

Interactive comment on “A plateau scale soil moisture and soil temperature observatory for quantifying uncertainties in coarse resolution satellite products” by Z. Su et al.

Anonymous Referee #1

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This paper presents the Tibetan Plateau soil moisture and temperature network. In the current context of development of soil moisture validation data bases, this paper is very relevant since it presents a new data set. This data set is of high interest for satellite and land surface models soil moisture validation activities. It provides valuable information on soil moisture and temperature in a region where very few data is available.

The introduction is very well written and it indicates adequate references. However the ITC model (and its use) is not well described and it would improve the paper to include a sub-section on this model and simulations, as indicated in the comments below. The presentation of the results need to be structure and clarified using Tables and defining

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properly the acronyms used in the legends. I recommend this paper to be published after the revisions indicated below are accounted for.

General Comments

The introduction is very well written and it describes very clearly the importance of soil moisture validation activities, in particular for the current and future soil moisture satellite missions. The objective of the paper is then clearly defined in the introduction: to present the Tibetan soil moisture and temperature observatory.

However the abstract and the text are not consistent with the introduction. The abstract contains many acronyms and it focuses on the comparison between satellite products, ITC model and ground data. The ITC model is not mentioned in the introduction and it is not described in the text. It is only mentioned twice in parenthesis at the end of section 3. Then in the results section the ITC model is again an important component. The reader does not know what is the ITC model and therefore the results discussion is difficult to follow. Page 257 line 9 the authors say that “The ITC-model retrievals are derived with . . . the assumption that for coarse footprint satellite scatterometer data, the backscattering coefficient of the land surface is...”. The reader understands that the ITC model is an active microwave inversion model. But the rest of the page 257 is very confusing. For example line 20 the authors mention that “the SMOS vegetation parameterisation (SMOS, 2007) was adopted”. This is confusing because active and passive microwave inversion algorithms are generally very different. After reading this page it is not clear whether the ITC model is a radiative transfer model or not. If so, the reader does not know how the inversion is done (seems to be a forward model). It is not clear either if it is for active or passive microwaves (both SMOS and ASCAT and backscattering coefficients are mentioned).

Lack of indication of the ITC model in the introduction and not having a clear description of the ITC model makes the results section very unclear. The purpose of showing the ITC model results should be explained in the introduction. And it would greatly improve

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the overall clarity of the paper to

Specific comments:

Some of the acronyms are not defined when they are used for the first time in the paper: AMSR-E, ASCAT, ITC in the abstract, and then in the paper ASCAT, METOP, ITC. ERS and WACMOS are not defined at all.

Units need to be added in the figure 2 axis. Figure 2 is not clear. Both the text and the caption indicate the the figure shows soil moisture and temperature measurements. However the legend indicate acronyms containing ITC (ITC-TE2, ITC-TE4, ITC-TSM1). It is important to clarify the legend of the figure and lines because as it is now it is very difficult to understand what represents the figure.

Figure 2 shows a soil moisture increase in April 2008. Soil moisture increase from $0.1\text{m}^3/\text{m}^3$ to $\sim 0.25\text{m}^3/\text{m}^3$ and then back to $0.1\text{m}^3/\text{m}^3$. The temporal scale is difficult to see but the duration of the peak is very short (~ 1 day at most). The text page 255 lines 17-18 explains that the peak is due to a brief soil temperature change, increasing from freezing to above 1 degree C. However this explanation is not convincing since the temperature plot (Figure 2 top panel) shows that temperature is already above one degree before. Is this increase not due to a sensor or a data logger issue at this date?

Page 255, line 11, it would be useful here to include some text to tell that Figure 2 includes wetland site (TE2, SM2) and grassland site (TSM1, TE4, SM4). Using more explicit acronyms and providing a table to summarize soil depth and site would help.

Page 256, when discussing the Figure 3 results, the authors should acknowledge that soil moisture measurements (from both in situ and microwave sensors) depend on the soil dielectric constant, which is related to the liquid soil moisture content. But then in Figure 6 it is surprising that in situ soil moisture is above $0.1\text{m}^3/\text{m}^3$ while soil is freezing for several months with temperature is around -5 degrees C. The authors need to clarify this point.

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For all figures 2 to 6 the x-axis is difficult to read. It would be clearer to use a letters for the Months. Years do not need to be written with all the dates.

Technical corrections

Page 254 line 19: replace “Rosany” by “Rosnay”

Page 248, remove line 6 (“Section 2.1.1..”) since it is the only subsection of section 2.1

Page 250, same comment for subsection 2.2.1

Page 252, same for subsection 2.3.1

Page 253: SMAP launch is expected to be in 2014

Page 253 line 17: replace “enable” by “enables”

Page 266, the reference SMOS should indicate the latest version of the SMOS ATBD.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 243, 2011.

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