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

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Keywords: Lower Crust, Pinched Out, Zagros

ABSTRACT

Seismicity in Zagros Fold and Thrust Belt is known as an enigma Most of the located earthquakes lay between sedimentary cover rocks and basement in upper crust located in depths 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 decades 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

INTRODUCTION

The Zagros fold-and-thrust belt in SSW of Iran (Fig 1) is amongst the world's most seismically active mountain ranges, and is significant in our understanding of continental collisions To date, the evolution of structure of Zagros has been looked mostly by two defaults: presence or absent of Hormoz formation (a 1km-thickness of Precambrian salt) and fracture patterns inherited since or before early Triassic when the NeoTethys started opening between Arabia and Central Iran by which a passive margin in north of Arabia evolved Seismicity is as a result of reactivation of these fractures (Jackson, 1980) Most of the earthquakes locate 10 – 15 km depths range: the depth between basement and sedimentary cover rocks The mechanisms controlling seismicity, however, attributed to thin- to thick-skinned tectonics Therefore, the depths of the sources deceive the researchers That is, somebody relate active deformation to the faulting within sedimentary cover rocks (Bahroudi and Koyi, 2003; McQuarrie, 2004, Nissen et al, 2011) some other suggest the origin is lower in basement (eg, Molaniro et al, 2005a; Berberian, 1995, Hatzfeld et al, 2010, Tartar et al, 2006) Although until an integrated study, by which a high resolution survey of active deformation in surface and depth would be produced, the debates will be remained, this paper, on the other hand, addresses an alternated possibility to explain the active deformation in point of view of flexural rigidity

In the last studies to find reasons for upper mantle dipping (5 to 17°) in place of suture zone laying along Main Zagros Reverse Fault, Snyder and Brazangi (1986) and Paul et al, (2006), in their flexed upper mantle, replaced higher density of lower crust material instead of upper crust to reconcile the flexure of upper mantle with this density contrast In the other word, the thickened lower crust is a consequent of weakening of upper mantle and vice versa This, in turn, causes decoupling of upper mantle with upper crust