Deltas in Depth scientific sessions		
Deltas in Depth 4. Coastal Systems and Wetlands		
DD 4.4 Sediment supply, loss and accumulation		
Chair	Prof. dr. Johan Winterwerp, Deltares, Netherlands	
Presentations	•	Dr. Mark Scheurch, University of Kiel, Germany
	•	Prof. Agustin Sanchez-Arcilla, Universitat Poltitecnica de Catalunya, Spain
	•	PhD Irina Overeem, University of Colorado, USA

In this session, the sedimentation patterns of three deltas were examined. First, dr. Mark Scheurch from the University of Kiel explained his research on the factors of influence in the Rio de la Plata estuary in Argentina. Then, prof. Agustin Sanchez-Arcilla from the University of Catalunya showed adaptation strategies for the Elbre Delta in Spain. Subsidence and sea level rise needs to be tackled and increased sedimentation with controlled flooding might be a successful strategy to cope with these challenges. The last speaker, PhD Irina Overeem from the University of Colorado showed the results of field data and physic based models on the sedimentation rates in the Ganges-Brahmaputra Delta in Bangladesh.

The research of dr. Mark Scheurch focusses around the drivers that influence deposition rates in the estuary. The depicted drivers are tidal effects, wave exposure and river discharge. The river discharge is largely influenced by El Niño but long term climate variations are taken into account as well.
By analysis of 15 core samples, yearly differences in sedimentation rates were shown for the estuary. El Niño variations are believed to cause most of the difference in sedimentation between years, but only in the south side, not in the northern part of estuary. It is therefore of high importance to look at local sedimentation rates. Extrapolation might be misleading to the local drivers that are of influence.

In order to increase the resilience of the Ebre Delta, an integrated approach is explored by enhancing natural accretion to offset subsidence. In the past years, subsidence rates increased due to decreased water supply. Building dams to provide water for agricultural uses led to the lower runoff. This leads to less flooding. The central research questions to cope with these challenges in a sustainable way is; How can one work with natural processes, and not against it.
Downscaled scenario's that take into account local wave directions and storm surges show that allowing local floods to increase sedimentation can be efficient in the outer part of the Ebre delta but it comes with the cost of siltation. Siltation does not lead to direct problems as no agriculture takes place. Also, this land is not privately owned, so erosion and changing land shapes are allowed.

The last speaker focused on the Ganges Brahmaputra delta system. On a yearly basis, 1.1 giga tons of sediment is carried to the coast. 10% of this sediment is believed to flush back to end up in the mangrove forests but (local) sedimentation patterns are uncertain. Besides mangrove forest with natural tides, polders with embankments are located near the coastline of Bangladesh. Here farmers grow crops and protecting their lands but this leads to increased subsidence and reduces sedimentation rates. It is unclear how these polders can keep up with subsidence and sea-level rise. Irina showed results from local sediment traps that were put in place in both mangrove areas and in polders that were opened to let water and sediment in. In the natural areas, the average

sedimentation rate was 1.1±0.9 cm y-1 and in the human induced areas, the regional vertical accretion was found to be 2.3±0.9 cm y-1. A more extensive fieldwork dataset is needed as input for modelling and to search for adaptation strategies

The overall conclusion of the session is that more research is needed to gain insight on the sedimentation and subsidence rate of the deltas. So far, it is not clear if the discussed deltas are able to cope with sea level rise and subsidence. First of all, exploring the factors of influence on (local) sedimentation rates is of high importance according to Mark. In order to do this properly, an extensive observation network is needed as comparison for physic-based models such as Delta3D. In order to increase the resilience of coastal systems, one should focus on the possibilities to work "with" nature and not against it. The challenge to integrate local livelihoods was the main point of discussion.