Mineralogical characteristics of iron formations from low-to high -grade terrains of Southern Peninsular India.

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Mineral assemblages in oxide, mixed oxide-sillicate facies banded iron formation, of (a) low- to medium-grade greenstone belts situated in a granite-greenstone region and (b) medium-to high-grade supracrustal belts located in transitional gneiss-granulite region in the Precambrian terrane of south India, are mainly dependent on bulk chemistry, P-T conditions, X (CO_2) and XH_2O of metamorphism. Bulk chemistry including trace elements and REE, dependent on the amount of clastic input to the otherwise pure chemical precipitate, is nearly constant with variations due to differing modal mineralogies. Chorite-biotite grade iron formations occuring in Kudremukh and Bababudan greenstone belts have amphibole, carbonate, chlorite, stilpnomelane bearing assemblages, resembling zones 1 and 2 of the Negaunee Iron Formation. Staurolite-kyanite grade iron formations occurring in Yediyur-Karighatta greenstone belt have amphibole carbonate, muscovite, chlorite, stilpnomelane bearing assemblages, while the Sargur iron formations have amphiboles, pyroxenes, garnet, carbonate and chlorite. These resemble zones 2 and 3a of the Negaunee Iron Formation. The sillimanite-orthoclase grade iron formations at Kanjamalai and Valaipatti-Tattayyangarpettai have pyroxene, garnet and minor amphibole, carbonate bearing assemblages resembling zones 3a and 3b of the Negaunee Iron Formaiton. Coexistence of chlorite-stilpnomelane, actinolite-hornblende-grunerite, garnet-hornblende in different quartz and magnetite rich layers in these iron formations indicates $X(CO_2)$ compositional gradients in the circulating metamorphic fluids coupled with variations in XH_2O in the P-T range of 400-850°C and 4-6 Kb. Genetic processes operating for the deposition of these polygenic sediments appear to have been similar in the different basins.