



The OSI SWE07 experiment of CTBTO: Processing microearthquakes ML -1.0 in an industrial environment

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To prepare for the comprehensive OSI test IFE08 of CTBTO in Kazakhstan, a preliminary test was done in August 2007 in Malmberget, Lapland. The task was detection, location, and identification of underground fracture processes caused by collapses from iron ore mining where all processing should be based on registrations of a temporary, surface-based network of seismic stations. Each of these stations comprised a seismic small array of one center 3-c geophone and three, satellite 1-c instruments at 100 m distance; in total, eleven small arrays were installed. This layout and the utilized processing software, HypoLine, resembles the concept of Nanoseismic Monitoring (Joswig, 2005) which proved superiority to standard seismic networks in former OSI tests (Labak et al., 2005). The OSI measurements were referenced to the permanent, LKAB-owned network of subsurface and borehole stations for rock burst monitoring, with sensitivity of ML -1.0 . This network detected an average of twenty events per day for our one-week test measurements. Surface-based event detection is extremely complicated by the unfavorable noise conditions of a heavy-industry environment exhibiting frequent, high-amplitude noise bursts from traffic, railway loading, and subsurface ore crushers.

Our presentation demonstrates first results of data processing, gives representative examples for noise sources and event sequences, and estimates the achieved level of sensitivity by small array seismic monitoring.