

Supplementary material for: Long-term irrigation water use datasets from multiple Earth Observation-based methods in major irrigated regions

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Overview

This supplementary document provides additional evaluation tables referenced in the main manuscript. Tables are numbered using the prefix “S” (Tables S1–S3).

S1. Evaluation metrics for the individual years 2013 and 2018 in the CONUS region

5 **S2. District-level (Murray Mulwala and Murray Wakool) validation metrics in the Murray–Darling Basin**

S3. District-level (Murrumbidgee and Coleambally) validation metrics in the Murray–Darling Basin

Table S1. State-level RMSD, bias, and Pearson correlation (R) between IWU estimates and FRIS observations for 2013 and 2018 in the CONUS.

Method	Dataset	RMSD (km ³ /yr)		Bias (km ³ /yr)		Pearson R	
		2013	2018	2013	2018	2013	2018
SM-Delta	CCI Combined & FLUXCOM	6.3	4.8	3.6	1.7	0.68	0.64
	CCI Passive & FLUXCOM	6.4	4.4	4.2	2.0	0.80	0.76
	CCI Active & FLUXCOM	7.2	4.9	4.4	2.5	0.68	0.70
	CCI Combined & SSEBOP	9.8	9.3	6.2	4.9	0.67	0.57
	CCI Passive & SSEBOP	10.1	9.3	6.8	5.2	0.77	0.64
	CCI Active & SSEBOP	10.5	9.7	7.0	5.7	0.68	0.61
SM-Inversion	CCI Combined	6.0	5.7	1.6	0.6	0.34	0.23
	CCI Passive	4.5	4.0	1.3	0.0	0.65	0.67
	ASCAT	6.0	6.9	1.1	1.9	0.38	0.27
	SMOS	5.5	5.3	-0.5	-0.9	0.40	0.38
	SMAP	–	6.7	–	0.8	–	0.22
Model-obs. integration	Landsat-based irrigation map	4.0	3.7	1.4	0.90	0.80	0.77

Table S2. RMSD, Bias, and Pearson R for the Murray Mulwala and Murray Wakool irrigation districts (Murray–Darling Basin).

Method	Dataset	Murray Mulwala			Murray Wakool		
		RMSD (mm/month)	Bias (mm/month)	Pearson R (–)	RMSD (mm/month)	Bias (mm/month)	Pearson R (–)
SM-based Delta	CCI Combined & FLUXCOM	13.19	4.45	0.28	14.30	10.32	0.16
	CCI Passive & FLUXCOM	14.89	7.28	0.24	16.19	13.04	0.22
	CCI Active & FLUXCOM	12.95	-3.80	0.22	11.33	5.71	0.12
	CCI Combined & SSEBOP	14.80	0.51	0.06	12.54	5.93	0.18
	CCI Passive & SSEBOP	16.31	3.34	0.04	14.21	8.65	0.23
	CCI Active & SSEBOP	15.64	-7.74	-0.01	10.24	1.31	0.16
SM-based Inversion	CCI Combined	13.92	4.00	0.00	12.41	9.21	0.15
	CCI Passive	13.38	6.19	0.32	16.05	13.91	0.32
	ASCAT	18.59	12.29	0.20	14.91	11.39	0.32
	SMOS	16.43	8.55	0.11	19.12	15.62	0.36
	SMAP	11.65	4.91	0.18	12.81	10.08	0.35
Model-obs. integration	Landsat-based irrigation map	14.92	9.01	0.47	16.13	14.19	0.33

Table S3. RMSD, Bias, and Pearson R for the Murrumbidgee and Coleambally irrigation districts (Murray–Darling Basin).

Method	Dataset	Murrumbidgee			Coleambally		
		RMSD	Bias	Pearson R	RMSD	Bias	Pearson R
		(mm/month)	(mm/month)	(–)	(mm/month)	(mm/month)	(–)
SM-based Delta	CCI Combined & FLUXCOM	13.07	6.85	0.15	18.82	3.73	0.44
	CCI Passive & FLUXCOM	15.20	10.31	0.29	20.91	6.59	0.39
	CCI Active & FLUXCOM	13.15	1.93	-0.03	19.60	4.75	0.43
	CCI Combined & SSEBOP	11.72	4.38	0.38	16.34	0.50	0.54
	CCI Passive & SSEBOP	15.83	7.83	0.41	19.79	2.36	0.45
	CCI Active & SSEBOP	10.83	-0.55	0.23	17.95	8.98	0.57
SM-based Inversion	CCI Combined	11.72	4.38	0.38	21.44	3.99	-0.11
	CCI Passive	15.83	7.83	0.41	22.20	0.28	0.02
	ASCAT	22.85	13.09	-0.12	27.22	11.81	0.00
	SMOS	18.23	13.57	0.10	21.17	7.14	0.20
	SMAP	9.64	4.15	0.38	15.82	1.80	0.12
Model-obs. integration	Landsat-based irrigation map	7.59	4.87	0.66	28.80	17.68	0.41