

Topic 1: Restoration of coastal wetlands and rehabilitation of ecosystem functions

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Coastal protection was characterized by the construction of dykes and levees with an ever-increasing height over centuries. Currently, we can observe a shift in perception of coastal protection towards nature-based solutions including deconstruction of dykes and the rehabilitation of low-lying coastal wetlands, which are natural flooding areas. By opening-up additional flooding areas, the energy and flux patterns of storm surges are modified and the pressure on neighboring dyke-protected coastal segments is reduced.

It remains, however, unknown how wetlands, which have been artificially drained to enable agriculture, behave upon reflooding and rewetting with salty water. Coastal wetlands are often characterized by peat soils with a high organic matter content. Drainage of these soils resulted in a loss of carbon and probably in an accumulation of nutrients because of agricultural activity. Flooding may alter redox conditions possibly enhancing greenhouse gas emissions (methane). Release of nutrients as a result of modified hydraulic heads may also be a consequence of rewetting of coastal wetlands.

Coastal wetlands are diverse including tidal and non-tidal systems. Tidal wetlands may be subjected to very different conditions depending on the tidal amplitude. Here we concentrate on systems, which have been dyked and often drained and which are now restored by removing the dykes. As a consequence, the wetlands are reconnected to the sea and exchange processes between the terrestrial part and the sea are again active.

Topic 1: 'Restauration of coastal wetlands and rehabilitation of ecosystem functions' aims to bring together scientists of various disciplines from coastal engineering, hydrology, biogeochemistry, biology to social science in order to discuss risks and benefits from the restoration of coastal wetlands. What are the best rehabilitation strategies to minimize impact on adjacent ecosystem compartments? How can the mobilisation and release of nutrients and pollutants from wetlands be quantified? What are the consequences for the biota of biogeochemical processes, which have been altered by flooding and rehabilitation? Can rewetted coastal wetlands enhance the overall attractiveness of a coast for inhabitants and tourists alike? These are just a few questions we want to discuss in this session. We intend to prepare a joint manuscript expressing the success of our collaboration. We focus on the comparison of dyked/drained sites with rewetted/pristine systems.

Emphasize is laid on

- (i) hydrodynamics / connectivity,**
- (ii) biomass production and biodiversity,**
- (iii) carbon storage and release (including greenhouse gas emissions),**
- (iv) nutrient dynamics and**
- (v) perception and use of rewetted coastal wetlands incl. touristic aspects.**

Contributions from participants include data sets, experience, literature analysis etc.