Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Field-scale soil moisture bridges the spatial-scale gap between drought monitoring and agricultural yields" *by* Noemi Vergopolan et al.

Anonymous Referee #2

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In this work, authors developed a yield prediction system by using a hyper-resolution land surface model HydroBlocks and Random Forest regression. Consequently, authors assessed the sensitivity of predictors towards monitoring droughts. The manuscript is well written with results that can contribute to the ongoing efforts in this area of research. In summary, the manuscript can be accepted for publication once authors address my comments below:

1) It would be nice to see some validation of HydroBlocks simulations. I understand getting root zone soil moisture can be difficult. An alternate comparison with SMAP Level 4 root zone soil moisture product can provide an overview of the quality of Hy-

droBlocks simulations. It may also address, to an extent, one of the limitations of input data uncertainty on yield prediction.

2) How is the calibration of HydroBlocks carried out? Authors may have to provide this information.

3) Apart from underestimation for high yields, there is also overestimation of yields below ~500 kg/ha. Does this indicate that RF produced yield simulations with lower variability than the observed data? Can authors comment on the overestimation?

4) It is surprising to see NDVI not contributing strongly to the prediction of yields. A lot of research on yield prediction depend on NDVI data as a predictor. Can authors throw some more light on this outcome? Is it because there is redundancy in the variance explained by soil moisture and soil temperature compared to that of NDVI towards estimating yields? Since analysis is carried out at monthly resolution, presence of clouds may not be a concern.

5) Spatial scale plays a significant role in driving the soil moisture processes at 30 metre resolution. Can authors assess on the impacts of spatial scales on the yield predictions? Besides, authors may have to describe how various datasets are processed to a consistent spatial resolution.

6) Authors may present time series plots of observed and simulated productivity in addition to the existing results.

7) Minor: Figure 8: How did authors do a pairwise comparison of October maximum temperature and April root zone soil moisture? It is not clear as of how Figure 8 is generated from the description.

8) Minor: Check the units of productivity in the manuscript. At some places, it is given as kg kg/ha instead of kg/ha.

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