Comparison of nonlinear wavelets observed by both infrasound and seismometers in polar regions

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Several characteristic waves detected by seismographs in Antarctic stations have been recognized as originating from the physical interaction between the solid-earth and the atmosphere - ocean - cryosphere system surrounding the Antarctic and may be used as a proxy for characterizing ocean wave climate. An infrasound sensor was installed at Syowa Station, Antarctica, in April 2008 during the IPY2007-2008. Continuous infrasound data for 2008-09 includes background signals - microbaroms- with a broad peak in the wave period between the values of 4 and 10 seconds. Signals with the same period are recorded by the broadband seismograph as microseisms. On the infrasound data, stationary signals are identified with harmonic overtones at a few Hz to lowermost human audible band, which we suggest is due to local effects such as sea-ice cracking and vibration. Microseism measurements are a useful proxy for characterizing ocean wave climate, complementing other oceanographic and geophysical data. In Antarctic stations, continuous monitoring by both broadband seismograph and infrasound contribute to the Federation of Digital Seismographic Networks, the Comprehensive Nuclear-Test-Ban Treaty in the high southern latitudes, and the Pan-Antarctic Observations System under the Scientific Committee on Antarctic Research. In particular, this presentation focuses on the characteristic harmonic tremors observed both by infrasound and seismic sensors at Syowa Station, Antarctica during the period from February to April 2015.

Keywords: infrasound, seismic waves, nonlinear wavelets, harmonic tremor, polar region

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