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Analysing the Uncertainty from using Different Representations of Physical Processes in Inundation

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The paper will present analysis of the uncertainty that arises from using different physical representations and how this compares to uncertainties due to input parameters. Using the LISFLOOD-FP code we use an approach based on a diffusion wave, an approach that incorporates excludes the advection term in the shallow water equations and a Godunov-based approach that solves the full two-dimensional shallow water equations. By using these representations within the same code we can make direct comparison of the models. The various models are then run in a Monte Carlo framework to study the effects and make comparisons to effects from parameter uncertainty. A case study in Glasgow, Scotland will be presented. This case study has been used as a benchmark in research by a number of authors and in a study by the Environment Agency for England and Wales. The results show that physical representation has a significant impact, but that this effect cannot be entirely separated from parameter uncertainty. Therefore the modelling parameter space is complex and all parameters contribute to uncertainty overall.