

Investigation of the April 2013 destructive earthquake in Makran subduction zone, southeast Iran

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The Makran subduction zone has been formed by the northward movement of Oman oceanic lithosphere and it is under thrusting of Iran and Afghanistan microplate at a very shallow angle. A major earthquake of magnitude 7.7 occurred in a sparsely populated area in southeast Iran near the border with Pakistan on April 16th, 2013 at 10:44 UTC (15:14 local time). This earthquake occurred in a sparsely populated area at a depth of about 90 km. At least 40 people were killed in Iran and 38 more in Pakistani neighbouring villages. There were reports of tremors felt in Qatar, Bahrain, Kuwait, Abu Dhabi, in the Gulf, in Afghanistan, in Pakistan and India. In Delhi, more than 1,500 km from the epicenter, office workers evacuated buildings as fittings shook and windows rattled. Tremors lasted for around 30 seconds. This earthquake is the largest instrumentally recorded earthquake in Iran but due to deep focal depth, the human loss was remarkably low. We used the broadband waveform data recorded by national seismic network and determined the moment tensor and the source parameters by inversion method. The waveform modelling, in this study, indicates almost pure normal faulting smoothed and simple source time function. This result is in agreement with the geology and faulting in this area and low rate of human casualties.