Geophysical Research Abstracts
Vol. 12, EGU2010-406, 2010
EGU General Assembly 2010

New approach to the boundary-parallel plastic / viscous diapiric flow patterns in the curvilinear boundary zones: an implication for structural geology studies

Khalil sarkarinejad

Shiraz University, Earth Sciences, Shiraz, Islamic Republic Of Iran (Sarkarinejad@geology.susc.ac.ir)

New approach to the boundary-parallel plastic / viscous diapiric flow patterns in the curvilinear boundary zones: an implication for structural geology studies Khalil Sarkarinejad and Abdolreza Partabian Department of Earth Sciences, College of Sciences, Shiraz University, Shiraz, Iran (Sarkarinejad@geology.susc.ac.ir).

In the oceanic diverging away plates, the asthenospheric flow at solidus high-temperature conditions typically produces mineral foliations and lineations in peridotites. Foliation and lineation of mantle are defined by preferred flattening and alignment of olivine, pyroxene and spinel. In the areas with steep foliations trajectories which are associated with the steeply plunging stretching lineation trajectories, reflecting localized vertical flow and has been related to mantle diapir. The mantle flow patterns are well documented through detail structural mapping of the Neyriz ophiolite along the Zagros inclined dextral transpression and Oman ophiolite. Such models of the diverging asthenaspheric mantle flow and formation of mantle diapir are rarely discussed and paid any attention in the mathematical models of transpressional deformation in converging continental crusts. Systematic measurements of the mineral preferred orientations and construction of the foliation and lineation trajectories of the Zagros high-strain zone reveal two diapers with the shape of the inclined NW-SE boundary-parallel semi-ellipses shape and one rotated asymmetric diapir. These diapers made of quartzo-feldspathic gneiss and garnet amphibolite core with phyllite, phyllonite, muscovite schist and deformed conglomerate as a cover sequences. These boundary-parallel and rotated diapirs are formed by the interaction of Afro-Arabian lower to middle continental detachment and hot subdacting Tethyan oceanic crust, due to increasing effective pressure and temperature. The plastic/viscous gneissic diapers were squeezed between in Zagros transpression curvilinear boundary zones in an angle alpha=25°. Constructed finite strain ellipsoid based on the X-axes of the elliptical shaped deformed markers of the diapir cover sequences show trend X-axis of the strain ellipsoid making an angle phai=2° with the boundary zones. The steep plunging stretching lineation primarily controlled by the plastic/viscous flow. This also show that during inclined upwelling boundary-parallel diapers, X-, Y-axes of the strain ellipsoid rotated clockwise and Z-axis experienced counter clockwise rotation with triclinic symmetries relative to the Zagros curvilinear transpression boundary zones with an orientation of N42°plus/minus 24°W.