

Supplement of:

## **The response of zooplankton network indicators to winter geothermal water warming in shallow reservoirs**

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Table S1. Species composition, biomass ( $\mu\text{g l}^{-1}$ ; mean  $\pm$  SD), and zooplankton frequency (%) in individual thermal classes. Values with different superscripts differ significantly across reservoirs in the Kruskal–Wallis non-parametric test ( $P \leq 0.05$ ).

Taxa	COLD			MIDDLE			WARM			Kruskal-Wallis
	Biomass ( $\mu\text{g l}^{-1}$ )		Freq (%)	Biomass ( $\mu\text{g l}^{-1}$ )		Freq (%)	Biomass ( $\mu\text{g l}^{-1}$ )		Freq (%)	
	$\bar{x}$	$\pm\text{SD}$		$\bar{x}$	$\pm\text{SD}$		$\bar{x}$	$\pm\text{SD}$		$P$
<b>Rotifera</b>										
<i>Anuraeopsis fissa</i>	0.007	0.019	13	-	-	-	-	-	-	>0.05
<i>Ascomorpha ovalis</i>	0.266 <sup>a</sup>	0.295	54	0.580 <sup>b</sup>	0.392	75	0.121 <sup>a</sup>	0.225	25	0.0001
<i>Ascomorpha saltans</i>	-	-	-	0.008	0.041	4	-	-	-	>0.05
<i>Asplanchna priodonta</i>	28.71 <sup>a</sup>	27.83	58	13.12 <sup>b</sup>	22.23	29	-	-	-	0.037
<i>Brachionus angularis</i>	0.414 <sup>a</sup>	0.577	42	0.065 <sup>b</sup>	0.235	8	0.065 <sup>b</sup>	0.177	13	0.005
<i>Brachionus calyciflorus</i>	0.826	2.035	17	0.092	0.450	4	-	-	-	>0.05
<i>Brachionus diversicornis</i>	0.057	0.277	4	-	-	-	0.057	0.277	4	>0.05
<i>Brachionus falcatus</i>	-	-	-	-	-	-	0.057	0.277	4	>0.05
<i>Brachionus leydigii</i>	0.497	2.434	4	1.49	3.06	25	-	-	-	>0.05
<i>Brachionus quadridentatus</i>	-	-	-	0.138	0.678	4	0.277	0.937	8	>0.05
<i>Cephalodella auriculata</i>	-	-	-	0.013	0.042	8	0.013	0.061	4	>0.05
<i>Cephalodella forficula</i>	-	-	-	-	-	-	0.015	0.072	4	>0.05
<i>Cephalodella gibboides</i>	0.100	0.358	8	0.111	0.264	17	0.262	0.683	21	>0.05
<i>Cephalodella psammophila</i>	-	-	-	0.038	0.106	13	0.045	0.096	21	>0.05
<i>Cephalodella sp.</i>	0.013 <sup>a</sup>	0.042	8	0.088 <sup>ab</sup>	0.124	38	0.169 <sup>b</sup>	0.199	58	0.001
<i>Colurella colurus</i>	0.023 <sup>a</sup>	0.046	21	0.103 <sup>b</sup>	0.114	54	0.107 <sup>b</sup>	0.134	46	0.006
<i>Colurella uncinata</i>	0.018	0.064	8	0.012	0.040	8	0.047	0.090	25	>0.05
<i>Conochilus unicornis</i>	0.065	0.319	4	0.022	0.106	4	-	-	-	>0.05
<i>Dicranophorous sp.</i>	0.138	0.493	8	0.092	0.449	4	-	-	-	>0.05
<i>Dipeuchlanis propatula</i>	-	-	-	-	-	-	0.033	0.163	4	>0.05
<i>Encentrum sp.</i>	-	-	-	-	-	-	0.016	0.080	4	>0.05
<i>Euchlanis contorta</i>	-	-	-	0.133	0.652	4	0.665	1.879	13	>0.05
<i>Euchlanisapidula</i>	-	-	-	0.266	0.902	8	0.399	1.079	13	>0.05
<i>Euchlanis dilatata</i>	0.146 <sup>a</sup>	0.714	4	0.073 <sup>a</sup>	0.357	4	1.457 <sup>b</sup>	1.835	46	0.0001
<i>Euchlanis lyra</i>	-	-	-	-	-	-	0.292	0.843	13	>0.05
<i>Filinia longiseta</i>	0.437	0.612	42	0.125	0.337	17	0.166	0.240	33	>0.05
<i>Hexarthra mira</i>	0.561	1.250	21	-	-	-	0.280	0.685	17	>0.05
<i>Kellicottia longispina</i>	0.016	0.054	8	-	-	-	-	-	-	>0.05
<i>Keratella cochlearis</i>	0.407 <sup>a</sup>	0.089	100	0.110 <sup>b</sup>	0.125	50	0.252 <sup>b</sup>	0.223	67	0.0000
<i>Keratella paludosa</i>	-	-	-	0.008	0.041	4	-	-	-	>0.05
<i>Keratella quadrata</i>	1.55 <sup>a</sup>	1.05	79	0.529 <sup>b</sup>	0.781	38	0.564 <sup>b</sup>	0.734	46	0.0001
<i>Keratella tecta</i>	0.258	0.218	63	0.161	0.202	46	0.129	0.175	46	>0.05
<i>Keratella testudo</i>	0.012	0.060	4	0.098	0.223	21	-	-	-	>0.05
<i>Keratella ticinensis</i>	0.005	0.024	4	-	-	-	-	-	-	>0.05
<i>Keratella valga</i>	0.245	0.363	38	0.140	0.234	33	0.140	0.286	25	>0.05
<i>Lecane arcuata</i>	-	-	-	-	-	-	0.002	0.011	4	>0.05
<i>Lecane bulla</i>	0.033 <sup>ab</sup>	0.110	8	0.016 <sup>a</sup>	0.080	4	0.228 <sup>b</sup>	0.344	38	0.004
<i>Lecane closterocerca</i>	-	-	-	0.004	0.021	4	0.030	0.057	25	>0.05
<i>Lecane cornuta</i>	-	-	-	-	-	-	0.029	0.142	4	>0.05
<i>Lecane flexilis</i>	0.004	0.021	4	0.013	0.047	8	-	-	-	>0.05
<i>Lecane hamata</i>	0.005	0.024	4	-	-	-	-	-	-	>0.05
<i>Lecane imbricata</i>	-	-	-	0.002	0.011	4	-	-	-	>0.05
<i>Lecane inermis</i>	-	-	-	0.005	0.018	8	-	-	-	>0.05
<i>Lecane levistyla</i>	-	-	-	-	-	-	0.011	0.056	4	>0.05
<i>Lecane ludwigii</i>	-	-	-	-	-	-	0.022	0.073	8	>0.05
<i>Lecane luna</i>	0.021	0.105	4	-	-	-	0.236	0.371	33	>0.05
<i>Lecane lunaris</i>	0.032	0.086	13	0.021	0.104	4	0.106	0.182	29	>0.05



<i>Cyclops scutifer</i>	1.67	8.16	4	-	-	-	-	-	-	>0.05
<i>Cyclops strenuus</i>	7.50	21.72	13	-	-	-	-	-	-	>0.05
<i>Cyclops vicinus</i>	9.17	22.63	17	-	-	-	-	-	-	>0.05
<i>Diacyclops crassicaudis</i>	-	-	-	5.00	19.11	8	1.25	6.12	4	>0.05
<i>Eucyclops macruroides</i>	1.25	6.12	4	-	-	-	-	-	-	>0.05
<i>Eucyclops serrulatus</i>	-	-	-	1.25	6.12	4	-	-	-	>0.05
<i>Eucyclops speratus</i>	-	-	-	5.00	11.42	17	-	-	-	>0.05
<i>Eudiaptomus graciloides</i>	11.67	34.35	13	-	-	-	-	-	-	>0.05
Harpacticoida	1.88	5.07	13	0.625	3.062	4	3.75	7.97	21	>0.05
copepodites	27.25 <sup>a</sup>	11.38	100	8.33 <sup>b</sup>	9.63	50	7.08 <sup>b</sup>	8.59	54	0.0000
<i>Microcyclops varicans</i>	2.50	8.97	8	0.833	4.082	4	-	-	-	>0.05
nauplii	2.13	0.689	100	1.604	0.895	96	1.56	1.01	92	>0.05
<i>Thermocyclops crassus</i>	20.00 <sup>a</sup>	30.22	38	-	-	-	0.104 <sup>b</sup>	0.510		0.0036
<i>Paracyclops fimbriatus</i>	-	-	-	-	-	-	0.833	4.082	4	>0.05
<b>Protozoa</b>										
<i>Arcella discoidea</i>	0.010 <sup>a</sup>	0.025	17	0.010 <sup>a</sup>	0.021	21	0.106 <sup>b</sup>	0.065	83	0.0000
<i>Centropyxis aculeata</i>	0.008 <sup>a</sup>	0.019	17	0.006 <sup>a</sup>	0.017	13	0.042 <sup>b</sup>	0.041	63	0.0000
<i>Codonella cratera</i>	0.098 <sup>a</sup>	0.062	75	0.015 <sup>b</sup>	0.028	25	0.021 <sup>b</sup>	0.039	29	0.0000
<i>Diffflugia acuminata</i>	-	-	-	-	-	-	0.013	0.045	8	>0.05
<i>Diffflugia limnetica</i>	-	-	-	-	-	-	0.004	0.020	4	>0.05
<i>Diffflugia lobostoma</i>	0.088 <sup>ab</sup>	0.133	33	0.021 <sup>a</sup>	0.051	17	0.100 <sup>b</sup>	0.114	54	0.004
<i>Diffflugia pyriformis</i>	-	-	-	-	-	-	0.017	0.048	13	>0.05

Table S2. The most important relationships between zooplankton species in the compared thermal classes.

Thermal class	Ralationships between taxa		
COLD	Negative	<i>Brachionus calyciflorus</i> - <i>Keratella tecta</i>	-0.671
		<i>Keratella valga</i> - <i>Pompholyx sulcata</i>	-0.638
		Harpacticoida - nauplii	-0.591
		<i>Bosmina longirostris</i> - <i>Keratella quadrata</i>	-0.584
		nauplii - <i>Keratella tecta</i>	-0.556
		<i>Diffugia lobostoma</i> - <i>Filinia longiseta</i>	-0.529
		<i>Keratella valga</i> - <i>Trichocerca pusilla</i>	-0.517
		<i>Pompholyx sulcata</i> - <i>Trichocerca pusilla</i>	-0.484
		<i>Cyclops vicinus</i> - <i>Trichocerca pusilla</i>	-0.473
		<i>Keratella cochlearis</i> - <i>Synchaeta</i> spp.	-0.471
		<i>Brachionus calyciflorus</i> - <i>Filinia longiseta</i>	-0.461
		<i>Keratella tecta</i> - <i>Lepadella</i> spp.	-0.457
		<i>Diffugia lobostoma</i> - <i>Brachionus calyciflorus</i>	-0.457
		<i>Thermocyclops crassus</i> - <i>Proales</i> sp.	-0.445
		<i>Cryptocyclops bicolor</i> - <i>Codonella cratera</i>	-0.435
		<i>Cryptocyclops bicolor</i> - <i>Keratella cochlearis</i>	-0.431
		<i>Codonella cratera</i> - <i>Brachionus calyciflorus</i>	-0.424
		<i>Cryptocyclops bicolor</i> - <i>Synchaeta</i> spp.	-0.419
		<i>Keratella cochlearis</i> - <i>Trichocerca pusilla</i>	-0.413
		<i>Keratella quadrata</i> - <i>Keratella valga</i>	-0.401
	Positive	<i>Ascomorpha ovalis</i> - <i>Notholca squamula</i>	0.837
		<i>Keratella tecta</i> - <i>Pompholyx sulcata</i>	0.773
		<i>Polyarthra longiremis</i> - <i>Synchaeta</i> spp.	0.759
		<i>Microcyclops varicans</i> - <i>Centropxyxis aculeata</i>	0.747
		<i>Keratella tecta</i> - <i>Keratella valga</i>	0.713
		<i>Filinia longiseta</i> - <i>Hexarthra mira</i>	0.657
		Harpacticoida - <i>Colurella colurus</i>	0.654
		<i>Brachionus angularis</i> - <i>Keratella cochlearis</i>	0.616
		copepodites - <i>Thermocyclops crassus</i>	0.610
		<i>Lepadella</i> spp. - <i>Notholca squamula</i>	0.607
		<i>Brachionus calyciflorus</i> - <i>Polyarthra longiremis</i>	0.603
		<i>Brachionus calyciflorus</i> - <i>Keratella valga</i>	0.588
		nauplii - <i>Keratella valga</i>	0.584
<i>Cryptocyclops bicolor</i> - <i>Polyarthra longiremis</i>	0.567		
<i>Lepadella</i> spp. - <i>Pompholyx sulcata</i>	0.564		
nauplii - <i>Pompholyx sulcata</i>	0.554		
<i>Brachionus calyciflorus</i> - <i>Polyarthra vulgaris</i>	0.552		
<i>Codonella cratera</i> - <i>Polyarthra longiremis</i>	0.533		
<i>Daphnia cucullata</i> - <i>Keratella cochlearis</i>	0.532		
<i>Bosmina longirostris</i> - nauplii	0.524		
MIDDLE	Negative	<i>Brachionus calyciflorus</i> - <i>Synchaeta</i> spp.	-0.821
		<i>Brachionus calyciflorus</i> - <i>Keratella valga</i>	-0.754
		<i>Bosmina longirostris</i> - <i>Keratella testudo</i>	-0.701
		<i>Keratella valga</i> - <i>Synchaeta</i> spp.	-0.689
		<i>Keratella tecta</i> - <i>Trichocerca tigris</i>	-0.677
		<i>Bosmina longirostris</i> - <i>Keratella tecta</i>	-0.636
		<i>Chydorus sphaericus</i> - <i>Notholca acuminata</i>	-0.632
		<i>Chydorus sphaericus</i> - <i>Euchlanis</i> spp.	-0.592

		<i>Euchlanis</i> spp. - <i>Notholca acuminata</i>	-0.591
		<i>Ascomorpha ovalis</i> - <i>Synchaeta</i> spp.	-0.586
		<i>Ascomorpha ovalis</i> - <i>Brachionus calyciflorus</i>	-0.571
		<i>Codonella cratera</i> - <i>Keratella valga</i>	-0.57
		<i>Keratella quadrata</i> - <i>Keratella testudo</i>	-0.562
		<i>Chydorus sphaericus</i> - <i>Microcyclops varicans</i>	-0.553
		<i>Microcyclops varicans</i> - <i>Notholca acuminata</i>	-0.551
		<i>Polyarthra longiremis</i> - <i>Trichocerca pusilla</i>	-0.54
		<i>Proales</i> sp. - <i>Trichocerca tigris</i>	-0.523
		<i>Asplanchna priodonta</i> - <i>Keratella testudo</i>	-0.519
		<i>Bosmina longirostris</i> - <i>Keratella quadrata</i>	-0.518
		<i>Ascomorpha ovalis</i> - <i>Keratella valga</i>	-0.507
	<b>Positive</b>	<i>Polyarthra longiremis</i> - <i>Trichocerca tigris</i>	0.961
		<i>Bosmina longirostris</i> - <i>Ascomorpha ovalis</i>	0.932
		<i>Asplanchna priodonta</i> - <i>Keratella valga</i>	0.907
		<i>Brachionus calyciflorus</i> - <i>Keratella tecta</i>	0.844
		<i>Brachionus calyciflorus</i> - <i>Filinia longiseta</i>	0.828
		<i>Arcella discoides</i> - <i>Notholca acuminata</i>	0.821
		<i>Filinia longiseta</i> - <i>Synchaeta</i> spp.	0.782
		<i>Chydorus sphaericus</i> - <i>Arcella discoides</i>	0.77
		copepodit - <i>Microcyclops varicans</i>	0.721
		<i>Daphnia cucullata</i> - Harpacticoida	0.697
		<i>Ascomorpha ovalis</i> - <i>Keratella testudo</i>	0.697
		<i>Microcyclops varicans</i> - <i>Arcella discoides</i>	0.677
		<i>Bosmina longirostris</i> - <i>Synchaeta</i> spp.	1
		<i>Keratella tecta</i> - <i>Synchaeta</i> spp.	0.659
		<i>Arcella discoides</i> - <i>Euchlanis</i> spp.	0.647
		<i>Bosmina longirostris</i> - <i>Brachionus calyciflorus</i>	0.645
		<i>Bosmina longirostris</i> - <i>Keratella valga</i>	0.616
		<i>Daphnia cucullata</i> - <i>Synchaeta</i> spp.	0.609
		<i>Codonella cratera</i> - <i>Asplanchna priodonta</i>	0.605
		<i>Ascomorpha ovalis</i> - <i>Keratella quadrata</i>	0.599
<b>WARM</b>	<b>Negative</b>	<i>Cephalodella</i> spp. - <i>Polyarthra vulgaris</i>	-0.582
		<i>Alona quadrangularis</i> - <i>Ascomorpha ovalis</i>	-0.397
		<i>Centropyxis aculeata</i> - <i>Trichocerca intermedia</i>	-0.337
		<i>Alona quadrangularis</i> - <i>Hexarthra mira</i>	-0.32
		<i>Monommata maculata</i> - <i>Trichocerca intermedia</i>	-0.312
		nauplii - <i>Centropyxis aculeata</i>	-0.305
		<i>Alona quadrangularis</i> - <i>Chydorus sphaericus</i>	-0.29
		<i>Diffflugia lobostoma</i> - <i>Euchlanis</i> spp.	-0.289
		<i>Alona quadrangularis</i> - <i>Notholca squamula</i>	-0.282
	<b>Positive</b>	<i>Brachionus angularis</i> - <i>Polyarthra vulgaris</i>	0.779
		<i>Alona quadrangularis</i> - <i>Centropyxis aculeata</i>	0.67
		<i>Chydorus sphaericus</i> - <i>Trichocerca intermedia</i>	0.67
		<i>Bosmina longirostris</i> - <i>Notholca acuminata</i>	0.658
		<i>Brachionus angularis</i> - <i>Cephalodella</i> spp.	0.651
		<i>Testudinella patina</i> - <i>Trichocerca tenuior</i>	0.646
		<i>Notholca squamula</i> - <i>Synchaeta</i> spp.	0.635
		<i>Lepadella</i> spp. - <i>Notholca acuminata</i>	0.591
		<i>Euchlanis</i> spp. - <i>Hexarthra mira</i>	0.57
		<i>Chydorus sphaericus</i> - <i>Monommata maculata</i>	0.552
		<i>Centropyxis aculeata</i> - <i>Ascomorpha ovalis</i>	0.521
<i>Ascomorpha ovalis</i> - <i>Trichocerca tenuior</i>	0.441		
<i>Synchaeta</i> spp. - <i>Trichocerca tenuior</i>	0.405		
<i>Diffflugia lobostoma</i> - <i>Hexarthra mira</i>	0.394		
<i>Cephalodella</i> spp. - <i>Polyarthra longiremis</i>	0.384		

	<i>Bosmina longirostris</i> - <i>Monommata maculata</i>	0.381
	<i>Codonella cratera</i> - <i>Trichocerca intermedia</i>	0.375
	<i>Colurella colurus</i> - <i>Lepadella</i> spp.	0.372
	<i>Diffugia lobostoma</i> - <i>Lecane</i> spp.	0.363
	<i>Keratella quadrata</i> - <i>Polyarthra longiremis</i>	0.353

UPGMA (constrained)

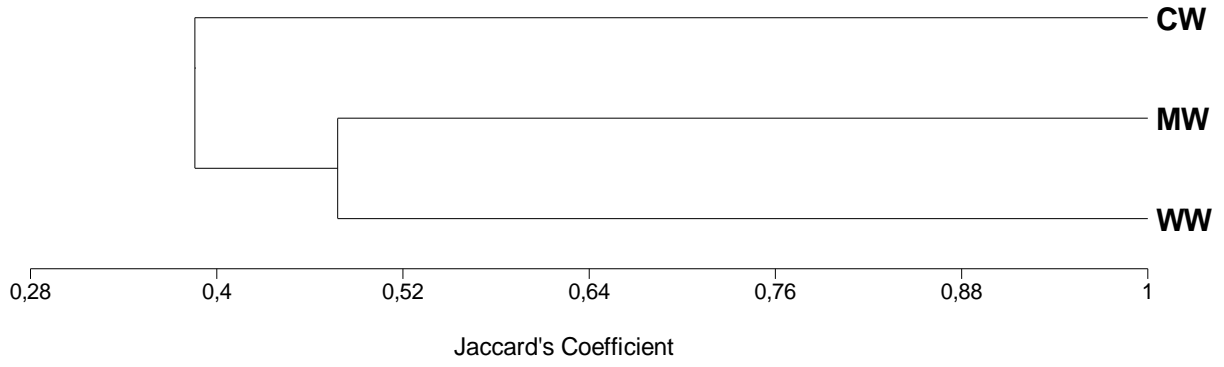


Fig. S1. Faunistic similarity of zooplankton communities in the compared thermal classes.