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Syn-Tectonic Progressive and Retrogressive Metamorphism in ALS-Bearing Schists,Southeast Hamadan,Sanandaj-Sirjan Zone,Iran

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Abstract

The Sanandaj-Sirjan zone is the metamorphic belt of the Zagros Orogen in western Iran that uplifted during continental collision between the Afro-Arabian continent and the Iranian microcontinent. ALS-bearing schists are part of the metamorphic rocks in northwestern half of the Sanandaj-Sirjan zone and consist of metasediments including micaschist, garnet staurolite schist, garnet andalusite schist and garnet sillimanite schist with protolith of pelite inter-bedded with detritic sediments.
Based on over than 2000 structural measurements and microstructural studies,during a single progressive deformation event, Five episodes of deformation(F1-F5) with two progressive(M1)and retrogressive(M2) metamorphism were recognized in the ALS-bearing schists. In the first stage of metamorphism (M1) four episodes of deformation are distinguishable:The first fold hingelines(F1) is not mapable in mesoscopic scale but observed by bedding parallel continuos schistosity(S1)and syntectonic growth of porphyroblasts under the optical microscope. The second one (F2) is well characterized by isoclinal recumbent folds with axial plane schistosity (S2) that folded by the later generations. The schistosity(S2) is the penetrative foliation in study area. Numerous quartz and pegmatoid veins and were formed during (F1) and folded with F2 and created pinch and swell and boudinage structures. This can be indicate the temporarily decreasing in the deformation temperature between F1 and F2.The third one (F3) is the most penetrative crenulation schistosity and (S3) developed parallel to the axial plane of (F3) tight upright to overturned folds .F1,F2 and F3 fold hinglines are sub-parallel and show boomerang fold interference pattern (type3) and oriented to south-southeast. The later (F4) is well recognized by mineral lineation of Sillimanite , Biotite and Muscovite and a less developed crenulation cleavage (S4). forth fold axes strike make a distinct angle with previous fold axes and oriented to S60W. The last one (F5) was generated during retrograde metamorphism(M2), is rarely recognised and cut the previous generations.(S5) is developed as kink band and in some places crenulation schistosity and well recogniseable with post-tectonic automorphic growth of Chlorites.
The majore episodes of deformation are during F1 to F3 and the pick of metamorphism is synchroneous with F4. As a result, Porphyroblasts growth are synchronous to deformation stages indicate syn-deformational metamorphism.

Key words:Iran,Sanandaj-Sirjan zone,deformation,metamorphism, structural analysis