

Origins and causes of river basin sediment degradation and available remediation and mitigation options: Feedbacks from the Riskbase Workshop

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Introduction: The objective of the FP6 CA RISKBASE is to review and synthesise the outcome of EC FP4-FP6 projects, and other major initiatives, related to integrated risk assessment-based management of the water/sediment/soil system at the river-basin scale. Workpackage 3 of RISKBASE (<http://www.riskbase.info/>) aims to i) establish state of the art of the origins and causes of degradation impacting river basin and remediation and mitigations available to minimise / clear these degradation ii) determine gaps and recommendations for future research needs.

In this context, the first WP3 workshop was held in October 2007 (Orléans, France) and brought the first conclusions related to State of the Art of the water/sediment/soil system and related to preliminary gaps identification and recommendations.

Methods: The workshop gathered water, soil and/or sediment international experts in order to discuss State of the Art of the river soil sediment system in the context of risk-based river basin management. The workshop was organised in four parallel sessions, two of which specifically focusing on soils and sediments: “*processes understanding, origins and sources of degradation causes in the river basin*”; and “*mitigations / remediation and monitoring of degradation*”.

Results & Discussion: The main achievements of the sessions dealing with sediments include the determination of a list of the main degradation types of river basin, description of State of the Art of origins and causes of degradation, and of monitoring and mitigations & remediation available options. The main degradation types related to sediment quality and quantity include: excessive erosion which leads to increase of sediment load in the river, chemical contamination impacting sediment quality, extreme events as floods and organic matter decline.

Origins and Causes of degradation: The preliminary review on origins and causes of degradation enabled to draw the following recommendations:

- Improvement of the understanding of sediment dynamics (short and long-term)

- Increase of event-based measurements
- Use of sedimentary record to be included in sediment budget studies
- Improvement of water column and sediment exchange understanding

Monitoring: Monitoring tools for sediment quality and quantity have been developed and are available (see SEDNET website at www.sednet.org) but are generally poorly used. This generally leads to a lack of data on sediment quality and quantity at the river basin scale.

The following recommendations on monitoring could be drawn:

- Increase the use and test of sediment monitoring tools to improve their economic and technical suitability.
- Development of knowledge in morphodynamic (soil erosion and sedimentation) – especially during high storm flood event.
- Increase of monitoring and data collection during high storm events
- Development of framework / methods to monitor river course
- Monitoring shall include monitoring of the physical system (quality and quantity) but also monitoring of the set of management actions.

Remediation & Mitigations: Remediation and mitigation actions in the context of river basin are very closely linked with river basin management actions. The remediation and mitigation of contaminated sediments is widely documented in the literature. However, in order to improve the management of sediment quality and quantity at the river basin scale, the following recommendations were proposed:

- Improvement of remediation / mitigations actions related to emerging compounds
- Development of remediation / mitigations aiming at minimizing issues associated with morphodynamic.

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