

INVESTIGATION OF SEISMOTECTONICS OF MAKRAN REGION USING LOCAL NETWORK DATA

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Makran subduction zone is situated at the SE of the Iranian plateau and is formed as a consequence of subduction of Arabian plate beneath Central Iran (e.g. Farhudi and Karig, 1977; Penney et al., 2017). From the pattern of sparse seismicity in the region, Penny et al. (2017) inferred a maximum average dip of subduction of $\sim 11^\circ$ in the west Makran. However, from a recent receiver function analysis along a profile in the West Makran, Mokhtarzadeh et al. (2018) showed a very low angle subducting plate of $\sim 3^\circ$ for the distance between the Oman sea coastlines to the edge of Jazmurian depression and then a more dipping plate of 12.5° north of the Jazmurian depression.

The western Makran has low seismicity in comparison with the east Makran. In the past 50 years, there is no mega thrust earthquake reported in the western Makran while an earthquake with a magnitude of 8.1 occurred at the east Makran. Our knowledge of seismicity in the west Makran is limited due to the lack of dense seismological networks. In this work, we used the temporary network installed by Institute for Advanced Studies in Basic Sciences (IASBS) during 2016 to 2019 (Figure 1) to improve seismicity pattern and evaluate focal mechanisms. These new information are required to investigate the relation between the seismicity with the active faulting and geometry of subducting plate in the west Makran. We located all events occurred from January 2006 to June 2018 (Figure 2). Earthquakes that took place before June 2016 were located using data from regional and global networks. From 772 events in this time period, only 166 earthquakes with the magnitude greater than two have azimuthal gap less than 190° (Figure 3). IASBS temporary network recorded 850 events with 127 events with magnitude greater than two and azimuthal gap less than 190° (Figure 4). It is clear from Figures 3 and 4 that the quantity and quality of the located earthquake increased after installing IASBS temporary seismological network. Figures 3 and 4 show that the events concentrate mostly on the periphery of Jazmurian depression, implying that the Jazmurian depression is relatively a solid aseismic block. A big portion of shallow earthquakes are concentrated around the Bam fault and eastern of the Jazmurian. In the SW of Jazmurian basin, the epicenter of shallow earthquakes do not correlate with known active faults implying presence of some undetected active faults there. Deeper earthquakes are observed along the west of the Makran between the latitude of 27° to 28° . The location of these earthquakes is correlated with the subducting plate dip angle as calculated by Mokhtarzadeh et al. (2018) and may represent the relation between deep earthquake and the subducting plate in the Makran subduction zone.



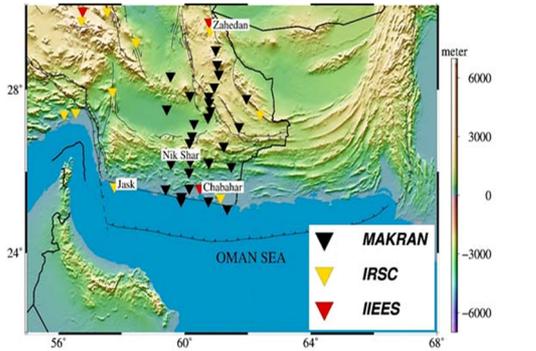


Figure 1. The location of seismic stations are denoted by triangles. Black triangles show IASBS stations, yellow triangles show IRSC stations and red triangles show IIEES stations.

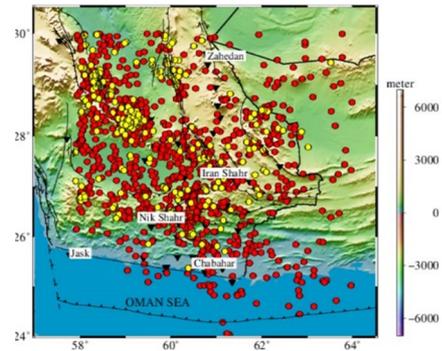


Figure 2. The location of 1622 events that happened from January 2006 to June 2018 in Makran (red circles). The 293 events (yellow circle) with magnitude greater than two and azimuthal gap less than 190° .

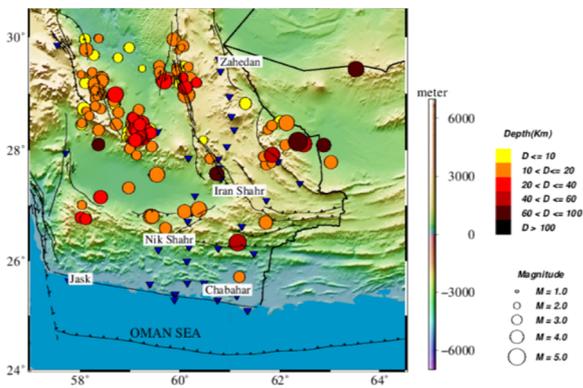


Figure 3. Location of 166 events happened from January 2006 to May 2016 in Makran. The events are recorded by regional Iranian networks and have magnitude greater than two and azimuthal gap less than 190° . The location of seismic stations are denoted by blue triangles.

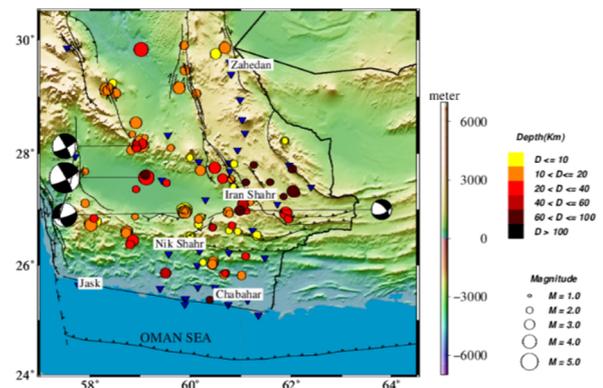


Figure 4. The location of 127 events that happened from January 2006 to May 2016 in Makran. The events are recorded by IASBS stations and have magnitude greater than two and azimuthal gap less than 190° . The location of seismic stations are denoted by blue triangles.

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