



Satellite remote sensing signatures of the Major Baltic Inflows

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The exchange of water between the Baltic Sea and the North Sea includes three main components. These are: 1) outflow of the low-salinity Baltic Sea water into the North Sea due to the surplus freshwater input from rivers and net precipitation; 2) episodic inflows forced by the baroclinic pressure gradient linked to the salinity difference between the Kattegat (34) and the Arkona Basin (8); 3) occasional barotropic inflows occurring when the sea level difference between the Kattegat and the Baltic Sea becomes large. When these sporadic inflows exceed 100 km³ of water they are classified as the Major Baltic Inflows (MBIs). The MBIs but have a fundamental influence on the state of the Baltic Sea, including the stratification of waters and conditions for life, particularly in the deep basins.

Irregular and infrequent occurrence, as well as short duration of the MBIs (about 2–3 weeks) present a challenge to in situ observations of these events. Up to now, published work about the MBIs has been mostly based on in situ oceanographic data collected from ships, moorings and tide gauge data used to represent the large scale sea level variability in the Baltic Sea. In contrast, in our work we explore satellite Sea Level Anomaly data. We use 25-year-long (1993-2017) time series of multimission gridded SLA data product, ERA Interim meteorological data, and information about river runoff from Balt-HYPE model. Based on this data we derive 25-year time series of SLA averaged of the Baltic Proper. We show what are the characteristic features of SLA variability during the MBIs in comparison to time intervals when MBIs were not present.

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