

EGU22-2125

<https://doi.org/10.5194/egusphere-egu22-2125>

EGU General Assembly 2022

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Variability of the Upper Ocean Energy Field in the Amundsen Basin, Arctic Ocean

Wen-Chuan Wu¹, Ying-Chih Fang¹, and Benjamin Rabe²

¹National Sun Yat-sen University, Department of Oceanography, Kaohsiung, Taiwan

²Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Bremerhaven, Germany

The dynamics of the Arctic Ocean are changing significantly with increasing global greenhouse gas emissions. Under the current warming scenario, the thinning of sea ice could affect Arctic thermohaline dynamics for the foreseeable future, which would affect the development of the energy cascade. Here, we analyze in situ Lagrangian measurements of the wintertime upper-ocean thermohaline field that were taken during the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC) expedition. Horizontal wavenumber spectra of density are examined from 13 approximately 100-km long transects from October 2019 – May 2020 to determine the steepness of spectra for different spatial scales. Unlike the relatively well-defined frequency spectra, horizontal wavenumber spectra yield variable patterns depending on the region of observations. This issue motivates us to investigate the current state of horizontal wavenumber spectra in the multiyear ice zone of the central Arctic. Our preliminary results show that the wavenumber spectra are not consistent in space and time, implying an interplay of stratification, mixed layer depth, and external forcing, such as ice dynamics.