

Seismic Characteristics of RAYN / GSN station, Saudi Arabia

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Abstract

The IRIS/IDA station RAYN at Ar Rayn town, Saudi Arabia is one of the newest stations in the IRIS Global Seismic Network (GSN). Ambient seismic ground noise levels and minimum detectable magnitudes were estimated at RAYN station. Noise conditions showed that RAYN station was quiet well with noise levels near the USGS Low Noise Model for frequencies higher than 0.1 Hz. At lower frequencies, the horizontal components showed increased noise levels, possibly due to instrumental characteristics. High frequency (1 Hz) noise varied as much as 10 dB between day and night. Seasonal noise levels also varied, with April to June being the quietest and with October to December being the noisiest months. Slight changes in peak microseism frequency also occurred seasonally.

Generally, noise levels were quietest at night and noisiest during morning and early afternoon, as expected for cultural noise. The most significant variations occurred at frequencies above 1 Hz. Minimum detectable magnitudes are estimated for RAYN station using the observed noise levels over 1 Hz. The m_b detection threshold for the distance range of 5 -10 degrees is about $m_b = 2.7-3.0$ assuming the signal-to-noise ratio of 3 dB or better. The magnitude estimates increase with increasing frequency.