Open Seminar Series
Geoscience & Remote Sensing

Transports in the Wadden Sea: an event-driven system

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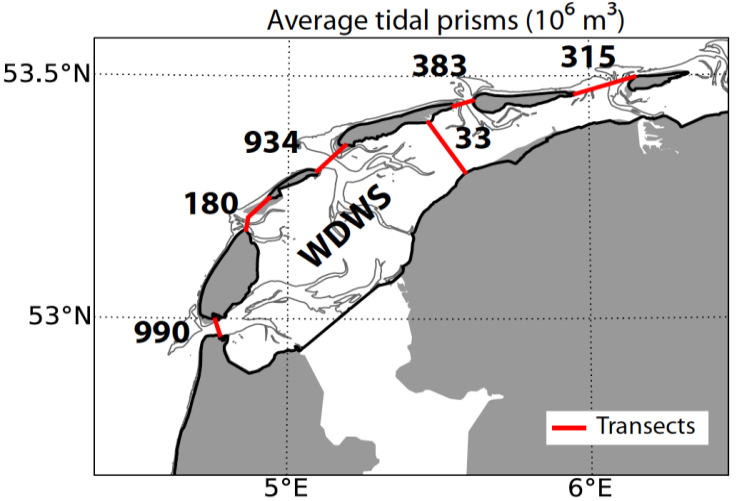
CiTG room E



In barrier-island systems like the Dutch Wadden Sea, large amounts of water are exchanged through the inlets with every ebb and flood (this amount is called the *tidal prism*). But one may find that, on average, flood dominates in some inlets, while ebb dominates in others. In that case, there is a residual flow through the system, i.e. there is a net flow if one integrates over a tidal period.

Numerical models provide an indispensable tool to study these flows and, in particular, their variability. Recent model results from the ZKO/BMBF 'PACE' project will be discussed, which offer unprecedented insight into the long-term variability of the transports in the Dutch Wadden Sea.

Surprisingly, some inlets that are predominant in terms of tidal prism, turn out to be relatively unimportant for residual flows and for the net exchange of freshwater. Conversely, the watershed (tidal divide, a shallow band connecting the island to the mainland), south of Terschelling, is much more important than was previously thought; this can be attributed to a few strong wind events, which stamp the yearly mean. In this presentation we focus on the residual transport of water itself, but the relevance of the problem at hand extends directly to residual transports of freshwater, sediment, nutrients, pollutants, etc.

Thus it is shown that, for the Western Dutch Wadden Sea, the annual mean flows are not representative of 'typical' conditions, because the former are strongly affected by episodic events (storms).

The inter-annual variability of annual mean sea level in the Wadden Sea is also demonstrated to be closely linked to the wind climate.