Conference Poster, Published Version

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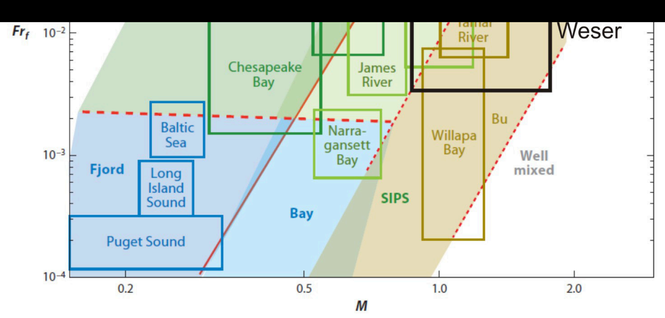
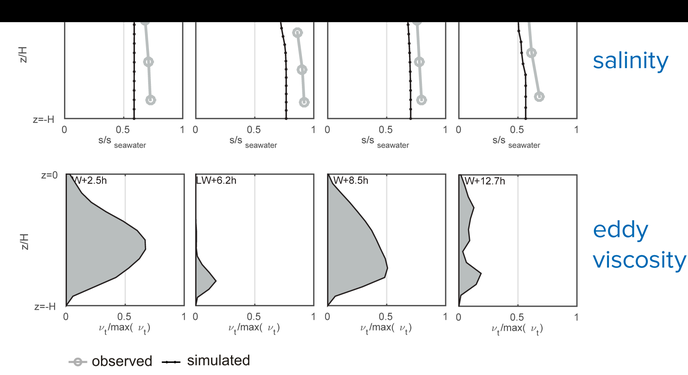
Hydrodynamic and suspended sediment patterns in the estuarine turbidity maximum zone of a mesotidal estuary from cross-sectional ADCP measurements and numerical simulations



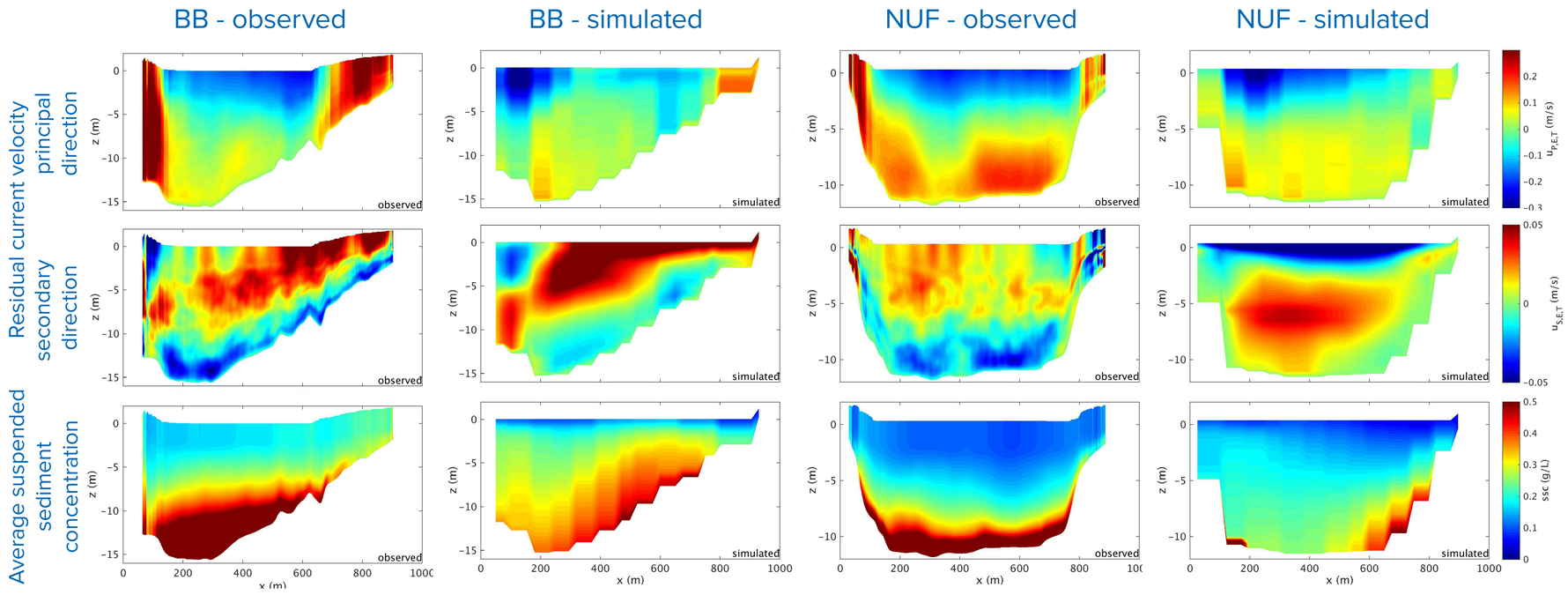
Estuarine parameter space based on Geyer and McCready (2014)

As shown at the example of station DWG, a pattern of strain induced periodic stratification is observed in the estuary (right figure). During flood, the water column is fully mixed with high eddy viscosity. Ebb flow shows slight surface intensification with reduced eddy viscosity and slight stratification in the upper half of the water column. Generally, there is a tendency toward ebb dominated currents in the main river channel.



Profiles of neap tide at station DWG

Residual and secondary currents



For analyzing lateral and vertical processes, residual currents along σ-layers (Eulerian transport velocity, Lui et al. 2012) and mean sediment concentrations were calculated for the measured and simulated tides.

The cross-sections BB and NUF show an upstream directed residual current in the bottom layers and a downstream directed residual current in the surface layers in both measurement and simulation. The sediment concentration at the bottom is underestimated by the model.

At transect BB, there is a strong and highly asymmetric secondary circulation due to the river bend. Based on this preliminary investigation, those bathymetry-based effects seem to overrule symmetric lateral advective processes as reviewed by Geyer and McCready (2014).

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