



One Year of Infrasound Event Analysis into the IDC Operations

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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, 42 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 required the Organization to redesign the way infrasound data are processed.

Each infrasound array is processed separately for signal detection using a progressive multi-channel correlation method (DFX-PMCC). For each detection, signal features – onset time, amplitude, frequency, duration, azimuth, phase velocity, F-statistics – are measured and used to identify a detection as infrasonic, seismic, or noise (including clutter). Infrasonic signals along with seismic and hydroacoustic signals are subsequently associated with Global Association software (GA) between stations to locate events. During detection and association phases, criteria are applied to eliminate clutter, identify signals of interest, and keep the number of automatic events containing infrasound detections to a manageable level for analyst review.

The IDC has developed analysis and visualization tools specifically for infrasound review (e.g. Geotool-PMCC). The IDC has continued to build the Infrasound Reference Event Database (IRED) from observations on the IMS network. This database assists both the routine IDC infrasound analysis and analyst training as it reflects the global detection capability of the network, illustrates the spatial and temporal variability of the observed phenomena, and demonstrates the various origins of infragenic sources.

Since 2007, the IDC has introduced new analyst procedures to review and add selected infrasound events to the REB. In early 2010, the IDC began routine automatic processing of infrasound data reviewed by interactive analysis; the detected and located events are now systematically included in the REB. This study focuses on the assessment of one year of infrasound event analysis into IDC Operations.

Work is under way on the enhancement of the automatic system for the identification of valid signals and the optimization of the detection threshold of the network.