Supplementary: Global synthesis of forest cover effects on long-term water balance partitioning in large basins

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Table S1. Basin, rivers and countries. n: total number of gauges of each basin; (): On parenthesis are the number of gauges at each river. Rivers contained in the same basin, can share at least the same outlet point of the basin, for example, Branco and Negro rivers share the outlet points of the Amazon basin (in Obidos).

Basin	**Sub-basin**	**n**	**Countries**
Amazon	Branco (6), Negro (6), Solimoes-Javari (8), Solimoes-Jurua (11), Purus (11), Madeira (12), Tapajos (9)	51	Bolivia, Brasil, Colombia, Ecuador, Peru, Guyana, Suriname, Venezuela
Danube	Danube (6), Sava (5)	10	Romania, Hungary, Serbia, Austria, Germany, Bulgary, Slovakia, Croatia, Ukraine, Moldova
Lena	Lena (7), Vitim (9)	12	Russia
Mackenzie	Mackenzie-Athabasca (6)	6	Canada
Magdalena	Magdalena (8), Cauca (8)	15	Colombia
Mississippi	Upper Mississippi (15), Ohio (14), Missouri (27)	55	EEUU
Murray-Darling	Murray (4), Darling (8)	13	Australia
Orange	Orange (9)	9	South Africa, Namibia, Lesotho
Parana	Parana (6), Paraguay (7)	10	Brasil, Paraguay, Argentina

Table S2. Data Sources

Data	Source
Digital Elevation Model (DEM)	Global 30 Arc-Second Elevation (GTOPO30),
	Shuttle Radar Topography Mission (SRTM).
Land Cover	MODIS land cover type product (MCD12Q1)
Rainfall	ECMWF-ERA-Interim reanalysis,
	Tropical Rainfall Measuring Mission (TRMM-3B32).
Streamflow	ORE-HyBAm, Murray-Darling Basin Authority (MDBA),
	Subsecretaria de Recursos Hidricos de Argentina,
	Agencia Nacional de Agua de Brasil,
	Water Survey of Canada,
	Global Runoff Data Centre
	(GRDC) 56068 Koblenz, Germany,
	Department: Water and Sanitation-Republic of South Africa,
	United States Geological Survey.

Table S3. Data used to calculate correlations

Basin/Attribute Mean	k	Forest	Shrub-Grass-Savannas	Urban-Crop
1. Branco	0.4884	0.8556	0.1354	0.0063
2. Negro	0.6096	0.9564	0.0374	0.0036
3. Solimoes-Jav.	0.5502	0.8914	0.0975	0.0080
4. Solimoes-Jur.	0.4483	0.9520	0.0390	0.0070
5. Purus	0.3703	0.9090	0.0724	0.0168
6. Madeira	0.2980	0.5123	0.4709	0.0103
7. Tapajos	0.4107	0.3983	0.4579	0.1437
8. Magdalena	0.5534	0.5766	0.1497	0.2663
9. Cauca	0.4336	0.5074	0.0954	0.3928
10. Parana	0.2763	0.1245	0.7228	0.1338
11. Paraguay	0.2027	0.2021	0.6978	0.0765
12. UMississippi	0.2504	0.2366	0.0983	0.6421
13. Ohio	0.4963	0.7343	0.0003	0.2637
14. Missouri	0.1217	0.1334	0.7069	0.1566
15. Mackenzie	0.3012	0.5778	0.3060	0.0619
16. Orange	0.0800	0.0000	0.9310	0.0650
17. Danube	0.4233	0.3810	0.0381	0.5776
18. Sava	0.6396	0.5600	0.0215	0.4174
19. Murray	0.4169	0.7373	0.0402	0.2211
20. Darling	0.0155	0.0083	0.8910	0.1005
21. Lena	0.5361	0.7023	0.2745	0.0215
22. Vitim	0.4830	0.4220	0.5342	0.0403

Table S4. Correlations for the first 9 basins between land cover types and mean k values

Land cover types (mean values)	Kendall's correlation (to non-normally distributed data) /p-value	Spearman's correlation (to non-normally distributed data) /p-value	Pearson's correlation (to normally distributed data) /p-value
Forest	0.7777/0.0024	0.8833/0.0031	0.8348/0.0051
Shrub-Grass-Savannas	-0.6666/0.0127	-0.8/0.0138	-0.8012/0.0094
Urban-Crop	-0.3333/0.2595	-0.5167/0.1618	-0.0109/0.9778

Table S5. Correlations for the 22 basins between land cover types and mean k values

Attribute (mean values)	**Kendall's correlation** (to non-normally distributed data) /p-value	**Spearman's correlation** (to non-normally distributed data) /p-value	**Pearson's correlation** (to normally distributed data) /p-value
Forest	0.5325/0.0003	0.712/0.0003	0.7808/0.0000
Shrub-Grass-Savannas	-0.5411/0.0003	-0.7007/0.0004	-0.7917/0.0000
Urban-Crop	-0.0909/0.5770	-0.1338/0.5512	0.0501/0.8249

Table S6. Basins and regions of the approximately free-flowing rivers.

Region	Basins	n	Notes
Amazon	Branco, Negro, Solimoes, Purus, Tapajos, Madeira	63	Madeira has dams in the high part of the basin. They are mainly used to hydroelectric energy production.
Australia	Diamantina, Cooper Fitzroy, Gascoyne	14	
Brasil	Ariguaia	5	Before Tucuruí Dam in Tocatins basin.
Lena	Lena, Vitim	16	A dam in Vilyuy River. It is used to hydroelectric energy generation.
Mackenzie	Mackenzie-Athabasca	6	A dam in the upper Peace River (tributary), complete area 1761km2.
Magdalena	Magdalena, Cauca	16	Some dams used to hydroelectric energy production
Paraná	Paraguay	4	Before it reaches the Parana river (contain the Itaipú dam)
United States (US)	Altamaha, John Day Salmon, Yellowstone	12	

Table S7. Data used to calculate correlations in the approximately free-flowing rivers

Basin/Attribute Mean	k	Forest	Shrub-Grass-Savannas	Urban-Crop
1. Branco	0.4911	0.8556	0.1354	0.0063
2. Negro	0.6173	0.9564	0.0374	0.0036
3. Solimoes-Jav.	0.5450	0.8914	0.0975	0.0080
4. Solimoes-Jur.	0.4558	0.9520	0.0390	0.0070
5. Purus	0.3836	0.9090	0.0724	0.0168
6. Madeira	0.3134	0.5123	0.4709	0.0103
7. Tapajos	0.4103	0.3983	0.4579	0.1437
8. Magdalena	0.5485	0.5766	0.1497	0.2663
9. Cauca	0.4363	0.5074	0.0954	0.3928
10. Paraguay	0.2395	0.2021	0.6978	0.0765
11. Cooper	0.0391	0.0000	0.9865	0.0000
12. Gascoyne	0.0901	0.0000	1.0000	0.0000
13. Fitzroy	0.0710	0.0022	0.9969	0.0003
14. Araguaia	0.0125	0.9532	0.0341	0.3348
15. Yellowstone	0.1794	0.8988	0.0034	0.0619
16. Altamaha	0.1361	0.2996	0.6254	0.0741
17. Salmon	0.2413	0.4546	0.5448	0.0006
18. John Day	0.6917	0.4687	0.5302	0.0011
19. Mackenzie	0.3060	0.5778	0.3060	0.0619
20. Lena	0.5439	0.7023	0.2745	0.0215
21. Vitim	0.4950	0.4220	0.5342	0.0403

Table S8. Correlations for the first 9 approximately free-flowing river basins between land cover types and mean k values

Land cover types (mean values)	Kendall's correlation (to non-normally distributed data) /p-value	Spearman's correlation (to non-normally distributed data) /p-value	Pearson's correlation (to normally distributed data) /p-value
Forest	0.6480/0.0159	0.8201/0.0068	0.7316/0.0251
Shrub-Grass-Savannas	-0.5000/0.0752	-0.7667/0.0214	-0.7273/0.0264
Urban-Crop	0.64790.0159	0.7699/0.0152	0.5818/0.1003

Table S9. Correlations for the 22 approximately free-flowing river basins between land cover types and mean k values

Attribute (mean values)	**Kendall's correlation** (to non-normally distributed data) /p-value	**Spearman's correlation** (to non-normally distributed data) /p-value	**Pearson's correlation** (to normally distributed data) /p-value
Forest	0.5489/0.0005	0.7275/0.0002	0.7402/0.0001
Shrub-Grass-Savannas	-0.5428/0.0004	-0.7364/0.0002	-0.7519/0.0000
Urban-Crop	0.1957/0.2155	0.3144/0.1651	0.2034/0.3763

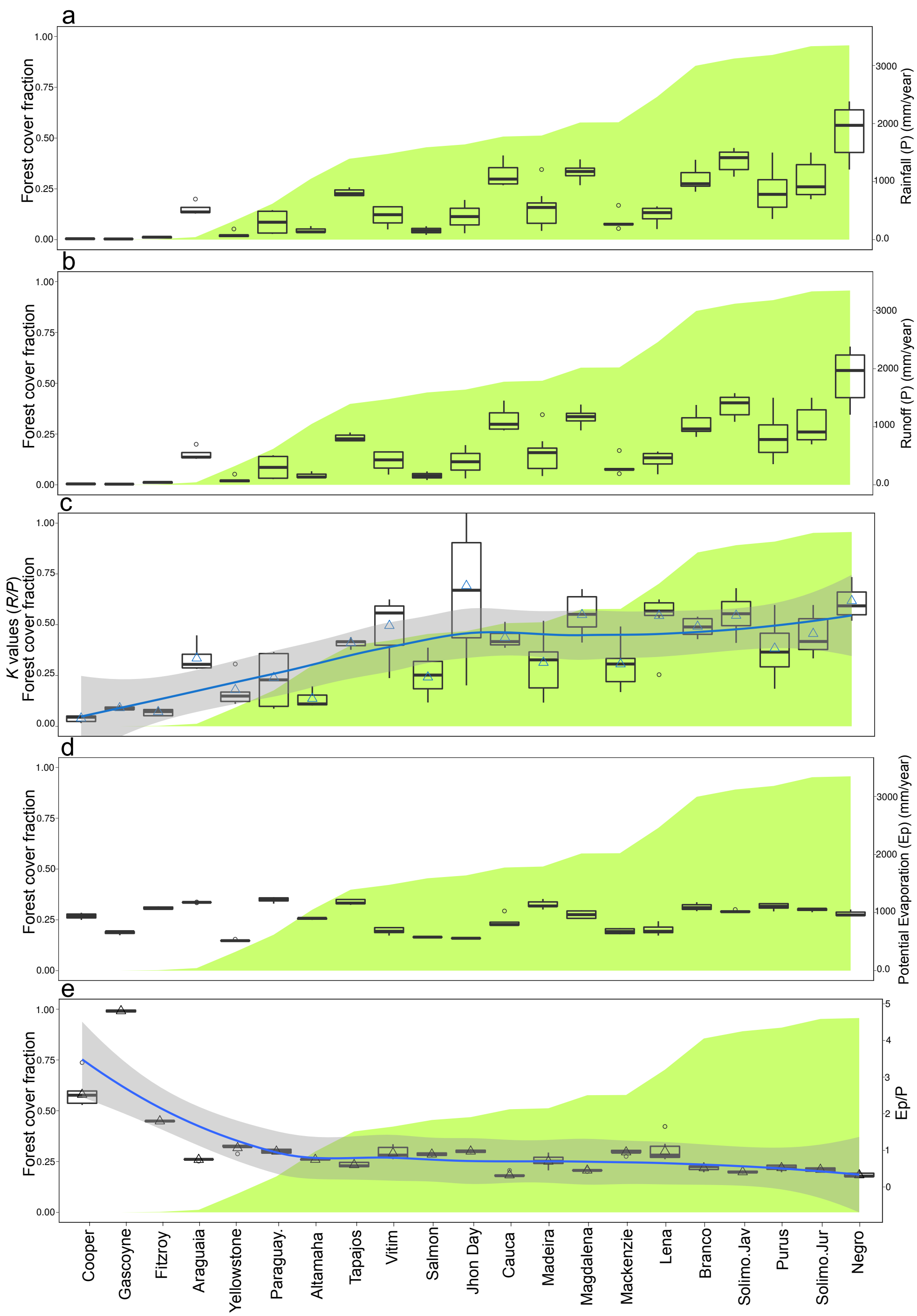

Figure S1. Distribution of spatially averaged R (a), P (b), k (c), Ep (d) and Ep/P for 21 free flowing river basins organized by increasing forest cover fraction (green shade), for the 2001–2012 period. Boxplots describe the spatial variability of R (a), P (b), k (c), Ep (d) and Ep/P within each basin. In basins with low forest cover fraction, k-mean values (blue triangles) increase with forest cover fraction, with $k < 0.5$: E-dominated pattern. In basins with high forest cover fraction, k-mean values converge to a value around 0.5: P-halved pattern. Blue line is the LOESS fitting and grey shade is the corresponding 95% confidence interval.