

Variation of suspended sediment flocs in tidal basins – A case study from the backbarrier area of Spiekeroog Island, German North Sea (talk)

Joerdel¹, O., Bartholomä¹, A., Flemming¹, B.W. & Lunau², M.

¹Senckenberg Research Institut, Dep. for Marine Sciences, Schleusenstrasse 39 A, D-26382 Wilhelmshaven, Germany

²Institut for Marine Chemistry and Biology, University of Oldenburg, Oldenburg, Germany

The water exchange in the wadden sea is mainly controlled by tidal currents. These currents transport, resuspend and deposit large volumes of sediment in dependence of the particle size.

The multidisciplinary research group „BioGeoChemistry of the Wadden Sea” analyses in its here presented subproject “Hydrodynamic of the Wadden Sea” the dynamics of suspended sediment transport in the backbarrier area of Spiekeroog Island, Lower Saxony, German North Sea Coast.

Measurements are carried out combining acoustical and optical instrumentation. Tidal currents are surveyed over the entire water column using “Acoustic Doppler Current Profiler” (ADCP) in a stationary setting as well as along transects across the main tidal channel. Suspended sediment concentrations were calculated based on the backscatter signal. Suspended sediment floc sizes are measured by a “Laser In-Situ Scattering and Transmissiometry” (LISST) System stationary at several water depths. Additionally floc sizes are recorded by a photogrammetric system. Grainsize distributions and suspension concentrations were analysed by means of a pump centrifuge system.

Pump samples, LISST and photogrammetric data shows that the flocs are complex particles consisting of single grains as well as smaller flocs. Flocculation is resulting in different orders. Flocs of higher order are generally less dense and more fragile. The ADCP data documents that floc sizes are mainly controlled by combination of current velocity and suspended sediment concentration. Current velocity and shear stress in the bottom boundary layer limit the maximum floc size. A higher concentration on the other hand aid faster flocculation and a larger spectrum of floc orders.