



Setting the scene for SWOT: global maps of river reach hydrodynamic variables

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Credible and reliable characterization of discharge from the Surface Water and Ocean Topography (SWOT) mission using the Manning-based algorithms needs a prior estimate constraining reach-scale channel roughness, base flow and river bathymetry. For some places, any one of those variables may exist locally or even regionally as a measurement, which is often only at a station, or sometimes as a basin-wide model estimate. However, to date none of those exist at the scale required for SWOT and thus need to be mapped at a continental scale. The prior estimates will be employed for producing initial discharge estimates, which will be used as starting-guesses for the various Manning-based algorithms, to be refined using the SWOT measurements themselves. A multitude of reach-scale variables were derived, including Landsat-based width, SRTM slope and accumulation area. As a possible starting point for building the prior database of low flow, river bathymetry and channel roughness estimates, we employed a variety of sources, including data from all GRDC records, simulations from the long-time runs of the global water balance model (WBM), and reach-based calculations from hydraulic geometry relationships as well as Manning's equation. Here, we present the first global maps of this prior database with some initial validation, caveats and prospective uses.