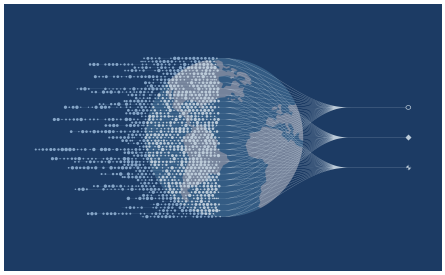

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Seasonality of sea ice extent and microbarom amplitude at high-latitude IMS infrasound stations

Tuesday 9 September 2025 14:00 (15 minutes)

The International Monitoring System (IMS) infrasound network's ability to detect atmospheric nuclear detonations is limited by a combination of wind-noise, anthropogenic sources, and the microbarom, the constant and globally ubiquitous infrasonic noise driven by oceanic waves. The presence of seasonal weather conditions may increase the strength of the microbarom, further increasing background noise at IMS stations. The microbarom may also strengthen due to seasonal variation in sea ice extent at high latitudes. In several studies, sea ice has been shown to inhibit the generation of the microseism, the seismic noise equivalent of the microbarom. Here we analyze ten years of acoustic data collected at six high-latitude IMS infrasound stations alongside hemispheric sea ice extent. We find that microbarom strength varies smoothly with the seasons by a factor of 2-5 but is out of phase with hemispheric sea ice extent. At each station, the maximum and minimum microbarom strength occurs 2-4 months before the maximum and minimum sea ice extent, respectively. We do not observe a clear relationship indicative that microbarom strength is diminished by hemispheric-scale sea ice. Instead, we now consider that other hemispheric-scale seasonal variations over the world's oceans will outweigh the effects of sea ice extent on the strength of the microbarom.

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