

Interactive comment on “Current, steady-state and historical weathering rates of base cations at two forest sites in northern and southern Sweden: A comparison of three methods” by Sophie Casetou-Gustafson et al.

Anonymous Referee #3

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The evaluated paper focused on detailed evaluation of chemical weathering rates of base cations in two representative sites of Sweden. It is very important task for Swedish forestry management strategies. There is a debate which form of tree removal during harvest should be preferred. Tree harvest with stem only is probably better than the newer method of whole-tree harvest at least with respect of nutrient base cations: calcium, magnesium and potassium. The presented research is not just an academic comparison of the following three assessments of weathering rates 1) elemental depletion method in soil representing mostly historical weathering rates 2)

C1

PROFILE modelling of soil representing mostly steady-state weathering rates 3) mass balance method in the pedon scale representing mostly current weathering rates (NOT mass balance in the CATCHMENT scale as mentioned incorrectly by the Reviewer 1). The paper is well written and very interesting. Presentation of main results is straightforward and valuable, in the main text and in some figures as well (e.g. Figs. 3 and 4). I recommend publishing this manuscript as soon as possible. It could be published alone but it will have much higher impact to be published in the special issue of Biogeosciences dedicated to the assessments of chemical weathering rates for sustainable forestry.

I recommend different orientation of Fig. 1 and Fig. 5, with depth in the vertical axes (like in the Figs. 2 and 6). Unfortunately I did not find captions for Supplementary data.

Short comments: 153 (5) – should be Erlandsson Lampa (not Lampa Erlandsson); 181 (6) – improve one sentence (. . .on soil derived from glacial till soil derived from mostly acid. . .); 255 (8) – . . .reference layer and above the reference layer. ???; 305 (10) – Please add the distance from your research sites to the IM catchments (Aneboda and Gammtratten); 307 (10) – I do not think that sodium is prone to canopy leaching (and perhaps also sulphate); 397 (12) – I am surprised that the soil water was collected only 2-3 times per year; 425 (13) – weatherable, not weatehrbale; 554 (17) – one redundant “.”; 870 (25) – should be Erlandsson Lampa (not Lampa Erlandsson); 955 (27) – 1990–1999 (not ?); Tab. 1 (30) – soil age should be probably 143000 (like in the text 216), not just 14300 years at Asa; Tab. 2 (30) – you should add “extractable” because some readers could think that the concentrations of base cations are “exchangeable”; Tab. 3 (31) – should be Aneboda (not Anneboda); Fig. 4 (37) – I recommend to delete site names from all 10 figures and write them only below Sinks – Sources title; Fig. S1 – add the right parenthesis to all four figures

C2