

Seismic Observation Network and Seismicity of Iran

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(2015 Global Observation Course)

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1. Local Seismic Networks of the Iranian Seismological Center (IRSC)

The Institute of Geophysics, affiliated with the University of Tehran, established the first seismic station in Tehran in 1958 to record and locate earthquakes. In the 1960s, the number of seismic stations increased to five (5) analogue stations installed in the cities of Tehran, Tabriz, Mashhad, Shiraz and Kermanshah. The stations in Tabriz, Mashhad and Shiraz were a subset of the World-Wide Standardized Seismographic Network (WWSSN). The Iranian Long Period Array (ILPA) consisted of seven (7) stations was installed in the south-west of Tehran in 1975. In the early 1981s, some additional analogue stations were installed at Brojen, Minoodasht, Mahabad, Ghamsar-e-Kashan and Ghaleh-Ghazi by Institute of Geophysics. Until 1995, the above-mentioned analogue stations were responsible for recording and reporting earthquake events throughout the nation. Digital seismological equipment was supplied and installed in Tehran and Tabriz local seismic networks in 1995, and gradually the local networks of Semnan, Quchan, Yazd, Sari, Esfahan, Shiraz, Mashhad, Kermanshah, Birjand and Khoram-abad in turn were installed and equipped with digital instruments. The new local seismic networks of Minab, Kerman, Shahr-e-Kord and Hamedan were installed in 2010. Seismic stations are equipped with three (3) component short-period, medium-band or broad-band seismometers. Today, the Iranian seismological network comprises 115 digital seismic stations in 21 local seismic networks, 4 digital seismic stations and 1 borehole stations which cover most earthquake-prone regions (Figure 1 and 2).

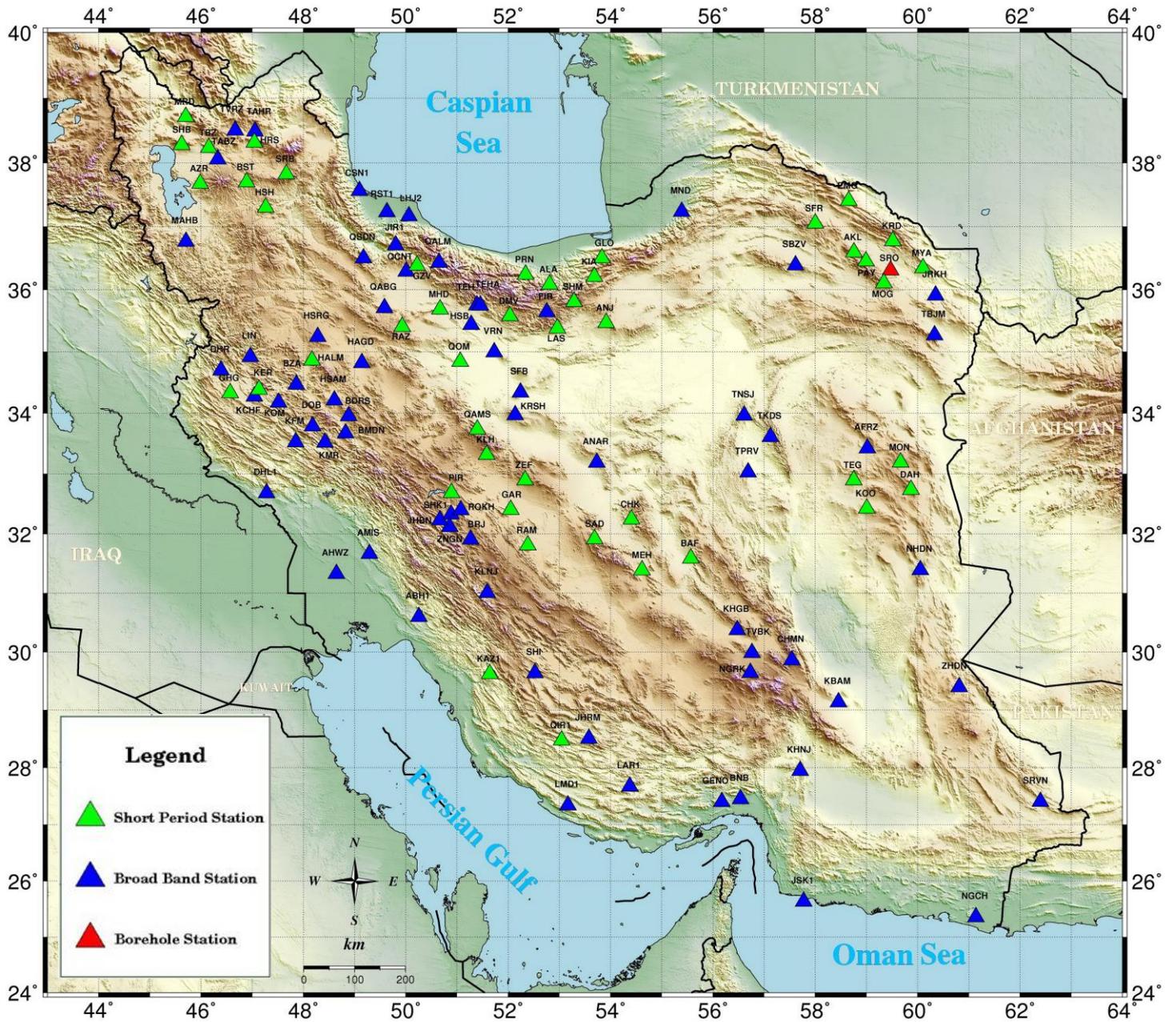


Figure 2. Seismic stations of the Iranian Seismological Center (IRSC). Green triangles depict short period stations; blue triangles depict broad-band stations; the red triangle is borehole station. (Source: IRSC)

2. Equipment used for the Observation

Local seismic networks are developing and expanding according to our short-term, medium-term, and long-term plans. Recorded data in all stations in the country are transmitted to the center of each local seismic network, which relays the data to the Iranian seismological center (IRSC) continuously via VPN or Satellite communications (Figure 5). IRSC's short period seismic stations are equipped with SS1 seismometers; the medium-bands are equipped with Trillium-40s seismometers; and broad-bands are equipped with CMG3ESP-120s, CMG3T-360s and Trillium-240s seismometers as below.



Figure 3. Some types of modern seismometers and digitizers of IRSC.



Figure 4. New dome of IRSC's station that is designed to reduce environmental noise and temperature effect.

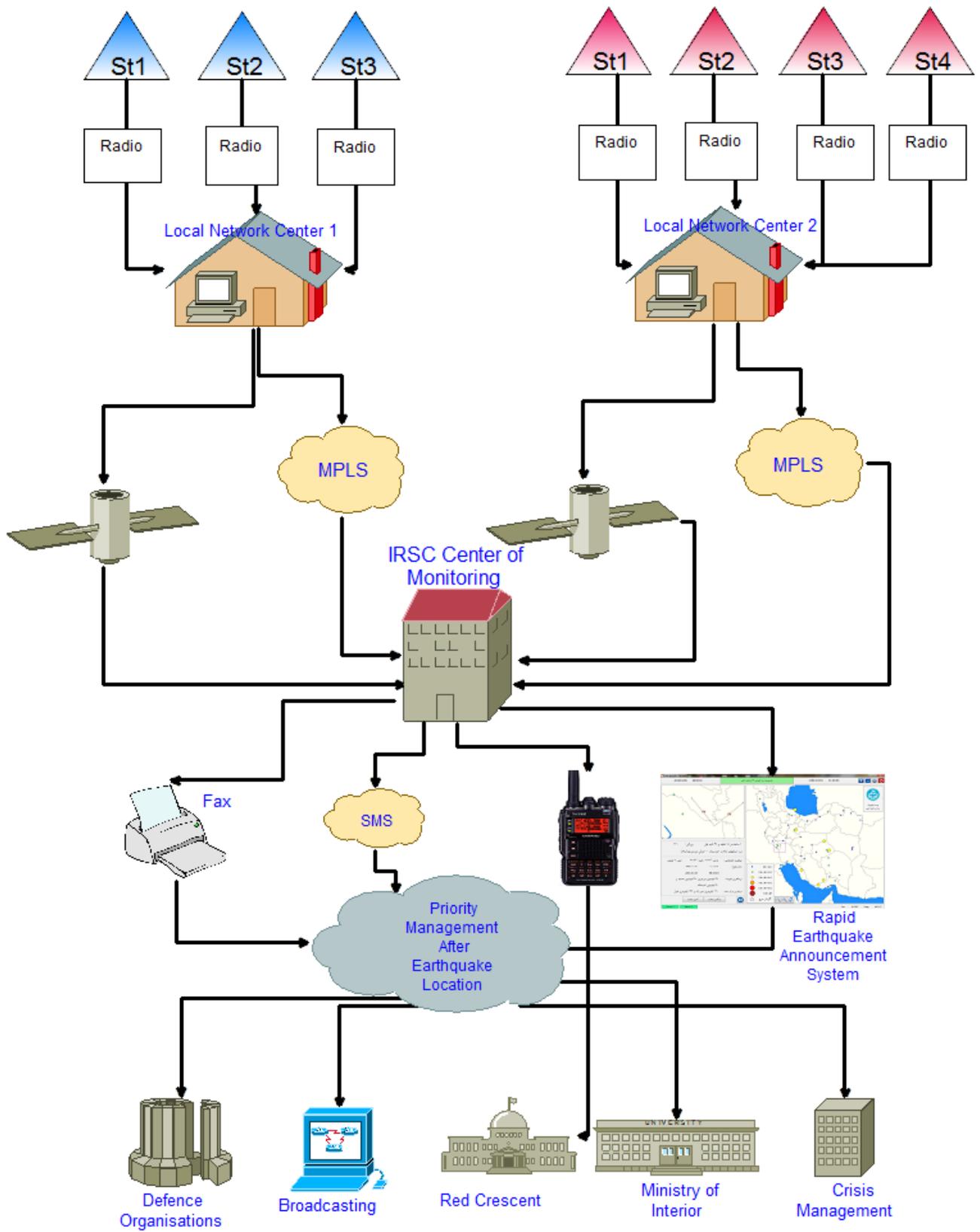


Figure 5. Schematic figure from communication of IRSC. (Source: IRSC)



Figure 6. Center of monitoring of IRSC.



Figure 7. Building of IRSC.

3. Seismicity of Iran

The Iranian Plateau is a unique place with a well-documented historical earthquake record of at least 2,000 years. The earthquakes have resulted from the continental collision between Arabia and Eurasia. Analysis of the historical seismicity and the post-1900 instrumental seismic data shows that seismicity is concentrated along major mountain belts (Figure 8).

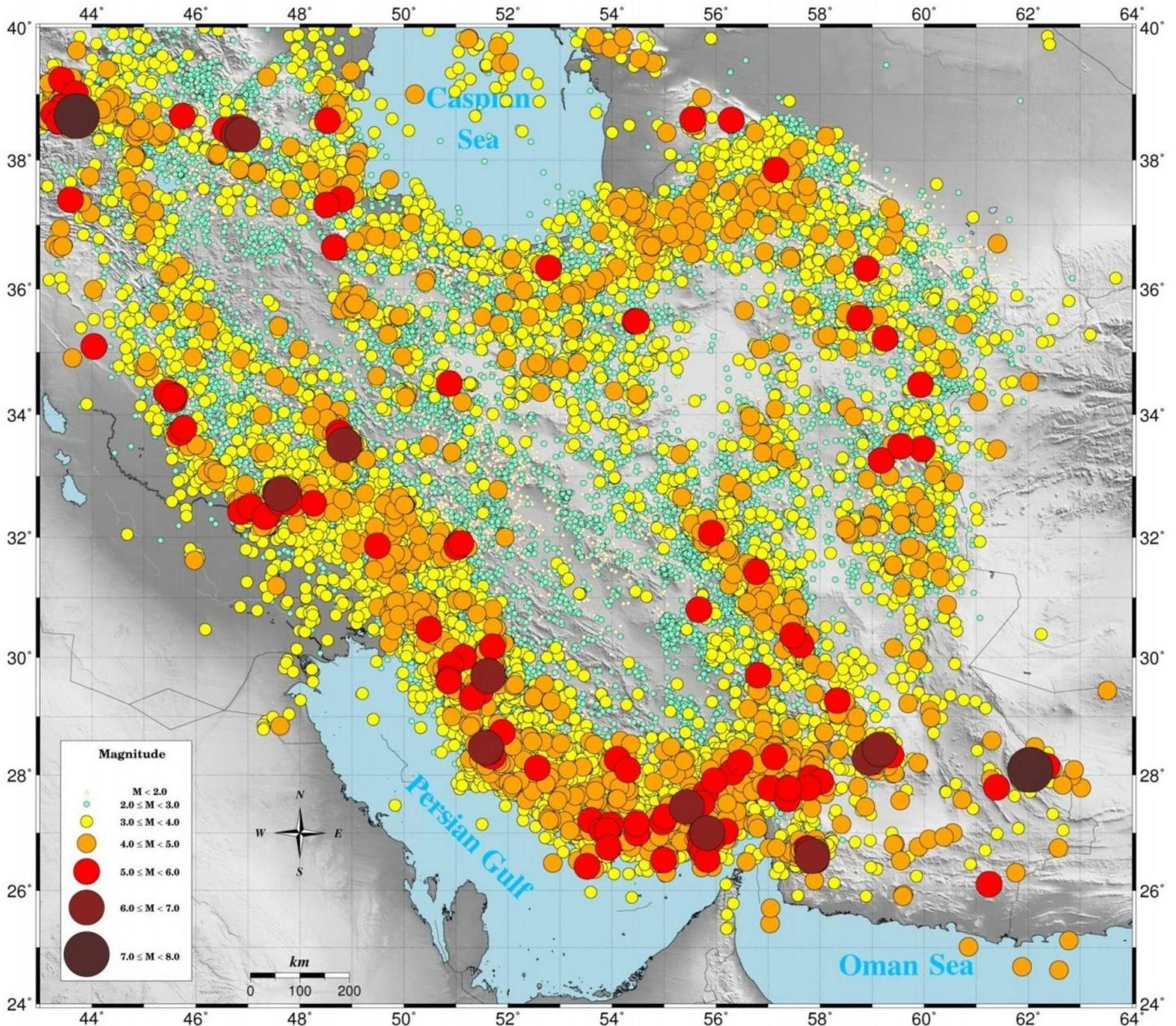


Figure 8. Seismicity map of Iran from 2006-2015.

(Source: IRSC)