



## **Sea state events in the marginal ice zone with TerraSAR-X satellite images as observational basis**

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With ice properties being changed by the breakup of ice floes, the penetration of ocean waves into the marginal ice zone (MIZ) has a variety of potential effects on the global Earth and climate system. In the last decades, the wave propagation in ice has been studied by in situ measurements, satellite imagery, and laboratory experiments using ice tanks. As well, different theoretical models of the behaviour of waves in ice have been developed.

We focus on events of long swell waves encountering the MIZ, mainly on the northern hemisphere. Images from the TerraSAR-X (TS-X) satellite and model runs from the European Centre for Medium-Range Weather Forecasts (ECMWF) are used to investigate the progression of waves and their behaviour in ice. The included TS-X scenes were acquired in Stripmap mode and are up to few hundred kilometres in length. In particular, the spatial variability of wave parameters through the MIZ is analysed. This yields valuable clues on the interaction between ocean waves and ice. Consistency checks between satellite and model data are performed. Likewise, this provides a basis for follow-on applications including the future cross-validation of the sea state modelling in ice by satellite data.