Structural, thermal, mechanical evolution of strike slip faults in Dehnow tonalite pluton, west of Mashhad, Northeast Iran

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Abstract: Dehnow tonalite in west of Mashhad, NE Iran, is one of the oldest pluton in Mashhad Granitoided Complexes. This pluton cut by four systematic fracture sets. Among them, two sets show right lateral strike separation. Set A consists of parallel right lateral strike slip faults with a minor reverse slip component and Set B includes right lateral strike slip faults with a small component of normal slip. Other set is formed between faults in set A. Tonalite is deformed into mylonite in fault cores. Study of microstructures and dynamic recrystallization of quartz grains in these mylonites indicates that the formation of mylonites have taken place under 410-430 ºC, 42.54 - 59.31(Mpa) differential stress and 21.27-29.65(Mpa) maximum shear stress. The strain rate in this deformation is $1.08 \times 10^{-12} - 7.3 \times 10^{-15}$. Field observations and study of microstructures revealed that these fault sets have formed during renewed slip on the earlier formed extensional joints and their asymmetric fringe joints probably during Late Cimmerian orogeny.

Keywords: Strike-slip fault; Mashhad; strain rate; stress; dynamic recrystallization; quartz.

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