

A Seismic Noise Survey of Western Kazakhstan

Kazakhstan is strongly committed to and ideally suited geographically for monitoring of nuclear explosions. Kazakhstan contributes key seismic stations and arrays to global and other cooperative efforts, though most monitoring activities are concentrated at sites in Central and Eastern Kazakhstan. Western Kazakhstan contains very few seismic stations and had not been adequately surveyed to identify quiet locations that could improve global monitoring capability. We deployed a temporary network of ten Guralp CMG-3T broadband seismometers in the Mangystau Region of western Kazakhstan, between the Caspian and Aral Seas, in August and September 2016, to identify noise characteristics and quiet sites suitable for monitoring. We found that at frequencies above 1 Hz, noise levels at some stations approach the New Low Noise Model and detection thresholds are similar to permanent borehole stations elsewhere in Kazakhstan. At frequencies below 1 Hz, noise levels are elevated due to microseism generated by the Caspian Sea. The quietest sites were those furthest from the Caspian Sea. On 9 September, 2017, four stations were operating and recorded the DPRK-declared nuclear test with good signal to noise ratios. Overall, stations were quieter and locations better than anticipated and we feel that efforts to install permanent stations are warranted.

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