

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2021-330

Geoff Pegram (Referee)

Referee comment on "Monitoring surface water dynamics in the Prairie Pothole Region of North Dakota using dual-polarised Sentinel-1 synthetic aperture radar (SAR) time series" by Stefan Schlaffer et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-330-RC2>, 2021

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Review

This article is novel in its approach to coping with the difficult problem of separating surface water from (possibly wet) vegetated land in a small catchment of 2770 sq.km in the Prairie Pothole Region in North America. The data to make the scheme feasible was obtained from the orbiting satellite Sentinal-1A, at a resolution of about 20m, sampled during the summer and autumn months, so were not blanketed by snow. The authors developed the tools to obtain valid images to work from.

The text is very well laid out and informative – there are only a few places that need repair and I am glad to say that I read every word so that [perhaps not to the authors' taste] I made some very minor alterations, where I deemed necessary. The math is well set out, but I would like the equations inset from the margins; however that's a minor issue of layout. The Figures are good and easy to understand. Regretfully some of them are placed up to 3 pages away from their first mention, which is irritating. There is however the odd glitch, like Fig. 9, where the caption and label are in in hectares, and the image legends are in sq m!! Fortunately, I could not find any others.

I judge that this paper is worth publishing after repair, so recommend minor corrections. I am returning the version of the paper that I have marked up, attached to this review. In addition, I will import the more substantial of my remarks to be listed below my signature, which is my wont.

Geoff Pegram

18 August 2021

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Comments, line-by-line from the article, followed by # and my suggestions

Abstract. The North American Prairie Pothole Region (PPR) represents a large system of wetlands with great importance for biodiversity, water storage and flood management. Knowledge of seasonal and inter-annual surface water dynamics in the PPR is important for understanding the functionality of these wetland ecosystems and the changing degree of hydrologic connectivity between them.

Try and make this more interesting so that, although it is informative as an introduction, please make your abstract (or intro) more descriptive - Wiki's description is a good springboard – your paper is not overlong:

“The Prairie Pothole Region (PPR) is an expansive area of the northern Great Plains that contains thousands of shallow wetlands known as potholes. These potholes are the result of glacier activity in the Wisconsin glaciation, which ended about 10,000 years ago. The decaying ice sheet left behind depressions formed by the uneven deposition of till in ground moraines. These depressions are called potholes, glacial potholes, kettles, or kettle lakes. They fill with water in the spring, creating wetlands, which range in duration from temporary to semi-permanent. The region covers an area of about 800,000 sq. km and expands across three Canadian provinces (Saskatchewan, Manitoba, and Alberta) and five U.S. states (Minnesota, Iowa, North and South Dakota, and Montana). The hydrology of the wetlands is variable, which results in long term productivity and biodiversity. The PPR is a prime spot during breeding and nesting season for millions of migrating waterfowl. [Wikipedia]”

27..... due to the rather low temporal resolution of 12 days over the PPR.

You make this point later on in the text (lines 97, 155, 451 & 473) but the reader is left unsure as to whether this data is sampled 12 days apart, or averaged over that interval

90 attention, as co and cross-polarised data

Unsure what 'co' means. Aha! found it on the web - does it make sense? :- "Co-polarization is the antenna's radiation in your desired directions. Whereas cross-polarization is the antenna's radiation in the unwanted directions, i.e the cross-polar is basically considered as a dissipation in antenna radiation."

184: composites of the images are shown in Appendix A (Fig. A1).

Fig. A1 is lonely in an appendix, but informative - I recommend your replanting it about here; there's enough room for it in this medium sized paper

225: $D = p_2|\mu_1 - \mu_2|_{-2}^2 +_{-2}^2$,..... (1)

For easier readability, please indent your 7 equations at both ends

313 water extent (Table 1).

Too far ahead on page 16

Figure 5. Map of predicted $p(W)$. Scales are in UTM (zone 14) coordinates.

Please tell us a bit more about this interesting figure in the caption which should be expanded. The caption should redefine the acronyms and symbols ($p(W)$ and UTM).

This suggestion applies to all figure captions. It helps the first quick scan for the tentative reader. I had to make a list of acronyms before I started reading through critically, as I can't retain them in all my head!

329: ... HAND....

How do you measure HAND, and to what precision? I see that you mention it in subsection 2.2.2 Topographical data, but you don't elaborate.

Figure 7. Backscatter in a) VV and b) VH polarisation and derived water bodies on 12 October 2019

That's pretty smart

365 Fig.8a

Please rearrange Figs 8 & 9 closer to first mention - they are up to 2 pages distant - I have to split the document to follow text. Not good if it's a printed copy ...

398: Fig. 10

3 pages ahead ... and I have to expand the figure to 300% to find the tiny yellow patches; can't you take a small clip and park it on the empty space like I've done?

Fig. 9

The caption and label are in hectares, the image legends are in sq m!! That's confusing - please fix

447-460

That last paragraph is a good summary

475 ... programme

there is a choice here – what about `program`?

'In American English, program is the correct spelling. In Australian and Canadian English, program is the more common spelling. In British English, programme is the preferred spelling, although program is often used in computing contexts.' [Grammarly]

476 Author contributions

I like this list of the contributions of the team. Nice job.

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