1 Reply to Jan Friesen, 08 Mar 2021

We thank Jan Friesen for underlining the relevance of ISMN and the manuscript for the scientific community. Our suggestions to improve the manuscript are given in blue font.

The manuscript 'The International Soil Moisture Network: serving Earth system science for over a decade' by Dorigo et al. presents the ISMN, its data providers and tools for quality control and data harmonization. The review also highlights the large diversity of data and its challenges but also the large number of studies that used and benefits from this unique data collection.

Besides a concise description of the ISMN data and the ISMN services in terms of harmonization, where possible, I also see this review as a useful reminder and call for networks and scientists to further use and support this initiative.

Detailed comments:

- Line 11: Please, state the number or percentage of data sets that are continuously/regularly updated.

  We propose to add the following information in Figure 2: networks that are updated in near-real-time, networks that are updated regularly, networks that are updated irregularly, and networks that are no longer being updated.

- Figure 2: The figure clearly shows the data availability by network. However, many networks are shown as active although no data has been provided within the last 5 or more years. As described not all networks have the capability to provide near-real time data, however I would suggest to highlight networks that are regularly providing data, even if that is in monthly or annual intervals.

  There are several networks that do not provide data regularly but of which we know that they are still recording data. For example, just after publication of this manuscript, the UMSUOL network provided their first data update in 8 years. We therefore propose to stratify the categories shown in networks that are updated in near-real-time, networks that are updated regularly (up till once per year), networks that are being updated irregularly, and networks that are no longer actively producing data (see revised figure below).

  1).

- Line 139ff: Perspectively, further data access options, such as an API would ease access to the data.

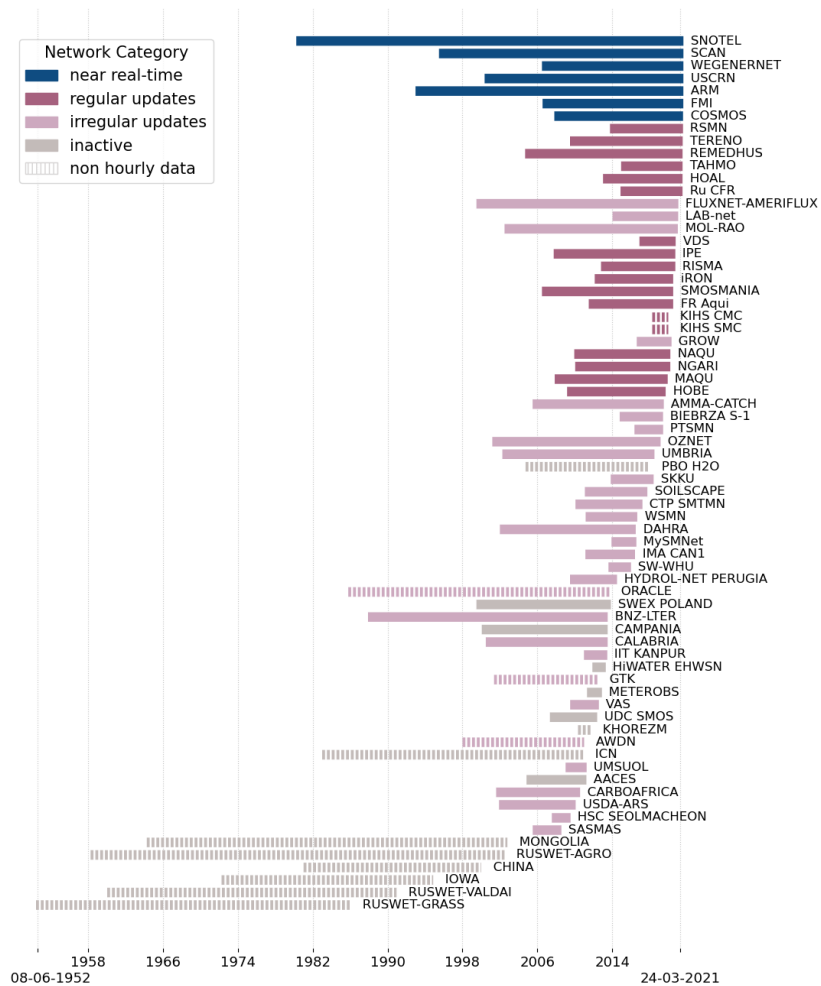 This is a good suggestion which we will consider for future implementations.

Figure 1: Overview of all available networks, the individual time span of the data availability within the ISMN, their operational status and their update category (Status March 2021).

- Line 162: Please, specify what 'misuse' includes. Is this mostly the lack of referencing ISMN or are there other misuse cases (e.g. commercial use of the data)?

  This includes both a redistribution of the data and stealing of ground equipment. We propose to rephrase this into: *"...is required to prevent illegal redistribution of the data or theft of ground equipment, and to track ..."*.

- Figure 7: This is more a positioning comments as Fig 7 seems to belong to section 3.4 not 4.1

  We will make sure that in the final typesetting this figure is closely linked to Section 3.4

- Line 325: Reference missing (?)

  We will add the missing reference: "Bayat, B., Camacho, F., Nickeson, J., Cosh, M., Bolten, J., Vereecken, H., and Montzka, C.: Toward operational validation systems for globalsatellite-based terrestrial essential climate variables, International Journal of Applied Earth Observation and Geoinformation, 95, 102 240,https://doi.org/10.1016/j.jag.2020.102240, 2021."

- Section 5.1.4: The inclusion of citizen science data is shown by the GROW dataset where soil moisture sensors have been made available to citizens. Would this also be extended to categorical citizen science data from initiatives such as CrowdWater (https://crowdwater.ch) where soil moisture states are collected as categories instead of volumetric soil moisture values?

  We are aware of this interesting initiative and in the past even considered including such data in the ISMN. However, as the nature is very different from the other data and harmonising them with the rest is very difficult, we decided not to.

- Line 543 / Section 5.2.2: Long-term data series is not necessarily only linked to citizen science projects. I understand that as few standards as possible are defined in order to provide data to ISMN, however, in view of long-term operation, is there a minimum limit of data before inclusion into ISMN is considered? This does not necessarily concern citizen science projects alone but also short (2-5 year) soil moisture observations limited to project durations.

  Continuity is certainly also an issue for many conventional networks, but this is usually threatened by funding cuts rather than by discontinued engagement of the researchers. It is the long-term engagement of the citizens we refer to in this paragraph. In fact, we do have a policy in place requiring a minimum time series length of one year to be included in the ISMN. This allows to catch at least one full year with all seasonal influences (e.g., frozen soil, vegetation growth, rain season, dry season, etc.).

Minor comments:

- Line 81: Please correct to '... Data sets from ...'

  We will change this as suggested.

- Line 221: Please correct to '... absolute quality indicator ...'

  We will change this as suggested.

- Line 302: Please correct to '... downscale ...'

  We will change this as suggested.

- Line 595: Please correct to '... is required to ...'

  We will change this as suggested.

- Table A1: The TAHMO network goes beyond the Sahel Zone, maybe just drop the specification or change to (Sub-Saharan Africa)

  We will change this as suggested.

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