As most of the late Archaean banded iron formations (BIFs) were affected by metasomatic, metamorphic and weathering processes, locally resulting in high-grade ore deposits, it is important to decipher their primary depositional setting in order to evaluate ocean basin conditions during this important interval of geological time, close to the global oxygenation event. The Manjeri Formation is a deepening-upward sedimentary succession (~250m) of very low metamorphic grade. The studied jaspilitic BIFs of the Spring Valley Member are intercalated with shallow-water siliciclastic sedimentary rocks, including organic-rich shale, and stromatolitic limestone. The jaspilitic BIFs represent chemical precipitates originally rich in Fe-sulphide, ankerite, siderite and quartz. Low Al_2O_3, TiO_2 and Zr contents indicate little detrital input. Despite the presence of stromatolitic limestones in the same stratigraphic unit, no Ce anomaly was observed, suggesting an anoxic depositional environment. Positive Eu anomalies may reflect either the Archaean ocean signature or the influx of hot S-rich fluids or both, as massive sulphide deposits occur higher up in the succession. Post-lithification, oxidizing silica (±Fe) rich fluids infiltrated the sulphide/ carbonate rocks. Fe-sulphides were oxidized to magnetite then haematite. Fe liberated from ankerite formed Fe-oxides (magnetite and/or haematite) in the matrix and in the veins.

PTt paths in dynamothermal metamorphic rocks of Hamadan area, Sanadaj – Sirjan Zone, Iran

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Sedimentary sequences of Upper Triassic to lower Jurassic in Hamadan area, Sanandaj- Sirjan zone, Iran; experienced both regional (dynamo thermal) and local (contact) metamorphism during Cretaceous. Slate, phyllite, garnet-, andalusite- garnet-, fibrolite- staurolite- andalusite-, staurolite- and sillimanite schists are different petrographic facieses of dynamothermal metamorphism. Five foliations determined in dynamothermal metamorphic rocks. Porphyroblast- foliations relations indicate that main part of mineral crystallization occurred pre-S2 and sillimanite crystallization is syn-S4, so at least two metamorphic events affected the area with pick PT condition of 628°C and 5.9 kilo bars. Because of poly metamorphism, mineralogical zones in the area are changing from South to East. P-T-t paths in dynamothermal metamorphic rocks discussed for these two sequences of mineralogical zonation. In Eastern-Western sequence, chlorite, biotite, garnet and andalusite zones have formed during first metamorphism (M1), and fibrolite and sillimanite zones during second metamorphism (M2). On the other hand, in Southern-Northern sequence, chlorite, biotite, garnet- and probably - staurolite zones occurred during M1 but staurolite crystallization completed mainly during M2. Considering geothermal gradient and heat source, these two sequences have different petrogenetic histories. Thermal section across the dynamothermal metamorphic rocks shows a thermal dome in sillimanite zone. Magmatic and metamorphic evolution of the Hamadan area interpreted as the consequences of Neo-Tethian oceanic crust subduction and its final collision.