

## AN OVERVIEW OF SEISMOTECTONIC PROPERTIES OF EASTERN ANATOLIA

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### ABSTRACT

Turkey is lying within a region surrounded by 3 main tectonic plates which are Eurasian, African and Arabian plates. The Global Positioning Systems (GPS) show that the Arabian plate is pushing and compressing Anatolia plate at a rate of 1.7-2.4 cm/year, being effective to the east of Anatolia, while the subduction of the African plate along the Hellenic arc pulls the Anatolian block toward SW at a rate of 3.0-4.0 cm/year. The intersection of the two main fault systems (North Anatolian and East Anatolian transform faults) constituting a triple junction point between Erzincan-Bingol-Elazig region is the most tectonically active area in East Anatolia.

The eastern part of North Anatolian Fault Zone is northeast of East Anatolian Fault zone. These two fault zones intersecting around Karliova and is called Karliova Triple Junction. In this region, in the east of Erzincan Yedisu Segment a seismic gap is defined by the previous scientific studies. However, there is not sufficient seismological study in this region to characterize the seismic gap. For this purpose the number of seismic stations have been increased. The number of stations increased 3 fold within the last 5 years with the aim to understand the characteristics of the earthquakes, to study earthquake risk analysis and the mechanism of the faults in the region.

Especially between 2003-2011 there were 3 large earthquakes (2003 Pulumur Mw=6.1; Bingol Mw= 6.4; 2010 Elazig Mw 6.1) in the region. In the same period 2004 Sivrice Ml=5.5; 2005 Karliova Ml=5.7-5.9; 2007 Sivrice-Elazig earthquakes (Ml=5.3-5.9) and 2010 Gokdere-Palu-Elazig (Ml=5.1) earthquakes showed that the region is highly active.

In addition along Southeast Anatolian border of Turkey, as a result of the compressional tectonism thrust type orogenic structures like Bitlis Suture Zone occurred. These structures are also active. The earthquakes of 6 September 1975 Lice (Ms=6.6), 24 November 1976 Caldiran (Ms=7.5), and 23 October 2011 Van (Mw=7.1) earthquakes were destructive and revealed that the faults in eastern Anatolia are capable to generate major events.

The October 23, 2011 Van-Ercis Earthquake (Mw=7.1) was the most devastating resulting in loss of life and destruction. The Van Earthquake activity initiated and caused an increase in seismic activity of the region. Van Earthquake and its important aftershocks fault mechanism solutions show that the region is under compression and reverse faulting is a result of this regime which is effective on the active compressional tectonics of the region.

The earthquakes generated significant amount of data that will be used in seismic tomographic inversion studies to determine a 3D velocity structure. The aim is to determine velocity and crustal structure of Karliova Triple Junction and surrounding area.

This study is supported by B.U Research Fund, with project number 6040.

Keywords: Karliova Triple Junction, Yedisu segment, seismic gap, aftershocks, compressional tectonics