



Kuwait National Seismic Network: Performance and Future Expansion

Reda Abdel-Fattah (1), Abdullah Al-Enezi (1), Farah Al-Jerri (1), Sheikh Abdul Majeed Ahmad (2), and Leonid Zimakov (3)

(1) Kuwait Institute for Scientific Research, P. O. Box 24885 Safat, 13109, Kuwait. rmohamad@kisr.edu.kw / PH: +(965)-2498-9201, (2) Environment World Company, Kuwait. P. O. Box 54275, Jleeb Al-Shuyoukh, 85863, Kuwait. ahmad@envw.com / PH: +(965)-2433-9080, (3) Refraction Technology, Inc. 1600 10th Street, Suite A, Plano, TX 75074. L.Zimakov@reftek.com / FAX: +(972)-578-0045

The Kuwait National Seismic Network (KNSN) was installed and commissioned in 1996, and started functioning in March 1997. The KNSN is operated by the Kuwait Institute for Scientific Research (KISR). The main task of the KNSN is to monitor the seismic activities in the State of Kuwait, record local and regional earthquake events inside Kuwait, and in the surrounding areas, characterize seismicity status in the State of Kuwait to develop local seismic hazard maps and exchange seismic data with international seismological networks. The KNSN comprises of 8 field stations originally equipped with the REF TEK data logger, model 72A series, SS1 short period seismometer (one station has a STS-2 broadband seismometer), UHF radio for real-time data transmission and REF TEK acquisition hardware at the central processing station. Each field station has a 2m (diameter) x 3m (depth) seismic vault and antenna mast with radio equipment. Most of the seismic vaults are installed in the thick layer of soft sand. On a trial basis, during 2010, the data acquisition system (DAS) was upgraded in a few stations with REF TEK broadband Recorders, model 130-01. One broadband station is now equipped with a 151-120 Observer broadband seismometer. The real-time data transmission is now accomplished using high speed 3G mobile router. The detected events are mainly processed by operators using SEISAN. Real-time data processing is currently performed by Antelope, while SeisComP3 is running in test regime.

Since 1997, the KNSN network recorded more than 1000 local earthquakes within Kuwait. One of the most important earthquakes that occurred in Kuwait and recorded by the KNSN was in the Minagish area close to the Saudi Arabian and Kuwaiti border on 30 December 1997. The KNSN has localized the seismic activity associated with the two major oil field regions in Kuwait. However, the relatively large distances between stations and site effect associated with signal attenuation make it difficult to detect events with a magnitude less than 1.5. KISR is planning to expand the KNSN network with two more field stations and establish 2-3 clusters in oil fields in order to lower the magnitude threshold detection and improve locations of small events.

The site selection and cluster instrumentations are presented and discussed.