

COSYNA: Improving regional forecasting capabilities for the German Bight

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The presented studies are part of the COSYNA (Coastal Observation System for Northern and Arctic Seas) project. The objective of COSYNA is to enable a long-term observational network for the southern North Sea and Arctic coastal waters, which will be linked to pre-operational models for scientific and management purposes.

The presented poster gives an overview of COSYNA related activities at the GKSS Research Centre with a focus on data analysis and numerical modeling. Investigations are carried out concerning surface waves, suspended sediment, sea surface temperature (SST), sea surface salinity (SSS), and water level. Numerical circulation models and ocean wave models are used in combination with optical satellite data to estimate suspended particulate matter (SPM) concentrations in the North Sea. A detailed study on the impact of currents and waves on sediment transport processes is carried out for the East-Frisian Wadden Sea using a nested model approach. A new method to re-construct SST and SSS fields from data acquired by ferry ships (FerryBox) is described. The approach is based on EOF decompositions of both the 2-D parameter fields and the corresponding 1-D measurements provided by ships. A special technique is applied to interpolate discontinuous FerryBox observations. Furthermore, first steps towards the assimilation of water level data into the circulation model GETM using a Singular Evolutive Interpolated Kalman filter (SEIK) are presented. A twin experiment is set up to assess the performance of the method based on simulated observations.

The next steps of the COSYNA project are summarised. Of particular importance is the systematic merging of numerical models and observations using assimilation techniques, which are suitable for operational use.