Observation-based bankfull discharge estimates to improve global flood models

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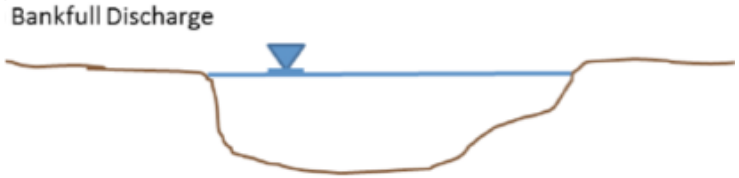
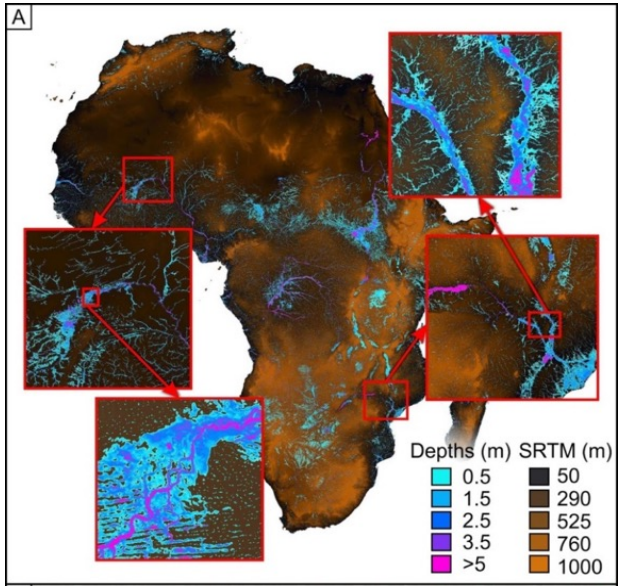
Challenges of Global Flood Models and the EvoFlood project

- Accurate channel conveyance capacities and its dynamics over time
- DEM-derived river networks and flow paths (no bifurcations, channel branches, canals)
- Variations in floodplain roughness
- The effects of dams on peaks and downstream sediment supply

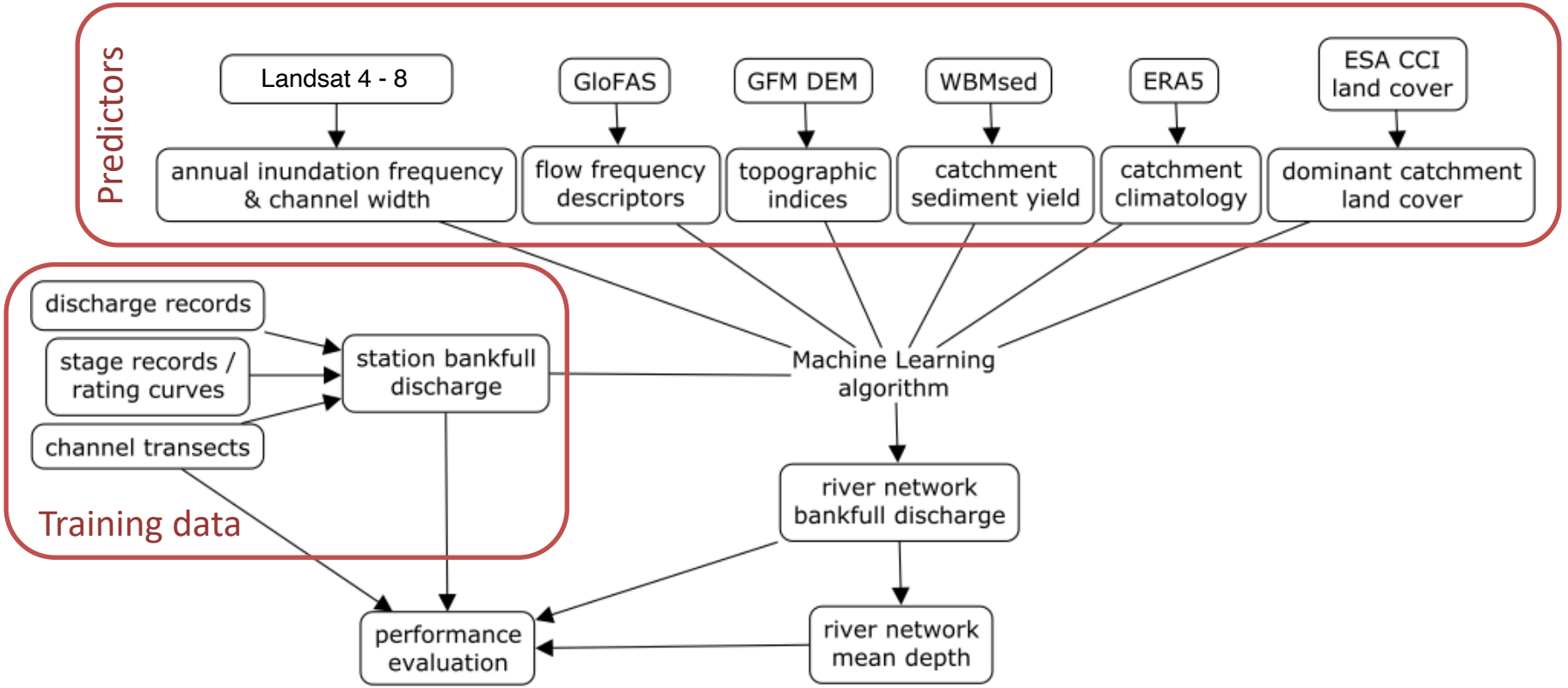




EVOFLOOD

http://www.evoflood.co.uk/

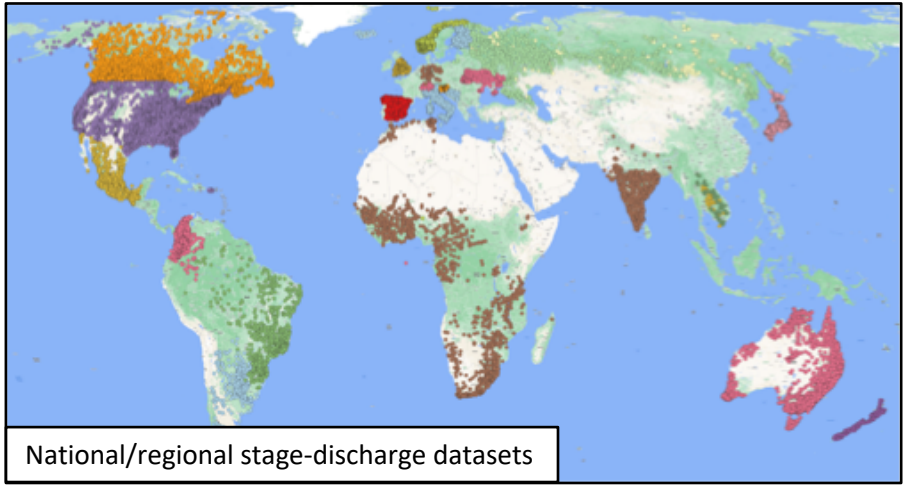
Data-driven estimates of bankfull discharge

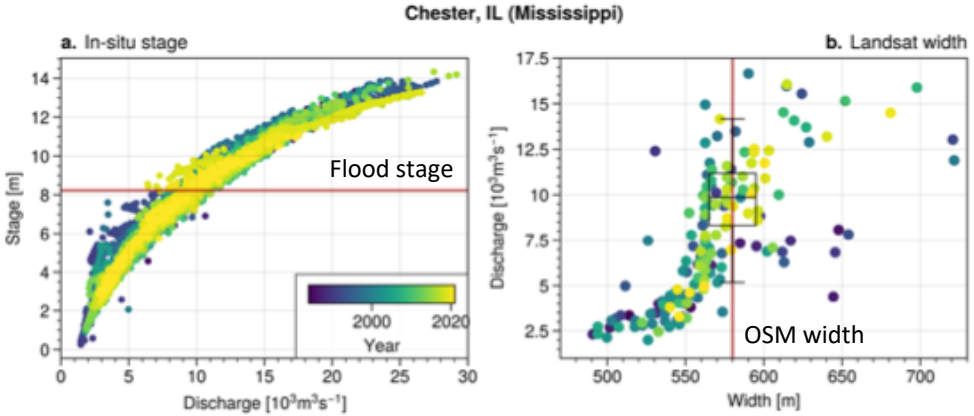


Observational training data for bankfull discharge

- Derived from stage & discharge observations
- Landsat river width vs discharge observations at OSM “riverbank” width
- Reference datasets from national agencies and literature

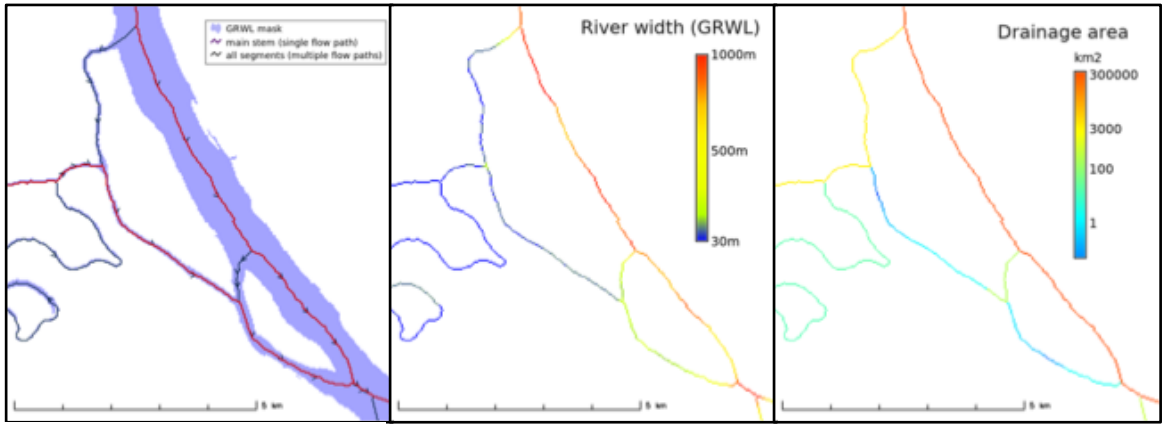
(Wortmann et al., in prep.)





High-resolution predictors for a new tributary and distributary river network

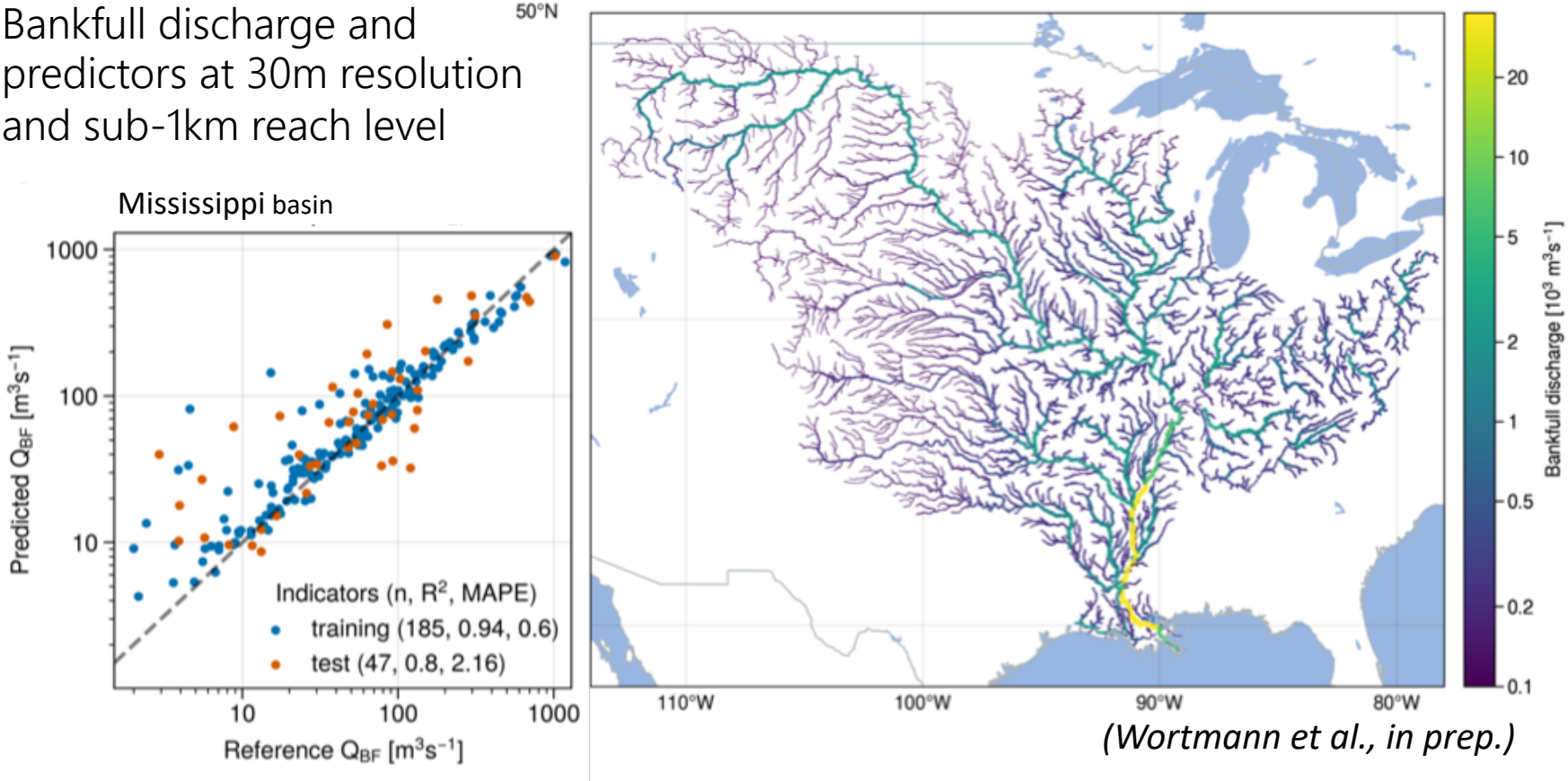
- River network based on Landsat water mask, 30m FABDEM and OSM
- topological routing, i.e. includes braids, bifurcations, deltas, canals
- Floodplain inundation width & recurrence from remote sensing imagery (Landsat, Pekel et al. 2016)



(Wortmann et al., in prep.)

Global bankfull discharge estimates

- Bankfull discharge and predictors at 30m resolution and sub-1km reach level



(Wortmann et al., in prep.)

Conclusions

- Bankfull discharge is a key uncertainty in large-scale flood models
- Data-driven approach to estimate global, reach-scale values developed
- Compiling an observation-based training dataset is the tricky part
- New datasets are expected to improve large-scale flood inundation simulations

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