

# ***Interactive comment on “Advances in Soil Moisture Retrieval from Multispectral Remote Sensing Using Unmanned Aircraft Systems and Machine Learning Techniques” by Samuel N. Araya et al.***

**Salvatore Manfreda (Referee)**

salvatore.manfreda@unina.it

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This research provides an excellent example of soil moisture retrieval from multispectral UAS remote sensing using machine learning methods. The manuscript is well written and fluent for the reader in general. Introduction of the manuscript is well-designed with convincing literature review and clear objectives; The description of dataset and methods is concise. The presentation of results is well organized with logical steps. The conclusion part is well organized with valuable information and suggestions. General issues: First, is there any possibility to validate the final soil moisture map excluding

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the sampling points used in the model training? Although the predicted soil moisture map looks reasonable, the accuracy is not guaranteed without a validation. Second, sometimes the figure name in the text is “Figure 1”, sometimes it is “Figure S1”, please check throughout the text. Minor issues: Line 126, “. . .low operating costs (Anderson and Gaston, 2013; Berni et al., 2009; Colomina and Molina, 2014; Elarab, 2016)”. you can also add some new references, such as: 1. Manfreda, S.; McCabe, M.F.; Miller, P.E.; Lucas, R.; Madrigal, V.P.; Mallinis, G.; Dor, E. Ben; Helman, D.; Estes, L.; Ciraolo, G.; et al. On the use of unmanned aerial systems for environmental monitoring. *Remote Sens.* 2018, 10, 641. 2. Tmušić, G.; Manfreda, S.; Aasen, H.; James, M.R.; Gonçalves, G.; Ben-Dor, E.; Brook, A.; Polinova, M.; Arranz, J.J.; Mészáros, J.; et al. Current Practices in UAS-based Environmental Monitoring. *Remote Sens.* 2020, 12, 1001. Line 146, the abbreviation “PTFs” appeared without definition. Please check throughout the text. Line 293, The reason why “transforms NDVI histograms into a normal distribution” is an advantage in this research may need to be explained here. Line 297, why the original resolution of DEM is 6.85 cm, while in line 238, it mentioned that the pixel resolution of the captured images are 10 to 15 cm”? As the DEM map should be generated from the same stereo-images, they may share the same resolution. Line 323, an explanation on the reason why a “standardization” is needed here and how does it benefit on the model training could be added. Seems this procedure may eliminate the physical meaning of variables. Line 357, “April 4, 2018”, replace the label “Day of the Water Year” of x axis in Figure 5 with exact dates could be better. Line 361, “. . .some terrain variables. . .” could be replace with “vegetation index”, which is the only variable presented in Figure 5. Line 365, “. . . variables selected variables in the data is shown in Figure S6”: duplicated word “variables”; the content is not in Figure 6. Line 451, “XBRT” should be “BRT”. Line 459, a detailed explanation of Figure 8 is necessary.

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