

Interactive comment on “Impacts of climate variability on wetland salinization in the North American Prairies” by U. Nachshon et al.

U. Nachshon et al.

uri.nachshon@usask.ca

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We are grateful to Anonymous Referee #1 for his positive and constructive review. The reviewer’s summary of lateral flow/transport processes in frozen and unfrozen conditions is correct. We think the reviewer’s idea of adding a conceptual diagram to show the different water flow paths for extreme snowy and rainy conditions is a good idea and the revised paper will include a short section that discusses the different water flow paths together with a conceptual diagram (attached below). In the added section we clearly explain our hypothesis about how snowmelt over frozen soils has only a small impact on salt flushing from the soils into the ponds. In addition, based upon the field measurements reported in the manuscript we will suggest that changes in salinity

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on seasonal and inter-annual timescales take place due to pathways from the uplands to the ponds, through the shallow subsurface (0-10 m) and not through the deeper aquifers (>15 m) (though these may influence salinity changes on longer time scales, i.e. decades to millennia). We expect this lateral subsurface flow to be dominated by saturated flow, when the shallow water table is within the “effective transmission zone” (i.e. the permeable, weathered near surface), which may persist for very short periods (on the order of days) following intense rain events (as we observed). We will emphasize that future studies need to examine this point more carefully.

The attached supplementary material provides our detail response to the reviewer’s comments including the added figure.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/10/C7027/2014/hessd-10-C7027-2014-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 13475, 2013.

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