Geophysical Research Abstracts,
Vol. 11, EGU2009-2384, 2009
EGU General Assembly 2009

Modelling of tides and storm surges in the Tjeldsund channel in northern Norway.

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A high resolution depth integrated tidal and storm surge model with horizontal grid resolution down to 25 meters has been implemented for the Tjeldsund channel in northern Norway. The four dominant tidal constituents M_2, S_2, N_2, and K_1 and their over-harmonics have been simulated. The results are in very good agreement with sea level observations. The modelled current fields reveal important features of the flow in the channel with tidal jets and topographically trapped and slowly propagating eddies. The eddies are found to be associated with over-harmonic tidal oscillations. Predicted time series for current speed and direction have been compared with measured current data from a few location. Two storm surge events have been studied by driving the model by the observed sea level difference between the two ends of the channel system. At certain instants storm surges are found to interact strongly with the tide, producing complex flow patterns which to some extent are verified by observations. Predicted tidal current fields are displayed by GIS tools and network browsers and made available for operational use by mariners.