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# *Interactive comment on* "Targeting the soil quality and soil health concepts when aiming for the United Nations Sustainable Development Goals and the EU Green Deal" *by* Antonello Bonfante et al.

**Antonello Bonfante et al.**

antonello.bonfante@gmail.com

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We appreciate the positive comments of the reviewer on our paper. Her/His specific comments were relevant and quite helpful and have been adopted in the revised manuscript. Her/His question as to why Yw of soil P6 (a loamy sand) is higher than the other two soils (sandy loams) can be explained by the following: - "Plant available water", defined as the water content between two pressure heads, does not represent the volume of water that is available for plants in a given growing season, as explained in the quoted letter to the editor in the Eur. J. of Soil Science by Bouma (2018) and thor-



oughly in this manuscript. Here, we use a dynamic sink term to express water uptake by roots resulting in varying water extraction as a function of the water content. These processes are highly non-linear, strongly depending on the shapes of the moisture retention and hydraulic conductivity curves. - Furthermore, soil hydraulic properties - strongly dependent by the soil structure and only partially by the soil texture - cannot be tightly related to the latter. In fact, even the widely applied pedo-transfer-functions (PTF) are not able to fully capture the intrinsic complexity of soil hydraulic properties, showing sometimes a weak correlation between measured and estimated parameters (r=0.3 – 0.5). - For these reasons we performed the soil water balance simulations by applying measured hydraulic properties and not estimated ones. This approach is even more important for our case studies because some of our soils (e.g. P6) show distinct hydraulic properties (Basile et al., 2007) due to the presence of shortâĂŘrange ordered clay minerals (e.g. allophane). Moreover, these soils are rather difficult to disperse due to their high variable charges (Mizota & van Reeuwijk, 1989), making textural analysis rather uncertain. - Finally, field experience in the area (Agro Nocerino-Sarnese plain, south of Vesuvius volcano) where this soil occurs indicates relatively accessible water, leading to high productions when, of course, other agronomic factors are optimal. Bouma, J.: Comment on: B. Minasny & A.B. Mc Bratney. 2018. Limited effect of organic matter on soil available water capacity, Eur. J. Soil Sci., 69(1), 154–154, doi:10.1111/ejss.12509, 2018. Basile, A., Coppola, A., De Mascellis, R., Mele, G., & Terribile, F. (2007). A comparative analysis of the pore system in volcanic soils by means of waterâĂŘretention measurements and image analysis. In Ó. Arnalds, H. Óskarsson, F. Bartoli, P. Buurman, G. Stoops, & E. GarcíaâĂŘRodeja (Eds.), Soils of volcanic regions in Europe (pp. 493–513). Berlin, Heidelberg: Springer. Mizota, C., & van Reeuwijk, L. P. (1989). Clay mineralogy and chemistry of soils formed in volcanic material in diverse climatic regions. Soil Monograph, 2. Wageningen, NL: International Soil Reference and Information Centre (ISRIC).

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