

Water Level Prediction Skill of an Operational Marine Forecast using a Hybrid Kalman Filter and Time Series Modeling Approach

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Abstract: The operational service the “Water Forecast” gives 5 days forecasts for the North Sea, Baltic Sea and interconnecting waters every 12 hours. Predictions of a range of physical and environmental parameters are provided. In this contribution, focus will be on water level. An ongoing development is focused on data assimilation of tidal gauge data. A cost-effective Kalman filter based procedure that uses a regularized constant Kalman gain is applied for the tidal gauge data. This approach gives an acceptable computational overhead for operational applications. The now- and forecast skill of the scheme is evaluated and compared to standard modeling results. Data assimilation improves the forecast skill, but local time series models of varying complexity often possess a longer forecast horizon at measurement points. For these error correction methods however, the problem is to extrapolate this correction spatially to increase the skill in validation points. A hybrid of the Kalman filter and local time series models is constructed by assimilating water levels predicted by the time series models. Its prediction skill is validated against the previous results.