SedNet Special Session
6 April 2011

Sediment in a Changing Environment

Who were involved:

Invited experts: Sabine Apitz, Tim Iannuzzi, Dick Bakker, Andrew Hursthouse, David Paterson, Günther Eichweber

The reporters

The audience volunteering to dehydrate during a two hour discussion in the garden and refusing to rehydrate at the start of the green cocktail
Highland
- snow melt
- rainfall patterns
- increased erosion
- fluctuating discharges

Lowland
- water discharges and sediment loads
- floodings <-> drought periods
- sediment transport patterns
- contaminant loads

Estuary
- water discharges and sediment loads
- tidal hydrodynamic
- salinity gradients
- exposure of intertidal areas
- sedimentation/resuspension patterns

Sea
- sediment input from land
- higher sealevels
- exposure of intertidal areas

Large scale-processes bound to change due to CC
Large scale processes

Micro-scale changes

Direct impacts

Indirect impacts

O₂, pH, nutrient-fluxes, temperature, UV-light, salinity, contaminant fluxes
Sediment fluxes
Microbial activity

• Bioavailability
• Mobility/desorption/adhesion
• Toxicity
• Transport scheme

• WFD-objectives
• Ecosystem goods & services
• Dredging activities

SedNet
Large scale processes

Micro-scale changes

Direct impacts

Indirect impacts

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and what about:
- Changes in microbial populations,
- Invasive species,
- Increased use of sun creams
- ..... 

and what about:
- Historical contamination,
- Changing food web,
- Downstream transport of pollutants in concentrations under detection limit or effect concentrations,
- ...

WFD-objectives
Ecosystem goods & services
Dredging activities

How significant/relevant? Do we understand the processes enough to judge? Are we able to upscale the microscale processes to estimate impacts?
**Things coming out of the discussion (1/2)**

- Extreme events have a big impact on large-scale processes but:
  - What do we consider to be an extreme event
  - Extreme events might become regular events due to CC
- Can we downscale the impact of ‘extreme’ events to micro-scale processes?
  - Measuring processes during peak discharges seems to be a practical problem
- Can we downscale the impact of large scale processes to micro-scale processes?
  - Range of uncertainty / selection of scenarios
Things coming out of the discussion (2/2)

- Can we upscale the impact of micro-scale-processes to large-scale impacts?
  - Which micro-scale processes are relevant?
  - How to include the relevant processes and heterogeneity of ecological processes in models?

- Transboundary links
  - Impact of resuspension/sedimentation cycles
  - Desorption of contaminants
  - Responsibilities of water managers

Understand today: Predict tomorrow
Anticipated main outcome

- An active discussion group is formed
- Outline for a review on impact of changing conditions on bioavailability/mobility of particle bound contaminants
- Session report in (suggestion) the SedNet associated Journal of Soils and Sediments
- Brief version of that report in the SedNet e-newsletter and/or overall conference report
- Basis for future project proposals focusing on sediments in a changing environment