EFFECT(S) OF LOWER CRUST FLOW AND RECENT TECTONIC ACTIVITIES IN ZAGROS

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Seismicity in Zagros Fold and Thrust Belt is known as an enigma. Most of the located earthquakes lie between cover rocks and basement in upper crust located in depth of 10-15km. Subduction of Arabian plate has not been confirmed by geophysical investigation or by GPS measurements. Indeed, the suture zone is not tectonically active as it is usual in area of continental underthrusting. The decision making to attribute earthquake events to cover or basement is also debated. Geophysical and geological studies across the belt, however, detected a weak thickened lower crust. The role of a fluid lower crust and its interaction with upper crust is known as an interested subject in continental collision domains in last two decade. With the use of bouguer gravity anomaly obtained by Snyder and Barazangi (1986) and calculating admittance and coherency, this study puts documents forward to show (in Zagros) the upper crust and lower mantle decoupled. It then concludes the vertical pressure induced by lower crust injection and horizontal pressure running by Arabia is responsible for recent configuration of seismic activity in Zagros. Finally, this paper discusses why the seismicity is different in salients respect to reentrants.

FACTORS IMPACTING OROGENESIS

Among the main factors involved in deformational pattern in an orogenesis are internal friction, basal friction, and lithosphere flexural rigidity. An increase in frictional strength or decrease in basal friction cause lower deflection of underlying plate concluding a narrower taper. In Dezful embayment (west central Zagros) it is suggested the Hormoz salt (a significant de'collement layer) is absent (e.g., Bahroudi and Koyi, 2003). Therefore, it can be expected a large basal friction and, conclusively, large deflection. The more deflection implies weaker crust that is more prone to decouple.

The admittance (observed and calculated) (Figure 1) and coherency (Figure 2) implemented on Snyder and Barazangi (1986) Bouguer anomaly show: (1) the elastic thickness is unusually thin (less than 10 km) lower than that is shown by seismogenic layer (20 km in average) and (2) the coherency in Dezful tend to higher wavenumber that, in turn, implies thicker elastic or more rigid lithosphere. These two results imply the lower crust decoupled the upper crust and upper mantle. As such, like some of continental collision zone the lower crust plays role as a liquid that flows and decouple the upper crust and upper mantle. As a result, we expect the deformation front controlled by lower crust injection and its morphology depends on foreland rigidity. In the other word, the deformation follows up lateral and (or) frontal lower crust pinch out instead of Hormoz salt pinch out.

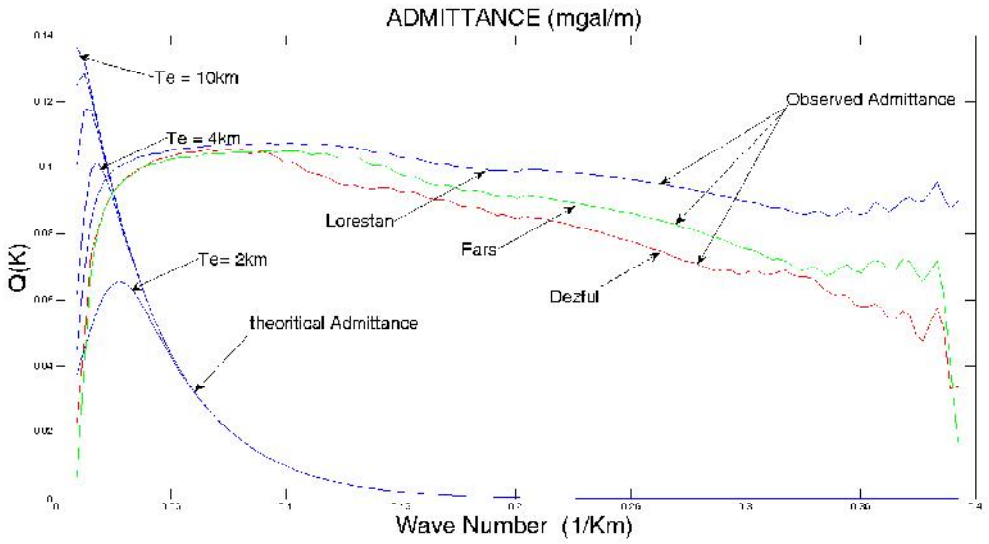

Figure 1. The result of calculation observed and calculated admittance versus wavenumber of Bouguer anomaly implying the lithosphere lower than 10 km thickness

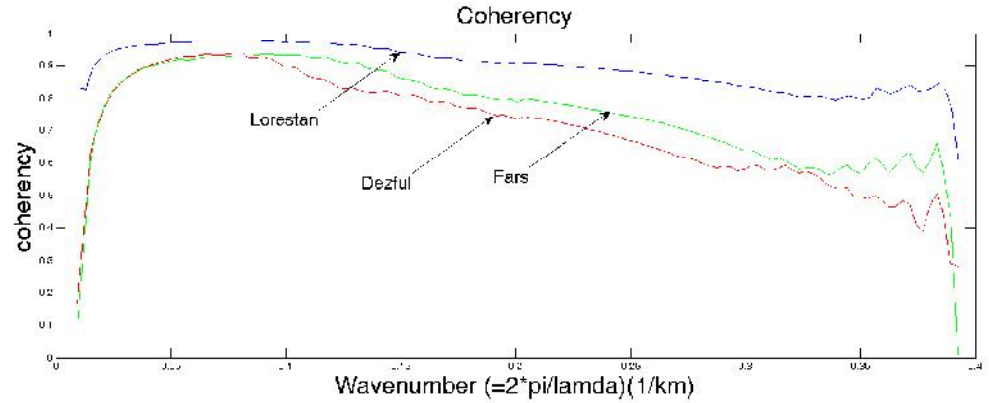

Figure 2. The result of calculation coherency versus wavenumber implying the lithosphere of Dezful has higher wavenumber at the same coherency denoting a higher elastic thickness

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