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Interactive comment on "Long-term trends of water chemistry in mountain streams in Sweden – slow recovery from acidification" *by* H. Borg and M. Sundbom

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Dear reviewer,

Thank you for your positive comments on our ms.

Specific comments 1.) P12856, line 7: The pH in the streams of high flow periods before the severe anthropogenic load occurred in the 1970's, was generally around 6.0 or higher. We have spring-flood data from unlimed conditions in stream 5006, R Djursvålsbäcken from 1975-1977 when pH was 5.9-6.3. Similarly, in stream 5004, R Djursvasslan, pH was relatively stable around 7.0 during the whole year, 1976, apart from at peak flow in May, when it dropped to 6.7 (alk 0.19 meq/l). In 1979, spring flood

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pH dropped to 4.0 in that stream. An estimation of reference conditions (1860) using the MAGIC library for Swedish lakes (Moldan et al., 2012) suggested a high flow pH of 5.4 in the reference stream 5011 Ö Häggingån. A comment on this will be added in the Discussion chapter.

2.) P12858, line 17: The comment on negative effects of wetland liming on peatland vegetation is relevant. However, we think that a discussion on terrestrial ecosystem effects of liming goes beyond the scope of this paper. Regarding possible remobilization of metals after termination of liming, we have not seen any signs of that in the stream 5005, R Hammarbäcken, where lime treatment stopped in 1995. The concentration of metals (Fe, Mn, Zn, Cu, Cd, Pb, Al) was relatively stable during the whole period and no trend could be detected (similar to the streams in fig. 10, in the ms). Simultaneously with acid episodes, there were elevated concentrations of inorganic Al at some occasions. There is probably no great risk of such long term washout of metals from this area, as the lime predominantly was applied on the relatively limited areas of groundwater outflow on the mires, and not evenly distributed over the whole wetlands.

3.) P12864, line 25: The sentence will be rewritten as follows: "However, when the acidic deposition on the catchments increased, the groundwater pH also successively decreased, and colloidal and particulate forms of Mn and Fe were dissolved, transported to the streams and then oxidized and precipitated further downstream after contact with the oxygenated stream water."

4.) Page 12865, line 14: Possible causes for the increase of sulphate in the reference stream, and the sometimes higher levels compared to the catchment snow, are commented in clause 4.2 in the Discussion.

The technical corrections will be included in the final version of the ms. The missing 400 m snow sampling site is outside the map (Lake Lofsen is about 590 m asl).

Ref.: Moldan, F., Cosby, B. J., Wright, R. F. & Stadmark, J. (2012) MAGIC library for Swedish lakes: evaluation of multiple calibrations. IVL Swedish

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Environmental Research Institute Ltd. IVL Report B 2104. (Download PDF: http://www.ivl.se/download/18.57d279e13f33d0117e18b/1371041094099/B2104.pdf; homepage: http://www.ivl.se/tjanster/datavardskap/magicbiblioteket.html)

Interactive comment on Biogeosciences Discuss., 10, 12849, 2013.