Recent anoxic cohesive sediment deposits in the Belgian near-shore area: sedimentological context and anthropogenic impact

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The recent cohesive sediments of the Belgian nearshore zone consist of Holocene back-barrier black muddy deposits dating back to 3000 years ago (Mathys, 2009) and freshly deposited grey or black muds occurring as ephemeral fluid mud layers or, locally, as increasingly more consolidated, thicker anoxic packages (>0.3 m). These deposits are associated with the occurrence of elevated concentration of suspended particulate matter (SPM). The distribution of muddy deposits depends on hydrodynamics, meteorological condition, climate, biological activity (primary production) and – in our case – anthropogenic influence. The latter is related to engineering works such as deepening of navigation channels, construction of harbours, dredging and disposal activities, and the anthropogenic induced eutrophication of the near-shore area. As a consequence SPM concentration, mud deposits, primary production and benthic life has changed during the last 100 years (Borges and Gypens, 2010; Fettweis *et al.*, 2009, Houziaux *et al.*, 2011).

The aim of the research is to show the effects of human impact on the SPM dynamics and on the deposition of anoxic cohesive sediments. In the beginning of the 20th century the freshly deposited mud layers were the result of natural morphological processes. Today, they are more concentrated in areas affected by engineering works. These changes have resulted in a larger extent of the turbidity maximum zone and in higher SPM concentrations. Organic matter and biogenic particles influence flocculation and thus SPM dynamics. Changes in nutrient loads of rivers has a strong influence on the primary production and thus on the carbon cycle in coastal areas (Borges and Gypens, 2010). The increase of organic matter concentration during spring algae bloom has an effect on the partitioning of sticky organic molecules to mineral flocs and thus on the settling of organic rich flocs and the formation of organic rich deposits. The changes associated with climate are related to variations in the North Atlantic Oscillation (NAO). As a consequence, the mud content of the sediment may vary considerably according to meteorological and climate condition.

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