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Characterizing middle atmosphere variability using ocean ambient noise as recorded by a regional infra-sound network

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Ocean wave interactions largely contribute to the atmospheric coherent ambient noise field between 0.1 and 0.5 Hz. This study aims to build a reference database to provide an improved knowledge-base on ambient ocean noise sources as recorded by ground-based infrasound arrays operating in the Scandinavia peninsula. Comparisons between the observed and predicted directional microbaroms using a two-dimensional energy spectrum ocean wave source model show a first order agreement from seasonal down to daily scales. Semi-diurnal variations in the recorded amplitudes are also observed. These are explained by return height oscillations of propagation paths resulting from the semi-diurnal solar tide modulation in the lower thermosphere. Statistical comparisons between the observed phase and amplitude semi-diurnal fluctuations and the predicted ones using a climatological description of the atmosphere at mesospheric and lower-thermospheric altitudes are carried out. Comparisons with near-continuous meteor radar measurements over Trondheim are also performed. Further developing such multi-technology comparisons using independent ground-based monitoring techniques can provide additional constraints on middle atmosphere dynamics and disturbances in otherwise sparsely covered altitude regions.