

GEO Work Plan 2012-2015

WA-01-04: Global Water Quality Products and Services

Sediments

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Why Sediments?

- **Why is a better understanding and integration of sediment dynamics important?**
 - **How is Sediment connected to Water Quality?**
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- Sedimentation and erosion have a big impact on hydromorphology of rivers and therefore on infrastructure
 - Like dams, harbors, bridges
 - Sediment can be a pollutant on its own
 - High concentration of suspended sediments → reduced water quality
 - Sediment carries nutrients and contaminants
 - e.g. N, P, C, heavy metals → Big impact on water quality
 - Ecosystem- and human health → eutrophication, health issues

Sediment Flux from Local to Global Scales



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www.ga.water.usgs.gov



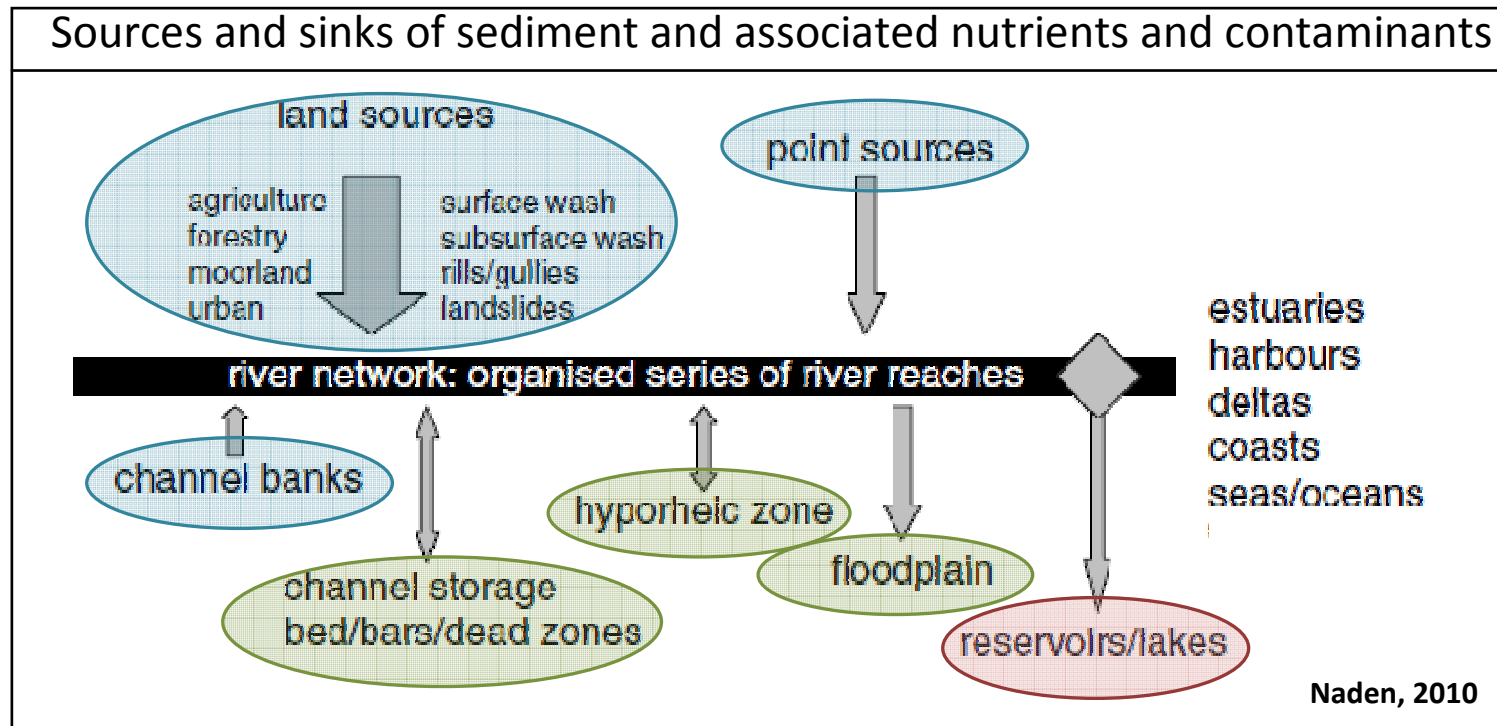
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Fine Sediment Cascade

- Pathways of fine sediment are also pathways of nutrients and contaminants
 - Very high percentage of most nutrients and contaminants in rivers are transported in particulate, sediment-associated form



Storage, Accumulation and Remobilization

- Problem of remobilization of contaminated floodplain sediments in the course of renaturation projects of rivers
 - High concentrations of heavy metals caused by former industrial activities in the catchment

Extensive floodplain of the River Sieg



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Floodplain erosion after renaturation



www.general-anzeiger-bonn.de

Discharge of Contaminants and Nutrients

Agricultural Runoff



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Eutrophicated River in Agricultural Area



www.bloomberg.com

- According to UN Water: Eutrophication of water bodies is the globally most prevalent water quality problem
- Main sources of nutrients are agriculture, domestic sewage and industrial wastewater

Importance of Sediment Data

Need for available sediment data in many different fields

Research

- ecology, hydrology, geology, geomorphology, engineering

River Management

- dredging, ecosystem management, water quality management

Transport and Infrastructure

- River navigation, harbors, bridges

Energy sector

- Dams and reservoirs, hydropower

Industry and Agriculture

- contamination of water, soil erosion

ISI, 2011; Owens, 2005; Slaymaker, 2003

GEO Work Plan

Sediment related Key Outputs (WA-01-C4):

- Key Output (Infrastructure)

Improved data discovery and access mechanisms to globally distributed sediment data sets

- Key Output (S&T)

Archive of in situ relevant optical and water quality parameters

Goals and Recommendations

- General Goal

Improve availability and accessibility of sediment related data and information for water quality information systems and scientific users

- Water Strategy Recommendation

An international cooperation and coordination mechanism should be developed to advance the technical implementation of global sediment databases and data portals. This mechanism should include existing data initiatives and build on the GEOSS Common Infrastructure as a framework for bringing together all relevant Earth observation data.

Activities

- Raising awareness of the importance of sediment fluxes for water quality issues
 - Discussions and talks with the sediment and EO community
 - Formulation of a sediment related recommendation for the GEO Water Strategy
 - Preparation of a scientific review paper:
“Contaminant dynamics in river systems - the sediment budget concept as tool for water resource management and system understanding”
- Improving the availability of sediment data
 - National level: Supporting the open access of German sediment datasets in cooperation with the German Federal Agency of Hydrology (BfG)

Existing Data and Databases

- Global Databases

- Water Quality

- UNEP GEMS/Water: GEMStat



- Sediment

- USGS: National Water Information System
 - UNESCO IHP-ISI: Erosion & Sedimentation Database
 - No actual data available (yet)



- Regional/Local

- Databases of administrative bodies
 - Databases of research institutions and individual researchers
 - Databases of water and sediment managers (e.g. harbors, reservoirs, river navigation)

Conclusions

Many open questions remaining:

- How to move this forward on a global scale?
- How to establish an interest group to strengthen this topic within GEO?
- How to improve the availability of existing data?
- How to identify existing data sets / data sources globally? And how to connect them?
- How to coordinate future international data collection and EO activities regarding sediment data?
- How to fund related activities?
- How to handle sediment aspects in the next GEO decade and new implementation plan & work plans?