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Surface Wave Propagation in Shallow Water beneath an Inhomogeneous Ice Cover

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ABSTRACT

The scattering of flexural–gravity waves in a layer of shallow fluid beneath an ice cover with irregularities is investigated. The irregularities considered are the ice edges, cracks, areas of finely broken ice, and ice ridges. Even this idealized problem formulation demonstrates that the accumulated effect of a large number of irregularities may lead to complete dissipation of the energy of wind waves and swells. The analysis shows a strong scattering of such waves by periodic linear irregularities in the sea ice cover. The authors employ the shallow-water approximation, which makes the results applicable for ocean shelf areas.

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