



Mapping areas exposed to erosion and water forces during extreme floods in steep terrain

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Extreme weather events, natural disasters and failure of climate change mitigation and adaptation are the risks with the highest likelihood of occurrence and largest global impact. According to the Natural Perils Pool, the direct compensations over the 10 last years due to Natural Hazards (NH) have costed Norway alone 27 billion NOK and the Public Sector even more. Historically, the attention has been on floods in the larger, slow responding watercourses. Due to a changing climate, it is both expected and experienced more frequent and more extreme rainfalls, creating violent flash floods in small catchments. In steep rivers, this induces rapid changing discharges and large water forces resulting in erosion and rivers taking new courses, destroying communities and threatening livelihoods and lives. Municipalities are responsible for mapping the risks natural hazards induce. When it comes to the risks due to floods in steep rivers, there is still a lack of approach and methodologies to handle their analysis. In this study, the flooding of Utvik (western Norway) in July 2017 is reconstructed using TELEMAC – MASCARET numerical simulating software. A 2D numerical model of Utvik was built. The proposed solution consists of a coupled hydrodynamic and morphodynamic simulation, which includes effect of erosion and deposition to the flood's study. So far, some instabilities in bed evolution were observed in river channel. Further research will explore the most suitable set up of the model to simulate the phenomena. The methodology is also tested and compared in the neighboring river in Innvik.