

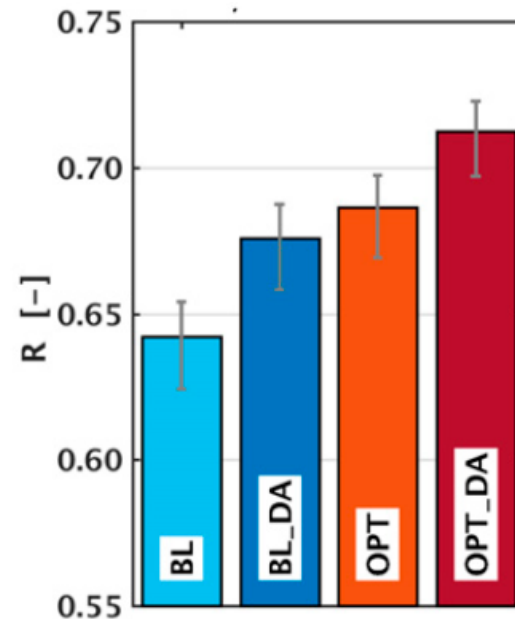


Improved Hydrological Simulation Using SMAP Data: Relative Impacts of Model Calibration and Data Assimilation

Problem: Data assimilation is one approach for utilizing satellite-based data in hydrological simulation, and model calibration is another. To what extent do these two approaches extract complementary information?

Finding: We calibrate a land surface model parameter using SMAP data. We then perform four hydrological simulations in which the calibrated parameter and SMAP data assimilation are used in different combinations. Using both data assimilation and model calibration provides the highest simulation skill.

Impact: Data assimilation and model calibration effectively access independent information contained within the SMAP dataset. Those applying SMAP data to hydrological simulation might do well to use both approaches.



Accuracy of simulated soil moisture (vs. in situ obs)

- No calibration, no data assimilation (BL)
- Data assimilation, but no calibration (BL_DA)
- Calibration, but no data assimilation (OPT)
- Calibration and data assimilation (OPT_DA).