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Monitoring Using Arrays in the Middle East

As part of capacity building and joint research under the U.S. Department of Energy's Seismic Cooperation Program (SCP), Lawrence Livermore National Laboratory (LLNL) collaboratively installed 9-element seismic arrays QWAR (Saudi Arabia, 2012) and HOQAR (Oman, 2015). All elements are equipped with 3-component short-period sensors. HOQAR array data is received in real-time at the Earthquake Monitoring Center (EMC) of Sultan Qaboos University (SQU) using Antelope software. The aperture of both arrays is approximately 3.5 kilometers, and minimum element spacing is about 500 meters. We test the array capabilities with a time-domain beampacking scheme which searches for the optimal slowness vector of a signal by measuring the power of beams formed over a grid of slowness points. The slowness vector provides information on both the apparent velocity and direction of the signal. We extend this analysis to examine the coherent noise recorded over time at the array. Coherent noise is generated globally at a range of frequencies and is useful due to its ability to impact an array's detection performance, and its ability to be used in a variety of seismic imaging studies. We also test waveform correlation detection performance using both arrays and Global Seismic Network data in the Middle East.

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