



Infrasound analysis using Fisher detector and Hough transform

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Automatic detection of infrasound signals from the International Monitoring System (IMS) from the Comprehensive Nuclear-Test-Ban Treaty requires low rates of both false alarms and missed events. The Fisher detector is a statistical method used for detecting such infrasonic events. The detector aims to detect coherent signals after Beamforming is applied on the recordings. A detection is defined to be above a threshold value of Fisher ratio. The Fisher distribution for such a detection is affected by the SNR. While events with high Fisher ratio and SNR can easily be detected automatically, events with lower Fisher ratios and SNRs might be missed.

The Hough transform is a post processing step. It is based on a slope-intercept transform applied to a discretely sampled data, with the goal of finding straight lines (in apparent velocity and back azimuth). Applying it on the results from the Fisher detector is advantageous in case of noisy data, which corresponds to low Fisher ratios and SNRs. Results of the Hough transform on synthetic data with SNR down to 0.7 provided a lower number of missed events.

In this work, we will present the results of an automatic detector, based on both methods. Synthetic data with different lengths and SNRs are evaluated. Furthermore, continuous data from the IMS infrasound station I18DK will be analyzed. We will compare the performances of both methods and investigate their ability in reducing the number of missed events.