



## **Vorticity and strain analyses: using rotated boudins and drag folds in the HP-LT Sanandaj-Sirjan metamorphic belt, Southwestern Iran**

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The Seh-Ghalatoun area, in the southwestern Iran, is part of the HP-LT Sanandaj –Sirjan metamorphic belt within the Zagros orogenic belt. The area exhum high- grade metamorphic rocks along thrusts and shear zones which reveals the HP-LT conditions of metamorphism. This high strain zone affected by the polyphase deformation. Mesoscopic and microscopic structures such as rotated porphyroclasts, boudins, veins, drag folds and superposed folds have been used to estimate quantitative finite strain, kinematic vorticity number and sense of shear. axial plane of the asymmetrical folds give an orientation of N30°W,40°NE to N45°W,39°NE. clockwise rotation of asymmetrical fold hinges indicates dextral sense of shear. The superposed folding patterns in this area indicates type 2 and type 3 interference patterns. Boudin trains in the quartzo-feldspatic gneisses layers are symmetric and asymmetric and they have been classified as the domino boudins, drawn boudins, shear band and torn boudins. The boudin obliquity with respect to the fabric attractor is considerable so that the domino boudins are either parallel or oblique to the S1 foliations, their mean orientation is N70°W. In addition modified or complex boudins consist of two categories: the sequential boudins and reworked boudins is a clear reason for subsequent deformation. Based on these structures, three phases of deformation were recognized in the Seh-Ghalatoun area. First phase of deformation (D1) led to the formation of the main foliation (S1) with NW-SE direction and have formed at the peak of metamorphism. Presence of weaker and less penetrative foliation superposed on the S1 foliation which form S2 foliation. Third phase of deformation (D3) developed by shearing along the shear zones and thrusts which give rise to the S/C shear band cleavage (S3) during lateral exhumation High-grade and high strain metamorphic rocks on top of the subducting Thethyan oceanic crust.