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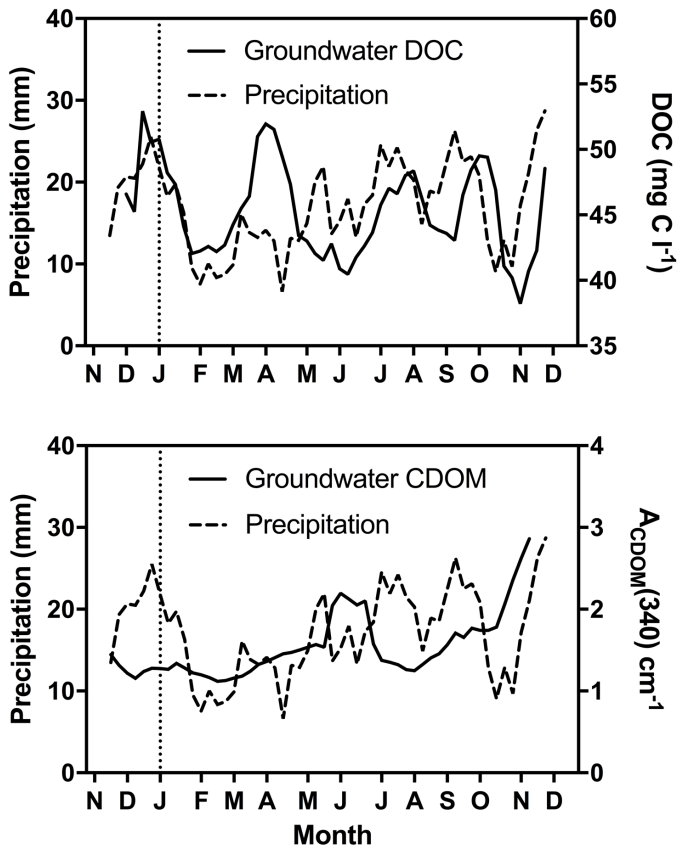
Supplement of

Catchment tracers reveal discharge, recharge and sources of groundwater-borne pollutants in a novel lake modelling approach

Emil Kristensen et al.

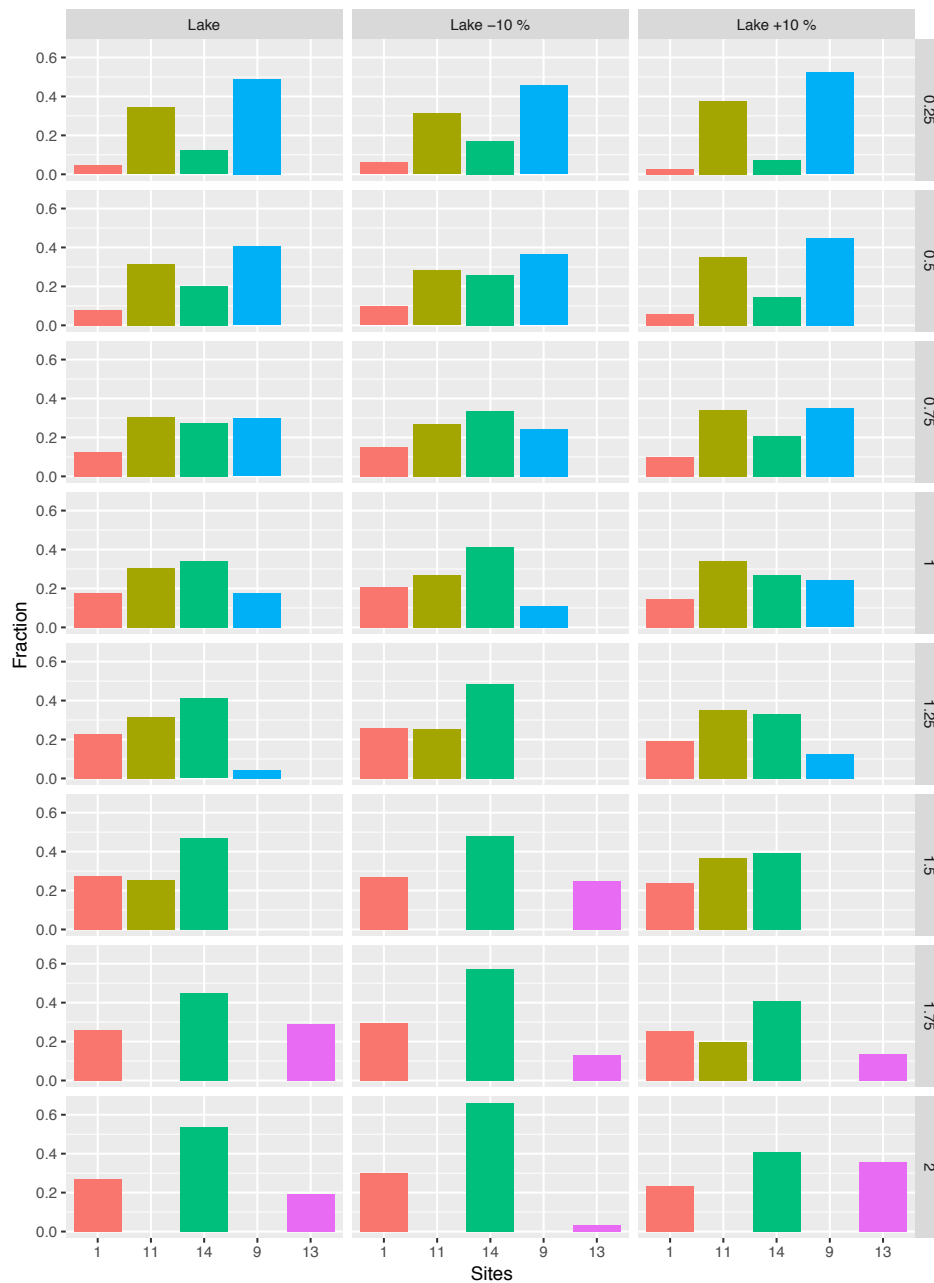
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Figure S1: Weekly CDOM absorption ($A_{CDOM}(340) \text{ cm}^{-1}$) and DOC (mg C l^{-1}) measurements from a drainage channel in the catchment area and precipitation (mm) data from a weather station placed at the lake shore. Data are shown as the running average of four weeks.



5 **Figure S2:** Bar plot showing the results from the sensitivity analysis derived from the CATS model. The top x-axis shows the different concentrations used for the lake e.g. no change (Lake), 10 % reduction (Lake -10 %) and 10 % increment (Lake +10. The left y-axis denotes the estimated fractions of inflowing groundwater originating from the groundwater well sites (bottom x-axis, only sites delivering more than 0.01 are shown) and the second y-axis denotes the corresponding WRT. In general, a smaller variance between sites and discharge fractions is seen up to a WRT of 1.25 years. Above this point there is some changes between site 11 and 13. Overall, the same 5 groundwater well sites are isolated which explain the measured lake concentrations.

Table S1: Tracer concentrations of $\delta^{18}\text{O}$ (‰), dissolved organic carbon (DOC $\mu\text{mol l}^{-1}$), coloured dissolved organic matter ($A_{\text{CDOM}(340)} \text{ cm}^{-1}$), total dissolved phosphorus (TDP $\mu\text{g l}^{-1}$), total phosphorus (TP $\mu\text{g l}^{-1}$), total dissolved nitrate (TDN $\mu\text{g l}^{-1}$), total nitrate (TN $\mu\text{g l}^{-1}$) and maximum fluorescence of component C1-C5 in Raman's units (R.U.) found around the lake (1-30), in the lake (a, b and c) and at a water locked (WL) site. Dissolved nutrients are measured in groundwater while total fractions are found in lake water. For site reference see figure 1a.

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Sites	$\delta^{18}\text{O}$ ‰	DOC $\mu\text{mol l}^{-1}$	CDOM $A_{\text{CDOM}(340)}$ cm^{-1}	TDP/T P $\mu\text{g l}^{-1}$	TDN/T N $\mu\text{g l}^{-1}$	C1 R.U.	C2 R.U.	C3 R.U.	C4 R.U.	C5 R.U.
Lake (a)		952	0.40	36	708	7.8	3.1	2.1	1.1	0.3
Lake (b)	-4.6	1117	0.41	28	662	7.8	3.1	2.2	1.1	0.3
Lake (c)	-4.6	1105	0.40	29	652	7.8	3.1	2.2	1.1	0.3
1	-7.2	3115	1.29	42	994	14.9	6.8	4.3	3.1	0.7
2	-9.2	5032	1.53	105	1051	21.6	9.8	7.8	3.8	1.0
3	-9.0	7782	2.04	102	1148	32.7	14.2	11.6	5.1	1.3
4	-8.6	10467	2.50	167	1671	44.3	18.0	15.7	5.1	1.1
5	-9.4	5735	1.59	90	1031	28.7	12.4	10.9	3.7	0.7
6	-8.2	8791	3.11	134	1477	36.3	16.3	12.6	6.2	1.5
7	-8.2	9298	2.94	124	1419	47.1	21.6	15.8	7.6	1.9
8	-7.3	4943	1.48	64	1250	26.7	14.3	11.2	5.2	2.9
9	-6.6	1721	0.31	54	405	7.0	3.4	2.6	1.1	0.1
10	-7.3	4483	0.58	17	856	20.8	8.9	9.1	2.3	0.3
11	-6.9	2504	0.32	9	764	6.9	3.1	2.9	0.9	0.1
12	-6.6	4229	0.55	18	857	13.7	6.2	5.9	2.0	0.2
13	-6.8	3848	0.64	34	1285	13.8	6.2	6.0	2.0	0.4
14	-7.0	5868	0.87	124	2198	13.9	5.7	6.2	1.2	0.3
15	-6.7	10656	2.41	59	2309	41.1	20.7	16.1	6.1	1.8
16	-4.3	2674	0.26	4	325	7.6	3.3	2.1	1.6	0.4
17	-5.2	3115	0.24	12	589	7.5	3.3	2.1	1.8	0.4
18	-4.8	5032	0.24	15	726	7.6	3.2	2.2	1.7	0.4
19	-4.7	7782	0.27	1	592	7.6	3.3	2.1	1.5	0.6
20	-4.6	10467	0.32	7	522	7.6	3.2	2.2	1.2	0.5
21	-4.5	5735	0.31	10	657	7.6	3.2	2.3	1.3	0.6
22	-4.7	8791	0.34	10	656	7.6	3.3	2.2	1.4	0.5
23	-5.3	9298	0.34	30	667	7.6	3.3	2.2	1.3	0.3
24	-5.1	4943	0.52	26	709	7.7	3.0	2.4	1.1	0.3
25	-4.6	1721	0.80	30	1016	15.0	5.9	5.1	1.8	0.5
26	-4.6	4483	0.32	66	436	7.7	3.1	2.2	1.3	0.3
27	-4.4	2504	0.30	38	511	7.6	3.3	2.0	1.6	0.3
28	-5.1	4229	0.90	65	859	15.0	6.2	4.8	2.1	0.5
29	-4.3	3848	1.21	81	775	18.5	8.4	5.7	3.7	1.0
30	-6.8	5868	1.09	59	788	17.4	9.3	6.0	4.3	0.9
WL	-6.7	4276	2.6	193	2388	41.7	16.4	19.5	3.5	2.6