Appendix 2

Correlations between organic carbon, indicative of light conditions, and *Gonyostomum semen* abundance in the lakes. For this analysis we calculated specific absorption ratio at 420nm (SAR420) by dividing the absorbance measured at 420 cm in a 5cm cuvette with the measured TOC concentrations.

The analysis of SAR420 as a function of pH revealed specific patterns (Figure A2.1). Regarding the limed lakes, naturally acidic limed lakes had higher SAR420 and thus higher absorbance (darker light conditions due to lighter carbon) than the acidified, limed lakes (upper panel; Figure A2.1). Comparing circumneutral and acidified unlimed lakes shows generally higher absorbance and thus darker light conditions in the latter lake group, correlating with lower pH values (middle panel; Figure A2.1). Comparing all lake types with each other (lower panel; Figure A2.1) shows that naturally acidic limed lakes have higher SAR420 values, indicating darker light conditions. Taken together these results are in accordance with earlier findings (Erlandsson et al. 2008), and related to the processing of organic carbon in lakes and the speciation of iron (Köhler et al. 2013).

The regional distribution and abundance patterns across lakes in Sweden of *Gonyostomum semen*, a mixotrophic species with both autotrophic and heterotrophic feeding modes, has been shown to correlate with increasing organic carbon concentration associated with recovery from acidification from lower to higher acidic pH condition and the associated increase of darker light condition in the lakes (Angeler et al. 2012). Liming as a management strategy seems to increase organic carbon of naturally brown acidic lakes to higher concentrations, favouring *Gonyostomum*. Our analysis shows how natural dynamics and management can be associated with linked geochemical and biological patterns.

Figure A2.1

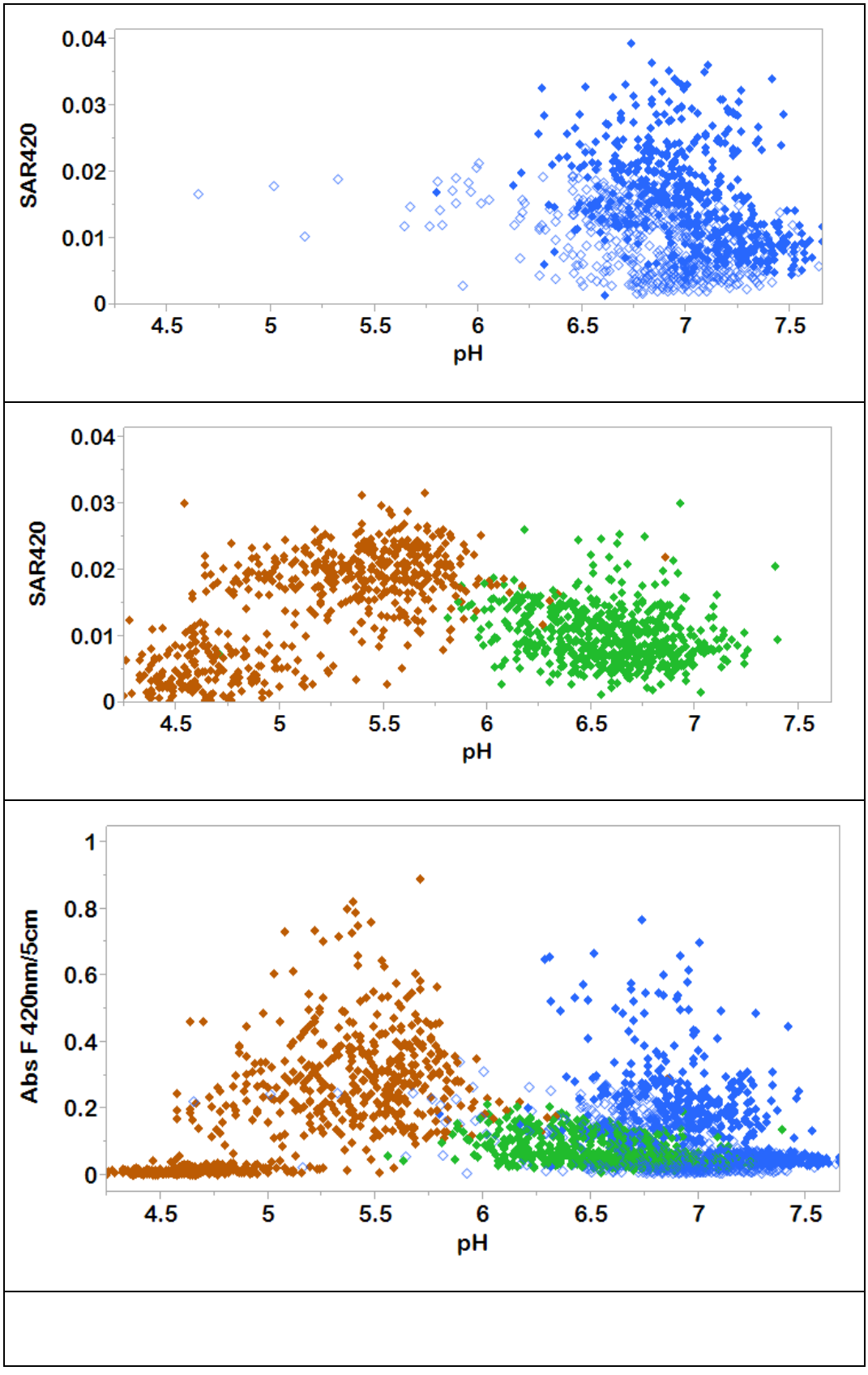
SAR420
0.04
0.03
0.02
0.01
0
4.5
5
5.5
6
6.5
7
7.5
pH
SAR420
0.04
0.03
0.02
0.01
0
4.5
5
5.5
6
6.5
7
7.5
pH
Abs F 420nm/5cm
1
0.8
0.6
0.4
0.2
0
4.5
5
5.5
6
6.5
7
7.5
pH

Figure A2.1: Specific absorption ratio SAR420 as a function of pH. Upper panel: for the acidified limed (full blue diamonds; naturally acid limed lakes (empty blue diamonds). Middle panel: acidified unlimed (brown symbols) and circumneutral lakes (green symbols). Lower panel: all lake types included in this study (symbols are as in upper and middle panel).

References

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