Seismic aftershock monitoring for on-site inspection purposes. Experience from Integrated Field Exercise 2008.

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One of the sub-goals of the Integrated Field Experiment in 2008 (IFE08) in Kazakhstan was testing the prototype elements of the Seismic aftershock monitoring system (SAMS) for on-site inspection purposes. The task of the SAMS is to collect the facts, which should help to clarify nature of the triggering event. Therefore the SAMS has to be capable to detect and identify events as small as magnitude -2 in the inspection area size up to 1000 km2.

Equipment for 30 mini-arrays and 10 3-component stations represented the field equipment of the SAMS. Each mini-array consisted of a central 3-component seismometer and 3 vertical seismometers at the distance about 100 m from the central seismometer. The mini-arrays covered approximately 80% of surrogate inspection area (IA) on the territory of former Semipalatinsk test site. Most of the stations were installed during the first four days of field operations by the seismic sub-team, which consisted of 10 seismologists.

SAMS data center comprised 2 IBM Blade centers and 8 working places for data archiving, detection list production and event analysis. A prototype of SAMS software was tested. Average daily amount of collected raw data was 15-30 GB and increased according to the amount of stations entering operation. Routine manual data screening and data analyses were performed by 2-6 subteam members. Automatic screening was used for selected time intervals. Screening was performed using the Sonoview program in frequency domain and using the Geotool and Hypolines programs for screening in time domain. The screening results were merged into the master event list. The master event list served as a basis of detailed analysis of unclear events and events identified to be potentially in the IA. Detailed analysis of events to be potentially in the IA was performed by the Hypoline and Geotool programs. In addition, the Hyposimplex and Hypocenter programs were also used for localization of events. The results of analysis were integrated in the visual form using the Seistrain/geosearch program.

Data were fully screened for the period 5.-13.9.2008. 360 teleseismic, regional and local events were identified. Results of the detection and analysis will be presented and consequences for further SAMS development will be discussed.