Review on "Influence of Snow Spatial Variability on Cosmic Ray Neutron SWE: Case Study in a Northern Prairie" by Kim et al.

Major applied changes

- The order in which the URANOS derived results are presented has been reversed, which improves the clarity of the manuscript: (1) modelling all 8 snow scenarios, (2) focusing on 15th Jan. snow scenario, (3) focusing on points with highest difference in neutron counts (P07, P00, P05, P19).
- Removing the plot that showed the analysis of Figure 4 for average SWE of the model domain, and instead only describing the results of this analysis improves the structure of the manuscript.
- Chapter 4.4 on "Assumptions and Limitations of this Study" was added and provides a great reflectance on strengths and weaknesses of the presented study.
- The effect of Fractional Snow Cover is appropriately discussed and displayed.

Minor comments

- Line 10: "[..] noninvasive (or aboveground) […]"
    - Please consider, that the method is both, non-invasive and above ground.
- Line 24: "[…] while CRNS SWE values match more closely."
    - Please provide the reference (compared against what?).
- Line 67-71: "In addition, continuous SWE monitoring through snow pillows or snow scales like those found in the snow telemetry (SNOTEL) network from the US Department of Agriculture Natural Resources Conservation Service (USDA NRCS) (Serreze et al., 1999), are not as effective in the prairie due to wind erosion and transport."
    - This is a great argument to use CRNS. Maybe consider to mention this point in the discussion to support your point that CRNS is especially well suited in a prairie environment.
- Line 117: "[…] during DJF[…]"
    - Please specify DJF
- Line 177-181: "Thus, we utilized a 2-layer density scheme to calculate spatially distributed SWE at the CARC, using snow density values derived from the snow pit measurements. The thickness of the lighter and basal snow layers on a given date was determined by differencing the lidar DSMs on different dates. These 2-layer snow density and depth maps were used to specify the "natural" snow cover conditions in the neutron transport simulations (section 3.2)."
    - This description seems to indicate that you defined a stratified snow layer in URANOS consisting of a denser bottom layer and a less dense top layer when simulating the neutron interactions with the lidar derived heterogeneous SWE maps. In section 3.2 (line 236) you write, however, that you created "[…] a snow layer with uniform thickness and density". The latter phrase in section 3.2 may correspond only to the uniform SWE cases, such that the provided information is not contradicting. However, to make your model setup more clear, please describe in section 3.2 also how you set up the heterogeneous snow scenarios in URANOS.
- Line 233: "[…] snow water volume was divided"
    - Not clear. Maybe "was derived"? Please consider to reformulate.

- Line 370-375: “We noticed skews in neutron origins due to the relation of the model geometry, namely the position of the virtual detector and the source geometry. Virtual detectors placed closer to the edges of our domain had neutron origins that were skewed towards the center of the domain. Therefore, we limited the neutron counts to within a 200 m radius of the virtual detector.”
    - Please consider to move this paragraph on how you have been dealing with model boundary artefacts to the methodology section (3.2), since this effect must have affected all URANOS simulation runs.
- Line 387-388: “P05, P07, and P19 which were modelled closer to the snow drift.”
    - Incomplete sentence
- Line 390: “[…] which enhances the neutron counts on the snow side in the heterogeneous runs.”
    - Is the figure not showing a decrease in neutron counts on the snow side (in line with what you wrote previously in this paragraph)?

Illustration remarks

- Figure 3:
    - Thank you for visually distinguishing snow-free from snow covered areas! This gives more in-depth information to the figure. Please consider to add an additional field to the legend, indicating that grey color corresponds to snow-free areas (instead of describing it only in the figure caption).
- Figure 5:
    - Please consider coloring the point plot in 5 (a) after bare ground (in the same fashion as in Figure 4 (a)), as this would make the influence of the distance of snow drifts to the detector location even better visible.
- Figure 4 (page 17):
    - The numbering of the figure should continue as Figure 7.
    - For c, d, e, and f: Please use the same color scale as in Figure 3 (where snow-free areas are indicated in grey).
- Figure 85 (page 19):
    - The numbering of the figure should continue as Figure 8.