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

Anonymous Referee #1

Received and published: 10 December 2013

This manuscript examines the long-term (40 yr) effect of years of exceptional snowfall and exceptional rainfall on hydrology and salinization in and adjacent to wetlands in hummocky knob-and-kettle topography. The study found that severe soil salinization only occurred in years of exceptional rainfall, which is a novel scientific finding. The authors may want to consider inserting a new figure where they show a conceptual diagram with surface and subsurface flow of water and salts under snowmelt vs rainfall conditions. I would assume that under snowmelt conditions, that the soil is frozen and most of transport to wetlands is in surface runoff and therefore there is little potential to transport salts through soil. For rainfall conditions, I would assume that infiltration into unfrozen soil then percolates and flows laterally or downward to water table and then to wetlands, transporting soluble salts. The authors may want to address whether

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there is any shallow lateral transport of water and salts through the unsaturated zone above lower permeability soil horizons, or is most of transport vertically to water table and then lateral flow through saturated zone. I wasn't clear whether continuously slotted wells were used for water table wells and short slotted lengths at specific depth intervals were piezometers. I wrote some minor comments directly on the PDF anuscript attached.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/10/C6672/2013/hessd-10-C6672-2013-supplement.pdf>

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

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