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Using continuous microbarom recordings for probing peri-Antarctica's atmosphere

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Germany is operating one of the four Antarctic infrasound stations to fulfil the compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). IS27 is a nine element array which is in continuous operation since its deployment in January 2003. Using the PMCC detection algorithm coherent signals are observed in the frequency range from 0.0002 to 4.0 Hz covering a large variety of infrasound sources such as low frequent mountain-associated wave or high frequency ice-quakes. The most prominent signals are related to microbaroms (mb) generated by the strong peri-Antarctic ocean swells. These continuous signals with a dominant period of 5 s show a clear trend in the direction of their detection being well correlated to the prevailing stratospheric winds.
For mb-signals a strong increase in trace velocity along with a decrease in the number of detections were observed during the Austral summer 2006 indicating strong variations in the troposphere and the stratospheric wave duct. However, ECMWF wind speed profiles at the station give no evidence for such an anomaly. Nevertheless, a smaller El-Nino event during Austral winter 2006 together with cooling in the upper stratosphere caused by eruption of the Manam volcano in Indonesia provide a potential explanation for the abnormal ducting conditions. This will be demonstrated with a statistical approach for the dominating ray-parameter launched from the estimated source regions towards IS27 (based on NOAA wave watch III). An increase in gravity wave activity is considered for Austral summer 2006 since a comparison of ECMWF profiles and measured radiosonde data has revealed a cleaning of the numerical profiles with respect to turbulences in the troposphere and lower stratosphere.