



Characterization and dynamics of Suspended Particulate Matter in the near field of the Rhine River Plume during a neap tide

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We present a unique data set from a 13 h survey collected in the Rhine Region of Freshwater Influence (ROFI). The site is located about 10 km downstream from the mouth of the Rotterdam Waterway. The data show the time evolution of suspended particulate matter near the seabed during a full tidal cycle. The data were collected on a neap tide, during calm weather conditions. Here we show that the variation of the d_{50} of the particles in time (150 - 220 microns) is correlated to the change in the cross-shore velocity direction. A large range of settling velocities (0.1 - 10 mm/s) and aspect ratios between 1 and 10 were recorded by video microscopy in quiescent water for samples taken during the survey period. This spreading in settling velocities and aspect ratio is due to the different nature of the particles in the water column, as identified from the underwater video recording. Some particles were bare algae particles, which are thin, very elongated particles whereas others were sediment-algae flocs in different states of coiling. From complementary laboratory measurements, it was shown that the high aspect ratio of flocs lead to discrepancies between laser diffraction (a technique also used in-situ) and video microscopy in the assessment of particle size distributions (PSD). Combining the results of all PSD measurement techniques, we could clearly identify four types of particles: mineral sediment based particles in the range size 5 - 10 μm , small aggregates and algae 20 - 50 μm , organic and inorganic aggregate 50 - 350 μm and chain like algae of equivalent diameter 500 μm .