FINITE FAULT SIMULATION OF STRONG GROUND MOTION FOR THE 2013, SARAVAN EARTHQUKAE

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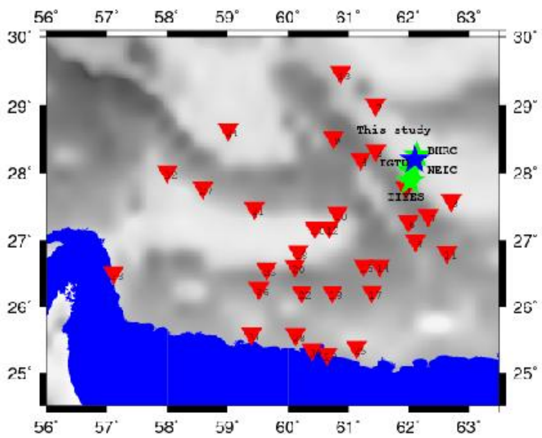
At 10:44 UTC (15:14 local time), April 16, 2013, an Mw 7.7 earthquake struck the Saravan region in South eastern Iran. The earthquake had reportedly 41 victims and more than 180 injured people. One of the victims was for the Iran region and the 40 remained were reported from Pakistan (most of the victims were for the Pakistan, although the epicenter was located in Iran). Reports on focal mechanisms (i.e. by USGS) show mostly normal having a little strike-slip component. This event can be associated with subduction of oceanic lithosphere beneath the Makran coast. The epicenter of Saravan earthquake of 16 April 2013 of Mw 7.7 is illustrated in Figure1. According to BHRC (Iranian Building and Housing Research Center) report, this event was recorded by 33 sets of digital accelerograph in Iran Strong Ground Motion Network. After correcting the acceleograms, the maximum value of PGA (186 cm/s^2) is shown up in Sabzegaz station on the T component.



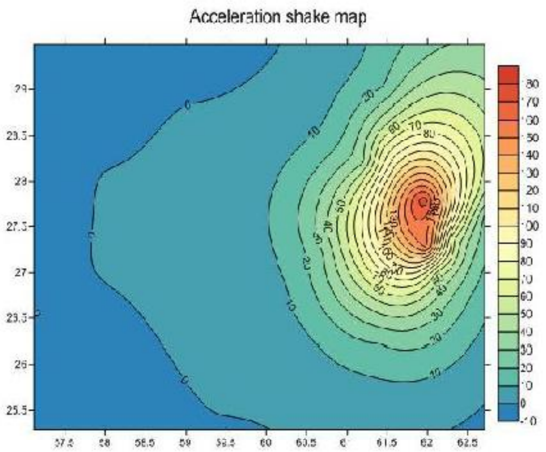


Figure 1. The epicenter report and the locations of 33 stations of BHRC (Left).
Acceleration shake-map (Right)

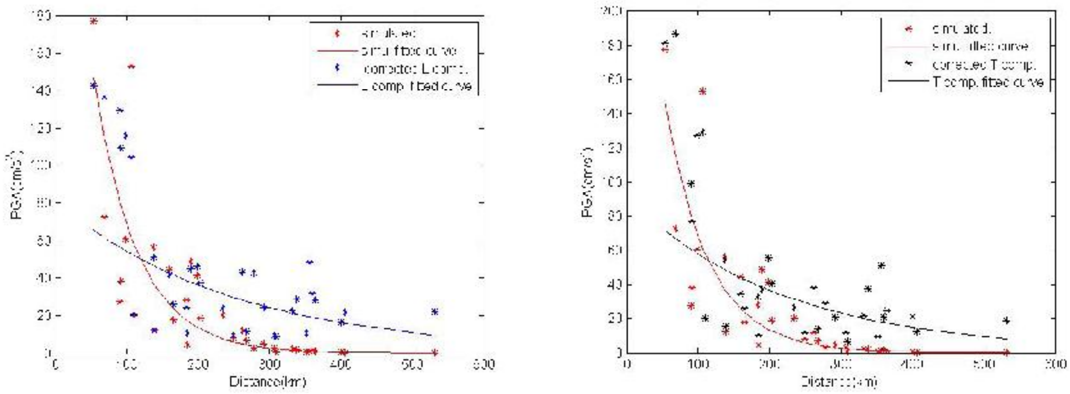


Figure 2. Comparison between corrected and simulated PGA for 2 components in 33 stations

Simulation procedures provide a means of including specific information about the earthquake source, the wave propagation path between the source and the site and local site response in an estimation of ground motion. In this study, stochastic simulation is used to model Saravan earthquake and to characterize source parameters and rupture propagation. Accelerogram data of 33 stations related to Building and Housing Research Center is used. The comparison of PGA (peak ground acceleration) between corrected and simulated acceleograms for horizontal components are shown in Figure 2. Simulation is among considering a half-space model and a single event. In this simulation, the fault is divided into N subfaults and each subfault is considered as a small point source, so the ground motion in each subfault is summed with a delay time. The method is based on a dynamic corner frequency. The corner frequency is a function of time and the rupture history controls the frequency content of simulated time series of each subfault. The spectrum of each subfault is calculated by source point modeling. The results show that the epicenter is located in 28.2 North latitudes and 62.1 East longitudes. Considering 15 subfaults along length and 5 along the width, the hypocenter is allocated in the (15, 4) element which causes the depth to be 48 kilometers. The length and width of the fault are estimated 127 and 28 respectively (Wells and Coppersmith, 1994). The magnitude is considered 7.7 and the stress drop is estimated about 70 bars. Rupture propagation shows the directivity from northwest to southeast and the strike and dip of the fault are calculated 200 and 35 degrees respectively which exactly suites the propagation. The widespread of accelerations on the shake-map shows the exact orientation of the fault, (Figure 1).

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