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Dynamics of Medium-Intensity dense Water Plumes in the Arkona Basin, Western Baltic Sea

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In this study, the dynamics of medium-intensity inflow events over Drogden Sill into the Arkona Sea (Wsestern Baltic Sea) is investigated. Idealised model simulations carried out with the General Estuarine Transport Model (GETM) suggest that the major pathway of such inflow events should be north of Kriegers Flak, a shoal with less then 20 m water depth surrounded by water depths of more than 40 m. This assumption about the pathway is supported by recent ship-based observations in the Arkona Sea during a medium-intensity inflow event. The propagation of a saline bottom plume could be observed during several days after having passed Drogden Sill. In the area north of Kriegers Flak the plume was about 10 m thick, and propagated with more than 0.5 $\mathrm{m\,s^{-1}}$ and a salinity of up to 20 psu (with ambient water salinity being 8 psu) eastwards. Although the model simulations were highly idealised, the structural agreement between observation and model result was good. Specifically, in the region north of Kriegers Flak, profile data obtained during a one-day station do structurally agree well with the model results, concerning velocity structure and stratification. The structure and pathways of these medium-intensity inflow events is of specific interest due to the plans for erecting extensive offshore wind farms in the Arkona Sea which may under certain circumstances lead to increased entrainment of ambient water into the bottom plumes.

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