

Group 3: Interdisciplinary approach to mitigate/prevent water-related disasters

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Area covered: water science, remote sensing, social science

Team keyword: Resilient society design to make people happy

1. Sharing state-of-the-art

- Climate change adaptation
- Flood excess volume, Multi-phase flow dynamics & sedimentation, storm water management, nature-based solutions
- flood risk assessment (risk curve), landslide risk reduction
- Earth monitoring using remote sensing (land subsidence, slope failure) to prevent natural disasters
- Transportation system & human behavior & flooding
- Largest-class natural hazard prediction

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2. SWOT analysis

Flood disaster identification

- ❑ Strengths
 - ❑ High quality of modelling performance for large-scale clear-water flow modelling
 - ❑ Satellite remote sensing for identifying disaster (extent of flooding, concentration of flow)
- ❑ Weakness
 - ❑ Scale issue between local-scale solution to catchment-scale flood risk assessment
 - ❑ Each component is not integrated (sediment, drainage, river flooding, trees)
- ❑ Opportunities
 - ❑ Application of remote sensing technique to complement on-site information
 - ❑ Integration of different techniques/modelling

Prevention

- ❑ Strengths
 - ❑ Quality of weather forecasting/numerical flow simulation → real time information
 - ❑ Real time modelling (combination of real time monitoring and model update)
- ❑ Weakness
 - ❑ Long-term forecast
 - ❑ Missing drainage capacity information drainage planning
 - ❑ Quantification of tail distribution and its impact on long-term forecasting
- ❑ Threats
 - ❑ Intensification of flooding by sediment and blocking trees

3. Conclusive framework and collaborative research proposal

Framework

- ❑ Flood modelling (Integration of each natural sciences)
 - ❑ Scale-up
 - ❑ Integration: sediment, trees, drainage
 - ❑ Estimating parameters with remote sensing
- ❑ Flood risk modelling (integration of natural and social sciences)
 - ❑ Human behavior modelling
 - ❑ Flood loss estimation (direct/indirect damage)

Collaborative Research

- ❑ Assessment of nature-based solution impact at a catchment scale
- ❑ Combination of on-site observation and remote sensing
- ❑ Development of integrated flood risk assessment model