Geophysical Research Abstracts
Vol. 15, EGU2013-10656, 2013
EGU General Assembly 2013

IDC Infrasound Pipeline initiative for technology development

Pierrick Mialle, Paulina Bittner, David Brown, and Jeffrey Given
CTBTO, IDC, Austria (pierrick.mialle@ctbto.org)

The first atmospheric event built only from infrasound arrivals was reported in the Reviewed Event Bulletin (REB) of the International Data Centre (IDC) of the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) in 2003. In the last decade, 45 infrasound stations from the International Monitoring System (IMS) have been installed and are transmitting data to the IDC. The growing amount of infrasound data and detections produced by the automatic system challenged the station and network processing at the IDC, which require the Organization to continually improve the infrasound data processing.
For 3 years, the IDC resumed automatic processing of infrasound data reviewed by interactive analysis; the detected and located events are being systematically included in the Late Event Bulletin (LEB) and REB. Approximately 16% of SEL3 (Selected Event List 3, produced 6 hours after real-time) events with an infrasound component make it to the IDC bulletins. 41% of SEL3 events rejected after review are built including only 2 associated infrasound phases (with the potential addition of seismic and hydroacoustic detections). Therefore, the process whereby infrasound and seismic detections are associated into an event needed to be investigated further.
The IDC works on enhancing the automatic system for the identification of valid signals and the optimization of the network detection threshold. Thus the IDC investigates ways to refine the signal characterization methodology and the association criteria. The objective of this study is to reduce the number of associated infrasound arrivals that are rejected from the SEL3 pipeline when generating the LEB and REB bulletins. The study is twofold, the first part consist of improving the detection accuracy at the station processing stage in the IDC development area by enhancing the infrasound signal detector DFX-PMCC (Detection and Feature eXtraction – Progressive Multi-Channel Correlation) used at the IDC.
The second part is performed in the virtual Data Exploitation Center (vDEC) from the CTBTO in order to separate the automatic network processing into two streams: seismic and hydroacoustic (SH) pipeline on one side, and infrasound (I) pipeline on the other side. The IDC executes its association algorithm called Global Association (GA) on infrasound data for selective periods of times, which follow the introduction of infrasound in the IDC automatic system. Infrasound rules in GA are tuned to pursue a lower ratio of false alarms and the IRED (IDC Infrasound Reference Event Database) is used for testing and validation of potential modification in the infrasound processing software and algorithms.
Once modifications are validated in the Infrasound Only Pipeline, the updated algorithms will be implemented in the development area of the IDC for further assessment of their performances in fusion with other waveform technologies.