

Geological And Structural Aspects of Gold Mineralization At Archaean Hutti-Maski Schist Belt, India.

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The Archaean Hutti-Maski greenstone belt in the South Indian Craton is presently the principal producer of gold in India, where gold-quartz-sulfide veins occupy the brittle-ductile shear zones. Greenschist to lower amphibolite facies supracrustals belong to Dharwar Super Group, skirted all sides by Peninsular Gneissic Complex and younger granitoids. The greenstone pile consists of submarine mafic and felsic volcanics, metasedimentaries, mafic dikes, pegmatites and both auriferous and barren quartz veins.

Gold occurs as native metal, associated with sulfides like arsenopyrite, pyrite, pyrrhotite, chalcopyrite and sphalerite in order of abundance in addition to scheelite. EPMA analysis shows presence of invisible gold within arsenopyrites. The shear fractures provide pathways for migration of hydrothermal ore fluids (H_2O) rich aqueous and carbonaceous fluid of low salinity ≈ 9 wt % and homogenized at $\approx 325^\circ C$) deposited the metal along these fractures in reducing and near neutral pH condition. Mylonitisation, brecciation and penetrative chloritic foliation represent major zones of structural anisotropy. The shear zones have been controlled by N-S tectonic fabric resulted from E-W compressional stress. Three deformational episodes affected the area and first episode control quartz-sulfide mineralization. The shear zones development started with the on set of second episode represented by gold-quartz-sulfide vein mineralization. The last episode, post-tectonic faults and dolerite dikes had minor effects on the mineralization. Gold source could have been derived from high ferro-magnesium basalts, scavenged by hydrothermal fluids generated by metamorphic remobilization resulted the first phase of gold-quartz-sulfide mineralization (invisible gold). This mineralized phase later reworked to form rich gold (native)-quartz-sulfide lodes.