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Modelling the transport of marine litter on Baltic sea ice and surface water

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The fate of plastic litter in seasonally ice-covered waters is an area of active research. The ice will transport any litter affixed to it, and the drift of sea ice differs substantially from the flow of surface currents, especially in marginal seas. This work studies typical drift patterns of marine litter in water, on ice, and in realistic circumstances where seasonal ice melts leaving marine litter suspended in flowing water.

The drift of litter in the Baltic Sea is simulated using the OpenDrift software package using oceanic drift from NEMO 4.0. A simple module was written to advect passive tracers that might be transported on sea ice or by sea water. The particles move with ice or surface water depending on the prevailing ice conditions. The results are analysed and compared to drift buoy results.