

Table S1. The average values and ranges (minimum – maximum) of all environmental variables measured on spatial scale *I* (60 km), spatial scale *II* (1300 km) and spatial scale *III* (2300 km).

	Spatial scale <i>I</i> Mean (min – max)	Spatial scale <i>II</i> Mean (min – max)	Spatial scale <i>III</i> Mean (min – max)
Water temperature (°C)	14.9 (8.0 – 19.9)	19.7 (16.3 – 22.3)	19.5 (10.0 – 25.3)
Salinity	3.6 (0.1 – 6.1)	3.5 (0.1 – 6.1)	9.9 (1.2 – 27.6)
pH	8.1 (6.9 – 8.8)	7.8 (6.4 – 8.5)	8.2 (6.7 – 9.5)
Stone volume (cm³)	544.7 (113.7 – 1200.0)	-	594.9 (224.4 – 1758.6)
Total N (µg/l)	508.9 (186.3 – 1297.9)	463.1 (255.8 – 1429.2)	-
NO₂⁻ + NO₃⁻ (µg/l)	18.6 (0.9 – 106.0)	-	9.6 (1.6 – 64.4)
NH₄⁺ (µg/l)	10.9 (0.8 – 86.3)	-	8.9 (1.4 – 74.2)
Total P (µg/l)	43.7 (15.9 – 205.2)	49.3 (13.7 – 131.0)	-
PO₄³⁻ (µg/l)	15.1 (2.4 – 60.7)	-	24.1 (1.7 – 632.8)
Si (µg/l)	216.1 (41.3 – 507.5)	1317.3 (50.0 – 8910.0)	360.3 (43.9 – 1757.3)
Chlorophyll <i>a</i> (µg/5 ml)	2.3 (0.1 – 14.7)	-	0.39 (0.02 – 2.14)
Sediment amount (categories 1-3)	-	-	1.7
Vegetation amount (categories 1-3)	-	-	1.9
Fetch (m)	2728.2 (0 – 47426.8)	-	1041571.3 (470 – 43725700)
Air temperature (°C)	-	16.4 (15.4 – 17.6) July	5.5 (1.2 – 8.1) Annual
Precipitation (mm)	-	62.7 (53.5 – 73.1) July	601 (482 – 793) Annual

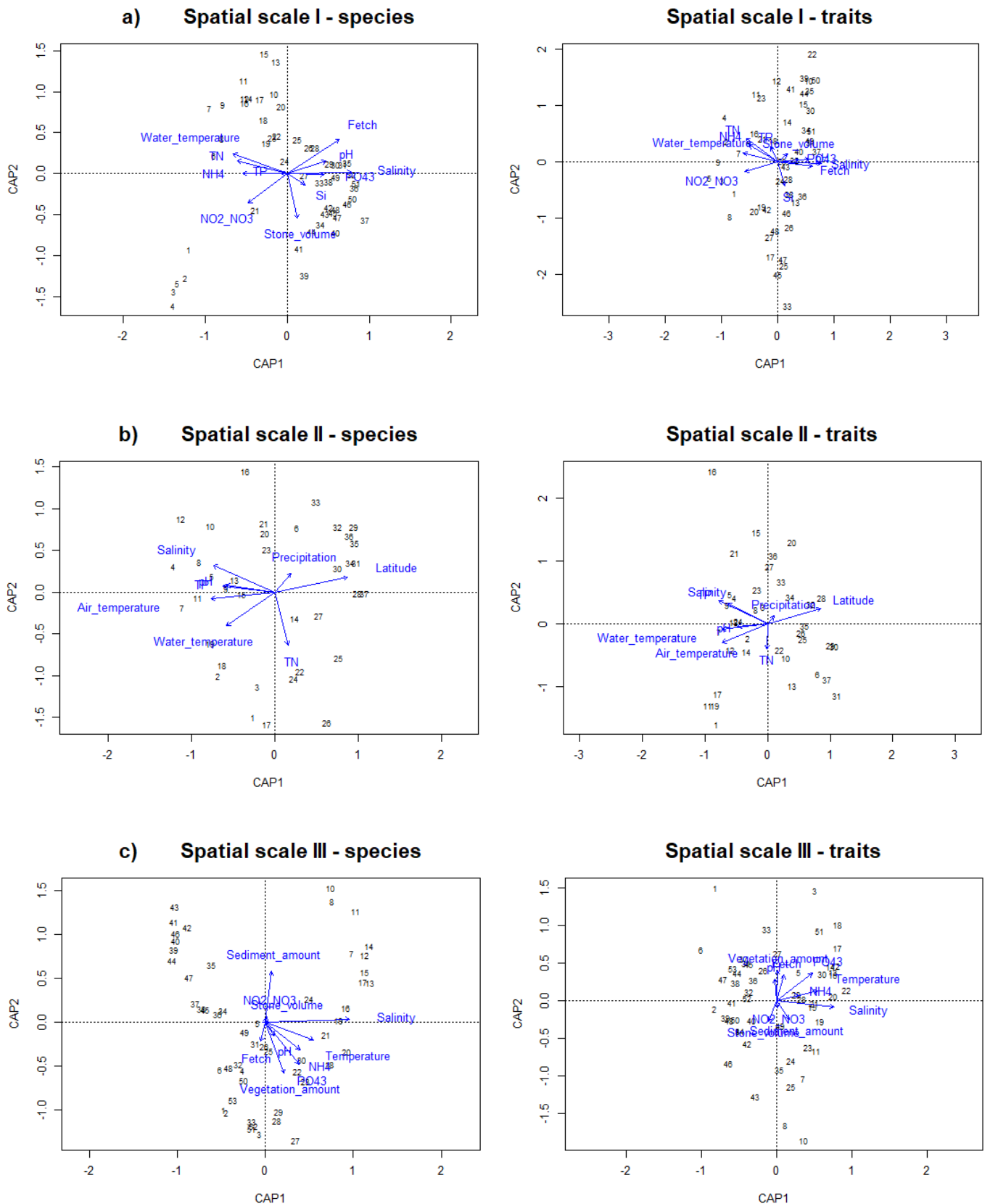


Fig. S1. Results of the distance-based redundancy analyses on the effect of environmental variables on species and trait composition of communities on spatial scales *I*, *II*, and *III*. Numbers in figures represent sampling sites.

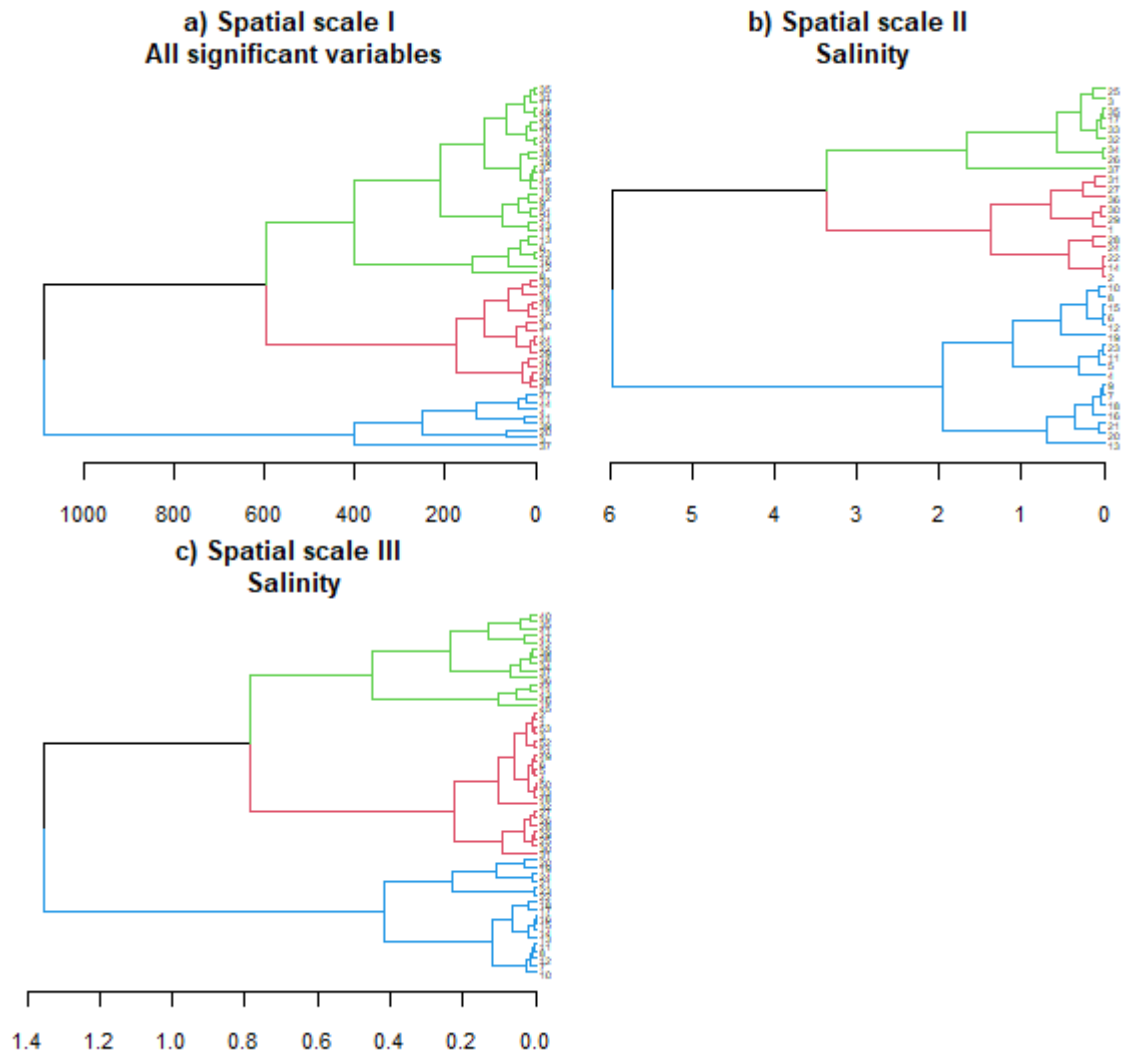


Fig. S2. Results of hierarchical clustering to divide the samples into groups according to the most important environmental variable (spatial scales *II* and *III*) or all significant variables (spatial scale *I*) indicated by the distance-based redundancy analyses.