SHAKEMAPS OF SARPOL–E ZAHAB EARTHQUAKE

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In this study, seismological aspects of the 2017 Sarpol-e Zahab earthquake have been investigated. The Sarpol-e Zahab earthquake, of magnitude 7.3 (Mw), occurred in southwestern Iran on November 12, 2017. Here, we investigated the properties of the strong ground motions of the earthquake using the records provided by Iranian Strong Motion Network (ISMN). At Sarpol-e Zahab (SPZ) station, about 30 km south of the epicenter, the recorded peak ground acceleration (PGA) and peak ground velocity (PGV) in both horizontal and vertical components were remarkably large, and visual inspection of the velocity time history reveals a pulse-like shape. Based on the recorded strong motion data and observed information such as the macroseismic intensity, ShakeMaps of this earthquake have been generated, which clearly shows the most affected areas that needed the immediate assistance and aid after the earthquake. These maps are fundamental in earthquake rapid response procedures and the after earthquake crisis management.

According to the strong motion records at ISMN stations and the macroseismic intensity, ShakeMaps of the Sarpol-e Zahab earthquake have been generated and are shown in Figure 1-a. The data used to produce the ShakeMap are collected by 113 strong-motion records around the epicenter and are improved with macroseismic intensity data of 45 places based on the observed effects of ground shaking on people and buildings. The area of variant intensities is divided using the collection of each contour. The annotation number of contour levels corresponds to a modified Mercalli scale.

For easy evaluation of the uncertainty of a ShakeMap, a color-coding map was introduced by Wald et al. (1999, 2008) and Worden et al. (2010). The average value and the corresponding letter grade on the scale on the right side is displayed on the bottom left of the uncertainty map (Figure 1-b). Besides, the area of intensity of VI or higher, over which the average uncertainty is computed, is shown with a bold black line. The derived ShakeMaps indicate that the instrumental intensity is in strict conformity with macrosesismic intensity.

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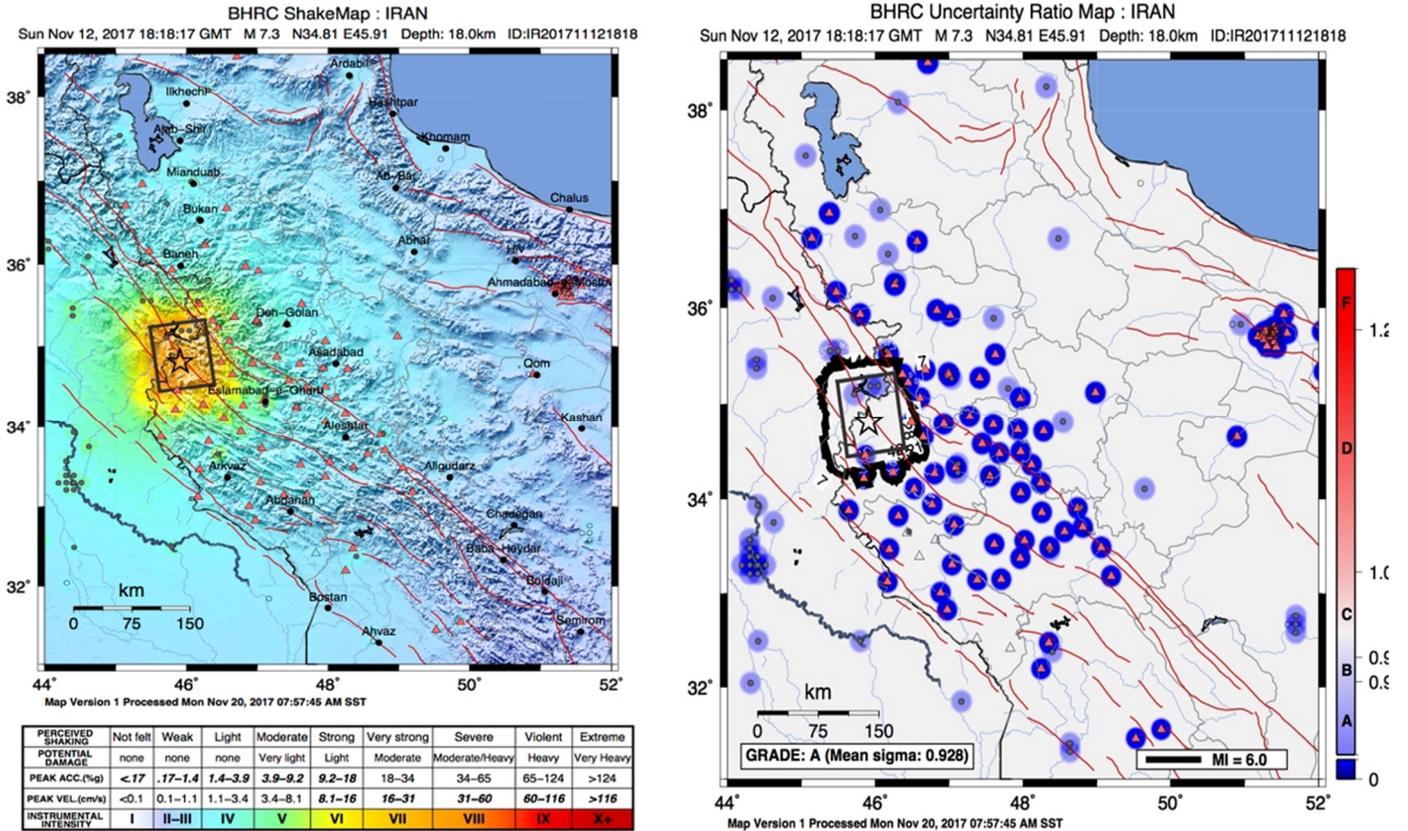
(a)

(b)

Figure 1. ShakeMap of Sarpol-e Zahab earthquake (a) and the uncertainty of a ShakeMap (b).