

APPLICATION OF 2D SEISMIC DATA AND SEISMIC ATTRIBUTES FOR IDENTIFICATION OF HIDDEN/BLIND FAULTS IN NATANZ AREA

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The study area is located between 51 to 53 degrees east and 33 to 35 degrees north at the central – eastern Iran. From seismotectonic point of view, the central Iran plateau has scattered and discontinuous seismicity. The main propose of this study is identification of blind/hidden faults in Natanz plain using seismic reflection data. Due to lack of earthquake monitoring stations within the study area, association of the faults and the occurred seismic events is rather difficult (despite the seismicity of the area). This also could be related to the fact that the faults do not show any surface rupture; therefore the surface mapping has been able to identify the faults.

In this study, first the interpretation of seismic sections using SMT software has been conducted. As there is no well information available, so the age determination of the horizons was not possible at this stage. However, using seismic characteristic and continuity of the horizons the fault detection and correlation within the study area has been conducted. Based on this study, three major horizons have been picked and fault interpretation has been conducted based on this procedure.

Seismic attributes have also been used in interpretation of seismic sections to help the minor fault identification, but due to poor quality of the seismic data no applicable result has been achieved. At the second step the 1:100000 Geological maps of Kashan, Natanz, KuhLatif and 1:250000 Geological map of Aran have been studied for possible correlation between the new identified faults and already mapped faults.

Considering that the area covered by alluvial sediments, the existing geological maps does not indicate any fault in the study area. At the final step, the existing seismic event catalogue of International Seismological Centre (ISC), United States Geological Survey (USGS) and Iranian National Broadband Seismic Network have been studied. Because most of the earthquake events in the area have small magnitude and their focal mechanism has not been determined, therefore, comparing the detected faults and earthquakes events could not be used to associate the seismic events and the determined faults.

Most of faults identified during this study using seismic reflection data have reverse character with dip toward the South West (F1, F2, F3 and F6 in Figure 1). Some of the faults are concurrent with main fault of the zone (Kashan fault) and have normal mechanism with a dip to the north-east (F4, F5).

It is important to mention that the seismic reflection provides the most accurate information in construction of the seismotectonic map within the study area. It is also concluded that detected faults in region that are introduced in this paper for the first time, are very important to future seismicity of the region.

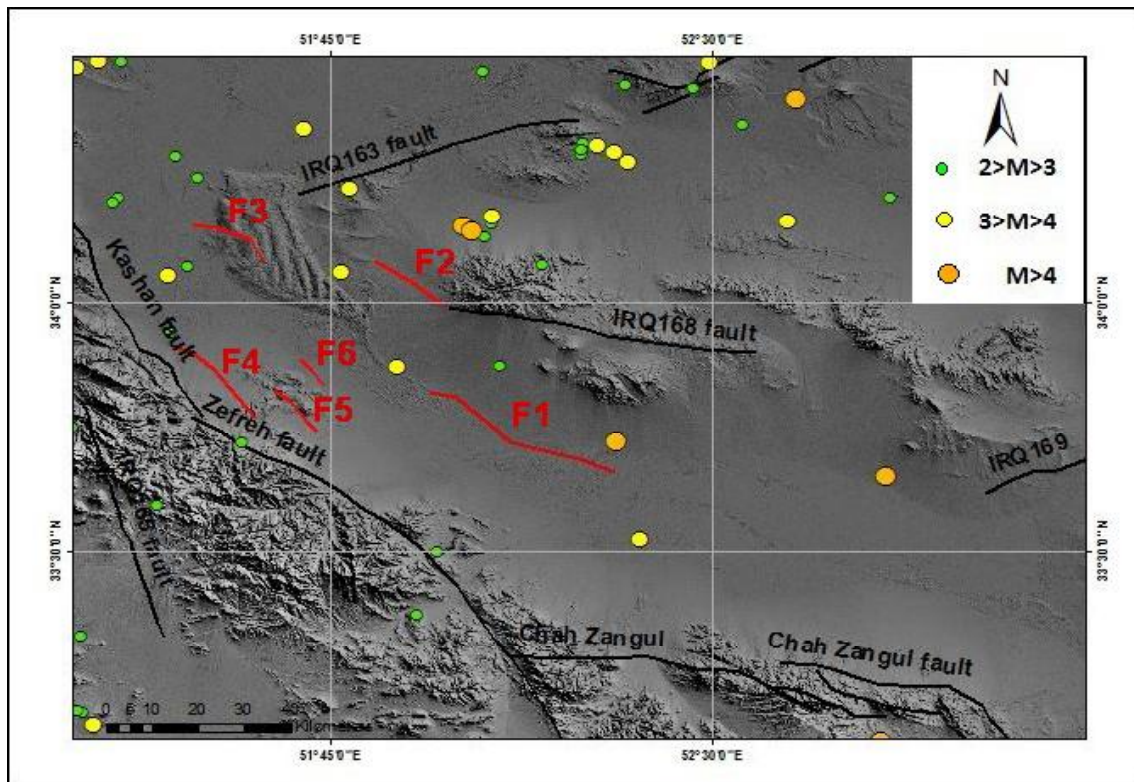


Figure 1. Map location of earthquakes recorded by the seismic stations in the study area (between the years 1900- 2014). Most earthquakes in the region with a magnitude of less than 4 (yellow and green circles) and a few magnitudes above 4 also shows (orange circle). The red lines are faults identified in the region by reflection seismic data. Kashan, Zefreh and Chahzangul is main fault zone, which is marked in the figure with black lines

