WG 122 Mechanisms of sediment retention in estuaries
Workgroup: sediment-biological interaction

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I Biological agents work in both directions; i.e. biology both stabilizes and destabilizes. Many plants and organisms are 'bio-engineers'. They produce geomorphic change.

Temperate systems: Wadden Sea examples

- *Algae bloom affects erodibility variation over time. Measured on samples, used chlorofyl a as a proxy of erosion thresholds. This implies that erosidibility is function of season.*
- *Mudflats with mudsnails; 80% of total volume can consist of fecal pellets, fecal pellets are more easily transported. Consistency of sediment decreases. This even appears to be recorded in the monthly bed-level changes over 1997-2006.*

Within the same Wadden Sea example net sediment budgets are studied. Short-term accumulation rates are proven to be affected by biological agents. However, short-term net accumulation is order of magnitude higher than millenia scale accumulation . Uncertain whether biological factors are of importance over longer time scales? It is a problem on that time scale we may not have sufficient data to disentangle sediment budget and causality.

Tropical systems: southern Asia and Australia. These areas may bring in the most fine sediment to worlds oceans.

- *Mangroves retain sediment. These influence the system over decadal time scale. Mangroves forests may consist of only 2% in area, but trap 30% of sediment.*
- *Korean tidal flats show similar erosion and sedimentation variability as the Wadden Sea system in that algae mats influence erosion on seasonal timescales.*

II Humans impact on vegetation-biological factors

- *Example of European beach grass. Introduces in Western US, caused a tremendous change in stabilizing beach areas.*
- *Artificial, plastic sea grass in Korea to reduce shear stress.*
- *USGS studies of Tamarisk introduction changes river dynamics.*
- *Study by Bob Nyman- beaver dams were in pristine US situation probably important traps.*
- *Arctic fjords are influenced by increased suspended sediment load due to recent melting. Primary biotic production is decreasing, due to increase of turbid waters and thus decrease of the photoic zone.*

- *Loosing mangroves due to subsidence, loss f fresh water input (e.g. in Indus), logging and shrimp farms remove mangroves in high rates.*

III Modeling efforts approach the vegetation as a hydraulic roughness problem.