



Monitoring of seismic aftershocks with the CTBTO On-Site Inspection Seismic Aftershock Monitoring System during a Field Exercise in Finland

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One of the objectives of the Field Exercise 2009 in Finland was to test the recently updated software for the Seismic Aftershock Monitoring System (SAMS). A tunnel structure being build-up by a series of explosions in depths ranging 300-400 m during the period of the exercise served as simulated inspection target; matching the conditions of one possible scenario during a real CTBT On-Site Inspection. The goal of the SAMS Team was to identify, localize and characterize possible aftershocks with the magnitude down to -2.

A total of 8 seismic mini-arrays were used for monitoring the simulated inspected area. Each mini-array consisted of a short period central 3-component seismometer and 3 vertical component seismometers at the distance about 100 m from the central element (triangle shape). While 5 mini-arrays were installed within a distance of up to 1 km from the epicenter, the 3 remaining mini-arrays were installed up to 5 km away from the epicenter; therefore, a combination of focused deployment and systematic approach as defined by the OSI test manual was tested.

The SAMS data center comprised 2 IBM Blade centers and 6 workstations. The scenario provided a good opportunity to perform extensive testing of the new low magnitude event detection and location engines of the SAMS software. During the five days (6-10 Aug 2009) of the exercise 12 aftershocks resulting from two main explosions were recorded and analyzed. Results of the analysis of the two main explosions were compared with the analysis provided by the independent local seismic network localized in the same area owned by the tunnel operator. Results of the detection and analysis are presented and discussed. The SAMS has proven to be successful for undertaking the mission.