INVESTIGATION OF THE CONTEMPORARY STRESS STATE IN CENTRAL ZAGROS

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Among the present active belt, the Zagros mountain fold and thrust belt located in SW Iran, is one of the most seismically active. It results from the collision of the Arabian plate with continental blocks of Central Iran. The studied area extend between 50 to 54E, characterizing by N-S-trending right laterally strike slip faults such as Kazerun, Kareh-Bas, Sabzpushan and Razak-Sarvestan.

Among these faults the less known fault is Razak fault (Hessami and Tabassi, 2006). The main purpose of present study is to find the faulting mechanism of the mentioned fault and furthermore by using of the inversion method is the state and direction of contemporary stress investigated. The present – day state of stress responsible for active faulting in central Zagros determined by inversion of focal mechanism from moderate to large ($4.5 \leq M \leq 7$) earthquakes. Furthermore, in this study we determined the stress tensor for local micro earthquakes focal mechanisms that have solved by first polarity of P wave (Tatar et. al., 2003). This method for inversion proposed by Carey- Gailhardis and Mercier (1987). In this method computation of stress state from populations of focal mechanisms require to knowledge of the seismic slip vectors and consequently the selection of the preferred seismic fault plane from each of nodal planes. The selection can be made directly from the observation of coseismic rupture as well as the distributions of the aftershock sequence, or by inverse computation. In the last alternative, the selection is possible because only one of the two slip vectors of focal mechanism is the seismic fault slip vector in agreement with the principal stress axes. Carey - Gailhardis and Mercier (1987, 1992) defined using the dihedral method (Angelier and Mechler, 1977; Carey - Gailhardis and Vergely, 1992).

The quality of stress tensor is based on number of data, Poisson distribution of deviation angle between real and calculated slip vector and plunge ratio (LP) for each individual tensor. We show in the figure (1) one example of a stable stress tensor that deduced from 33 focal mechanisms in Borazjan region. This tensor show that a compressional tectonic regime in this zone because minimum stress (σ_3) is vertical axes and R =0.569 (R is stress ratio, $R = \sigma_2 - \sigma_1/\sigma_3 - \sigma_1$ describes the relative stress magnitude of the calculated mean deviatoric stress tensor).

The direction of maximum shear stress (σ_1) vary about 35^o of the northwest to southeast in central Zagros (table 2, figure 2). We can tell that compression tectonic regimes govern to over Zagros and strike slip faults that existed in that, regionally controls this regime.

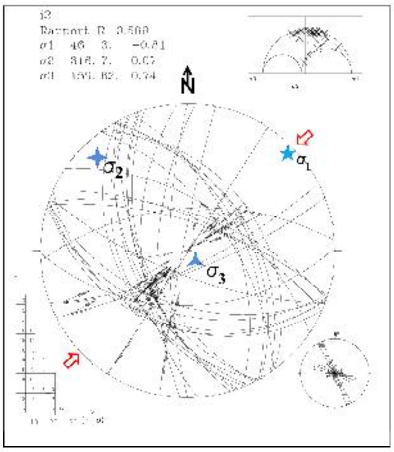

Figure 1. A stable tensor that deduced from inversion of 33 earthquake focal mechanisms for Borazjan realm. The red arrow show direction of maximum stress, histograms show distribution of deviation angles between the measured and calculated slip vectors

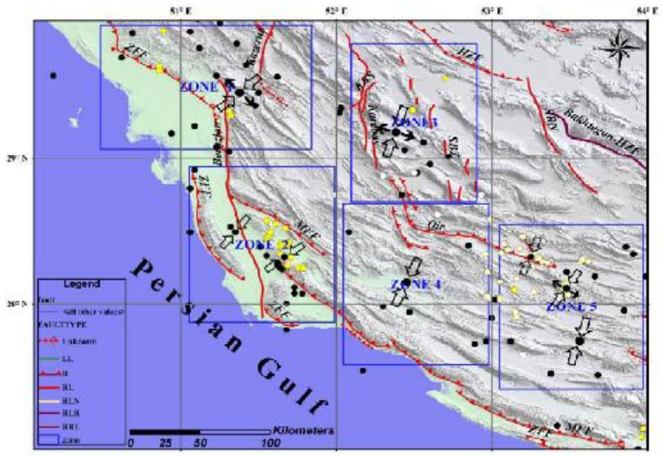

Figure 2. Map of the present- day stress state deduced from inversion of earthquake focal mechanisms data in central Zagros. In this study, we subdivided central Zagros to five zones based on geology structure and P axes of focal mechanisms

The NW-SE trending faults showing thrust faulting with a small right laterally horizontal component. The second faulting trend comprises the N-S strike-slip, which displaces the major trends right laterally. Locally the E-W-trending faults are strike-slip faulting with minor extensional component. In a regional scale the E-W-trending faults show a left laterally strike-slip mechanism with a compressional component.

Table 1. The result of stress tensors deduced from inversion of earthquake focal mechanisms data characterizing the present day stress regime in central Zagros

Zone	σ1			σ2			σ3			R	*Rm*
	trend	**pl**	**mag**	**trend**	**pl**	**mag**	**trend**	**pl**	**mag**	____	___
1	*230*	*2*	*-1.07*	*126*	*83*	*0.19*	*320*	*7*	*0.87*	*0.646*	***SS***
2	*40*	*5*	*-0.78*	*131*	*3*	*0.03*	*250*	*84*	*0.75*	*0.528*	***C***
3	*198*	*5*	*-0.79*	*28*	*85*	*0.01*	*288*	*1*	*0.76*	*0.511*	***SS***
4	*25*	*7*	*-0.81*	*294*	*8*	*0.11*	*154*	*80*	*0.7*	*0.612*	***C***
5	*16*	*1*	*-0.74*	*106*	*3*	*0.04*	*265*	*87*	*0.7*	*0.538*	***C***
4+5	*20*	*3*	*-0.76*	*110*	*3*	*0.05*	*247*	*86*	*0.7*	*0.556*	***C***
IRSC(2)	*54*	*0.1*	*-0.87*	*324*	*11*	*0.17*	*147*	*79*	*0.69*	*0.667*	***C***
IRSC(2)+2	*46*	*3*	*-0.81*	*316*	*7*	*0.07*	*159*	*82*	*0.74*	*0.569*	***C***
GHIR	*214*	*10*	*-1.02*	*42*	*80*	*0.23*	*304*	*1*	*0.79*	*0.692*	***SS***
	20	*2*	*-0.83*	*110*	*1*	*0.2*	*236*	*87*	*0.62*	*0.712*	***C***

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