

## **Archaean subduction processes, development of shear zones, alteration and gold mineralization - geochemical evidence from Penakacherla schist belt - India**

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Five arcuate auriferous shear zones pass through the late Archaean (2.7 Ga) greenstone belts of Dharwar craton, India. One of them cuts across 400 km long Ramgiri-Hungund greenstone belt. Penakacherla part of this belt is well exposed providing evidence for synorogenic deposition of gold and producing an alteration assemblage from the hydrothermal fluid generated by metamorphic devolatilization and dehydration of a hydrous subducting slab. Geological, structural and geochemical mapping of the Penakacherla schist belt (PSB) show that mylonitization (phyllosilicate) in a ductile-brittle shear zone, is superimposed on D1 schistosity. Intensive permeation of hydrothermal fluids through the shear zone complex altered the host rocks and generated an alteration assemblage of carbonatized (ankerite), chloritized (bleached chlorite), silicified (quartz crushed and recrystallized), sulfidized (pyrite-pyrhotite-chalcopyrite- arsenopyrite) and sericitized (biotite- muscovite) of basic and intermediate rocks and Banded Iron Formation. Multicomponent addition by hydrothermal fluids disturbed major, minor, trace and REE and their mutual behaviour showing a general chaotic scatter especially in case of mobile incompatible elements. On the other hand, despite of their large range in concentration geochemical twins such as Zr-Hf, Nb-Ta and V-Sb exhibit their expected linear distribution. Concentration with respect to mass/volume balance equation of K, Rb, Sr, Ba, Nb, Ta, Ti, Cs, Cr, Co, V, Ca, La, Nd, Sm, Eu and Yb and their ratios indicate the dehydration-devolatilization of the basic source. Second stage deformation concentrated sulfides and gold along the hinges of the minor D2 fold. PSB is only a truncated dismembered and unsubductable part of a larger greenstone belt sequence.