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Application of hyper-resolution hydrological modeling for water resources decision making

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Managing water resources and basin reclamation requires hydrological data across a set of scales. Unfortunately, in many areas the in-situ data is sparse, or not made available to water managers. With NASA, ESA and Chinese satellites, their data can potentially be merged with in-situ gauge data. Doing so results in a number of research challenges: 1. Satellite data based on microwave sensors (e.g. L-band sensors from SMAP or SMOS) results in coarse resolution (~35-50 km) making the data difficult for management; (ii) Satellite data from instruments like LandSat (~90m) suffers from cloud contamination. New satellites improve resolution but still suffer cloud contamination; (iii) Precipitation (along with radiation) falls between these two spectrums, and its fast dynamics can impact water management decision making; (iv) Topographic and soil characteristics, which govern the runoff from the land to rivers; and (v) river flows that are a water source for drought and a site for reservoirs.

In this talk I will present a new land surface model (HydroBlocks) that we run at a 30m resolution at regional to continental scales. The water is transmitted to hyper-resolution streams for which we have extracted ~2,900,000 reaches. Visualization of the models will offer the listener the impact of moving to these scales; and the data needed for water resources management of river basins.