Biogeosciences Discuss., 11, C8167–C8168, 2015
www.biogeosciences-discuss.net/11/C8167/2015/

Biogeosciences
Discussions
Open Access

Interactive comment on "Carbon dioxide transport across the hillslope–riparian–stream continuum in a boreal headwater catchment" *by* F. I. Leith et al.

Anonymous Referee #1

Received and published: 20 January 2015

This manuscript documenting the transport and fate of carbon dioxide in headwater streams will increase our understanding of the spatial configuration of carbon cycling in catchments. The combination of high-frequency CO2 monitoring in hillslopes and in riparian zones, combined with a hydrologic model strongly supports the dominant role of the riparian zone. The comparison between hillslope+riparian export with downstream export is a nice approach, although i think the comparison with previous estimates should be expanded. This could be accomplished simply by providing the evasion values from the referenced papers. My main critique of this paper is that the literature review and focus of study is limited to boreal catchments of Sweden and other similar locations. There is certainly more literature regarding CO2 processing in headwater catchments in general and boreal catchments outside of Sweden. I strongly encourage the authors to include some comparison and interpretation of studies originating

from boreal Alaska, Canada, and perhaps the Great Lakes region of the U.S.A (e.g. Wisconsin). The hypothesis of riparian control on gas export is also evaluated for other catchments and could help frame these results. My question is how often and where would we expect riparian CO2 controls in streams? Does this extend to the temperate zone or the tropics where soil CO2 has been used to infer aquatic evasion?

Additionally, it is difficult to evaluate the hydrologic export model directly from the text presented here. I would recommend including more details about the model, and perhaps a figure or similar guide to help describe how the model was run. The comparison with the actual water balance is helpful, but does not allow for an effective review of the methods.

Interactive comment on Biogeosciences Discuss., 11, 15585, 2014.