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Seismic Aftershock Monitoring Network Optimization Based on Detection Threshold Estimation from Background Noise Measurements

The Seismic Aftershock Monitoring System (SAMS) is an important method during the initial period of an On-site Inspection (OSI) to identify the possible source area of an underground nuclear explosion (UNE). A network of tripartite mini-arrays and single three-component seismic stations will be deployed during an OSI to detect and localize aftershocks in the vicinity of a possible explosion. The threshold of a seismic network depends on many aspects such as configuration, data quality and site conditions of each individual station. During an OSI a tradeoff between fast station deployment and precise site analysis has to be made. A first rough site characterization is possible with information about geology, local facilities and infrastructure e.g. roads. An individual characterization needs additional information to be acquired by field measurements. A method with a visualization tool will be presented which can be integrated into the SAMS and allows an inspector to estimate the detection threshold of the inspection area and to adapt the network configuration to the needs by densifying the network or relocating stations. A threshold reduction at locations of interest can be implemented and information about station data quality assists an inspector to focus the work on sites with optimum conditions.

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