

## **A comparative study of the fault interaction and seismicity migration in the Kazerun (Iran) and North Anatolian (Turkey) fault systems**

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The Kazerun Fault System (KFS) is a right-lateral strike slip fault system in the middle part of the Zagros seismogenic zone in Iran. This fault system consists of three right-stepping segments with the nearly similar strikes. It is a N-S trending fault crossing the Zagros trend with bending, dragging and offsetting the fold axes in a right-lateral sense. This study attempts to prove the migration of seismicity in the middle part of the Zagros region along the segments of the KFS and between the Kazerun fault segments. On the other hand, the seismic migration in the North Anatolian Fault System (NAFS) has been discussed by many researchers. This fault system, same as the Kazerun Fault System, shows a right-lateral mechanism and extends from the East to the West of Turkey. In this research, we describe the fault interactions and seismic migrations in KFS and NAFS based on the spatiotemporal analysis of the earthquake data of these two regions covering a time period of 5 years (from 2005 to 2010). In order to characterize the spatiotemporal evolution of the seismic activity of the regions for a given time, the regions were divided into equal area units (we call cells). These cells are square-shaped with a dimension of 10 km. We extracted earthquakes for each cell. The seismicity parameters of each cell was computed based on seismicity data. For temporal analysis, we divided the overall data time period into equal time spans of six months. To detect the interaction of two active fault, we should find a reliable parameter to be monitored. Seismic energy released is a good parameter for this spatiotemporal analysis. We overlay maps of every two successive six-month seismicity parameters, and finally we find the seismicity migrations. The spatiotemporal analysis of the data along with the study of the geometry of the active faults in both fault systems are related to the tectonic regime within the middle part of Zagros (Iran) and the Anatolian block (Turkey)

The results obtained indicate that these migrations mainly occur along the trends of these fault systems. Additionally, we found a good agreement between these seismicity patterns and the overall plate tectonic movements ongoing in these parts of the World. The results obtained also show that the seismicity migrations and fault interactions are strongly ongoing between the Kazerun and Borazjan segments of the Kazerun Fault System (KFS). The dominant direction of this migration is NE-SW, perpendicular to Main Zagros Reverse Fault and more or less parallel to the direction of the Arabian plate motion towards the Eurasian plate. In addition, the existence of many bends in the Kazerun and Borazjan faults (especially on the Kazerun fault) is a good explanation for energy jumps in seismic migrations. The mean direction of seismic migrations in the North Anatolian Fault System is E-W. According to this study and the studies carried out by previous researchers, the seismic migrations and fault interactions along the segments of NAFS are interpreted by the westerly motion of Anatolian block, with respect to the Eurasian and African plates, caused a great change in the tectonic evolution of the eastern Mediterranean region, giving rise to the Aegean extensional regime and to internal deformation of Anatolia.