

## ***Interactive comment on “Riparian zone controls on base cation concentrations in boreal streams” by J. L. J. Ledesma et al.***

**Anonymous Referee #2**

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### General comments

This paper explores the flow of base cations and Si in riparian zone and stream environment in a Swedish boreal forest. This is done by using the Riparian Flow-Concentration Integration Model (RIM) and actual measurements in the field. The topic is interesting and important in view of the impact of forest management methods and climate change on riparian zones and hence water quality. However, the actual purpose of using the model for estimating the concentrations of base cations in riparian soil and stream water is not clear, but perhaps it's assume that this is common knowledge. The paper is interesting and a lot of data has been collected. However, the manuscript is long and slightly disorganised and need some restructuring. A massive amount of references are collected for some sections while others are missing references completely.

C395

I always find it difficult to discuss ions in natural waters without involving organic matter in the discussion since it is one of the main factors influencing the chemistry of stream and soil water. How do you reason around this. Is it possible to model the base cation chemistry without taking organic matter into account?

Why is the Mg/Ca ratio important, clarify

To make the “study design” easier to digest it might be a good idea to start with a sampling section of some kind, which would make it easier to find how all the samples were attained and stored, treated and analyzed. As it is now, you'll get new information about sampling in several places which makes things confusing.

As I understand it, one of the major purposes of this paper is to link the riparian soil water chemistry to the stream water chemistry in the nearby stream. Is it then wise to keep the riparian sites R1 and R2 in the study when there is no data collected from the stream C8?

Is it possible to merge study area and study design into one section and maybe rearrange them and shorten them a bit?

Both the result and discussion are quite extensive and it would be nice with a conclusion to wrap it all up and repeat the most important findings.

Supplementary material First table: Is there a reason why the lysimeters are not listed in order?

Specific comments P740 L2 Reformulate sentence: ... major factor in controlling ...

P740 L22 This is a nice sentence/intention, however it seems a little farfetched to mention in the abstract since the study don't really provide new information about the vulnerability of RZ to changes induced by changes in forest management and climate change. Maybe it would fit better in a possible Conclusions section.

P741 L4 Habitat function

C396

P741 L15 This sentence by itself doesn't really explain much. Please elaborate or remove.

P742 L8 Is this really an appropriate reference in this case?

P745 L16 If the stream C8 was omitted from the study, is it wise to keep the R1 and R2 sites?

P745 L8 Are the soil depths measured from the mineral top soil surface or does it include the O-layers?

P746 L25 Should the base cations have charge or not? Be consistent?

P756 L11 This is the first mention of SiO<sub>2</sub>, please be consistent.

P762 L5 SiO<sub>2</sub>?

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Interactive comment on Biogeosciences Discuss., 10, 739, 2013.