



Changing sources during an acidification reversal

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Abstract. The strontium isotope ratio and major element chemistry have been analysed in 40 samples in runoff during a 10-year period from the roof covered catchment G1, at Lake Gardsjön (sea-salt is added to the artificial throughfall sprinkler water with a homogeneous Sr isotope ratio of 0.7092). By comparing the $^{87}\text{Sr}/^{86}\text{Sr}$ ratios for the first two years with the last two years showed that there was a statistical significant difference ($p=0.011$), 0.7193754 ± 0.0006656 compared to 0.7197593 ± 0.0001022 with the 95% confidence intervals given. The correlation between Sr and Ca was very good, $r^2=0.98$. Thus, Sr isotopes show a small but significant increase over ten years suggesting that the weathering fraction in runoff is increasing, which means either maintained at the same level or decline less than total Sr in runoff. Several changes in the deposition chemistry were made during the experiment. Addition of for example Na, Cl, K, Ca and Mg was varied with time to follow the ambient deposition of sea salt outside the roof. Therefore, the Si concentration was normalized with the Cl concentration; the normalised trend shows with time an increasing proportion (fraction) of Si in runoff. Si originates from weathering compared to other ions and is transported through the soil due to its uncharged nature (as H_4SiO_4 (aq)) conservatively. One of the key issues for acidification reversal is the replenishment of base cations, which will occur at the mineral weathering rate plus deposition minus runoff flux minus uptake to vegetation (the part which is eventually harvested). The Si concentration and the Sr isotope composition in runoff implies that weathering of plagioclase is enhanced in the roof covered area after 10 year of treatment with pre-industrial rain.