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Super-Sonograms and graphical seismic source locations: Facing the challenge of real-time data processing in an OSI SAMS installation

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The installation and operation of an OSI seismic aftershock monitoring system (SAMS) is bound by strict time constraints: 30+ small arrays must be set up within days, and data screening must cope with the daily seismogram input. This is a significant challenge since any potential, single ML –2.0 aftershock from a potential nuclear test must be detected and discriminated against a variety of higher-amplitude noise bursts. No automated approach can handle this task to date; thus some 200 traces of 24/7 data must be screened manually with a time resolution sufficient to recover signals of just a few sec duration, and with tiny amplitudes just above the threshold of ambient noise. Previous tests confirmed that this task can not be performed by time-domain signal screening via established seismological processing software, e.g. PITSA, SEISAN, or GEOTOOLS. Instead, we introduced 'SonoView', a seismic diagnosis tool based on a compilation of array traces into super-sonograms. Several hours of cumulative array data can be displayed at once on a single computer screen – without sacrifying the necessary detectability of few-sec signals. Then 'TraceView' will guide the analyst to select the relevant traces with best SNR, and 'HypoLine' offers some interactive, graphical location tools for fast epicenter estimates and source signature identifications. A previous release of this software suite was successfully applied at IFE08 in Kasakhstan, and supported the seismic sub-team of OSI in its timely report compilation.