

1 **Supplementary information of the article**

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3 **Diversity and assembly processes of microeukaryotic**
4 **community in Fildes Peninsula Lakes (West Antarctica)**

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18 **Table S1 Physical and chemical properties of different lakes.**

19 **Table S2 Analysis of spatial and temporal variation in eukaryotic plankton based**
20 **on genus level**

21 **Table S3 Classification and topological properties of keystone species**

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57 **Table S1 Physical and chemical properties of different lakes**

Lake	WT	Sal	pH	NO ₂ -N	PO ₄ -P	SiO ₃ ²⁻	NH ₄ ⁺	Chl a
CH_17	0.90	0	8.05	0.02	0.11	—	—	0.25
KT_17	2.40	0.10	7.89	0.02	0.04	—	—	0.40
XH_17	1.60	0.10	7.91	0.03	0.02	—	—	0.33
YO_17	4.90	0.10	7.92	0.03	0.02	—	—	0.33
YY_17	0.90	0.10	8.05	0.05	0.95	—	—	2.11
CH_18	2.00	0.14	8.27	0.1	0.16	51.50	0.27	0.31
KT_18	2.70	0.12	7.91	0.01	0.06	21.89	0.42	0.43
XH_18	2.60	0.09	7.75	0	0.04	22.34	0.46	0.56
YO_18	3.50	0.07	7.87	0.08	0.07	24.10	0.27	0.89
YY_18	2.10	0.09	7.55	0	1.78	1.43	0.74	1.26
CH_19	3.37	0.12	7.82	0.15	0.10	45.47	0.15	—
KT_19	2.27	0.09	7.81	0.11	0.08	12.67	0.11	—
XH_19	3.69	0.07	7.91	0.03	0.07	6.24	0.23	—
YO_19	7.14	0.06	7.95	0.11	0.10	6.27	0.18	—
YY_19	2.22	0.07	7.65	0.14	2.29	2.67	0.05	—

58 Note: “—” represents missing data

59 WT: Water temperature; Sal: Salinity; NO₂-N: Nitrite; PO₄-P: Phosphate; SiO₃²⁻:
60 Silicate; NH₄⁺-N: Ammonium nitrogen; Chl.a: Chlorophyll a.61 Units: (μM L⁻¹): PO₄-P, NH₄⁺-N, NO₂-N, SiO₃²⁻; (μg L⁻¹): Chl. a; (°C): WT.62 **Table S2 Analysis of spatial and temporal variation in eukaryotic plankton based**
63 **on genus level**

Lake (5 lakes)	Genus (<i>P</i> <0.05)
CH vs. KT	<i>Chrysosphaerell, Tessellaria, Raphidonema</i>
CH vs. XH	<i>Raphidonema, Ochromonas</i>
CH vs. YO	<i>Raphidonema</i>
CH vs. YY	<i>Raphidonema</i>
KT vs. XH	<i>Komma, Chrysosphaerell, Microglen, Synura</i>
KT vs. YO	<i>Monochrysis, Chrysosphaerell, Komma, Synura</i>
KT vs. YY	<i>Hydrurus, Chrysosphaerell, Monochrysis, Synura, Tessellaria, Ochromonas</i>
XH vs. YO	<i>Microglen</i>
XH vs. YY	<i>Chrysosphaerell, Ochromonas, Microglen</i>
YO vs. YY	<i>Mallomonas</i>
Time (3 years)	
2017 vs. 2018	—
2017 vs. 2019	<i>Spumella</i>
2018 vs. 2019	—

Table S3 Classification and topological properties of keystone species

Id	Phylum	Genus	Degree	Closeness centrality	Betweenness centrality
OTU379	Glissomonadida	<i>Heteromita</i>	41	0.441	281.343
OTU148	Glissomonadida	<i>Heteromita</i>	37	0.439	155.678
OTU7	Glissomonadida	<i>Heteromita</i>	32	0.418	269.285
OTU119	Glissomonadida	<i>Heteromita</i>	37	0.433	214.410
OTU52	Glissomonadida	<i>Heteromita</i>	40	0.442	453.743
OTU22	Glissomonadida	<i>Heteromita</i>	35	0.422	76.265
OTU122	Glissomonadida	<i>Heteromita</i>	34	0.431	222.590
OTU84	Chytridiomycota	<i>unclassified</i>	35	0.434	234.814
OTU102	Chrysophyta	<i>Spumella</i>	42	0.455	300.461
OTU372	Chrysophyta	<i>Spumella</i>	33	0.420	104.788
OTU29	Chrysophyta	<i>Ochromonas</i>	48	0.456	373.244
OTU342	Chrysophyta	<i>Ochromonas</i>	39	0.449	920.933
OTU98	Chrysophyta	<i>Paraphysomonas</i>	34	0.421	124.205
OTU242	Chrysophyta	<i>Monochrysis</i>	38	0.435	267.606
OTU394	Chrysophyta	<i>Spumella</i>	48	0.457	519.813
OTU103	Chrysophyta	<i>Chromulina</i>	42	0.449	305.687
OTU395	Chrysophyta	<i>Paraphysomonas</i>	33	0.420	206.241
OTU347	Chlorophyta	<i>Chloromonas</i>	41	0.447	213.040
OTU33	Chlorophyta	<i>Aphelida</i>	38	0.449	351.757
OTU114	Chlorophyta	<i>Chlamydomonas</i>	42	0.441	775.600
OTU380	Bacillariophyta	<i>Nitzschia</i>	36	0.454	479.301
OTU383	Bacillariophyta	<i>Nitzschia</i>	38	0.445	280.677
OTU253	Bacillariophyta	<i>Fragilaria</i>	34	0.435	491.089
OTU67	Alveolata	<i>norank_A31</i>	36	0.436	200.221