

DEBRIS FLOW HAZARD ASSESSMENT - FROM REGIONAL TO BASIN SCALE

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Forum topics	<input type="checkbox"/> Energy in 21st Century	<input type="checkbox"/> Cultural Heritage in Digital World
	<input type="checkbox"/> Engineering Capacity Building	<input checked="" type="checkbox"/> Disaster Risk Management & Governance for Resilient Communities
	<input type="checkbox"/> Construction 4.0	<input type="checkbox"/> BIM Lifecycle, Facility & Asset Management

Abstract: (250 to 500 words: for each heading use the bullet points or narrative - the submission including graphics should not exceed one page)

Problems - Issues / Challenges-Needs	In Slovenia, floods hazard assessment has been introduced by the national legislation and special regulations; it does not cover debris flows. Several large debris flows in the last few decades ask for special legislation and thus debris-flow hazard should be implemented in spatial planning process. Debris flow research in the past mainly focused on post-event analysis. When predicting potential events, several questions should be addressed: Where can it occur? What magnitude can we expect? What are its rheological characteristics?
Solutions - Methods / Results - Findings	Various morphological methods and susceptibility models were analyzed to classify torrential catchments into three groups: prone to debris flows, transitional catchments and catchments with no debris flow hazard. The main difference between floods and debris flows, when assessing magnitude of an event, is that a debris-flow magnitude is much harder to estimate than for torrential floods. Debris-flow magnitudes can be estimated using a landslide triggering model LS-Rapid. Main model input data are LiDAR digital terrain models (DTM1) and the geological map of Slovenia (scale 1:100 000). This approach can only determine the upper and lower limits for potential debris-flow magnitudes. Rheological parameters in the 2D numerical transport model Flo-2D can be calibrated for past events, but not for potential future events. Sensitivity analysis of the Flo-2D model has shown that volume concentration is the most relevant parameter for modeling results and that changing values of dynamic viscosity and shear resistance in a debris-flow has only small effects on the modeling results. The proposed methodology can be tested in other debris-flow prone areas in Slovenia.
Novelty - Value / Relevance to ...	A methodology for debris-flow hazard assessment on torrential fans was proposed covering phases from preliminary classification of torrential fans to a final preparation of debris-flow hazard maps. Such maps should avoid to apply sharp border lines between hazard classes, the transition between them should be smooth and the consequences of this novelty in hazard assessment for spatial planning procedures should be discussed and optimized.
Forum statement	In debris-prone areas, debris-flow hazard and risk should be assessed and furthermore used in spatial planning process to increase their resilience.

Keywords: (up to 5 keywords)

debris flows, hazard assessment, mathematical modeling, risk management, spatial planning

Graphics: (please use the gray area below for *representative graphics* or *graphical summary*: select the gray area below and paste your graphics)

