



## Quantitative investigations on the nature of ductile deformation within the Sanandaj-Sirjan Metamorphic Belt (Zagros Mountains, Iran)

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The analysis of lattice preferred orientation patterns (LPOs) is of considerable interest for the investigation of the structural evolution of tectonic units. Quartz *c*-axis fabrics were used to establish differences in deformation history, finite strain and deformation temperature within a transpressional collision zone of the Zagros orogeny in the SW Iran. The orogen is characterized by the occurrence of metamorphic and/or magmatic complexes that are arranged parallel to the strike of the orogen, which are bordered by distinct ductile NW-trending zones and thrusts that form the NE and SW limits. Quartz *c*-axis fabrics transitions were studied in well-exposed quartz mylonites within the Sanandaj-Sirjan Metamorphic Belt in the Dehbid area of the Zagros orogeny. This area consists of NW-striking sheets, NE-dipping dextral strike-slip duplexes that are linked with imbricate fans and oblique-slip thrusts and is a portion of the internal zone of the Zagros orogenic belt. These data were used to establish differences in deformation history, finite strain and deformation temperature during ductile deformation. Quantitative finite strain ( $R_{XZ} = 2 - 4.7$ ) and kinematic vorticity number ( $W_K = 0.45 - 0.93$ ) analyses demonstrate that both strain ratio and the simple shear component of deformation increase towards the Main Zagros Thrust (i.e. from northeast to southwest). The variation in the quartz *c*-axis patterns is explained in terms of decreasing metamorphic grade during ductile deformation from the SW (high to medium grade) to the NE (low grade), and decreasing finite strain respectively which is related to general progression of transpressional tectonics and exhumation of core complexes towards the north.

**Keywords:** heterogeneous ductile deformation, quartz *c*-axis fabric, vorticity, deformation temperature, Zagros, Iran