Author Response to Reviewer #3 from

Improving Calibration and Validation of Cosmic-Ray Neutron Sensors in the Light of Spatial Sensitivity – Theory and Evidence

M. Schrön, M. Köhli, L. Scheiffele, J. Iwema, H. R. Bogena, L. Lv, E. Martini, G. Baroni, R. Rosolem, J. Weimar, J. Mai, M. Cuntz, C. Rebmann, S. E. Oswald, P. Dietrich, U. Schmidt, S. Zacharias
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RC: ***Reviewer Comment***, AR: *Author Response*, ☐ Manuscript text

Dear Anonymuous Reviewer #3,

we are greatful for the positive review and the helpful comments and questions raised. Please find below our response to the specific points.

1. Reviewer #3

1.1. P.3, L.2

RC: ***delete 'how'***

AR: *Thank you, we will change the text as suggested.*

1.2. P.3, L.26

RC: ***for improved clarity, insert 'corrected' before neutron count rate.***

AR: *Thank you, we will change the text as suggested.*

1.3. P.8, L.20-25

RC: ***I fail to see the 'regular grid' in Fig.9***

AR: *Thank you for pointing out the lack of visual clarity in Fig. 9. The colored areas therein have a pixel size of* $1\,m$ *– only visible at high zoom level. We will emphasize this detail in the text.*

1.4. P.8, L.20-25

RC: ***I do not follow the derivation of the sector weighting, and as written, it is mathematically incorrect (does it not give the result of Wr/12Pi?***

AR: *We admit that the calculation was a bit vague and overcomplicated. We would suggest to replace the old text with the the following derivation:*

While an infinitesimal point at distance r has the weight $W_r/(2\pi\, r)$, a regular pixel of size s at that distance weighs $W_r/(2\pi\, r) \cdot s \propto W_r/r$. For all radially symmetric sampling schemes, where each point measurement represents one of n circular sectors, the sector at distance r has the size (arc length) of $2\pi\, r/n$, and thus contributes the weight $W_r/(2\pi\, r) \cdot (2\pi\, r)/n \propto W_r$.

1.5. P.8 L.24

RC: ***grid size s is presumably a dimension - is that the length of the side one pixel?***

AR: *Correct, please see above.*

1.6. P.8, end of L.25

RC: ***presumably should be Wr/n?***

AR: *Correct, while $n = r/s$. This leads to the said result, $\propto W_r/r$.*