

*Electronic Supplementary Information*

# Does microbial and faunal pattern correspond to dynamics in hydrogeology and hydrochemistry? Comparative study of two isolated groundwater ecosystems in Münsterland, Germany

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**Table S1.** Descriptive statistics of Baumberge on three sampling occasions.

Parameters	Unit	Minimum	Maximum	Mean	Std. Deviation
Temp.	°C	9.7	10.5	9.99	0.25027
pH		7	8	7.2575	0.27526
DO	mg/L	4.19	8.59	6.1617	1.31906
EC	μS/cm	700	758	731.75	16.581
$\dot{V}$	L/s	9.504	27.216	19.1448	6.053883
$h_{GW}$	m a.s.l	114.24	122.82	117.12	4.20981
Detritus		1	3	1.83	0.835
GFI		0.226201	5.782226	1.328724	1.517958
$sf/\dot{V}$	Ind./m <sup>3</sup>	0	2.964963	0.630118	0.937479
$sb/\dot{V}$	Ind./m <sup>3</sup>	0	1.982596	0.307739	0.551054
Ca <sup>2+</sup>	mg/L	154.6	172.2	162.942	4.808
Mg <sup>2+</sup>	mg/L	2.914	4.765	3.83475	0.600612
Na <sup>+</sup>	mg/L	5.05	9.89	7.6158	1.68479
K <sup>+</sup>	mg/L	0.996	1.282	1.12192	0.09991
Al <sup>3+</sup>	mg/L	0.0003	0.0218	0.007108	0.007001
Sr	mg/L	0.781	1.142	0.95917	0.116446
Fe <sup>2+</sup>	mg/L	0.0011	0.0651	0.010858	0.01779
SO <sub>4</sub> <sup>-</sup>	mg/L	41.702	50.495	46.72767	2.691285
Cl <sup>-</sup>	mg/L	12.589	25	18.89633	4.226788
HCO <sub>3</sub> <sup>-</sup>	mg/L	342.21	373.482	355.5092	9.756656
F <sup>-</sup>	mg/L	0.081	0.116	0.09783	0.011869
NO <sub>3</sub> <sup>-</sup>	mg/L	29.272	42.951	36.97725	4.700051
PO <sub>4</sub> <sup>3-</sup>	mg/L	0	0.519	0.18783	0.153878
SiO <sub>3</sub>	mg/L	4.6	14.01	8.17175	4.064251
δ <sup>2</sup> H <sub>H2O</sub>	‰	-54.34	-50.06	-52.2058	1.36129
δ <sup>18</sup> O <sub>H2O</sub>	‰	-7.97	-7.3	-7.65	0.21187
δ <sup>13</sup> C <sub>DIC</sub>	‰	-15.26	-14.17	-14.75	0.34317
δ <sup>34</sup> S <sub>SO4</sub>	‰	-5.2	-1.9	-3.2659	1.152114
δ <sup>18</sup> O <sub>SO4</sub>	‰	1.7	3	2.318722	0.363102
δ <sup>15</sup> N <sub>NO3</sub>	‰	2.83	7.81	5.79	1.76
δ <sup>18</sup> O <sub>NO3</sub>	‰	1.67	8.26	6.07	1.86
Biomass	cells/L	6.20x10 <sup>6</sup>	1.53x10 <sup>8</sup>	6.21x10 <sup>7</sup>	4.19x10 <sup>7</sup>
Activity	pM	9.70x10 <sup>-1</sup>	6.79x10 <sup>2</sup>	1.96x10 <sup>2</sup>	2.32x10 <sup>2</sup>

**Table S2.** Descriptive statistics of Schöppinger Berg on three sampling occasions.

Parameters	Unit	Minimum	Maximum	Mean	Std. Deviation
Temp.	°C	10	12	10.842	0.7914
pH		7	7.5	7.233	0.1614
DO	mg/L	4.77	8.5	7.11	1.00396
EC	μS/cm	749	824	777.83	23.571
$\dot{V}$	L/s	1.04	48.38	15.315	20.17273
$h_{GW}$	m a.s.l	114.24	122.82	117.12	4.20981
Detritus		0	2	0.83	0.577
GFI		0	2.566032	0.728908	0.741029
$sf/\dot{V}$	Ind./m <sup>3</sup>	0	1.45	0.5208	0.4699
$sb/\dot{V}$	Ind./m <sup>3</sup>	0	0.96	0.2858	0.28147
Ca <sup>2+</sup>	mg/L	168.5	187	173.842	4.8967
Mg <sup>2+</sup>	mg/L	2.7	4.68	3.8117	0.62855
Na <sup>+</sup>	mg/L	6.27	10.91	8.78	1.51711
K <sup>+</sup>	mg/L	1.16	1.98	1.5167	0.25896
Al <sup>3+</sup>	mg/L	0.0003	0.0262	0.005317	0.007394
Sr	mg/L	0.735	1.361	1.02892	0.204436
Fe <sup>2+</sup>	mg/L	0.0011	0.0249	0.005292	0.006806
SO <sub>4</sub> <sup>-</sup>	mg/L	46.02	59.74	50.3025	4.43876
Cl <sup>-</sup>	mg/L	23.19	35.64	29.5792	3.54744
HCO <sub>3</sub> <sup>-</sup>	mg/L	317.2	393.97	346.7467	21.72613
F <sup>-</sup>	mg/L	0.08	0.23	0.1058	0.04337
NO <sub>3</sub> <sup>-</sup>	mg/L	40.56	65.86	53.5342	7.37495
PO <sub>4</sub> <sup>3-</sup>	mg/L	0	0.57	0.205	0.18353
SiO <sub>3</sub>	mg/L	4.18	24.42	9.1917	5.85418
δ <sup>2</sup> H <sub>H2O</sub>	‰	-55.49	-49.8	-52.6775	1.76712
δ <sup>18</sup> O <sub>H2O</sub>	‰	-8.09	-7.4	-7.7475	0.24581
δ <sup>13</sup> C <sub>DIC</sub>	‰	-15.26	-14.17	-14.77	2.4486
δ <sup>34</sup> S <sub>SO4</sub>	‰	-6.07	-1.85	-3.4958	1.43331
δ <sup>18</sup> O <sub>SO4</sub>	‰	1.9	3.02	2.6358	0.3655
δ <sup>15</sup> N <sub>NO3</sub>	‰	3.72	7.96	6.13	1.33
δ <sup>18</sup> O <sub>NO3</sub>	‰	1.46	6.81	4.56	1.55
Biomass	cells/L	1.41x10 <sup>6</sup>	7.38x10 <sup>8</sup>	1.01x10 <sup>8</sup>	2.02x10 <sup>8</sup>
Activity	pM	1.7x10 <sup>3</sup>	1.74x10 <sup>3</sup>	3.75x10 <sup>2</sup>	5.74x10 <sup>2</sup>

**Table S3.** Spearman correlation of BB, n= 12 samples of 30 variables, considering a significance level of  $p \leq 0.01$ .

[illegible]

**Table S4.** Spearman correlation of SB, n= 12 samples of 30 variables, considering a significance level of  $p \leq 0.01$ .

	DO	EC	V	$h_{\text{low}}$	Detritus	GR	sf/V	db/V	Ca <sup>2+</sup>	Mg <sup>2+</sup>	Na <sup>+</sup>	K <sup>+</sup>	Al <sup>3+</sup>	Sr	Fe <sup>3+</sup>	SO <sub>4</sub> <sup>2-</sup>	Cl	HCO <sub>3</sub> <sup>-</sup>	F	NO <sub>3</sub> <sup>-</sup>	PO <sub>4</sub> <sup>3-</sup>	SiO <sub>2</sub>	U <sub>2</sub> H <sub>5</sub> SiO <sub>3</sub>	U <sup>6+</sup> O <sub>2</sub> (aq)	U <sup>5+</sup> O <sub>2</sub> (aq)	U <sup>4+</sup> O <sub>2</sub> (aq)	U <sup>3+</sup> O <sub>2</sub> (aq)	TCC	ATP				
Temp.	-0.232	62.3*		0.074	0.105	-65.7*	-0.168	-0.397	-0.471	65.1*	0.242	0.483	0.533	-0.1	0.313	-0.284	595*	0.57	-0.271	0.029	0.123	0.351	-0.174	-0.055	0.153	-6.30*	-680*	0.199	0.185				
DO			-0.26	0.542	0.148	0.441	0.322	-0.323	-0.323	0.012	-0.355	-0.302	-0.354	-0.517	0.366	-0.463	0.149	-0.439	-0.127	-0.133	-0.069	0.862	-0.379	0.007	-0.372	-0.482	-0.109	0.396	0.46	0.07	0.446		
EC				-0.342	0.118	-71.9*	-0.423	-0.299	-0.249	595**	0.021	0.168	648*	0.021	0.168	648*	0.021	0.168	648*	0.021	0.168	648*	0.021	0.168	648*	0.021	0.168	648*	0.021	0.168	0.46	0.07	0.446
V					0.164	0.401	0.348	-0.397	-0.353	-0.3	-0.3	-0.155	-0.399	0.373	-695*	0.351	-0.026	0.311	-0.497	0.054	954**	-0.299	-0.152	-0.392	-0.458	0.039	0.554	0.299	0.462	0.351	0.07	0.446	
Detritus						0.16	-0.168	-0.282	-0.326	-0.089	62.1*	0.582	0.459	839**	0.325	705*	0.163	0.163	0.118	-0.446	0.074	-757**	-0.361	-0.946**	-0.503	0.414	-0.207	-0.415	0.356	877**	0.07	0.446	
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