NTNU

Faculty of Engineering Science and Technology

Department of Hydraulic and Environmental Engineering

Tittel	**Hydraulic model suitability for hydrodynamic analysis based on LiDAR data of steep rivers**
Type	Prosjekt/Master oppgave
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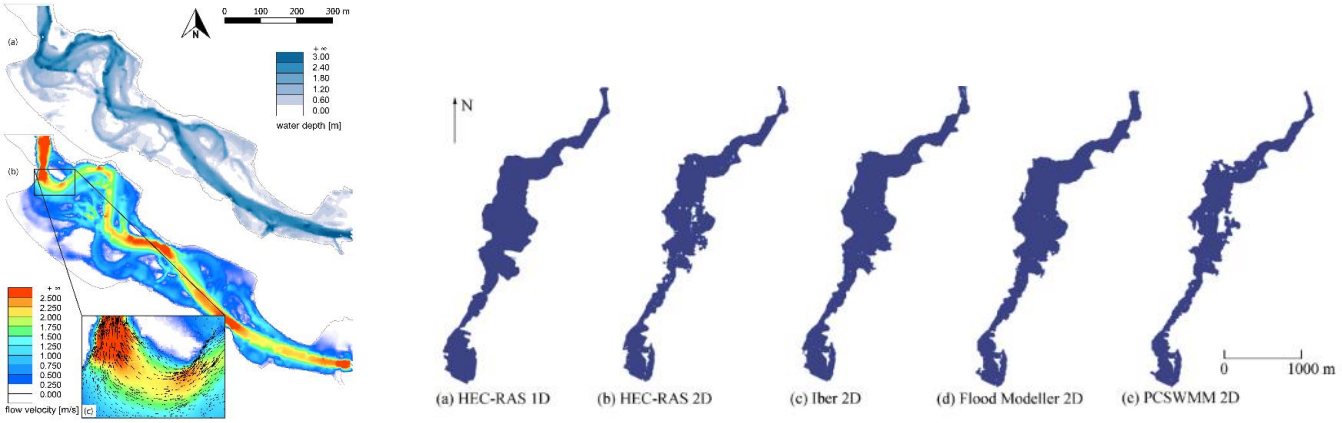
Sted	Trondheim, Norway

Short description with pictures/Kort beskrivelse med et bilde

Advanced topographic-modelling methods such as LiDAR or Drone photogrammetry provide high-resolution digital elevation data, which contributes to an increasing hydrodynamic modelling reliability, provides more accurate information and facilitates decision-making.

The aim of this master thesis is to compare two-dimensional hydrodynamic simulations on steep rivers based on LiDAR input data carried out in at least two different software (*e.g.* HEC-RAS 2D *versus* Iber2D, Telemac-Mascaret, Flood Modeller-TUFLOW, REEF3D, ANUGA, Gerris, etc.) in order to determine their suitability to identify the most sensitive parametres during changing environmental conditions. The research focus will be on identifying critical parametres in steep rivers and defining the performance of hydrodynamic models by contrasting numerical simulations and documented observations in low, normal and extreme (*i.e.* flooding) flow conditions. The outcome of this comparison will contribute to highlight the importance of detailed geographic data in hydraulic modelling as well as the limitations of state-of-the-art fluid solvers. The candidate is expected to have knowledge on hydrodynamics and be willing to master a new hydraulic modelling package if not previously familiar with it.



Figures show: Left) 2D water depth (DWM) (a) and depth-averaged flow velocity (b) based on 3D LiDAR point cloud (from Mandlburger et al., 2015); Right) comparison of flood areas simulated with different models for the same return period (from Pinos & Timbe, 2019).