

COUPLED ECOSYSTEM MODEL OF THE BALTIC SEA

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UPWELLING DETECTION TOOL

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The automatic upwelling detection tool is a new functionality built on top of an existing 3D CEMBS system. It was developed in 2017 and introduced in an operational mode in early 2018. It is based on a method presented in a study by Andreas Lehman (Lehmann et al., 2012). The method was modified and adapted in order to function correctly with the 3D CEMBS model (Dzierzbicka-Glowacka et al., 2013; Nowicki et al., 2014). It was described and evaluated based on a data collected between 2010 and 2016 (Nowicki et al., 2018, Manuscript submitted for publication).

The method assumes that during the upwelling, water from below thermocline reaches the surface, causing significant drop in temperature. Therefore, this method is only able to detect strong coastal upwelling events during stratified period of the year. As a result of this limitation, the tool is used only for data between May and September. The tool is based on the assumption, that there is a latitudinal SST gradient from south to north, following previous studies (Bychkova et al., 1988; Lehmann et al., 2012). Thus, the entire area of the Baltic Sea was divided into latitudinal zones. Mean temperature was calculated for each zone. Upwelling was detected, if temperature at a specific pixel differed from corresponding mean value by more than a threshold of 2 °C. In addition to achieve more accurate results, mean temperatures were calculated independently for the entire areas of Gulf of Finland, Gulf of Riga and part of Bay of Bothnia. Results are presented in horizontal resolution of ~2.3 km, which derives directly from 3D CEMBS properties. Open sea data are masked since the tool focuses on coastal upwellings only.

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