Supplement of

Estimating the global lateral transfer of nitrogen through river network using a land surface model

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Table S1. Information of observational sites from literature.

Site	Lat	Long	Mean TN flow (Tg/yr)	Periods	Reference
Rio Canague	8.03	-69.99	0.048	1990-1999	Lewis et al., 1999
Rio Caroni	6.00	-62.85	0.049	1990-1999	Lewis et al., 1999
Gambia River	13.32	-14.21	0.005	1990-1999	Lewis et al., 1999
Trombetas	0.02	-58.01	0.039	1990-1999	Lewis et al., 1999
Japura	-1.87	-67.00	0.258	1982-1990	Lewis et al., 1999
Madeira	-8.00	-62.87	0.550	1990-1999	Lewis et al., 1999
Negro	-0.01	-67.19	0.091	1990-1999	Lewis et al., 1999
Orinoco	7.00	-67.07	0.568	1990-1999	Lewis et al., 1999
Paraguay River	-19.03	-57.36	0.027	1990-1999	Lewis et al., 1999
Manacapuru	-3.15	-60.01	1.895	1990	Hedges et al., 1994
Içà	-1.40	-69.44	0.124	1982-1990	Hedges et al., 1994
Vargem Grande	-3.50	-69.33	1.242	1982-1990	Hedges et al., 1994
Purus	-4.10	-61.57	0.378	1982-1990	Martinelli et al., 2010
Óbidos	-1.93	-55.52	2.815	1969-1970	Salati et al., 1982
Han Jiang	30.51	113.09	0.170		
Yangtze river	30.76	117.68	1.820		
Huaihe	32.95	117.27	0.087	2014-2015	a
Tongtian river	33.01	97.26	0.110		
Yellow river	34.92	112.40	0.340		

a http://envi.ckcest.cn/environment/data_Integration/data_Integration.jsp
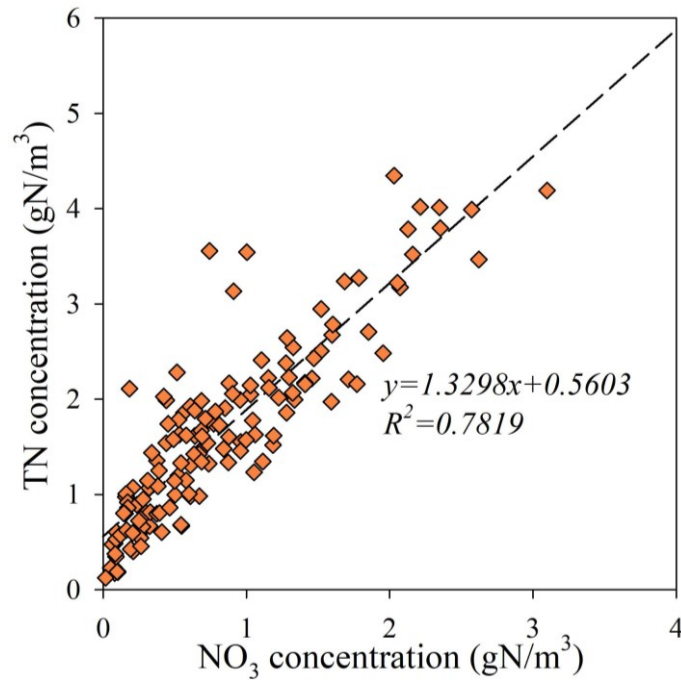
Figure S1. Linear regression relationship between TN concentration and NO_3^- concentration in rivers based on data from GRQA.
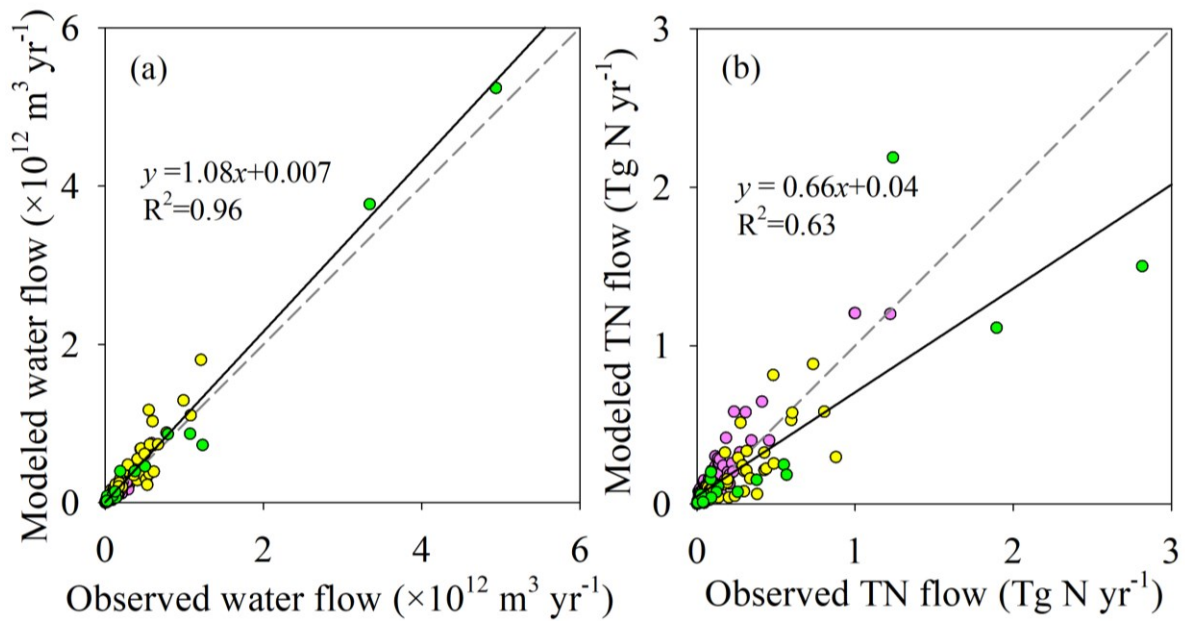
Figure S2. The evaluation of ORCHIDEE-NLAT, comparison between observed and simulated water (a) and TN flow (b). Pink symbols represent sites with observations of TN from GRQA, yellow symbols represent GRQA sites for which TN concentrations were estimated from observations of NO3-, and green symbols represent sites with observations of TN from published literature.
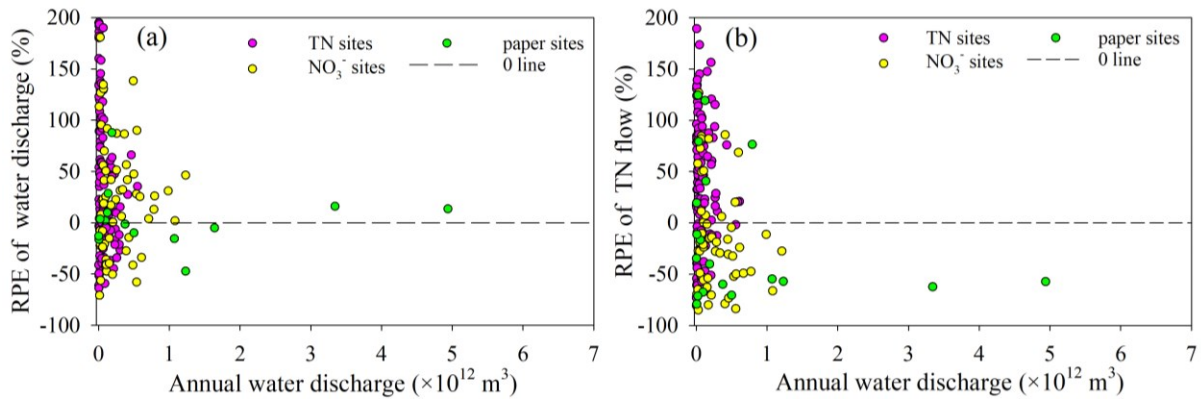
Figure S3. The evaluation of ORCHIDEE-NLAT, comparison between observed and simulated water (a) and TN flow (b).
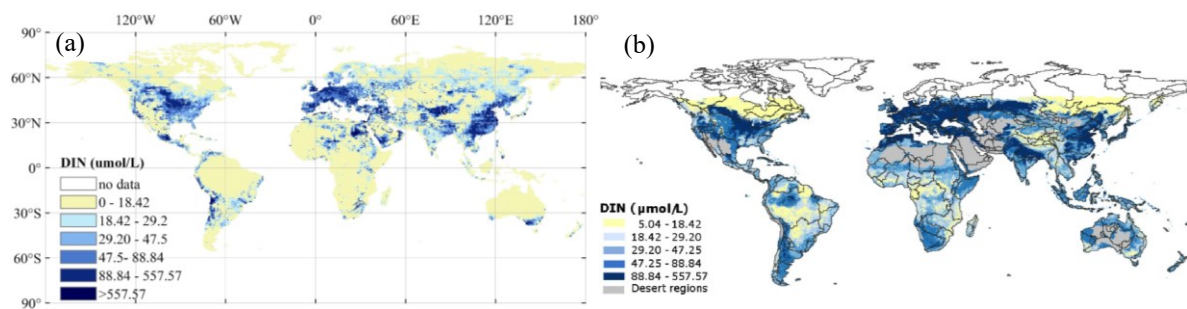
Figure S4. Spatial distribution of DIN concentration: (a) DIN concentration simulated by ORCHIDEE-NLAT; (b) DIN concentration simulated by semi-empirical (observation-based) model from Marzadri et al (2021).
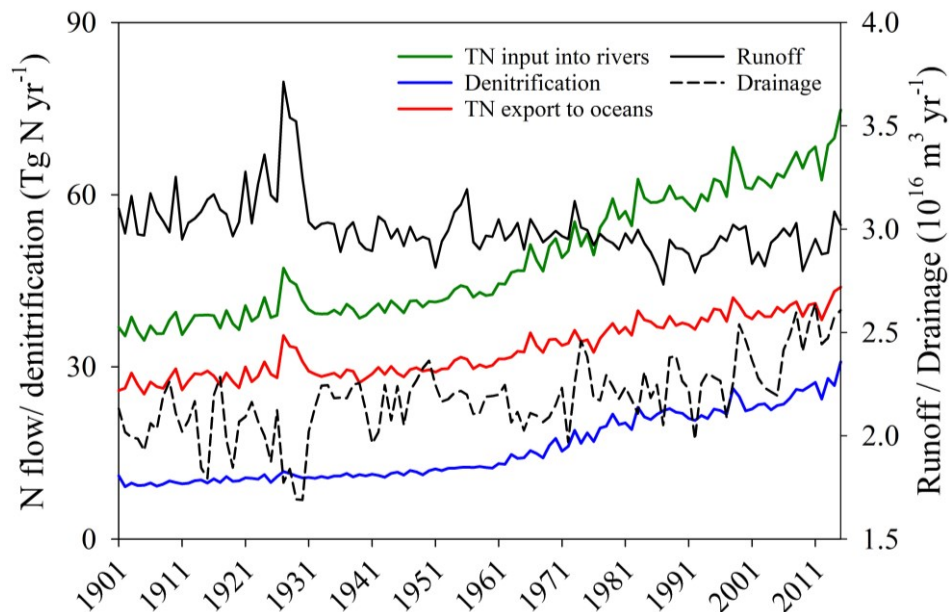
Figure S5. Global annual N flows, runoff and drainage from 1901 to 2014.
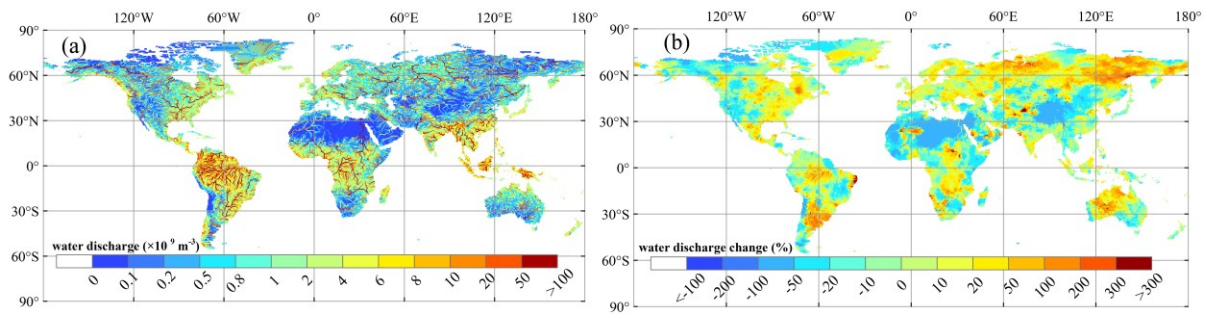
Figure S6. Spatial patterns of water: (a) average annual water discharge over 2001-2014; (b) water discharge changes from the reference period 1901–1910 to 2001–2014.
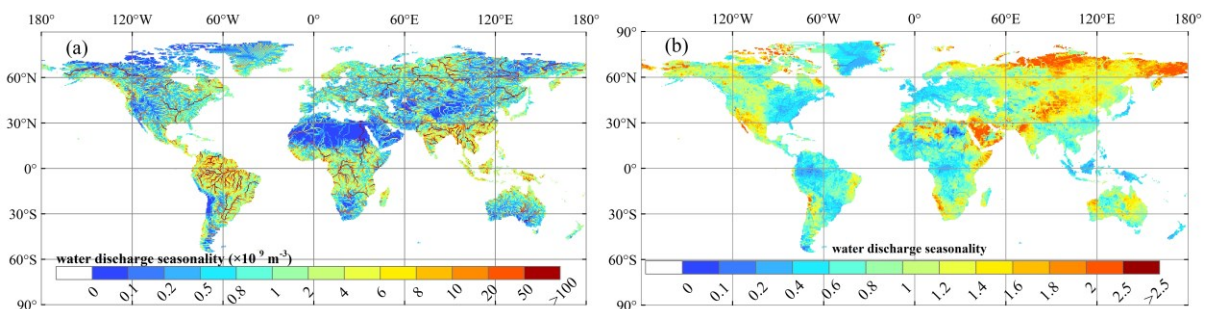
Figure S7. Spatial patterns of water discharge seasonality over 2001-2014: (a) water discharge seasonality; (b) normalized water discharge seasonality (=water discharge seasonality/ averaged annual water discharge).
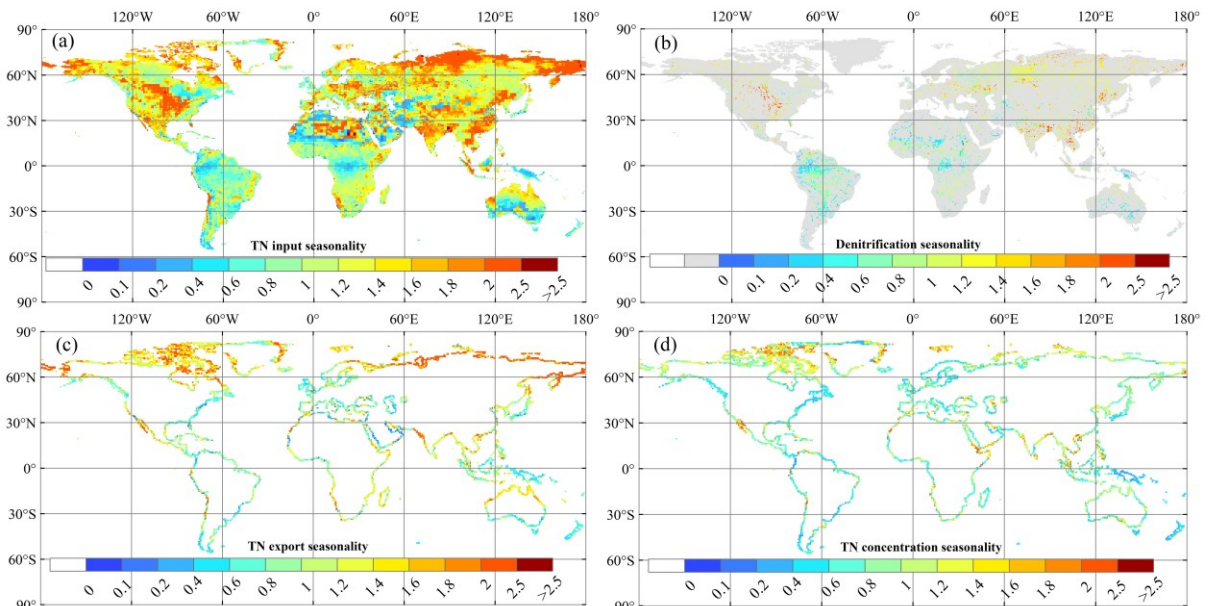
Figure S8. Spatial distribution of normalized seasonality for TN and dnitrification over 2001-2014: (a) TN inputs into rivers; (b) TN exports to oceans; (c) denitrification rates; (d)TN concentrations at rivers' mouths. The normalized seasonality of TN or denitrification = seasonality of TN or denitrification /averaged annual values of TN or denitrification.

References

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