# Long term series of discharges distributed in the Congo River basin from hydrological modelling and satellite altimetry

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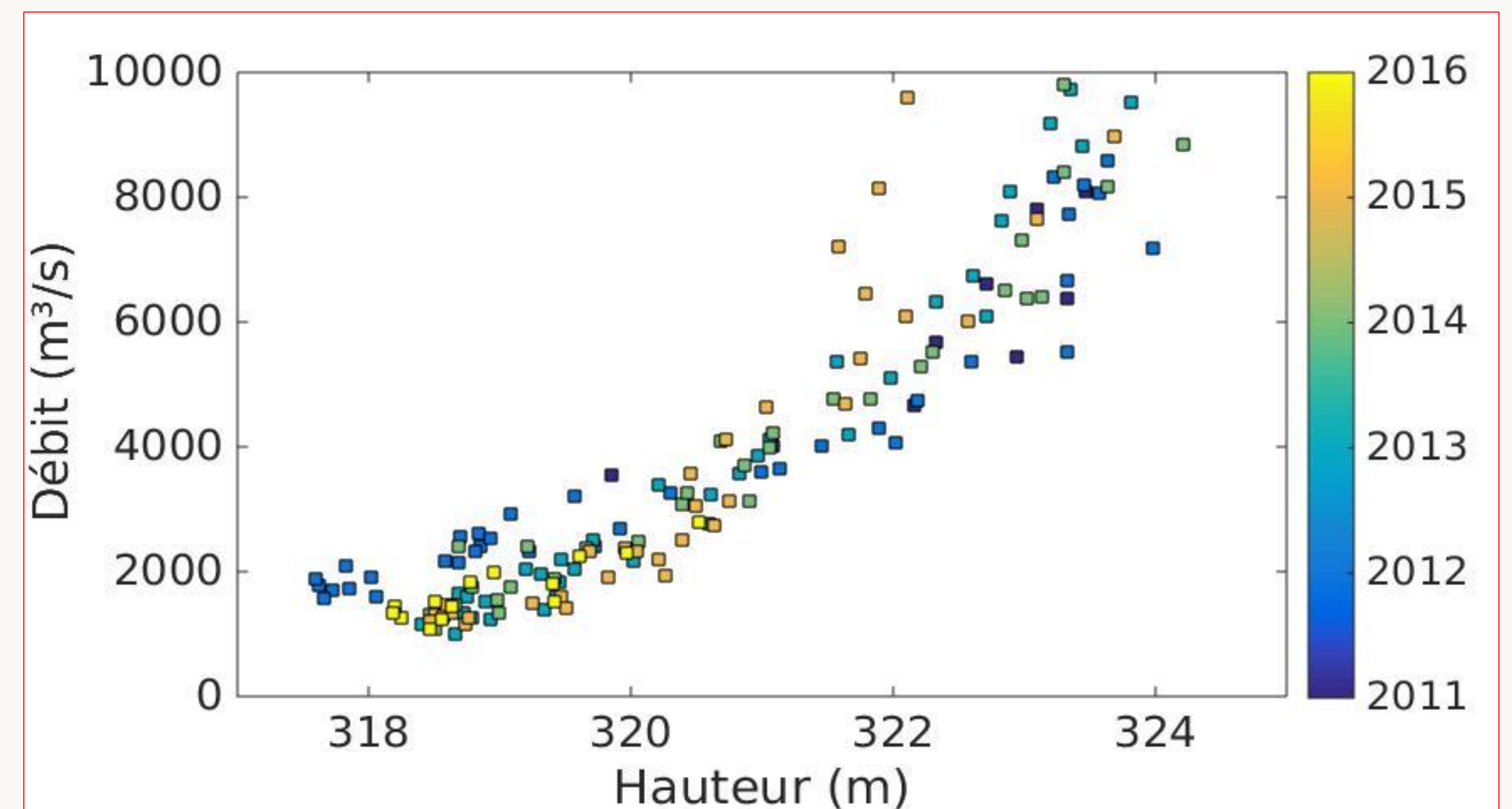5. LEGOS UMR5566 IRD/CNES/CNRS/UPS, Toulouse, France
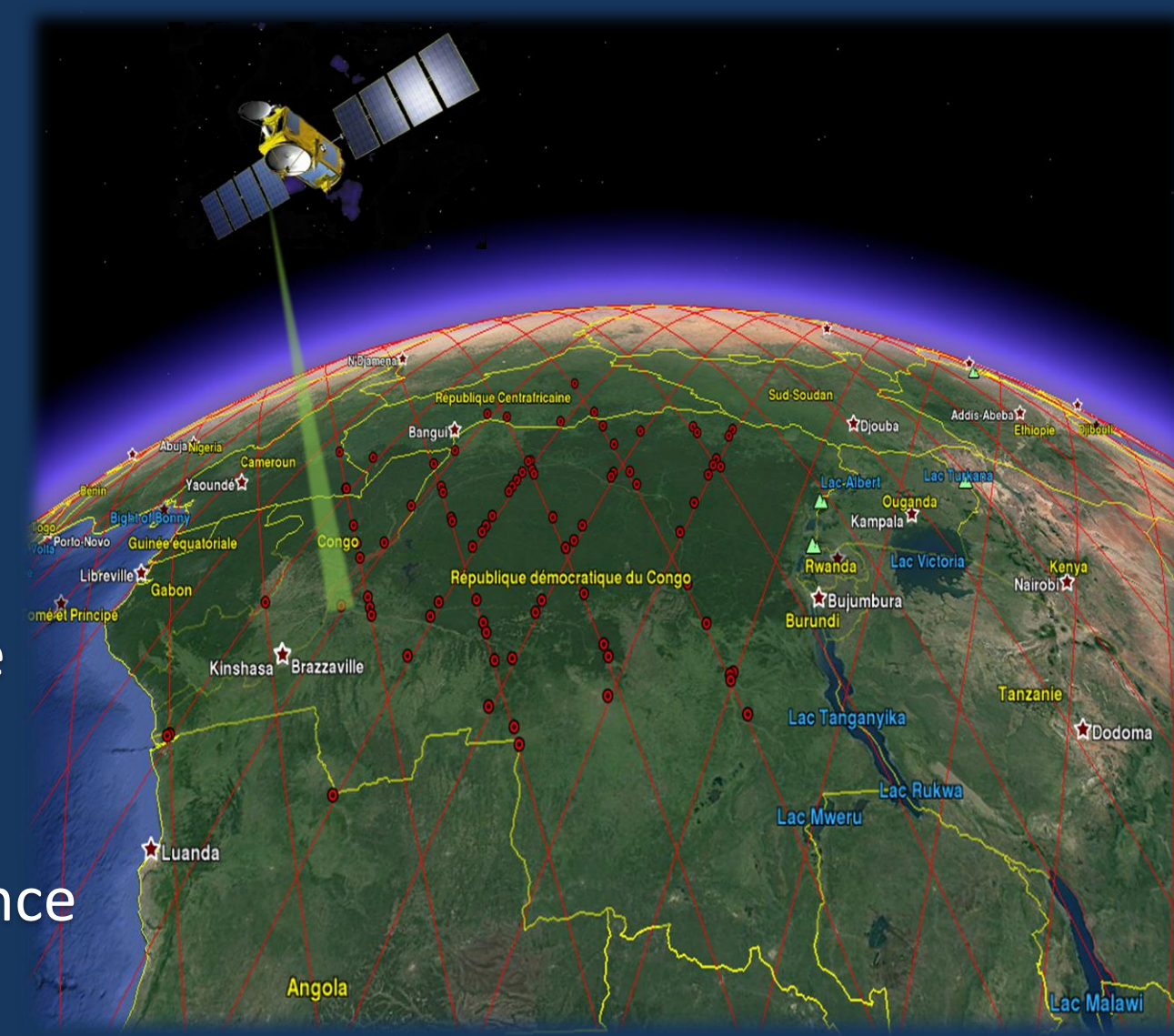
The Congo River basin

➢ The Congo River basin is one of the largest and most ungauged basins
➢ The anthropic pressure on the water cycle is increasing(dams construction, mining pollution, irrigation, deforestation, …)
➢ Hydraulics and hydrodynamics are unknown; there is a strong interaction with global climate (ENSO, etc.)

Hydrological modelling & data inputs

➢ Distributed hydrological and hydrodynamic model set on the entire Congo River basin (**MGB-IPH**)
➢ Remote sensing datasets for climate, soil and vegetation description
➢ Remote sensing rainfall estimates (**GPM TAPEER 1.5**) from 2012 to 2016 (res: 0.25°x1d)
➢ Very few in-situ heights and discharges data but lot of satellite altimetry heights (**Saral/AltiKa & Jason2&3**)
➢ Model calibrated at gauges anyway

○ Envisat & Saral
○ Jason2&3

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
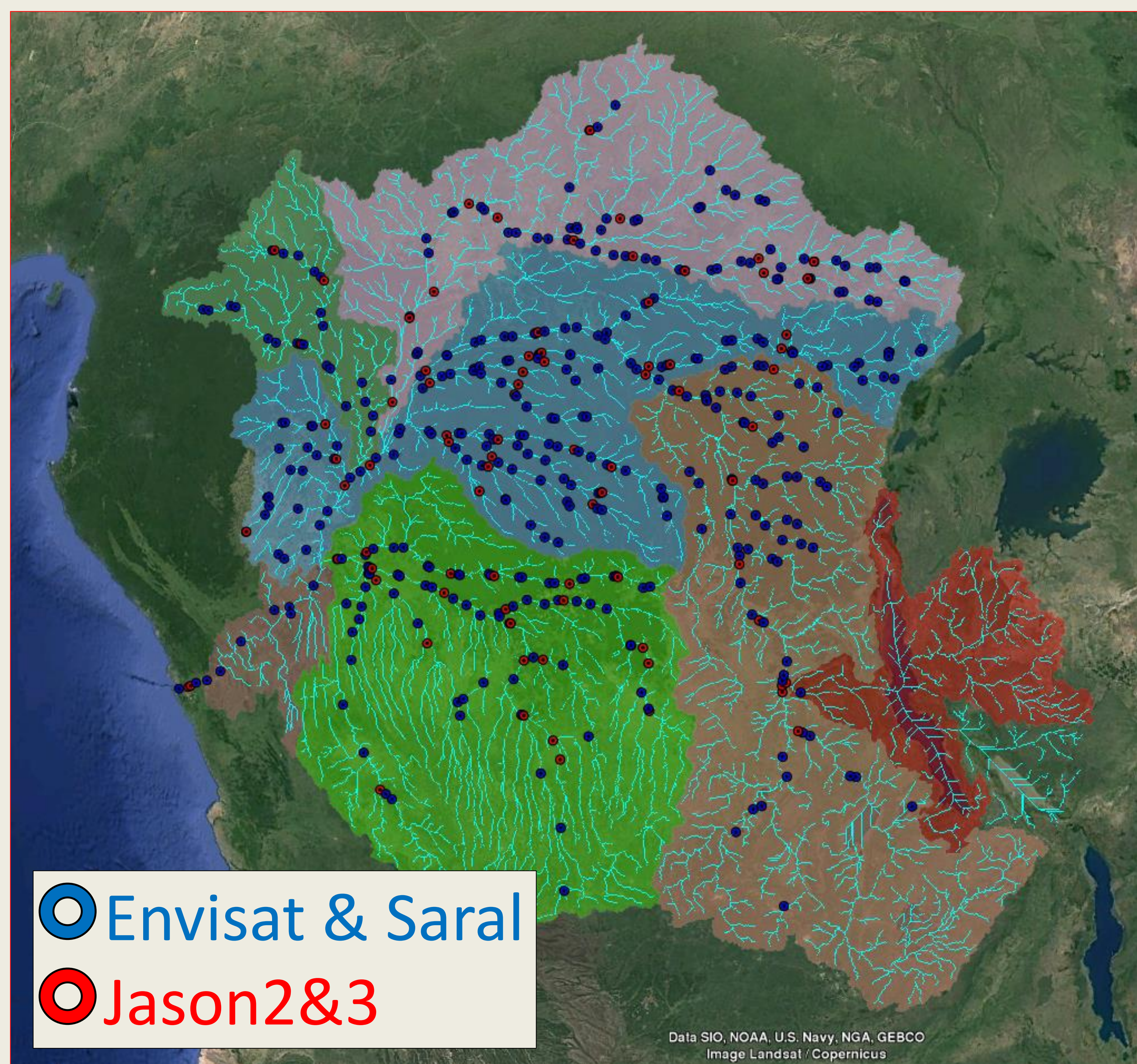
Rating curves and long term discharges

➢ Set of RCs built for Qsim vs. Haltim (Saral/AltiKa & Jason-2)
➢ Series extended with ENVISAT & Jason-3 observations
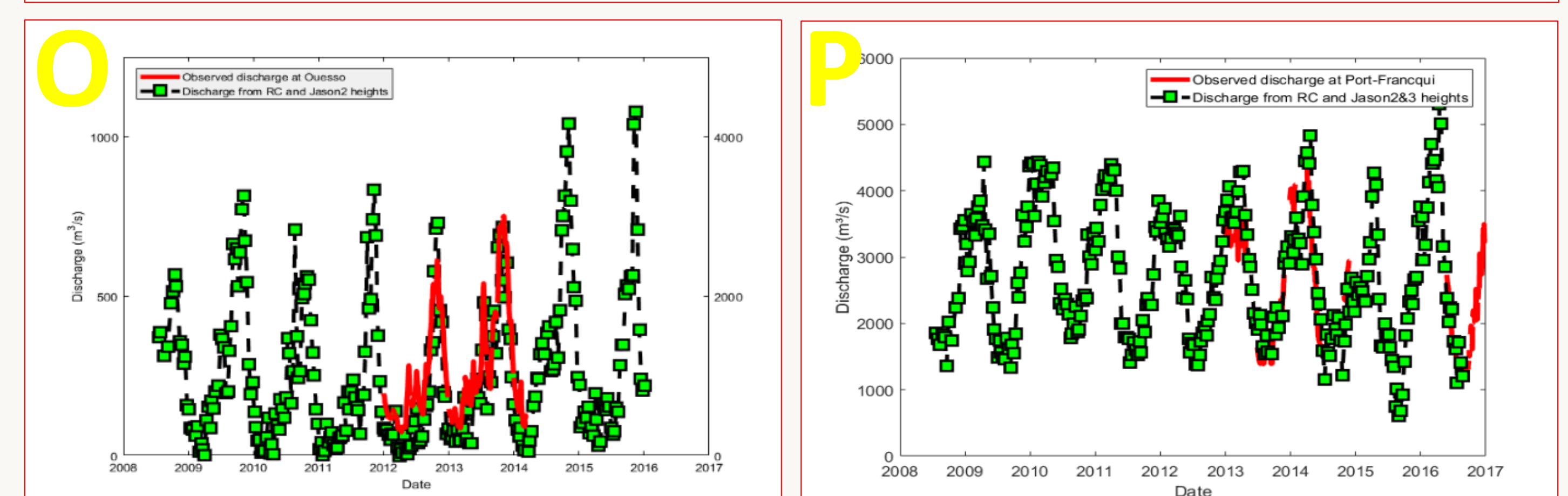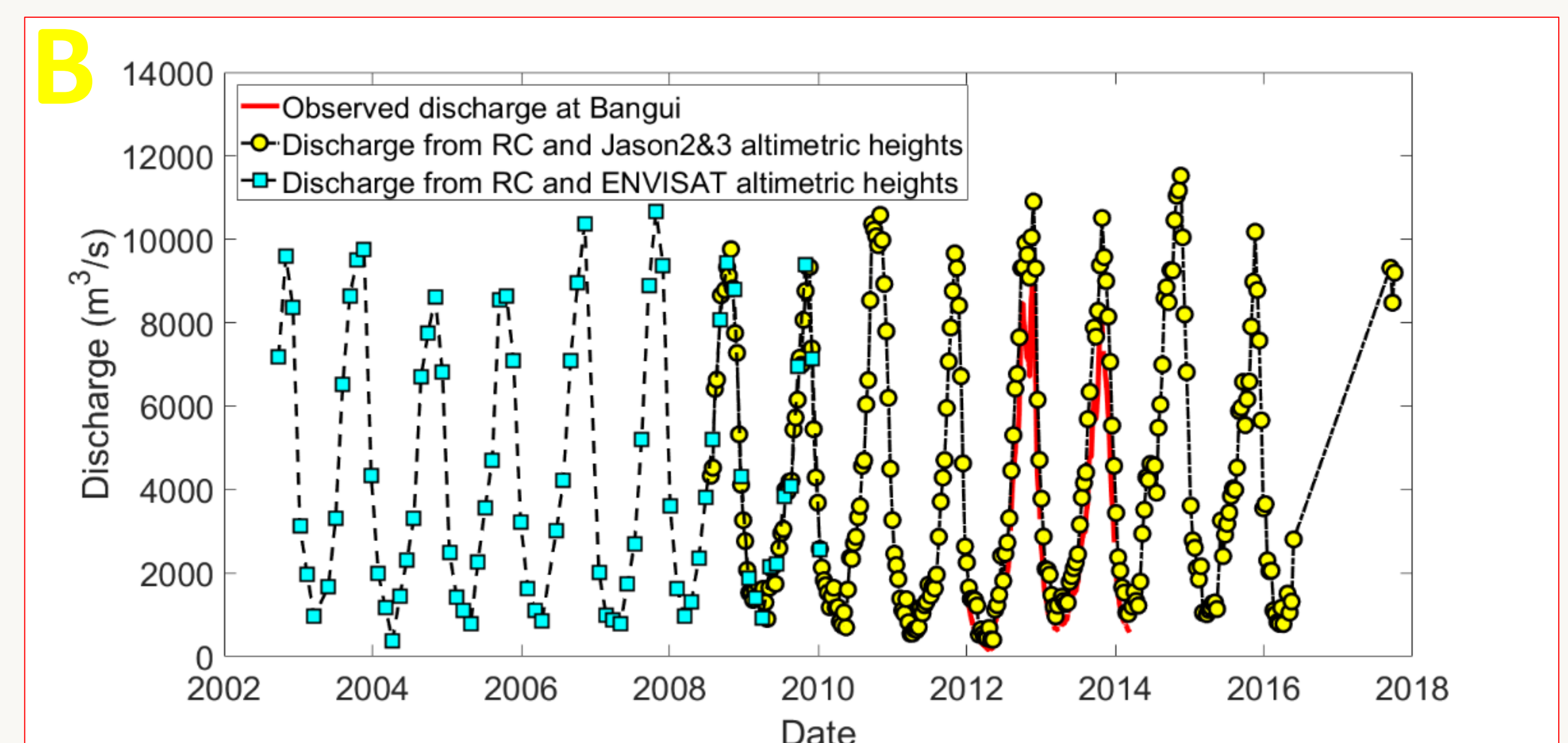
Discussion

➢ Remote sensing rainfall estimate + satellite altimetry ⟹ model validation in an ungauged basin (here, all the upper Congo)
➢ Distributed set of rating curves providing NRT discharge and depth estimate (from Theia/Hydroweb operational stations or after manual extraction)
➢ New retrackers applied to J1, ERS2 and T/P ⟹ possibility of extending series backwards; Sentinel3A can be used to densify network and/or time sampling

References

➢ Paris et al. (2016), *Stage-discharge rating curves based on satellite altimetry and modeled discharge in the Amazon basin*, WRR
➢ Theia/Hydroweb: http://hydroweb.theia-land.fr/