Hydrol. Earth Syst. Sci. Discuss., 8, C1841–C1843, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C1841/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Dissolved inorganic carbon export from carbonate and silicate catchments estimated from carbonate chemistry and $\delta^{13}C_{DIC}$" *by* W. J. Shin et al.

Anonymous Referee #2

Received and published: 28 May 2011

Review of "Dissolved inorganic carbon export from carbonate and silicate catchments estimated from carbonate chemistry and d13CDIC" by Shin and others

General comments:

1ïijŐ Presented data and descriptions include several interesting and important information. The document itself is valuable as a report of a case study on isotopic characteristics of DIC of groundwater and streamwaters in headwater catchments, but the conclusion is not new. It might be true that case studies on this type of topic have not been appeared frequently, and is understandable of the importance of data set of this

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study. However, to answer the question of whether the DIC dynamics and amount in the headwater catchments are important for the global carbon budget estimation, precise estimation of its contribution to global scale carbon budget. The authors concluded that "the importance of dynamic carbon exchange occurring at headwater regions and its variability with catchment lithology for a more reliable carbon budget in river systems". Second half of this sentence is grammatically confusing. Should write "importance of evaluation of variability with catchment lithology for a more reliable carbon budget in river systems. I do not believe that sufficient data sets and discussions have been made in the paper. 2ïijŐ There are several questions on results and discussion. In the carbonate catchment, the alkalinity of streamwater is lower than that in spring water, although the EC of streamwater is higher than that of spring. Usually, alkalinity changes closely with EC, because that is often altered by the amounts of mineral cations. What kind of mechanisms could explain this disagreement? Or, Weren't these differences of Alk, and EC significant? 3ïijŐ It is reasonable that pCO2 of the spring waters were higher than those in streamwaters both at the silicate catchment and carbonate catchment. However, pCO2 of spring water (meaning, groundwater) in the silicate catchment was much higher than that of the carbonate catchment. The difference of those was larger than the difference between spring and stream. Additionally, seasonal variation with high in summer was significant in the pCO2 of the spring water of the silicate catchment. As the authors mentioned, increase of pCO2 in the spring water was caused by the soil gas CO2 supplied through the decay process of soil organic matters by the microbes and roots respiration. This indicates that there was a significant difference in the CO2 supply by root respiration and degradation of soil organic matters in soils between the silicate and carbonate catchment. If there is this difference, it is not ideal comparison between these two catchments, because the conditional differences were multiple.

Individual comments:

See the attached PDF file with my comments added directly on the PDF document.

HESSD

8, C1841–C1843, 2011

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/8/C1841/2011/hessd-8-C1841-2011-supplement.pdf

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1799, 2011.