

## 極域での大気-海洋-雪氷-固体地球システムにおける地震波相互作用

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### **Seismic Wave Interactions between the Atmosphere - Ocean - Cryosphere system and the Geosphere in Polar Regions**

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Several kinds of seismic signals detected by POLENET data were recognized as originated from physical interaction between solid-earth, atmosphere, ocean and cryosphere, involving the environmental changes in global warming. A Chaparral type infrasound sensor was planted in Syowa Station (SYO; 39E, 69S), East Antarctica, as one of the IPY projects. Continuous data during last two over winter seasons in 2008-2010 included background infrasound (“microbaroms”) with peak with few seconds or more of its intrinsic period. Microseisms and microbaroms presumably originated from the Southern Ocean and Antarctic margins were clearly recorded by both the broadband seismograph (STS-1), as well as the infrasound sensor at Syowa Station. Continuous images are achieved for the Double-Frequency Microseism / Microbaroms (DFM) with peaks between 4 and 10 s in a whole season during the IPY. The peak amplitudes of DFM reflect the large influence of winter extratropical cyclonic storms (blizzard) in the Southern Ocean (Aster, 2009). The DFM has relatively lower amplitudes during austral winters, caused by the larger amount of sea ice extent around the Lützow-Holm Bay with decreasing the ocean wave loading effects. On the contrary, Single-Frequency Microseism (SFM, with periods between 12 and 30 s) can be observable only by a seismograph under excellent storm conditions, particularly in local winter. On the infrasound data, moreover, stationary signals are identified with harmonic over tones at a few Hz to lower the most human audible band. It might probably be related to ice vibrations close to the Station. Microseism measurements are a useful proxy for characterizing ocean wave climate, complementing other oceanographic and geophysical data. A continuous monitoring both by broadband seismograph and infrasound firmly contribute to the Federation of Digital Seismographic Network (FDSN) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT) in southern high latitude, together with the Pan-Antarctic Observations System (PAntOS) under SCAR.