

Supplement of Hydrol. Earth Syst. Sci., 25, 17–40, 2021
<https://doi.org/10.5194/hess-25-17-2021-supplement>
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Hydrology and
Earth System
Sciences

Open Access



Supplement of

Evaluation of 18 satellite- and model-based soil moisture products using in situ measurements from 826 sensors

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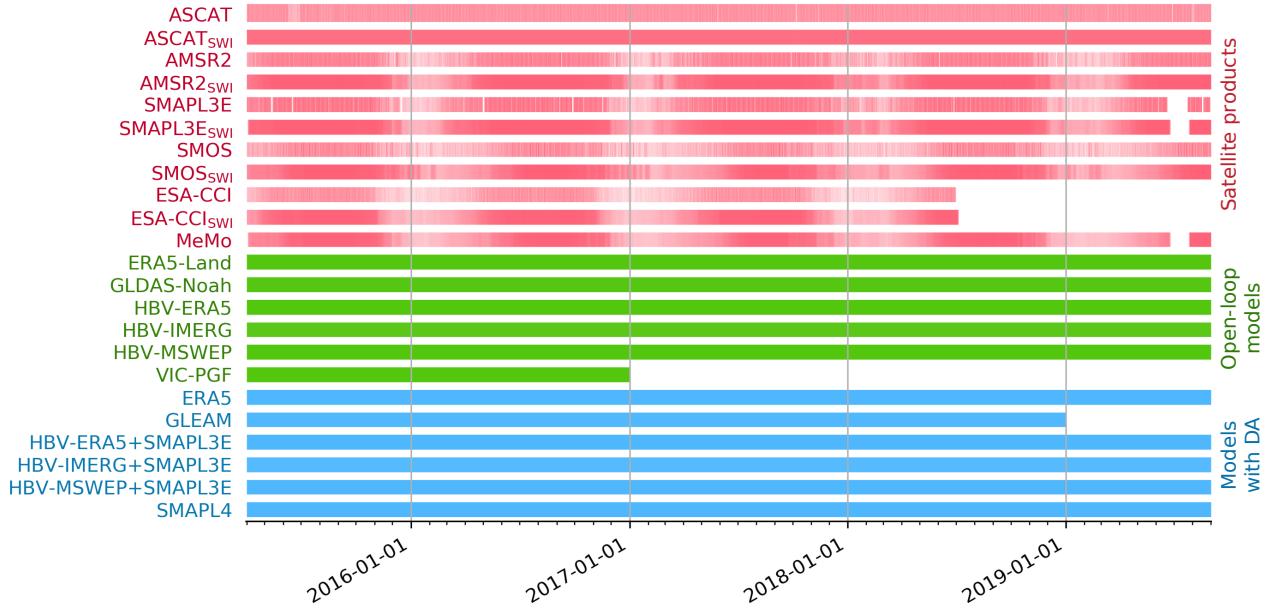


Figure S1: For each product, the daily % of probes ($N = 826$) with ≥ 1 soil moisture estimate, before masking the data based on soil temperature and snow depth. White indicates that there are no soil moisture estimates for any of the probes. The x -axis spans the evaluation period (March 31, 2015, to September 16, 2019).

Table S1: Parameters for HBV calibrated using different precipitation datasets (ERA5, IMERG, and MSWEP). We only calibrated the 7 parameters pertaining to the snow and soil routines and thus relevant for simulating soil moisture.

Parameter	Description	Calibration range		Calibrated value		
		Minimum	Maximum	ERA5	IMERG	MSWEP
BETA	Shape coefficient of recharge function (-)	1	6	2.78	3.49	2.83
FC	Maximum soil moisture storage (mm)	50	1000	169.35	131.16	145.48
LP	Soil moisture value above which actual evaporation reaches potential evaporation (-)	0.2	1	0.84	0.98	0.76
TT	Threshold temperature ($^{\circ}\text{C}$)	-5	5	0.03	2.54	2.59
CFMAX	Degree-day factor ($\text{mm } ^{\circ}\text{C}^{-1} \text{ d}^{-1}$)	0.5	10	6.37	4.61	1.17
CFR	Refreezing coefficient (-)	0	0.1	0.00	0.08	0.10
CWH	Water holding capacity (-)	0	0.2	0.19	0.13	0.02

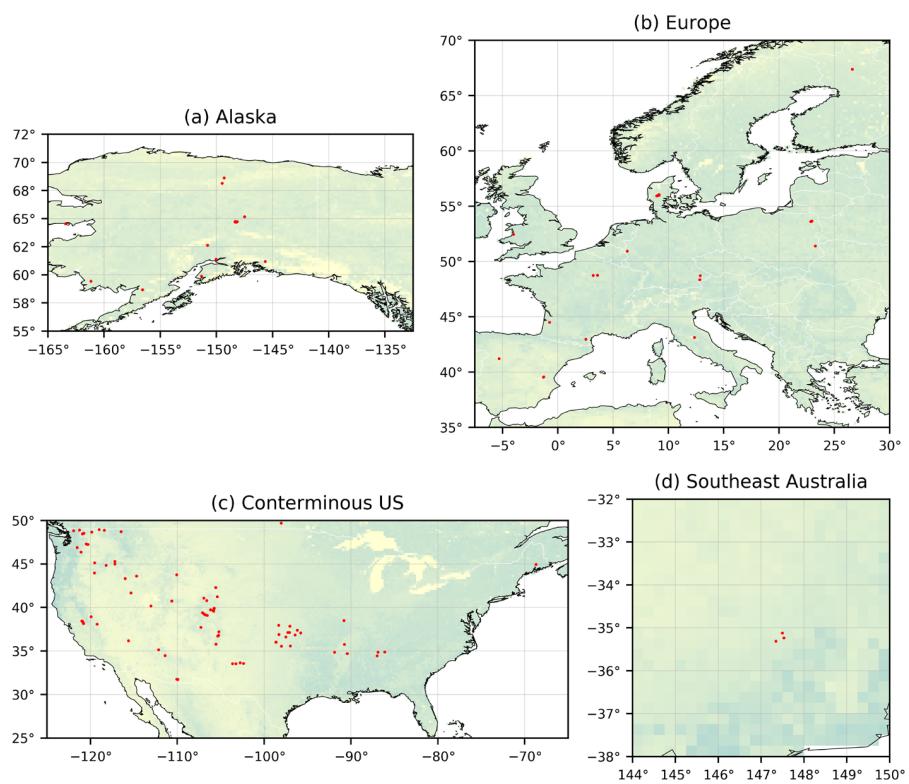


Figure S2: Location of the 177 independent probes used for calibration of the HBV model.