



Event driven approach for the identification of the environmentally safe fairway in the south-western Baltic Sea and Kattegat

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Application of the preventive techniques for the optimisation of fairways in the south-western Baltic Sea and the Kattegat in terms of protection of the coastal regions against current-driven surface transport of adverse impacts released from vessels is considered. The techniques rely on the quantification of the offshore domains (the points of release of adverse impacts) in terms of their ability to serve as a source of remote, current-driven danger to the nearshore. An approximate solution to this inverse problem of current-driven transport is obtained using statistical analysis of a large pool of Lagrangian trajectories of water particles calculated based on velocity fields from the DMI/BSH cmod circulation model forced by the DMI-HIRLAM wind fields for 1990–1994. The optimum fairways are identified from the spatial distributions of the probability of hitting the coast and for the time (particle age) it takes for the pollution to reach the coast. In general, the northern side of the Darss Sill area and the western domains of the Kattegat are safer to travel. The largest variations in the patterns of safe areas and the properties of pollution beaching occur owing to the interplay of water inflow and outflow. The gain from the use of the optimum fairways is in the range of 10–30% in terms of the decrease in the probability of coastal hit within 10 days after pollution release or an increase by about 1–2 days of the time it takes for the hit to occur.