

## ***Interactive comment on “Year-long, broad-band, microwave backscatter observations of an Alpine Meadow over the Tibetan Plateau with a ground-based scatterometer” by Jan G. Hofste et al.***

**Anonymous Referee #1**

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The submitted manuscript deals with the acquisition, pre-processing as well as the introduction and explanation of a ground-based broad-band (1-10GHz), year-long (08/2017–08/2018), multi-polarimetric (HH,HV,VH,VV) scatterometer dataset from the Tibetan Plateau (Maqu, China) to study backscattering dynamics and their relation to environmental conditions at the alpine meadow site at hourly and half-hourly intervals. The hardware instrumentation, data acquisition and pre-processing is explained quite in detail, while the presentation of the dataset falls a bit short. But the dataset appears unique. Hence, the reviewer finds the biggest challenge in reasoning if the uniqueness

C1

of the scientific dataset is presented in a complete and comprehensive way. Leading theme: What is the novelty of the dataset to our science community and is it shown adequately to advertise usage for research?

These are the reviewer's seeding questions for manuscript update on:

Completeness of dataset analysis/preparation and adequate presentation: -Why to confine the analysis/presentation to typical microwave bands? -What is about showing more broad-band/wide-band analyses? Can we find characteristics of the observed media (alpine meadow) in non-typical/non-standard microwave bands? -Why not adding at least L-band (if broad-band is not possible for some reasons)? -What about showing the variation in backscatter with viewing geometry (incidence:  $\alpha$  & azimuth:  $\Phi$ ) also along time (similar to Figs. 9 & 10)? -Why not analyzing and showing all polarizations in analysis and presentation? -What is the benefit of polarimetry in this data set? -Why not showing at least cross-polarizations (e.g. in Fig. 13)? -Why soil temperature is mentioned as target variable? -Why not showing more of the time series of the data set? Can we correlate to seasons? Can we correlate to special (hydrological) events (e.g. drought)? -What are the exact ground conditions and their dynamics along the year? -Are there images how the site changes in phenology along the year (e.g. blooming or snowy or icy conditions)? -Is it possible to add further in situ time series curves (e.g. precipitation, vegetation conditions, solar irradiation . . .) to the figures to obtain a complete eco-hydrological picture of the alpine meadow? -Why not showing a temporal high-resolution freezing or thawing event with the hourly or half-hourly data? Just as a teaser for scientists to attract subsequent data usage.

Data preparation: -What about RFIs of the surrounding (area) and the hardware / measurement setup? -Is the radiometric calibration accuracy reported in the manuscript? -How were cross-polarized backscatter (HV, VH) measurements (pre-)processed? -Statement line 390: Is this correct? Does the wavelength double? -Where is the asphalt zone? Can we sketch it in Fig. 2?

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Graphical presentation: -Why are figures kept small throughout the document (e.g. Figs. 7, 12 & 13)? -Which figure shows all the seasonal and diurnal changes of the different polarimetric backscatters along the year?

Citation: -Please add references to all equations not developed in the manuscript & to preceding research.

Outlook: -Why the scatterometer data is not combined with the radiometer data (ELBARA-III) for an active-passive combined dataset (in the future). This would be surely an even more unique dataset and fosters joint active-passive microwave research.

In a later stage of the manuscript (further) minor comments will be given.

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