Supplement of

ET-WB: water balance-based estimations of terrestrial evaporation over global land and major global basins

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Table S1. List of 14 existing water transfer megaprojects from Shumilova et al. (2018). Please refer to the Shumilova et al. (2018) for the whole of the global water diversion project database.

Project name	Start of project operation	Continent	Country	Donor	Recipient	Transboundary status: international (I)/ national (N)	Total water transfer distance, km	Total water transfer volume, km³ a⁻¹	Estimated project cost, billion US$	Purposes of water transfer
Eastern National Water Carrier	1987	Africa	Namibia	Okawango River, Van Bach Dam	Grootfontein	N	394	0.063	0.15	Domestic supply
Orange river Transfer Scheme	1987	Africa	South Africa	Orange River basin	Great Fish and Sundays Rivers	N	97	1.7	NA	Flood control; hydropower; domestic supply
Indira Gandhi Canal	1958	Asia	India	Harike Barrage at Harike (confluence of Satluj and Beas Rivers)	Thar Desert (Rajasthan state)	N	649	10.608	NA	Domestic supply; irrigation
Telugu Ganga Project	2004	Asia	India	Krishna River	Chennai city	N	406	0.1	NA	Domestic supply
Snowy river Scheme	1949	Australia	Australia	Murray-Darling River basin	Snowy River	N	100	1.1	0.63	Irrigation, hydropower
Tagus-Segura Transfer	1978	Europe	Spain	Upper Tagus River (Tagus Basin)	Talave Dam (Mundo River, Segura basin)	N	286	0.305	NA	Irrigation; domestic supply
California State Water Project	1962	North America	USA	Lake Oroville	South California (San Francisco bay area)	N	1128	3.33	9	Domestic supply; irrigation
Cutzamala System	1970	North America	Mexico	Cutzamala River in the Balsas basin	Great Mexico City	N	154	0.479	1.3	Domestic supply
James Bay Project (La Grande Project, Phase 1)	1984	North America	Canada	Eastmain, Opinaca and Caniapiscau Rivers	reservoirs on La Grande River	N	400	51.404	13.7	Hydropower
Churchill River Diversion	1977	North America	Canada	Churchill River	Nelson River	N	40	24.44	NA	Hydropower

Churchill Falls diversion	1970	North America	Canada	Rivers Naskaupi and Kanairktok	Churchill River	N	45	10.407	NA	Hydropower
Long Lake Diversion	1941	North America	Canada	Kenogami River	Lake Superior (through Long Lake)	N	0.4	1.42	NA	Hydropower, pulpwood transportation
Ogoki River Diversion	1943	North America	Canada	Ogoki River	Lake Superior (through Nipigon Lake)	N	8.5	3.6	NA	Hydropower, pulpwood transportation
Saint Joseph Lake Diversion	1958	North America	Canada	St-Joseph Lake (source of Albany River)	Root River (Nelson River)	N	7	2.7	NA	Hydropower

Table S2. Basic information of 168 selected river basins globally. The endorheic basins are colored yellow, of which Volga, Ural, and Kura basins that flow into the Caspian Sea are colored green.

ID	Name	Area (km²)	Continent	Ocean	Sea	AI	Climate type	Irrigation rate (%)	Irrigation rate based on surface water (%)	Irrigation rate based on ground water (%)	Irrigation rate based on non-conventional water (%)
1	Amazon	5,965,897	South America	Atlantic Ocean	North Atlantic	1.63	Humid	0.13	0.10	0.03	0.00
2	Congo	3,705,226	Africa	Atlantic Ocean	South Atlantic	1.01	Humid	0.01	0.01	0.00	0.00
3	Nile	3,353,206	Africa	Atlantic Ocean	Mediterranean Sea	0.30	Semiarid	1.52	1.47	0.06	0.00
4	Mississippi	3,240,619	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	0.57	Dry subhumid	4.17	0.87	3.30	0.00
5	Ob	3,040,606	Asia	Arctic Ocean	Kara Sea	0.57	Dry subhumid	0.22	0.20	0.02	0.00
6	Parana	2,647,020	South America	Atlantic Ocean	South Atlantic	0.73	Humid	0.77	0.57	0.20	0.00

7	Yenisey	2,505,671	Asia	Arctic Ocean	Kara Sea	0.68	Humid	0.03	0.03	0.01	0.00
8	Chad	2,471,047	Africa			0.15	Arid	0.08	0.06	0.02	0.00
9	Lena	2,453,648	Asia	Arctic Ocean	Laptev Sea	0.62	Dry subhumid	0.00	0.00	0.00	0.00
10	Amur	2,238,970	Asia	Pacific Ocean	Sea of Okhotsk	0.58	Dry subhumid	1.89	0.77	1.12	0.00
11	Niger	2,122,994	Africa	Atlantic Ocean	Gulf of Guinea	0.29	Semiarid	0.23	0.22	0.02	0.00
12	Mackenzie	1,795,636	North America, Central America and the Caribbean	Arctic Ocean	Beaufort Sea	0.59	Dry subhumid	0.00	0.00	0.00	0.00
13	Yangtze	1,748,118	Asia	Pacific Ocean	East China Sea	0.94	Humid	8.08	7.70	0.39	0.00
14	Tarim	1,563,202	Asia			0.08	Arid	1.50	1.22	0.28	0.00
15	Volga	1,424,438	Europe		Caspian Sea	0.70	Humid	0.45	0.36	0.09	0.00
16	Zambezi	1,378,099	Africa	Indian Ocean	Mozambique Channel	0.48	Semiarid	0.22	0.21	0.01	0.00
17	Aral Sea	1,372,517	Asia			0.21	Semiarid	6.25	5.70	0.54	0.00
18	Lake Eyre	1,214,630	South-West Pacific			0.09	Arid	0.00	0.00	0.00	0.00
19	Nelson	1,106,520	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	0.57	Dry subhumid	0.81	0.71	0.10	0.00
20	Murray	1,055,419	South-West Pacific	Indian Ocean	Indian Ocean	0.26	Semiarid	2.33	1.89	0.41	0.03

21	Saint Lawrence	1,053,301	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Saint Lawrence	1.02	Humid	0.49	0.17	0.32	0.00
22	Ganges	1,006,559	Asia	Indian Ocean	Bay of Bengal	0.62	Dry subhumid	29.33	8.80	20.53	0.00
23	Orange	977,322	Africa	Atlantic Ocean	South Atlantic	0.16	Arid	0.30	0.27	0.03	0.00
24	Yellow	962,986	Asia	Pacific Ocean	Yellow Sea	0.35	Semiarid	6.86	3.98	2.88	0.00
25	Orinoco	941,417	South America	Atlantic Ocean	North Atlantic	1.43	Humid	0.51	0.41	0.09	0.00
26	Shatt Al Arab	935,570	Asia	Indian Ocean	Persian Gulf	0.17	Arid	7.63	6.03	1.58	0.01
27	Indus	865,013	Asia	Indian Ocean	Arabian Sea	0.29	Semiarid	17.67	10.28	7.39	0.00
28	Yukon	832,821	North America, Central America and the Caribbean	Pacific Ocean	Bering Sea	0.57	Dry subhumid	0.00	0.00	0.00	0.00
29	Jubba	797,881	Africa	Indian Ocean	Indian Ocean	0.23	Semiarid	0.24	0.24	0.00	0.00
30	Danube	795,316	Europe	Atlantic Ocean	Black Sea	0.81	Humid	4.11	3.54	0.57	0.00
31	Mekong	783,796	Asia	Pacific Ocean	South China Sea	0.93	Humid	4.33	4.26	0.08	0.00
32	Tocantins	772,468	South America	Atlantic Ocean	South Atlantic	1.06	Humid	0.27	0.23	0.04	0.00
33	Okavango	692,223	Africa			0.23	Semiarid	0.00	0.00	0.00	0.00
34	Rio Grande	673,858	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	0.19	Arid	2.24	1.02	1.22	0.00

#	Name	Area	Continent	Ocean	Sea		Climate				
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35	Columbia	669,400	North America, Central America and the Caribbean	Pacific Ocean	North Pacific	0.58	Dry subhumid	4.56	3.28	1.28	0.00
36	Colorado	661,114	North America, Central America and the Caribbean	Pacific Ocean	Gulf of California	0.18	Arid	2.31	1.68	0.63	0.00
37	Kolyma	652,958	Asia	Arctic Ocean	East Siberian Sea	0.54	Dry subhumid	0.00	0.00	0.00	0.00
38	Sao Francisco	637,202	South America	Atlantic Ocean	South Atlantic	0.59	Dry subhumid	0.76	0.39	0.37	0.00
39	Brahmaputra	540,783	Asia	Indian Ocean	Bay of Bengal	0.90	Humid	5.18	1.45	3.73	0.00
40	Dnieper	509,817	Europe	Atlantic Ocean	Black Sea	0.69	Humid	1.98	1.96	0.03	0.00
41	Senegal	458,025	Africa	Atlantic Ocean	North Atlantic	0.20	Arid	0.28	0.26	0.02	0.00
42	Don	437,676	Europe	Atlantic Ocean	Black Sea	0.49	Semiarid	1.44	1.26	0.18	0.00
43	Rio De La Plata	427,307	South America	Atlantic Ocean	South Atlantic	0.59	Dry subhumid	0.32	0.20	0.12	0.00
44	Irrawaddy	422,917	Asia	Indian Ocean	Andaman Sea	1.22	Humid	4.72	4.52	0.20	0.00
45	Lake Balkhash	414,761	Asia			0.24	Semiarid	2.85	2.46	0.39	0.00
46	Volta	412,645	Africa	Atlantic Ocean	Gulf of Guinea	0.48	Semiarid	0.11	0.09	0.02	0.00

47	Limpopo	412,578	Africa	Indian Ocean	Mozambique Channel	0.28	Semiarid	1.08	0.99	0.08	0.00
48	Pearl	411,930	Asia	Pacific Ocean	South China Sea	1.16	Humid	6.66	6.60	0.06	0.00
49	Colorado	400,890	South America	Atlantic Ocean	South Atlantic	0.18	Arid	1.23	0.99	0.24	0.00
50	Indigirka	341,234	Asia	Arctic Ocean	East Siberian Sea	0.53	Dry subhumid	0.00	0.00	0.00	0.00
51	Parnaiba	332,979	South America	Atlantic Ocean	South Atlantic	0.62	Dry subhumid	0.18	0.08	0.11	0.00
52	Pechora	314,221	Europe	Arctic Ocean	Barents Sea	1.03	Humid	0.00	0.00	0.00	0.00
53	Godavari	310,375	Asia	Indian Ocean	Bay of Bengal	0.52	Dry subhumid	11.62	3.84	7.78	0.00
54	Severnaya Dvina	306,849	Europe	Arctic Ocean	White Sea	0.91	Humid	0.01	0.01	0.00	0.00
55	Churchill	302,494	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	0.66	Humid	0.00	0.00	0.00	0.00
56	Khatanga	300,828	Asia	Arctic Ocean	Laptev Sea	0.80	Humid	0.00	0.00	0.00	0.00
57	Neva	281,465	Europe	Atlantic Ocean	Baltic Sea	0.96	Humid	0.08	0.07	0.01	0.00
58	Salween	266,293	Asia	Indian Ocean	Andaman Sea	0.81	Humid	1.08	1.06	0.02	0.00
59	Uruguay	266,134	South America	Atlantic Ocean	South Atlantic	1.09	Humid	2.13	1.79	0.34	0.00
60	Magdalena	260,736	South America	Atlantic Ocean	Caribbean Sea	1.36	Humid	1.90	1.80	0.09	0.00
61	Krishna	258,785	Asia	Indian Ocean	Bay of Bengal	0.44	Semiarid	17.57	7.41	10.16	0.00

62	Thelon	244,857	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	0.61	Dry subhumid	0.00	0.00	0.00	0.00
63	Yana	233,391	Asia	Arctic Ocean	Laptev Sea	0.54	Dry subhumid	0.00	0.00	0.00	0.00
64	Fraser	230,828	North America, Central America and the Caribbean	Pacific Ocean	North Pacific	0.88	Humid	0.48	0.45	0.02	0.00
65	Liao He	220,125	Asia	Pacific Ocean	Yellow Sea	0.39	Semiarid	12.84	5.67	7.17	0.00
66	Olenek	217,723	Asia	Arctic Ocean	Laptev Sea	0.56	Dry subhumid	0.00	0.00	0.00	0.00
67	Haihe	215,966	Asia	Pacific Ocean	East China Sea	0.35	Semiarid	24.57	5.90	18.67	0.00
68	Ogooue	215,213	Africa	Atlantic Ocean	South Atlantic	1.61	Humid	0.02	0.02	0.00	0.00
69	Ural	211,009	Asia		Caspian Sea	0.33	Semiarid	0.43	0.40	0.03	0.00
70	Vistula	192,638	Europe	Atlantic Ocean	Baltic Sea	0.73	Humid	0.37	0.33	0.04	0.00
71	Kura	189,819	Europe		Caspian Sea	0.46	Semiarid	12.56	11.03	1.51	0.03
72	Lake Turkana	181,232	Africa			0.47	Semiarid	0.11	0.11	0.00	0.00
73	Rufiji	177,135	Africa	Indian Ocean	Indian Ocean	0.63	Dry subhumid	0.20	0.17	0.02	0.00
74	Anadyr	172,111	Asia	Pacific Ocean	Bering Sea	0.76	Humid	0.00	0.00	0.00	0.00
75	Huaihe	172,079	Asia	Pacific Ocean	East China Sea	0.65	Humid	28.65	16.34	12.31	0.00
76	Pyasina	169,628	Asia	Arctic Ocean	Kara Sea	1.07	Humid	0.00	0.00	0.00	0.00

77	Ruvuma	164,103	Africa	Indian Ocean	Indian Ocean	0.67	Humid	0.04	0.03	0.00	0.00
78	Rhine	163,122	Europe	Atlantic Ocean	North Sea	1.13	Humid	1.64	0.60	1.04	0.00
79	Chao Phraya	157,707	Asia	Pacific Ocean	Gulf of Thailand	0.65	Humid	18.92	16.56	2.36	0.00
80	Chuy	152,951	Asia			0.17	Arid	3.10	3.00	0.10	0.00
81	Taz	150,291	Asia	Arctic Ocean	Kara Sea	0.95	Humid	0.00	0.00	0.00	0.00
82	Cuanza	150,085	Africa	Atlantic Ocean	South Atlantic	0.71	Humid	0.04	0.03	0.01	0.00
83	Red	148,025	Asia	Pacific Ocean	South China Sea	1.10	Humid	6.53	6.47	0.06	0.00
84	Fitzroy	140,912	South-West Pacific	Pacific Ocean	Coral Sea	0.31	Semiarid	0.55	0.49	0.05	0.01
85	Elbe	138,382	Europe	Atlantic Ocean	North Sea	0.77	Humid	1.52	0.43	1.10	0.00
86	Chubut	137,936	South America	Atlantic Ocean	South Atlantic	0.15	Arid	0.23	0.22	0.01	0.00
87	Great Salt Lake	136,254	North America, Central America and the Caribbean			0.19	Arid	3.95	3.23	0.72	0.00
88	Negro	136,085	South America	Atlantic Ocean	South Atlantic	0.27	Semiarid	1.05	1.01	0.04	0.00
89	Caniapiscau	135,537	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	1.41	Humid	0.00	0.00	0.00	0.00
90	Mahanadi	135,525	Asia	Indian Ocean	Bay of Bengal	0.68	Humid	9.72	8.11	1.61	0.00

91	Albany	134,726	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	1.03	Humid	0.00	0.00	0.00	0.00
92	Santiago	134,071	North America, Central America and the Caribbean	Pacific Ocean	North Pacific	0.39	Semiarid	7.50	3.28	4.22	0.00
93	Sanaga	133,627	Africa	Atlantic Ocean	Gulf of Guinea	1.11	Humid	0.01	0.01	0.00	0.00
94	Burdekin	130,431	South-West Pacific	Pacific Ocean	Coral Sea	0.31	Semiarid	0.37	0.21	0.16	0.01
95	Mar Chiquita	129,874	South America			0.43	Semiarid	1.65	1.48	0.17	0.00
96	Usumacinta	127,388	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	1.27	Humid	0.69	0.59	0.10	0.00
97	Kuskokwim	123,081	North America, Central America and the Caribbean	Pacific Ocean	Bering Sea	0.85	Humid	0.00	0.00	0.00	0.00
98	Oder	118,791	Europe	Atlantic Ocean	Baltic Sea	0.68	Humid	0.48	0.43	0.05	0.00
99	Brazos	118,643	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	0.35	Semiarid	8.01	0.26	7.76	0.00
100	Loire	116,722	Europe	Atlantic Ocean	Bay of Biscay	0.76	Humid	5.96	2.48	3.48	0.00

101	Lake Gairdner	113,051	South-West Pacific			0.09	Arid	0.00	0.00	0.00	0.00
102	Mobile	112,528	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	0.99	Humid	0.40	0.24	0.17	0.00
103	Pur	111,253	Asia	Arctic Ocean	Kara Sea	0.92	Humid	0.00	0.00	0.00	0.00
104	Colorado	110,769	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	0.29	Semiarid	4.35	0.29	4.06	0.00
105	Kunene	108,947	Africa	Atlantic Ocean	South Atlantic	0.38	Semiarid	0.10	0.08	0.02	0.00
106	Flinders	107,786	South-West Pacific	Pacific Ocean	Gulf of Carpentaria	0.19	Arid	0.01	0.01	0.00	0.00
107	Moose	107,727	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	1.07	Humid	0.01	0.00	0.00	0.00
108	Hayes	107,549	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	0.77	Humid	0.00	0.00	0.00	0.00
109	Save	102,591	Africa	Indian Ocean	Mozambique Channel	0.36	Semiarid	0.80	0.71	0.09	0.00

110	Severn	101,172	North America, Central America and the Caribbean	Arctic Ocean	Hudson -Bay	0.89	Humid	0.00	0.00	0.00	0.00
111	Victoria	101,080	South-West Pacific	Pacific Ocean	Timor Sea	0.25	Semiarid	0.00	0.00	0.00	0.00
112	Bandama	99,254	Africa	Atlantic Ocean	Gulf of Guinea	0.65	Humid	0.37	0.37	0.00	0.00
113	Douro	97,241	Europe	Atlantic Ocean	Bay of Biscay	0.54	Dry subhumid	6.48	3.80	2.68	0.00
114	Rhone	96,638	Europe	Atlantic Ocean	Mediterranean Sea	1.03	Humid	4.33	3.12	1.21	0.00
115	La Grande	96,573	North America, Central America and the Caribbean	Arctic Ocean	Hudson -Bay	1.30	Humid	0.00	0.00	0.00	0.00
116	Narmada	96,046	Asia	Indian Ocean	Arabian Sea	0.51	Dry subhumid	16.24	6.18	10.07	0.00
117	Fitzroy	95,695	South-West Pacific	Indian Ocean	Indian Ocean	0.20	Semiarid	0.00	0.00	0.00	0.00
118	Tana	95,249	Africa	Indian Ocean	Indian Ocean	0.39	Semiarid	0.56	0.56	0.01	0.00
119	Churchill	92,712	North America, Central America and the Caribbean	Atlantic Ocean	Labrador Sea	1.58	Humid	0.00	0.00	0.00	0.00
120	Neman	92,523	Europe	Atlantic Ocean	Baltic Sea	0.84	Humid	0.27	0.22	0.05	0.00

121	Back	91,458	North America, Central America and the Caribbean	Arctic Ocean	Northwestern Passages	0.56	Dry subhumid	0.00	0.00	0.00	0.00
122	Anabar	89,819	Asia	Arctic Ocean	Laptev Sea	0.58	Dry subhumid	0.00	0.00	0.00	0.00
123	Panuco	89,696	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Mexico	0.46	Semiarid	5.51	4.07	1.43	0.00
124	Bancannia Lake	87,901	South-West Pacific			0.11	Arid	0.00	0.00	0.00	0.00
125	Saguenay	87,596	North America, Central America and the Caribbean	Atlantic Ocean	Gulf of Saint Lawrence	1.49	Humid	0.02	0.01	0.01	0.00
126	Murchison	87,572	South-West Pacific	Indian Ocean	Indian Ocean	0.08	Arid	0.00	0.00	0.00	0.00
127	Daugava	85,616	Europe	Atlantic Ocean	Baltic Sea	0.89	Humid	0.15	0.12	0.02	0.00
128	Ebro	85,460	Europe	Atlantic Ocean	Mediterranean Sea	0.44	Semiarid	8.64	7.76	0.88	0.00
129	Cuyuni	85,208	South America	Atlantic Ocean	North Atlantic	1.18	Humid	0.08	0.06	0.02	0.00
130	San Joaquin	84,848	North America, Central America and the Caribbean	Pacific Ocean	North Pacific	0.25	Semiarid	26.55	10.59	15.96	0.00

131	Kapuas	83,880	South-West Pacific	Pacific Ocean	Natuna Sea	2.45	Humid	0.52	0.52	0.01	0.00
132	Comoe	83,111	Africa	Atlantic Ocean	Gulf of Guinea	0.62	Dry subhumid	0.25	0.24	0.01	0.00
133	Doce	82,935	South America	Atlantic Ocean	South Atlantic	0.98	Humid	1.54	1.49	0.06	0.00
134	Kizilirmak	80,780	Europe	Atlantic Ocean	Black Sea	0.33	Semiarid	5.22	3.99	1.15	0.07
135	Sepik	80,129	South-West Pacific	Pacific Ocean	Bismarck Sea	2.10	Humid	0.00	0.00	0.00	0.00
136	Mamberamo	79,016	South-West Pacific	Pacific Ocean	South Pacific	1.98	Humid	0.00	0.00	0.00	0.00
137	Cauvery	78,369	Asia	Indian Ocean	Bay of Bengal	0.54	Dry subhumid	17.97	7.64	10.34	0.00
138	Ashburton	77,971	South-West Pacific	Indian Ocean	Indian Ocean	0.09	Arid	0.00	0.00	0.00	0.00
139	Roper	77,475	South-West Pacific	Pacific Ocean	Gulf of Carpentaria	0.35	Semiarid	0.01	0.00	0.00	0.00
140	Yaqui	77,327	North America, Central America and the Caribbean	Pacific Ocean	Gulf of California	0.27	Semiarid	1.47	0.74	0.73	0.00
141	Mezen	76,753	Europe	Arctic Ocean	White Sea	0.97	Humid	0.00	0.00	0.00	0.00
142	Mahakam	76,749	South-West Pacific	Pacific Ocean	Makassar Strait	2.14	Humid	0.05	0.05	0.00	0.00
143	Sassandra	75,333	Africa	Atlantic Ocean	Gulf of Guinea	0.85	Humid	0.15	0.15	0.00	0.00

144	Gascoyne	73,672	South-West Pacific	Indian Ocean	Indian Ocean	0.08	Arid	0.03	0.01	0.02	0.00
145	Jaguaribe	73,491	South America	Atlantic Ocean	South Atlantic	0.44	Semiarid	0.78	0.62	0.16	0.00
146	Titicaca	73,324	South America			0.52	Dry subhumid	0.56	0.48	0.08	0.00
147	Po	73,290	Europe	Atlantic Ocean	Adriatic Sea	0.93	Humid	21.69	17.47	4.23	0.00
148	Seine	73,248	Europe	Atlantic Ocean	English Channel	0.78	Humid	4.43	1.21	3.22	0.00
149	Dniestr	73,160	Europe	Atlantic Ocean	Black Sea	0.72	Humid	3.33	3.33	0.00	0.00
150	Gambia	72,619	Africa	Atlantic Ocean	North Atlantic	0.37	Semiarid	0.04	0.04	0.00	0.00
151	Jacui	71,806	South America	Atlantic Ocean	South Atlantic	1.18	Humid	2.83	2.76	0.08	0.00
152	Sacramento	71,344	North America, Central America and the Caribbean	Pacific Ocean	North Pacific	0.50	Dry subhumid	12.52	5.75	6.78	0.00
153	Tagus	71,140	Europe	Atlantic Ocean	North Atlantic	0.38	Semiarid	4.98	2.57	2.40	0.00
154	Jequitinhonha	70,981	South America	Atlantic Ocean	South Atlantic	0.70	Humid	0.97	0.96	0.01	0.00
155	Susquehanna	70,979	North America, Central America and the Caribbean	Atlantic Ocean	North Atlantic	0.96	Humid	0.27	0.20	0.07	0.00
156	Essequibo	69,650	South America	Atlantic Ocean	North Atlantic	1.20	Humid	0.00	0.00	0.00	0.00
157	Guadiana	66,927	Europe	Atlantic Ocean	North Atlantic	0.31	Semiarid	7.37	3.51	3.86	0.00

158	Anderson	66,586	North America, Central America and the Caribbean	Arctic Ocean	Beaufort Sea	0.42	Semiarid	0.00	0.00	0.00	0.00
159	Maroni	66,408	South America	Atlantic Ocean	North Atlantic	1.47	Humid	0.00	0.00	0.00	0.00
160	Nottaway	66,053	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	1.27	Humid	0.00	0.00	0.00	0.00
161	Copper	65,704	North America, Central America and the Caribbean	Pacific Ocean	Gulf of Alaska	1.40	Humid	0.00	0.00	0.00	0.00
162	Winisk	65,635	North America, Central America and the Caribbean	Arctic Ocean	Hudson-Bay	0.95	Humid	0.00	0.00	0.00	0.00
163	Tapi	64,337	Asia	Indian Ocean	Arabian Sea	0.37	Semiarid	10.07	2.47	7.60	0.00
164	Sungai Fly	64,320	South-West Pacific	Pacific Ocean	Coral Sea	2.39	Humid	0.00	0.00	0.00	0.00
165	Alazeya	64,313	Asia	Arctic Ocean	East Siberian Sea	0.49	Semiarid	0.00	0.00	0.00	0.00
166	Courantyne	64,286	South America	Atlantic Ocean	North Atlantic	1.21	Humid	0.00	0.00	0.00	0.00
167	Mitchell	63,661	South-West Pacific	Pacific Ocean	Gulf of Carpentaria	0.47	Semiarid	0.29	0.25	0.04	0.01
168	Pivdenny Buh	63,568	Europe	Atlantic Ocean	Black Sea	0.57	Dry subhumid	1.88	1.88	0.00	0.00

Table S3. Basic information of 53 selected GRDC stations for comparison with R datasets. The column 'controlled percentage' defines the ratio between the drainage area of the station and the basin area of the corresponding basins. Column 'Start' and 'End' means the start and end time of the observation records of the station in GRDC. Column 'missing rate' is the percentage of the missing months to the whole period May 2002-December 2021 (237 months).

GRDC ID	River	Gauge station	Latitude(°)	Longitude(°)	Controlled area(km²)	Basin area(km²)	Basin ID	Controlled percentage(%)	Start (Year/month)	End (Year/month)	Missing rate (%)
1147010	Congo river	Kinshasa	-4.30	15.30	3,475,000	3,705,226	2	94	2002/5	2010/12	59
1159100	Orange river	Vioolsdrif (27811003)	-28.76	17.72	866,486	977,322	23	89	2002/5	2020/10	14
1255100	Kunene river	Ruacana (64740001)	-17.40	14.20	89,600	108,947	105	82	2002/5	2021/6	10
2178950	Huai he	Bengbu	32.93	117.38	121,330	172,079	75	71	2004/5	2004/9	98
2180800	Yellow river	Huayuankou	34.92	113.65	730,036	962,986	24	76	2004/1	2004/12	95
2181900	Yangtze river	Datong	30.77	117.62	1,705,383	1,748,118	13	98	2004/1	2004/12	95
2186800	Xi jiang	Wuzhou 3	23.48	111.30	329,705	411,930	48	80	2004/1	2004/12	95
2906900	Amur river	Komsomolsk	50.63	137.12	1,730,000	2,238,970	10	77	2002/5	2006/12	78
2909150	Yenisey	Igarka	67.48	86.50	2,440,000	2,505,671	7	97	2002/5	2015/12	36
2912600	Ob'	Salekhard	66.57	66.53	2,949,998	3,040,606	5	97	2002/5	2015/12	36
2998510	Kolyma	Kolymskaya	68.73	158.72	526,000	652,958	37	81	2002/5	2008/12	69
2999110	Yana	Ubileynaya	70.75	136.08	224,000	233,391	63	96	2002/5	2007/12	73
2999150	Anabar	Saskylakh	71.98	114.06	78,800	89,819	122	88	2002/5	2015/12	47
2999910	Olenek	7.5km d/s of mouth of river pur	72.12	123.22	198,000	217,723	66	91	2002/5	2015/12	38
3265601	Parana, rio	Timbues	-32.67	-60.71	2,346,000	2,647,020	6	89	2002/5	2014/8	43
3649900	Tocantins, rio	Itupiranga	-5.13	-49.32	731,270	772,468	32	95	2002/5	2010/7	64
3650481	Parnaiba, rio	Luzilandia	-3.45	-42.37	322,823	332,979	51	97	2002/5	2019/8	19
3652450	Jequitinhonha, rio	Jacinto	-16.14	-40.31	63,300	70,981	154	89	2002/5	2010/7	61
4103200	Yukon river	Pilot station, ak	61.93	-162.88	831,390	832,821	28	100	2002/5	2020/10	14
4115200	Columbia river	The dalles, or	45.61	-121.17	613,830	669,400	35	92	2002/5	2019/1	21

4127 800	Mississip pi river	Vicksburg, ms	32.32	-90.91	2,964,255	3,240,6 19	4	91	2002/5	2020/12	18
4143 550	Saint lawrence river	Cornwall(ont.), near massena, n.y.	45.01	-74.79	773,892	1,053,3 01	21	73	2002/5	2020/12	13
4146 281	Sacramen to river	Verona, ca	38.77	-121.6 0	55,040	71,344	152	77	2002/5	2021/3	11
4147 700	Susqueha nna river	Harrisburg, pa.	40.25	-76.89	62,419	70,979	155	88	2002/5	2021/7	10
4150 500	Brazos river	Richmond, tex.	29.58	-95.76	116,827	118,643	99	98	2002/5	2021/7	10
4207 900	Fraser river	Hope	49.38	-121.4 5	217,000	230,828	64	94	2002/5	2019/12	17
4208 025	Mackenzi e river	Arctic red river	67.46	-133.7 4	1,660,000	1,795,6 36	12	92	2002/5	2018/4	25
4209 805	Back river	Above hermann river	66.09	-96.51	93,900	91,458	121	103	2002/5	2018/12	33
4213 720	Nelson river	At kelsey generating station	56.04	-96.53	1,010,000	1,106,5 20	19	91	2002/5	2020/12	13
4214 025	Hayes river	Below gods river	56.43	-92.79	103,000	107,549	108	96	2002/5	2020/12	30
4214 260	Churchill river	Above granville falls	56.15	-100.4 6	228,000	302,494	55	75	2002/5	2019/12	18
4214 450	Winisk river	Below asheweig river tributary	54.52	-87.23	50,000	65,635	162	76	2002/5	2020/12	14
4214 520	Albany river	Near hat island	51.33	-83.84	118,000	134,726	91	88	2002/5	2019/12	17
4244 500	Churchill river	Above upper muskrat falls	53.25	-60.79	92,500	92,712	119	100	2002/5	2016/11	32
5101 200	Burdekin river	Clare	-19.77	147.2 4	129,900	130,431	94	100	2002/5	2012/2	54
5101 301	Fitzroy river	The gap	-23.09	150.1 1	135,757	140,912	84	96	2002/5	2012/2	54
5109 200	Mitchell river	Koolatah	-15.95	142.3 8	45,872	63,661	167	72	2002/5	2012/2	58
5606 080	Murchiso n river	Emu springs	-27.85	114.5 5	86,777	87,572	126	99	2002/5	2006/8	80
5607 400	Ashburto n river	Nanutarra	-22.54	115.5 0	71,387	77,971	138	92	2002/5	2006/5	81
6226 800	Ebro, rio	Tortosa	40.81	0.52	84,230	85,460	128	99	2002/5	2017/9	28
6335 020	Rhine river	Rees	51.76	6.40	159,300	163,122	78	98	2002/5	2019/12	17
6340 110	Elbe river	Neu darchau	53.23	10.89	131,950	138,382	85	95	2002/5	2019/12	17
6373 300	Daugava	Daugavpils	55.86	26.51	64,500	85,616	127	75	2002/5	2020/12	18
6457 010	Oder river	Gozdowice	52.76	14.32	109,811	118,791	98	92	2002/5	2020/10	13

6458 010	Vistula	Tczew	54.09	18.81	193,923	192,638	70	101	2019/11	2020/10	95
6574 150	Nemunas	Smalininkai	55.08	22.58	81,200	92,523	120	88	2002/5	2009/12	69
6590 700	Kura river	Surra	40.07	48.53	178,000	189,819	71	94	2002/5	2017/12	27
6955 430	Neva	Novosaratovka	59.84	30.53	281,000	281,465	57	100	2002/5	2011/12	55
6970 250	Severnaya dvina	Ust'-pinega	64.15	41.92	348,000	306,849	54	113	2002/5	2014/9	49
6970 500	Mezen'	Malonisogorskaya	65.03	45.62	56,400	76,753	141	73	2002/5	2014/12	41
6970 700	Pechora	Oksino	67.60	52.20	312,000	314,221	52	99	2002/5	2014/12	41
6977 100	Volga	Volgograd power plant	48.80	44.59	1,360,000	1,424,438	15	95	2002/5	2010/12	59
6978 250	Don	Razdorskaya	47.54	40.65	378,000	437,676	42	86	2002/5	2010/12	59
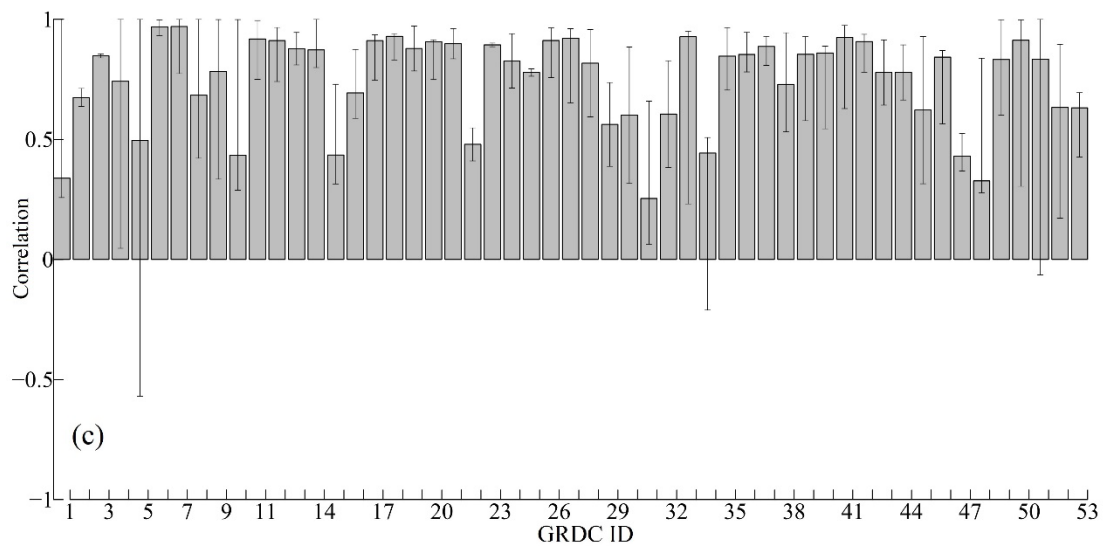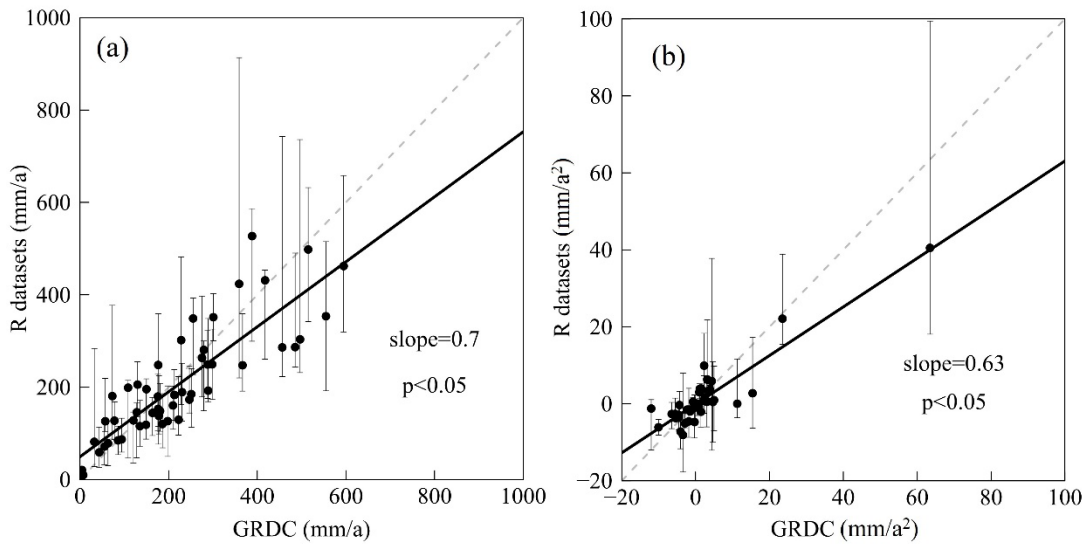
Figure. S1. Comparisons between R datasets of this study against GRDC streamflow observations over 53 river basins. Scatter plots of (a) long-term annual mean and (b) annual trends of basin-scale runoff during the period when GRDC data are available. (c) Correlation coefficients between GRDC and R datasets in each basin on the monthly scale. The error bar represents the change range of results from different R datasets. Only the GRDC stations with more than 5-year observations are used for trend calculation. Detailed information on GRDC stations is listed in Table S3.
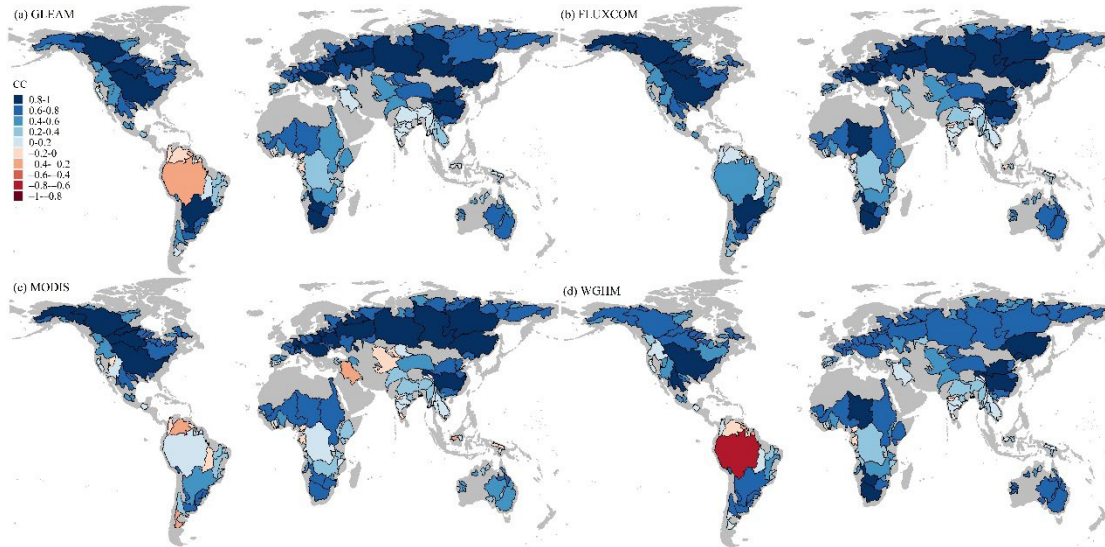
Figure S2. Spatial distribution of CC between the ET-WB and multiple auxiliary ET products on the monthly scale during the period 2002-2021.
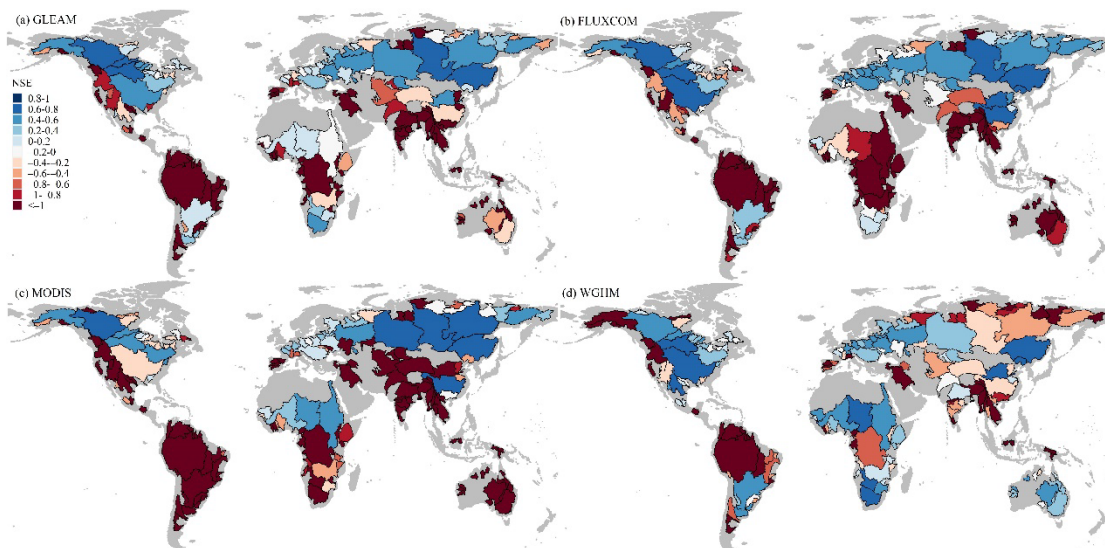
Figure S3. Spatial distribution of NSE between the ET-WB and multiple auxiliary ET products on the monthly scale during the period 2002-2021.
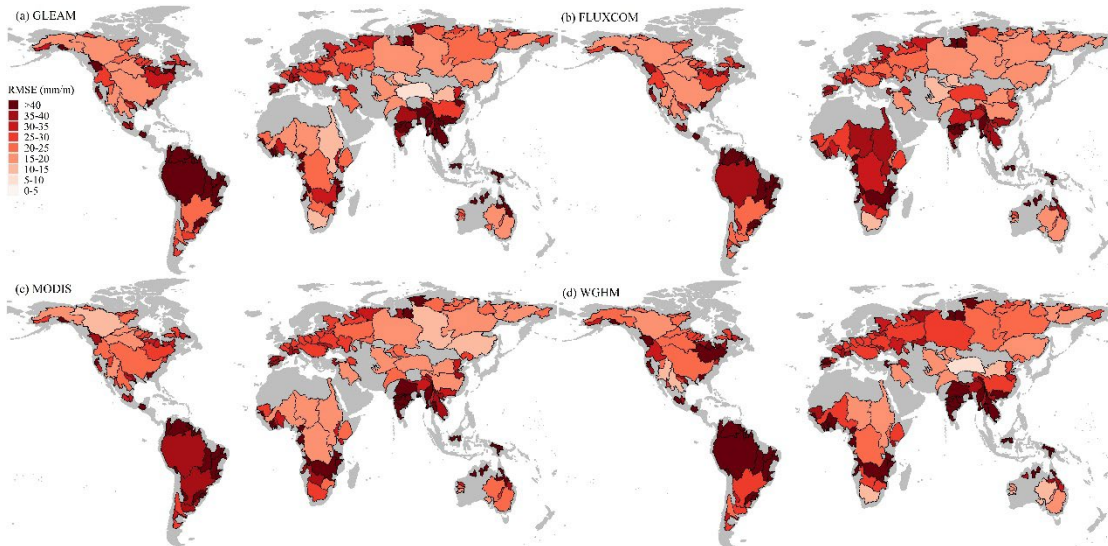
Figure S4. Spatial distribution of RMSE between the ET-WB and multiple auxiliary ET products on the monthly scale during the period 2002-2021.

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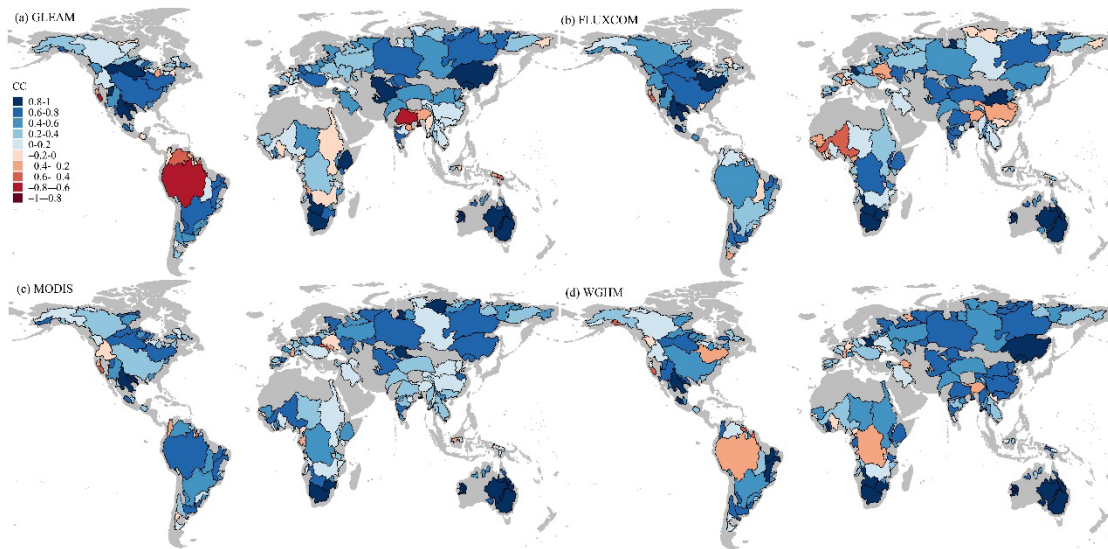
Figure S5. Spatial distribution of CC between the ET-WB and multiple auxiliary ET products on the annual scale during the period 2002-2021.
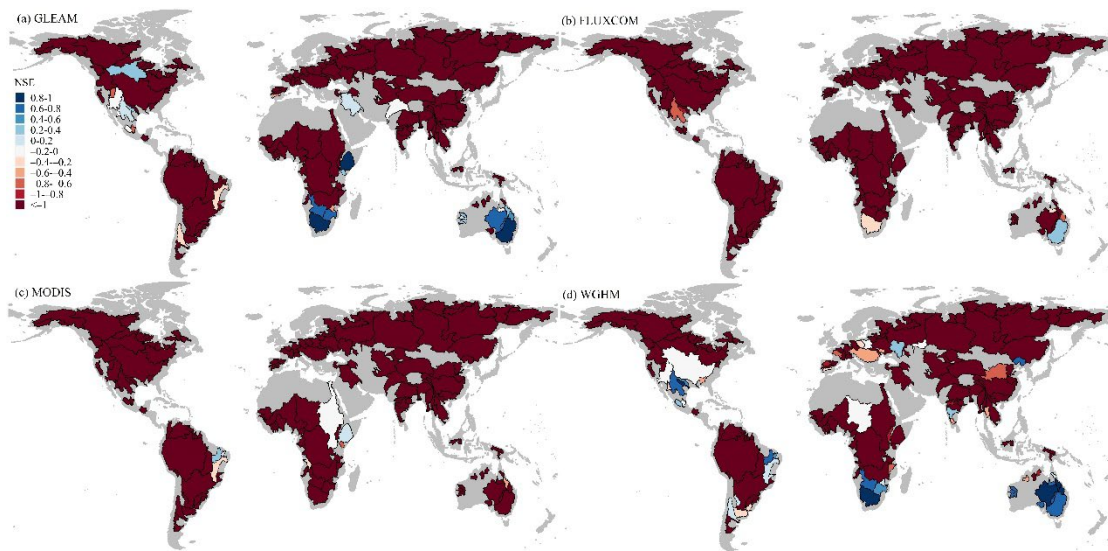
Figure S6. Spatial distribution of NSE between the ET-WB and multiple auxiliary ET products on the annual scale during the period 2002-2021.
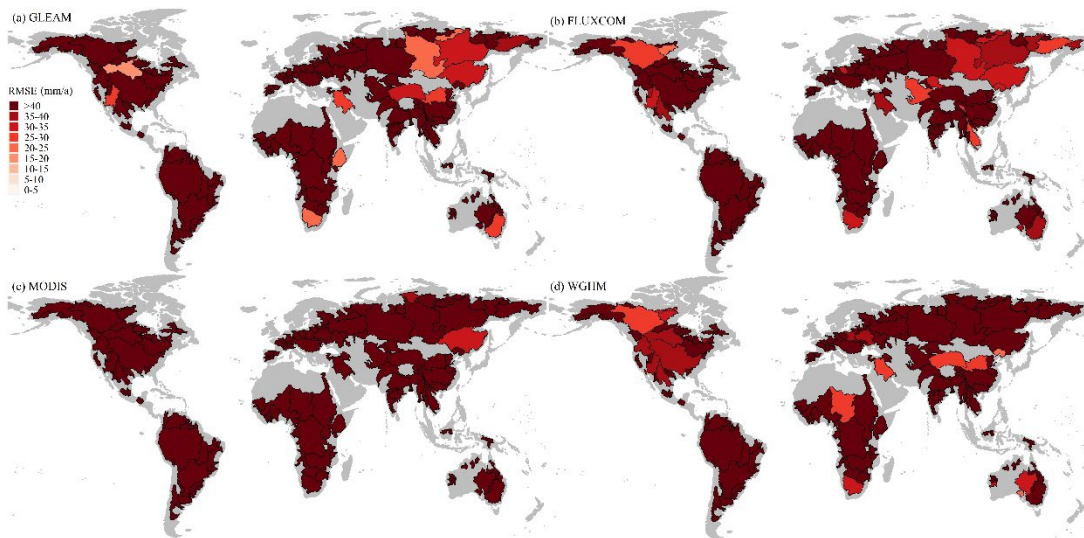
Figure S7. Spatial distribution of RMSE between the ET-WB and multiple auxiliary ET products on the annual scale during the period 2002-2021.
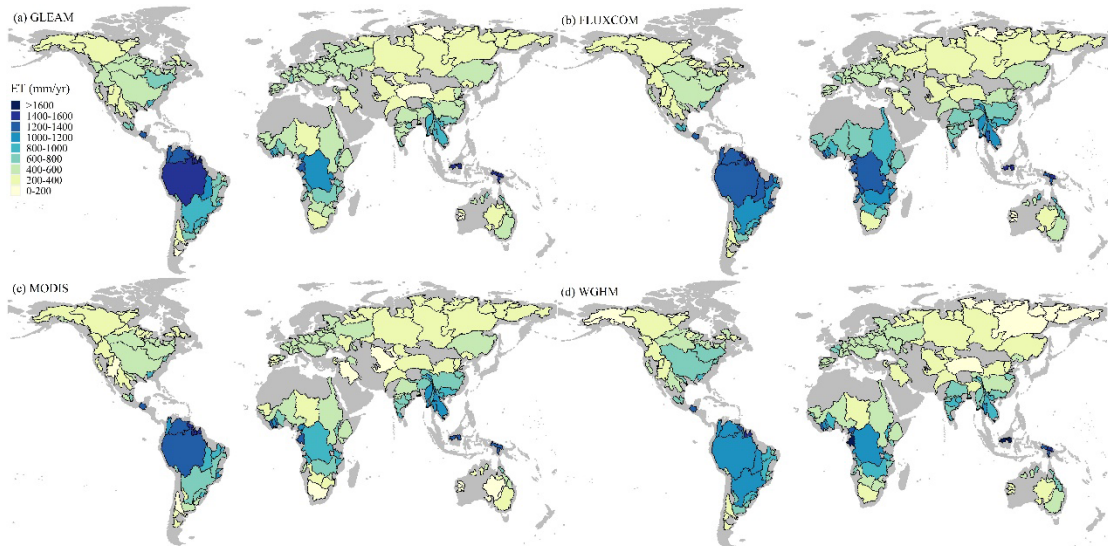
Figure S8. Global distribution of the long-term mean from multiple auxiliary ET products during 2003-2021. The long-term mean is calculated as the sum of the long-term averages of ET in each month.
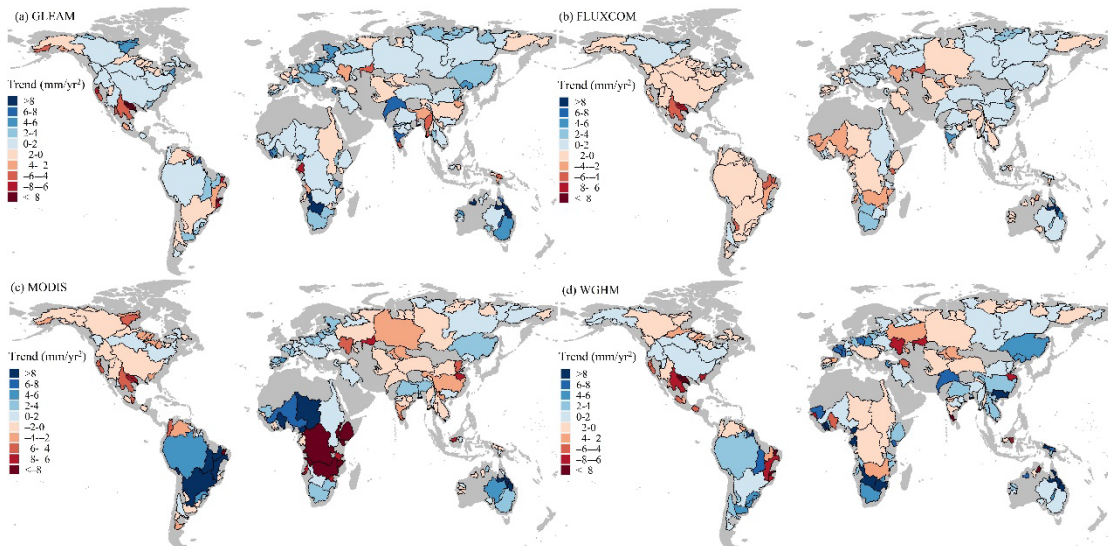
Figure S9. Global distribution of the annual trend during 2003-2014 in multiple auxiliary ET products. The trend is calculated by using the Sen's slope method.

Reference:

Shumilova, O., Tockner, K., Thieme, M., Koska, A. and Zarfl, C.: Global Water Transfer Megaprojects: A Potential Solution for the Water-Food-Energy Nexus?, Front. Environ. Sci., 6, 2018.