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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Chemical and U-Sr isotopic variations of stream and source waters at a small catchment scale (the Strengbach case; Vosges mountains; France)" *by* M. C. Pierret et al.

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Chemical and U-Sr isotopic variations of stream and source waters at a small catchment scale (the Strengbach case; Vosges mountains; France By Pierret et al.

This very comprehensive manuscript describes geochemical measurements of both element concentrations and isotope ratios in a small French catchment. The authors use these tracers to identify water sources and dominating geochemical processes. The paper is generally well written and I have made a number of suggestions in the attached pdf file.

I have a few general comments: 1) I would wish that the authors add some overview of the quantitative mineralogy of some of the soil plots. This new table could even contain data on CEC (see my comment in line 142). 2) I do not understand why the authors do not display isotopic data for the chlorite and biotite in figure 9. Please comment ! 3) In the current version of the manuscript I find it difficult understanding whether the clays precipitate or dissolve and what the effect of this process is on K, Mg and Ca. (see comment in 338, 343) 4) The Mg-Smectite that is present could either have been formed during the hydrothermal activity, may have formed after that os may still be precipitating (which I thought it would according to Godderis et al.). Please clarify this ! 5) What is the role of ion-exchange and organic matter for the isotopic signal of U? (see comment in line 233) 6) With regards to acid rain that effected the catchment in the 1970-1990 I am wondering if the catchment currently at steady-state with respect to ion-exchange. It is my experience that modeling results indicate that the process of cation recharge after depletion by acid rain may take 30-40 years. This could have an effect on the mass balance in table 2. 7) There are large number of French references on catchment work in the text. I appreciate that a lot of the isotope work is done in France but the authors seem to neglect the exhaustive work done by researchers in Northern America, Northern Europe including England, Finland and Sweden. (see my comment line 59) 8) The Conclusions section is much too long 9) I propose to reduce the number of figures. Why not skip figures 2,3,14. Also Figure 5a and 8 could be combined and in figure 14 the pH, alk and H4SiO4) do not really show anything.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/11/C1323/2014/hessd-11-C1323-2014-supplement.pdf

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