UFMG SMARH

FEDERAL UNIVERSITY OF MINAS GERAIS
BRAZIL

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Progressive assessment of multivariate parameter estimation in distributed hydrological modelling using spatial patterns of remote sensing data

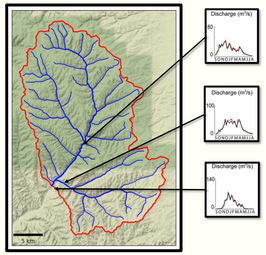
Vinicius Moreira, Francisco Silva and Camila Welerson

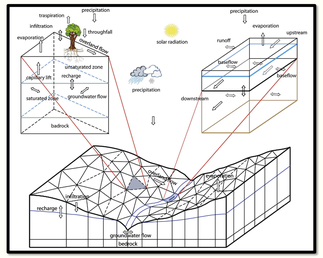
Code

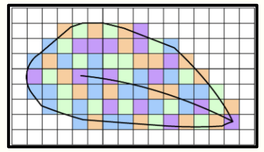
Abstract

Sharing is encouraged

1. MAIN PROBLEM







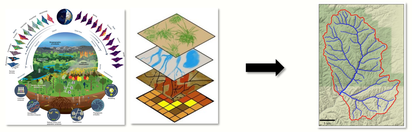
The estimation of parameters in distributed hydrological models using only streamflow records can lead to spatial and temporal inconsistencies.

Questions

I. Can the use of multiple remote sensing data during the calibration improve the spatial patterns of simulated fluxes?

II. What is the influence on streamflow when using a multi-objective parameter estimation strategy?

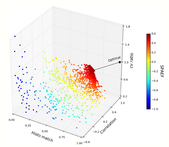
2. METHODOLOGY



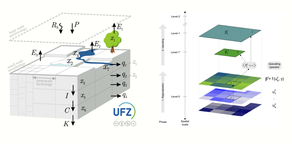
SPAtial EFficiency metric (SPAEF)

The mesoscale Hydrologic Model mHM

OSTRICH



Koch et al (2018)



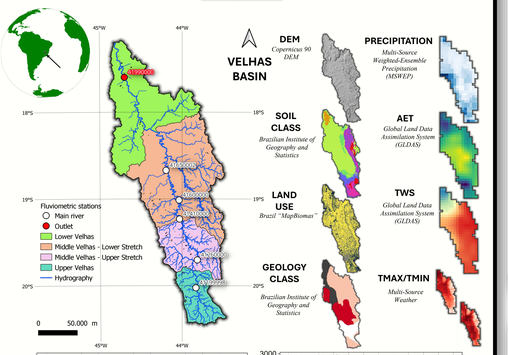
Samaniego et al. (2010), Kumar et al. (2013) and Thober et al. (2019)

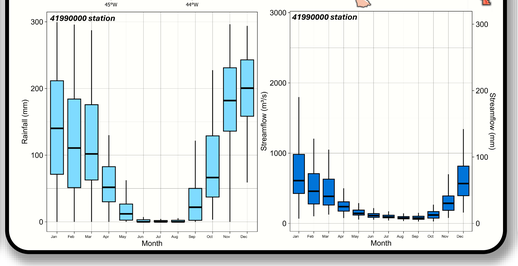
PARAMETER ESTIMATION STRATEGY

1. Only Streamflow (KGE)
2. Streamflow (KGE) + AET (SPAEF)
3. Streamflow (KGE) + TWS (SPAEF)
4. Streamflow (KGE) + AET + TWS (SPAEF)

3. STUDY AREA AND DATA

- **Drainage area:** 29,173 km².
- **River length:** Approx. 801 km.
- **Population:** More than 5 million inhabitants.

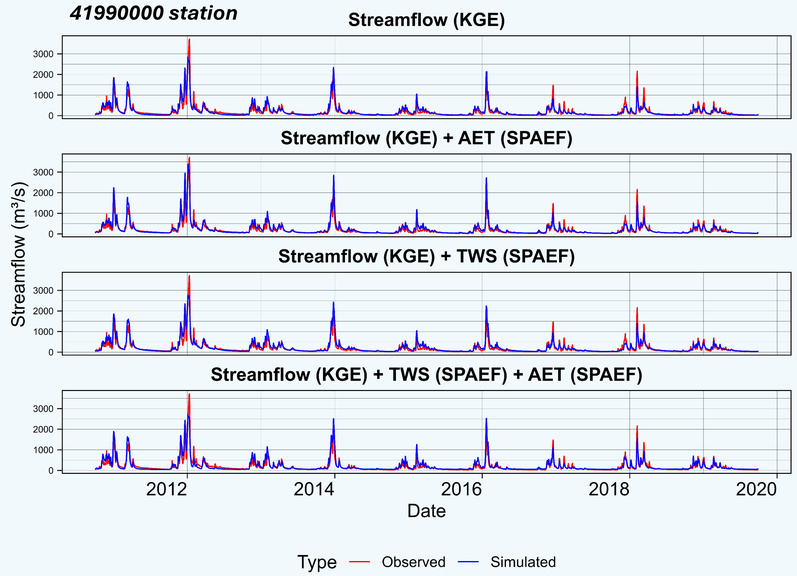


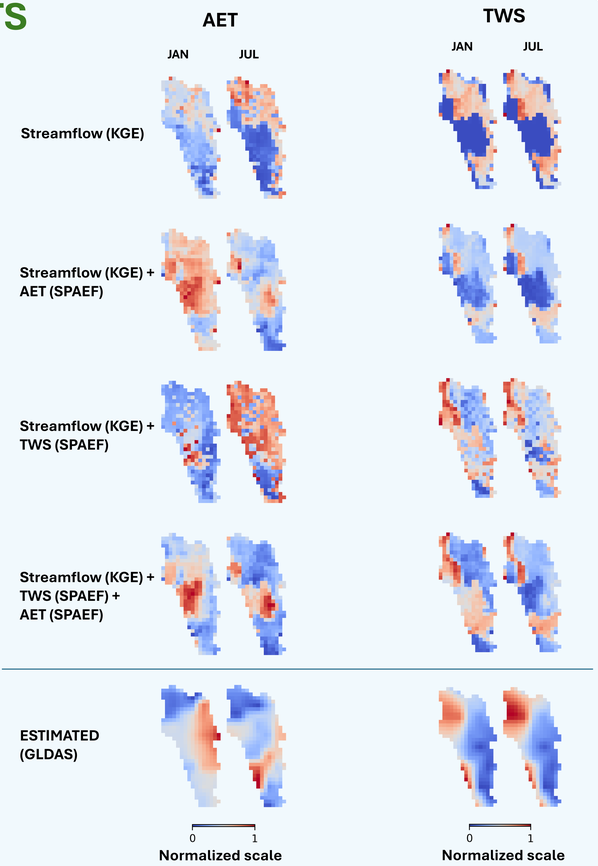


4. RESULTS

PAR. EST. STRATEGY	Streamflow (KGE)	AET (SPAEF)	TWS (SPAEF)
Streamflow (KGE)	0.742	-1.244	-2.654
Streamflow (KGE) + AET (SPAEF)	0.731 ≈	0.071 ↑	-0.391 ↑
Streamflow (KGE) + TWS (SPAEF)	0.741 ≈	-0.358 ↑	0.189 ↑
Streamflow (KGE) + TWS (SPAEF) + AET (SPAEF)	0.724 ≈	0.002 ↑	0.107 ↑

1 is the max value for both metrics





5. CONCLUSIONS

I. Incorporating multiple remote sensing data sources into the calibration process can improve the agreement between observed and simulated values especially for the datasets employed in the calibration.

II. Similar degrees of agreement between streamflows can be obtained for completely disparate spatial fluxes.