

Comment on essd-2020-363

Anonymous Referee #3

Referee comment on "*STH-net: a soil monitoring network for process-based hydrological modelling from the pedon to the hillslope scale*" by Edoardo Martini et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-363-RC3>, 2021

The submission describes the installation and data collection of a set of eight profiles of TDR soil water content sensors, temperature sensors, and groundwater wells. The installation and instrumentation are well described. The figures do a nice job of providing an overview of the site and the data being collected there.

The manuscript seems to fit many of the criteria listed in the ESSD guidelines, including describing open access data and having a thorough description of the data products. However, the manuscript also falls short in a few areas. The data management section provides an overview of some of the processing applied to the data, but I did not see those scripts listed on the URL provided in the paper. Also, I did not notice any discussion of uncertainties. I think this discussion could be fairly brief, but one example would be to do a sensitivity analysis for Eq. (2), which requires an estimate of porosity and soil dielectric. Given the emphasis of the journal, the authors should work to better quantify uncertainties in the data.

With attention to these details, the manuscript should be acceptable.

Specific Comments:

L2: The title seems more aspirational than descriptive. I saw nothing related to "model-driven" or "process-based" in the abstract, and while the introduction does a bit better in this regard, the authors might consider editing the title.

L13: dynamics "are"... Also this sentence is very long; might consider breaking it up.

L28: This “what” gives rise?

L32: Provide more details or support on what is meant by the strongest gradients are in the vertical direction.

L34: Could simplify as “heterogeneity of soil properties across spatial scales”

L37: Another long sentence that might be better split up.

L42: Define intermediate and large scales. Which do you consider the hillslope to fall into? You later also use ‘hillslope scale’ (L58), so try to be consistent with these terms.

L56-63: This paragraph was fairly unfocused, and in particularly the part about CZOs seems tangential to the manuscript (e.g., referencing chemical and biological processes).

L69: Awkward sentence.

L85: a subcontinental what?

L90: either “a meadow” or “meadows”

L102: Elaborate on pedological features.

L105: I did not see a scale on this figure.

L124: It would be helpful to label the horizons, if possible.

L135: What is meant by self-produced? That the probes produced them?

L150: Would be good to briefly comment on the data gaps in P4 and P5 (same for Figure

5).

L166: I would use "monitoring well" instead of "piezometers" here and elsewhere, since the two terms are not really synonymous. Also, the sensor used to measure water table height is not described here.

L179: "were" installed.