A climatology of infrasound detections at Kerguelen Island

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The International Monitoring System (IMS) is in place for the verification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Part of the IMS are 60 infrasound arrays, of which 51 currently provide real-time infrasound recordings from around the world. Those arrays play a central role in the characterization of the global infrasonic wavefield and localization of infrasound sources.

Power Spectral Density (PSD) estimates give insight into the noise levels per station and array. The IMS global low and high noise model curves have been determined in a study by Brown et al. [2014] using a distribution of computed PSDs. All the IMS infrasound arrays, except IS23, have been included in the determination of the atmospheric ambient noise curves. IS23 is located at Kerguelen Island and exist of 15 elements that have been divided into five 100 meter aperture triplets arrays. The array is located at one of the noisiest locations in the world, due to the high wind conditions that exist year-round. The resulting high noise floor appears to hamper infrasound detection at this island array.

In this work, the effects of meteorological, oceanographic, and topographical conditions on the infrasound recordings at IS23 are studied. Five years of infrasound data is analyzed, as recorded by IS23, by using various processing techniques. Contributions within different frequency bands are evaluated. The infrasound detections are explained in terms of the stratospheric winds and ocean wave activity. Understanding and characterization of the low-frequency recordings of IS23 are of importance for successfully including this array for verification of the CTBT.