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Quantitative study of the heterogeneous ductile deformation within the Zagros Thrust System, Iran

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The chief goal of this research is focused on the quantitative evaluation of the fabric development across the Zagros transpression zone which is related to the oblique collision between the African-Arabian continent and the Iranian microcontinents. The collision started in the late Cretaceous and is continuing to the present day. Coupled structural and microstructuural data such as quartz c-axis fabrics, finite strain and kinematic vorticity number were used to characterize fabric development during shear deformation along the thrust sheets constituting the Zagros Thrust System. These data provide new insight on the strain, temperature of deformation, kinematics and vorticity of flow associated with collisional oblique transpression in the Sanandaj-Sirjan metamorphic belt of the Zagros Mountains of Iran. The quantitatively determined kinematic vorticity number based on the quartz c-axis fabrics was 0.76 which revealed contribution of 57% simple shear and 43% pure shear for the deformation. Opening angle of the quartz c-axis fabrics was 55º-75º which yield temperature of deformation varies from 435° $\pm$ 50°C to 600° $\pm$ 50ºC. These c-axis patterns thus indicate that the quartzites of the study area were deformed under greenschist to epidote-amphibolite facies conditions. The observed deformation pattern seems to be comparable with those observed in adjacent along-strike areas of this deformed zone as well as in zone of ductile extrusion of the other orogens in the world.