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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Wetlands inform how climate extremes influence surface water expansion and contraction" *by* Melanie K. Vanderhoof et al.

Anonymous Referee #2

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General Comments:

The authors attempted to analyze the spatiotemporal variations of surface-water expansion and contraction across the Prairie Pothole Region (PPR) and the adjacent Northern Prairie (NP) of the United States using time-series Landsat images (1985-2015). By delineating the time-series surface-water extent, the authors investigated how landscape characteristics (infiltration capacity, surface storage capacity, stream density, etc.) influenced the relationships between climate inputs and surface-water dynamics differently in the PPR and NP. Overall, the manuscript is well written and it is a welcome contribution to the field of wetland hydrology in the Prairie Pothole Region

of North America. I have a few minor comments that might help improve the quality of the manuscript.

Specific Comments:

One of the major undertakings of this paper is mapping surface-water extent by classifying 157 Landsat images, which is a huge amount of effort. The authors stated that the image classification algorithm is trained on a water spectral signature, which was derived from open-water polygons manually selected within each path/row, resulting in a water signature specific to each image (see Lines 217-219). To make the research reproducible, I suggest the authors elaborate the manual delineation of open-water polygons for deriving water spectral signature. For example, what's the minimum size of polygons? On average, how many polygons were manually delineated for each Landsat image? Did the Landsat images with the same path/row use the same open-water polygons?

It seems the authors did not mention the minimum wetland/surface-water size they were trying to map. To my knowledge, the median size of PPR wetlands is less than 2000 m2, which is approximately equal to the size of two Landsat pixels. On the one hand, image objects with only a few pixels might not be reliable classification results. On the other hand, small wetlands (< 2 pixels) might be more sensitive to climate change. How would the minimum size of wetlands influence the regression results?

Lines 291-293: How about p31r29? This Landsat scene also lies across both PPR and NP.

Table 2 shows that the overall accuracy for p33r28 is 85.5%, which is significantly lower than other Landsat images (90∼97%). I think this deserves some explanation.

Appendix Table 1: It would make more sense to me if the Landsat images of each path/row are listed in a chronological order of image acquisition dates. I would also suggest adding a dashed line to separate different path/row (e.g., between p26r30 and

p26r32), which can make this long table a bit easier to read. I also noticed that the PHDI for p36r28-1994-142 is missing. Why?

It would increase the impact of this paper and benefit the community if the authors can make the surface-water mapping products available to the public.

Technical Corrections:

Lines 226/338: National Wetland Inventory -> National Wetlands Inventory

Line 227: "Select images"?

Lines 892/897: National Agricultural Imaging Program -> National Agricultural Imagery Program

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