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Integration of remote sensing and in-situ data in large scale hydraulics

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Calibration and validation of hydraulic models is – compared to other disciplines like e.g. hydrology – still underdeveloped. This has mainly two reasons: the lack of appropriate data and the large computational demand in terms of CPU-time of the models. Both aspects are aggravated in large scale applications. However, there are recent developments that improve the situation on both the data and computing side. Remote sensing, especially radar-based techniques proved to provide highly valuable information on flood extends, and in case high precision DEMs are present, also on spatially distributed inundation depths. On the computing side the use of parallelization techniques brought significant performance gains. In the presented study we build on these developments by calibrating and validating a large scale one-dimensional hydraulic model of the whole Mekong Delta downstream of Kratie in Cambodia: We combined in-situ discharge data from a network of river gauging stations with a series of inundation masks derived from Advanced Synthetic Aperture Radar (ASAR) satellite images in an automatic calibration process. In this presentation we show how these data with high spatial coverage/low temporal resolution and high temporal resolution/low spatial coverage are combined to be used in a parallelized gradient based automatic calibration procedure, as well as the performance of the optimizer and model.