

Comment on **essd-2020-362**

Anonymous Referee #2

Referee comment on "The hysteretic response of a shallow pyroclastic deposit" by Luca Comegna et al., Earth Syst. Sci. Data Discuss.,
<https://doi.org/10.5194/essd-2020-362-RC2>, 2021

The work addresses a remarkably interesting topic. The characterization of hydraulic hysteresis in situ and the role of such dynamics on slope stability can provide useful information for landslide practitioners. In this regard, the work represents a valuable contribution to research on such topics. According to my view, it could be suitable for publication after minor revisions are implemented.

Details are reported below:

ABSTRACT: In my view, the Abstract should be reviewed. First the main Target could be introduced, after the collected data to investigate the issue could be presented. In this regard, they should be differentiated: volumetric water content and suctions are used to investigate the soil hysteretic behaviour while the other ones provide the boundary conditions regulate the exchanges among soil, vegetation, and atmosphere. Furthermore, temperature data could be cited also if not directly managed by the Authors.

In my view, the significant detail about the role of imbibition/drying rate deserves more attention in the initial description. In this regard, it should be presented in advance with few sentences about all the mechanisms regulating the hysteretic process (air entrapment, ink effect). Rows 46-51 could be anticipated.

Figure 2: please introduce T and TDR in the caption of Figure 2

L52: the investigation of soil hysteretic behaviour is usually carried out by using laboratory tests. Which are the main benefits associated to the use of field data (also accounting for the higher difficulties in retrieving and post-processing data)?

L57-58: temperature data are also available

Figure 4: which are the reference time spans over which the average values are computed? How long is the interval? If possible, a measure related to the "spread" could provide information about interannual variability.

L119: please provide brief insights about the choice of such period. For example, a comparison between temperature, rainfall heights, PET of the selected period and the average trends could be useful to retrieve its peculiarities joining the content of Figure 2 and 6

Figure 5: please report the paper(s) where the meaning of the different acronyms used in the legenda can be retrieved. If relevant for such investigation, please report also in the Manuscript

Table 2: please replace "q" with "theta"; for theta, please use the same symbol

L157: please mention that, as the station is not located on the slope and probably at different altitude, some discrepancies can arise. If possible, include the position of temperature sensor in Figure 3 or provide some details about the location

L191: please provide more details about iso safety factors permitting a clearer understanding about their meaning (e.g. anticipating lines 301-312)

L196: please consider that, probably, in the final part of the period, the atmospheric demand could be not fulfilled by soil water.

L196: please introduce further details about how main drying curve has been identified

L261: please provide, if possible, an attempt value for field capacity suction for your soil

L268: probably, internal hysteresis within the scanning curves could be not relevant (the same insight can be retrieved from other Research papers)

L314-317 If possible, I suggest also including the trends in terms of safety factors in Figure 7 and 9 (Figure 11 and 12 are then anticipated)