ABSTRACT

We analyze the seismicity that occurred in the Gulf of California, México, before and after the occurrence of the 2010 El Mayor-Cucapah (Mw 7.2) earthquake. For that purpose, we compile a catalog of earthquakes located in the region of the Gulf of California (GoC), between 1901 and 2018. This catalog consists of more than 5,600 earthquakes that occurred in the GoC region between latitudes 23N and 32N and longitudes between 107W and 115W. We include events reported by the catalog of the seismic network RESNOM (Red Sísmica del Noroeste de México) operated by CICESE (Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California) and complemented with events listed in the ISC (International Seismological Centre) and the SSN (Servicio Sismológico Nacional, UNAM) catalogs. The minimum magnitude of completeness of the compiled catalog is Mc=3.6, and many hypocenters concentrate between 5 km and 10 km depth, the likely depth of the seismogenic zone of the earthquakes in the GoC. The distribution of the epicenters shows that the Pacific-North America plate boundary in the GoC is not simple, this plate boundary consists of a highly segmented fault system, particularly in the northern GoC. The distribution of the epicenters indicates the direction of the section shown in Figure 3.

Figure 1. Distribution of seismicity in the GoC for the period 1901 to 2018 from the unified catalog RESNOM-ISC-SSN. The size of the circles representing the epicenters are scaled according with their magnitude. The black line along the GoC indicates the direction of the section shown in Figure 3.

Figure 2. Cumulative number of events (triangles) and non-cumulative frequency (circles) versus magnitude for the period 1901 - 2018. A minimum magnitude of completeness Mc=3.6 and a b value of 0.83 of the Gutenberg-Richter law was estimated.

Figure 3. Distribution of focal depths for the period 2010 – 2018 along the axis of the gulf (NW-SE direction). The origin of the horizontal axis of the vertical section is (31.79N,114.75W).

Figure 4. Distribution of seismicity for the period 2011 to 2018.

References


