Geophysical Research Abstracts
Vol. 18, EGU2016-12350-2, 2016
EGU General Assembly 2016

The Seismic Aftershock Monitoring System (SAMS) for OSI – Experiences from IFE14

Nicolai Gestermann (1), Benjamin Sick (2), Martin Häge (3), Thomas Blake (4), Peter Labak (5), and Manfred Joswig (2)

(1) Federal Institute for Geosciences and Natural Resources, Germany (nicolai.gestermann@bgr.de), (2) Institute for Geophysics, University of Stuttgart, Germany, (3) Schlumberger, Calgary, Canada, (4) Dublin Institute for Advanced Studies, Geophysics Section, Dublin, Ireland, (5) Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Vienna, Austria

An on-site inspection (OSI) is the third of four elements of the verification regime of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The sole purpose of an OSI is to confirm whether a nuclear weapon test explosion or any other nuclear explosion has been carried out in violation of the treaty and to gather any facts which might assist in identifying any possible violator. It thus constitutes the final verification measure under the CTBT if all other available measures are not able to confirm the nature of a suspicious event.
The Provisional Technical Secretariat (PTS) carried out the Integrated Field Exercise 2014 (IFE14) in the Dead Sea Area of Jordan from 3 November to 9. December 2014. It was a fictitious OSI whose aim was to test the inspection capabilities in an integrated manner. The technologies allowed during an OSI are listed in the Treaty. The aim of the Seismic Aftershock Monitoring System (SAMS) is to detect and localize aftershocks of low magnitudes of the triggering event or collapses of underground cavities. The locations of these events are expected in the vicinity of a possible previous explosion and help to narrow down the search area within an inspection area (IA) of an OSI.
The success of SAMS depends on the main elements, hardware, software, deployment strategy, the search logic and not least the effective use of personnel. All elements of SAMS were tested and improved during the Built-Up Exercises (BUE) which took place in Austria and Hungary. IFE14 provided more realistic climatic and hazardous terrain conditions with limited resources. Significant variations in topography of the IA of IFE14 in the mountainous Dead Sea Area of Jordan led to considerable challenges which were not expected from experiences encountered during BUE.
The SAMS uses mini arrays with an aperture of about 100 meters and with a total of 4 elements. The station network deployed during IFE14 and results of the data analysis will be presented. Possible aftershocks of the triggering event are expected in a very low magnitude range. Therefore the detection threshold of the network is one of the key parameters of SAMS and crucial for the success of the monitoring. One of the objectives was to record magnitude values down to -2.0 ML. The threshold values have been compared with historical seismicity in the region and those monitored during IFE14. Results of the threshold detection estimation and experiences of the exercise will be presented.