Geophysical Research Abstracts
Vol. 19, EGU2017-14640, 2017
EGU General Assembly 2017

Wave-Current Interactions in the Southern North Sea: The Impact on Salinity

Emil Stanev and Sebastian Grashorn
Helmholtz-Zentrum Geesthacht, Institute for Coastal Research, Geesthacht, Germany (emil.stanev@hzg.de)

The interplay between wind waves and currents in the coastal zone of southern North Sea along with the resulting changes in the salinity distribution there are quantified using simulations with the unstructured-grid ocean model SCHISM coupled with the wind wave model WWM. The wave-induced transport of salt leads to changes in the horizontal salinity distribution. These are most pronounced in front of barrier islands where coherent patterns caused by the coupling between tides, surface drift and wind waves reveal salinity changes up to 0.5. The weak stratification dominating the patterns of salinity in the coastal zone is mostly destroyed by wind waves. Thus, effects created by wind waves tend to substantially modify the estuarine circulation. An explanation of these important processes in the coastal zone has been given based on analysis of ratio between significant wave height and tidal range. This control-parameter, which is relatively small under mild weather conditions, can exceed under strong-wind condition 1 in the coastal zone, thus mixing due to waves becomes dominant. The effect of fresh water fluxes from subterranean estuaries is relatively small and confined only in the vicinity of corresponding sources.