RC: Reviewer Comment, AR: Author Response, ☐ New Manuscript text

Dear Referee,

We would like to thank you very much for your effort in reviewing our manuscript. Please find our responses to your comments below. These should be considered as preliminary (part of the interactive discussion) as implementation of the final changes also depends on another referee report that is still pending.

Kind regards,

Dr. Prof. Chansheng He

(on behalf of all the authors)

The comments of editor and reviewers are in black with bold text, the author's answers are indicated in blue color, as well as old text passages. New text passages are indicated in green color.

General Comments

This paper provides potentially a very useful and important dataset. Substantial effort to collect soil samples and build up a long-term SM monitoring network in the high and cold mountainous region. Potentially a good candidate for ESSD. However, the important first-hand measured data cannot be accessible, for instance, SMST at the half-hourly scale on 32 LULC-Soil-DEM zones and measured SWRCs and possible soil heat conductivity curves, which hampers its potential to become a useful dataset in the hydrology, RS and soil research conducted on the high and cold mountainous region. The reviewer suggests the author uploading all raw data and completing the description data. Moreover, provide a brief description of the loaded data (in the data availability) that is consistent with the description in the manuscript. For detailed comments please see below. Some comments are labeled in the .pdf.

AR: We appreciate your comments and suggestion. Currently three of Ph.D. candidates are using the collected soil moisture datasets to work on their Ph.D. theses and continue to expand the datasets as well. By international protocol, we cannot upload the raw SM datasets at this point of time. We are willing to share all the raw SM datasets later once the Ph.D. candidates complete their theses. Thank you for your understanding.

Meanwhile, as suggested by reviewer 1, the raw SHP datasets (including the soil texture, soil dry bulk density, soil organic carbon, soil saturated hydraulic conductivity and soil water retention curve) of eight representative stations (with five layers for each station) have been updated in the datasets of the manuscript (https://doi.org/10.5281/zenodo.6514191). The description of the dataset has also been uploaded to the public datasets of the manuscript.

Specific Comments

RC: **In Line 69 about 'a long-term SM dataset for the Qilian Mountains', the reviewer knows the focus of this dataset is more about SM, while soil temperature information measured by ECH2O 5TE device should also be released for a comprehensive soil physical property information, which is more helpful in the use of soil water and heat transport (in LSM) research conducted on the high and cold mountainous region, as well as microwave signal simulation and the corresponding SM retrieval validation.**

AR: Thanks for your suggestions. As stated by the reviewer, SM and soil temperature (ST) datasets are very useful for investigating the soil water and heat transport (in LSM), as well as microwave signal simulation and the corresponding SM retrieval validation. Our team is focusing on the land surface water-energy transport, runoff process, and land-atmosphere interactions in the Qilian Mountains through the regional climate model (e.g. Weather Research and Forecasting Model), land surface model (e.g. Community Land Model and NOAH-MultiParameterization Land Surface Model). In addition, we are also combining methods such as machine learning and data assimilation with remote sensing observations to produce soil moisture and temperature datasets with a high spatial and temporal resolution over the Qilian Mountains. The above work has not yet been completed. We are therefore sorry that we are unable to update this dataset at this point of time but will upload the updated dataset as soon as the work is done.

RC: **In line 114-115, it is mentioned that SM at different soil depths with a time interval of 30 min. The reviewer does notice this half-hourly data cannot be accessible. The reviewer suggests publishing SMST at the measured time scale rather than at the processed scale. Moreover, the reviewer does not think evaluating SM at the monthly scale is a routine, at least at the daily scale is more convincible.**

AR: As stated above, three of Ph.D. candidates are using the collected SM/ST datasets at 30 min or daily scale to work on their Ph.D. theses and continue to expand the datasets as well. By international protocol, we cannot upload the raw SM/ST datasets with the 30 min and daily scale at this point of time.

Also suggested by reviewer 1, the validations of the SM products at daily scale was performed. Results are shown in Figure S6 (scatterplots comparing the different SM products with observations) and Figure S7 (the results of the evaluation metrics for the different products). Results indicate that the performance of different SM products at daily scale is consistent with that at monthly scale. This part has been added to the revised supplement.

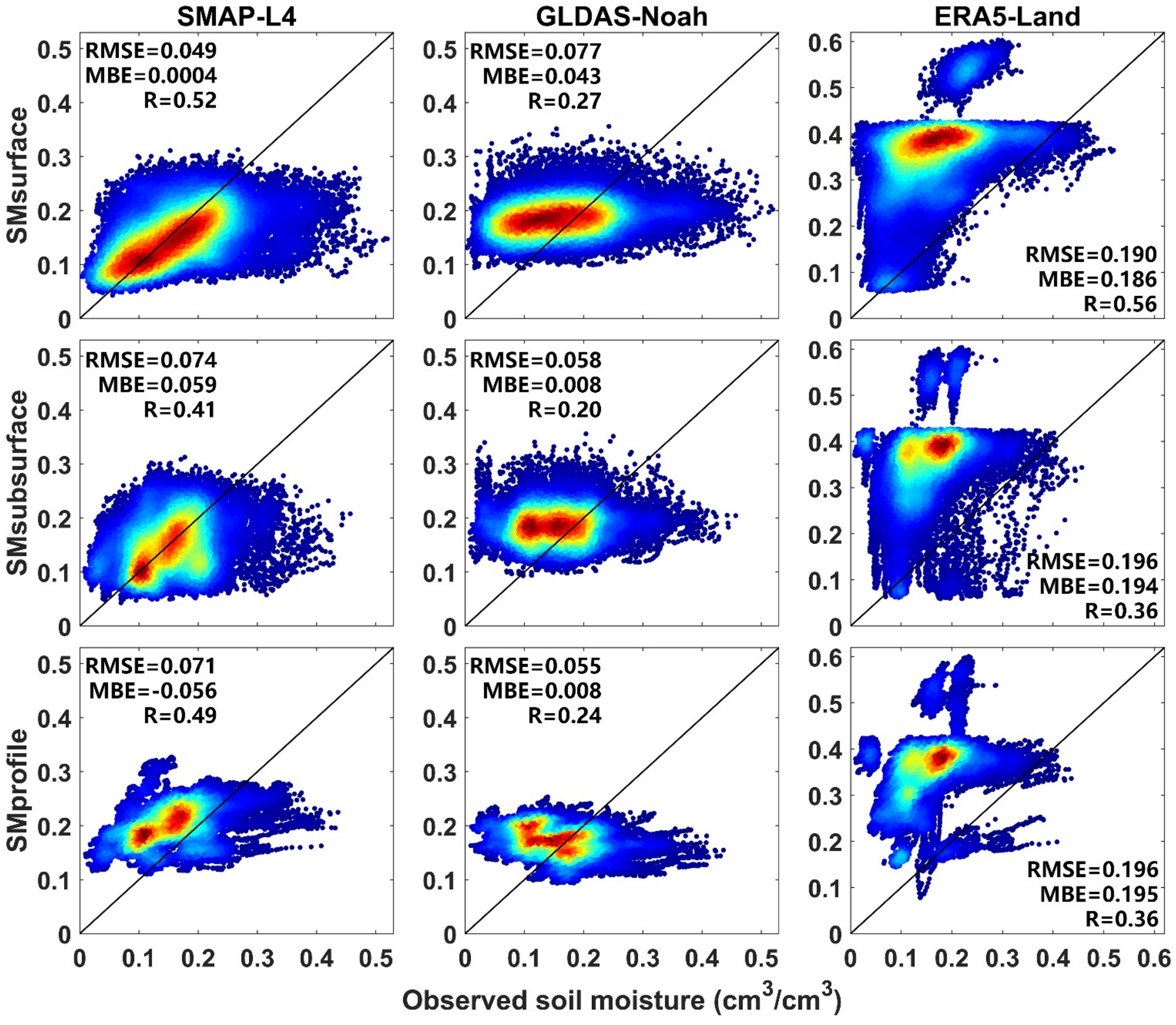

Figure S6. Scatterplots comparing the different derived SM products with the observed SM for different soil layers at daily scale. The metrics within each plot show the median value of the metrics for all stations. The smoothed color density in the scatter plots shows the density of points.

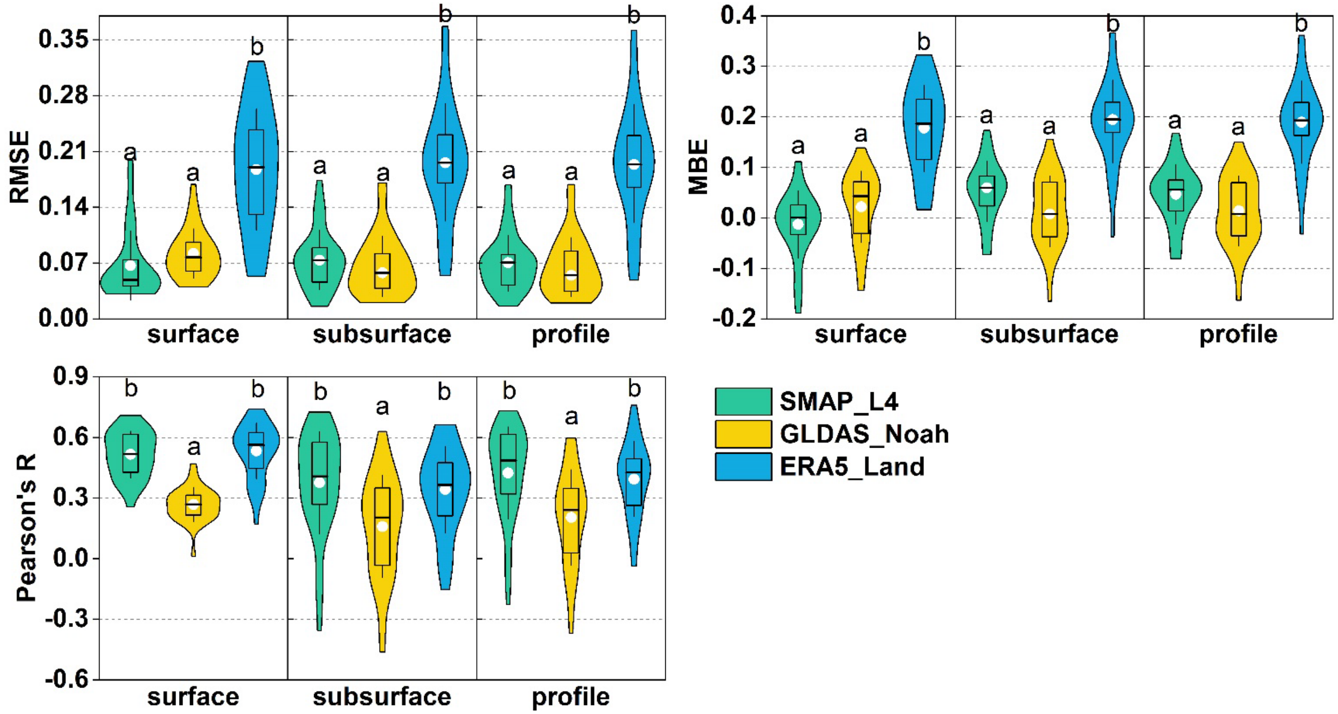

Figure S7. Metrics for comparing the different SM products (GLDAS2.1_Noah, ERA5_Land, SMAP_L4) with the in-situ SM observations for different soil layers at daily scale. The different letters above the violin plot indicate the significant differences ($p < 0.05$) between different products for each soil layer.

RC: **L130, In the sheet ‘’station information’ of the uploaded file ‘soil moisture data_NE_QTP.xlsx’, there is no information of land use/type data, elevation, soil type and soil texture. In line 123, ‘Environmental factors such as the position, slope, aspect, root depth, and land cover were measured at each station’, please complete all these related information. In Figure 1, please also add the meaning of 32 main LULC (Land Use/Cover)- soil-DEM types, which is not clear for the reviewer who does not concern with LULC research.**

AR: The above information (including the position, land use/type, elevation, soil, slope, and root information) has been uploaded to the public datasets of this manuscript. The meaning of the 32 LULC (Land Use/Cover)- soil-DEM types have also been added to the supplement (Table S1)

☐ Table S1. The meaning of the 32 LULC-soil-DEM types in the study area

ID	Elevation (m)	Soil Genetic Classification	Land use/cover	Percentage (%) [a]
D1	2000-2500	Typical sierozem	Middle coverage grassland	1.07
D2	2000-2500	Light chestnut soil	Middle coverage grassland	2.61
D3	2000-2500	Sliming grey desert soil	Middle coverage grassland	2.43
D4	2500-3000	Typical chestnut soil	Middle coverage grassland	0.84
D5	2500-3000	Light chestnut soil	Middle coverage grassland	1.91
D6	2500-3000	Light chestnut soil	Middle coverage grassland	2.53
D7	3000-3500	Calcareous alpine steppe soil	Middle coverage grassland	2.74
D8	3000-3500	Saturation alpine steppe soil	Middle coverage grassland	2.97
D9	3500-4000	Saturation alpine steppe soil	Middle coverage grassland	9.44
D10	3500-4000	Calcareous alpine steppe soil	Middle coverage grassland	9.56
D11	2500-3000	Typical chestnut soil	Forestland	1.53
D12	2500-3000	Typical grey cinnamon soil	Forestland	1.32
D13	2500-3000	Peat subalpine steppe soil	Forestland	3.45
D14	2500-3000	Light chestnut soil	Forestland	2.14
D15	3000-3500	Peat subalpine steppe soil	Forestland	5.52
D16	3000-3500	Saturation alpine steppe soil	Forestland	2.23
D17	3500-4000	Peat subalpine steppe soil	Forestland	2.21
D18	2500-3000	Typical chernozem	Farmland [b]	0.96
D19	2500-3000	Dry chernozem	Farmland [b]	1.01
D20	2500-3000	Typical chestnut soil	Barren land	1.29
D21	2500-3000	Calcareous alpine steppe soil	Barren land	3.02
D22	3000-3500	Calcareous alpine steppe soil	Barren land	8.77
D23	3000-3500	Saturation alpine steppe soil	Barren land	0.77
D24	3500-4000	Typical alpine steppe soil	Barren land	2.08
D25	4000-4500	Typical alpine frost desert soil	Barren land	1.96
D26	4000-4500	Saturation alpine steppe soil	Barren land	0.80
D27	2500-3000	Typical chestnut soil	High coverage grassland	1.18
D28	2500-3000	Light chestnut soil	High coverage grassland	0.78
D29	3000-3500	Typical chestnut soil	High coverage grassland	0.68
D30	3000-3500	Peat subalpine steppe soil	High coverage grassland	0.80
D31	3000-3500	Saturation alpine steppe soil	High coverage grassland	1.31
D32	3500-4000	Saturation alpine steppe soil	High coverage grassland	1.64

Note: [a] Percentage (%) means the percentage of area of the DEM-Soil-LULC type in the study area; [b] For the Farmland: as the influence of agricultural activities, it's difficulty to monitor SM at the farmland for long term, we install the sensor in the field ridge of the farmland, and the actual land cover of the farmland site is high coverage grassland.

RC: In line 140, please consider making the measured soil water retention curve (SWRC) data accessible. Peers are more interested in the raw data, which they can use to obtain parameters in other soil hydraulic models that they are interested

AR: Currently some Ph.D. candidates are using the raw SWRC data to calculate the soil hydraulic parameters. We cannot upload all the raw SWRC datasets at this point of time. Additionally, as suggested by Reviewer 1, we have shared the raw SWRC data at eight representative sites in the study area, which has relatively complete profile SHP data and can represent the main land covers (two sites for each main land covers of Forestland, High coverage grassland, Middle coverage grassland and Barren land). The selected original measurements of the key SHP datasets for the main land covers have been uploaded to the public datasets (https://doi.org/10.5281/zenodo.6514191). Until now, both the spatial distribution of parameters of Van Genuchten model for the SWRC and the raw SWRC data of eight representative sites (five layers for each site) are provided. We will upload all the raw SWRC data once they finish their Ph.D. work, Thank you for your understanding.

RC: In Line 270, the author used Kriging method in ArcGIS to interpolate the spatial SHPs, please specify the Kriging method (e.g., what kind of method, any covariates and spatial resolution) and describe the uncertainty of this method and the interpolated data.

AR: As suggested by Reviewer 1, the Inverse Distance Weighted (IDW) method was adopted to generate the SHP products (with spatial resolution of 900 m, Figure 6). Furthermore, based on the cross-validation method, the uncertainty of the interpolated SHP products through the IDW method is calculated. The results are listed in Table S2 and Figure R1. Overall, our results show that the uncertainty of SHP decreases as SOC, α, θ_r, K_S, sand, clay, bulk, θ_s, silt and n, which have the NRMSE (at first layer) of 90.5%, 75.1%, 64.1%, 46.7%, 45.6%, 23.2%, 22.5%, 20.6%, 19.2% and 14.2%, respectively. The above statement has been added to the revised manuscript.

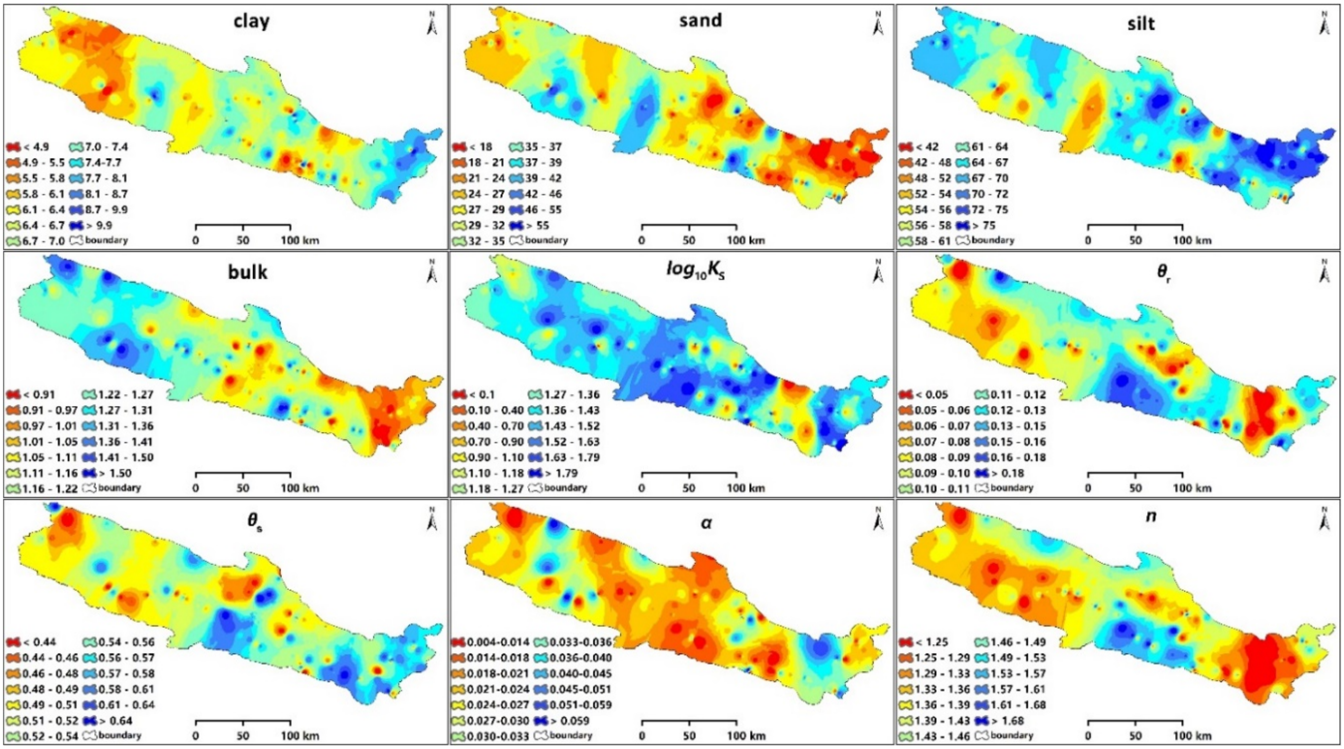

Figure 6. The spatial distribution of soil texture (sand, silt, clay, %), bulk (g/cm^3), $log_{10}K_S$ (log_{10} transformed saturated hydraulic conductivity, cm/day), the residual SM (θ_r, cm^3/cm^3), saturated SM (θ_s, cm^3/cm^3), α and n in the study area.

☐ **Table S2. The uncertainty of the generated SHP datasets through the Inverse Distance Weighted method based on the in-situ observations.**

metric	depth	clay	sand	silt	bulk	SOC	K_S	θ_r	θ_s	α	n
BIAS	5 cm	0.015	-0.129	0.114	-0.008	0.884	0.037	-0.0007	0.0022	-0.0002	-0.0007
	15 cm	0.173	-0.742	0.570	-0.029	0.399	0.001	0.0013	-0.0047	0.0005	0.0088
	25 cm	-0.135	-0.189	0.324	-0.008	0.776	-0.020	-0.0056	-0.0034	0.0006	-0.0162
	40 cm	0.200	-0.769	0.569	-0.040	0.414	0.027	-0.0039	0.0007	0.0025	-0.0061
	60 cm	0.339	-1.642	1.303	-0.073	0.746	0.052	-0.0072	-0.0203	0.0014	-0.0114
PBIAS (%)	5 cm	0.227	-0.444	0.177	-0.642	23.00	2.625	-0.730	0.420	-0.754	-0.048
	15 cm	2.568	-2.807	0.852	-2.573	11.61	0.092	1.013	-0.920	1.576	0.630
	25 cm	-2.074	-0.627	0.511	-0.652	21.45	-1.331	-5.299	-0.669	2.021	-1.166
	40 cm	2.991	-2.568	0.898	-3.148	19.16	2.043	-3.077	0.137	8.609	-0.441
	60 cm	5.143	-5.960	1.979	-5.474	32.50	5.303	-5.588	-4.001	6.056	-0.845
NRMSE (%)	5 cm	23.16	45.59	19.19	22.47	90.51	46.72	64.11	20.58	75.12	14.16
	15 cm	21.56	53.57	19.73	20.60	72.74	44.21	41.00	26.69	42.29	11.30
	25 cm	24.55	45.15	20.28	27.06	94.20	48.05	79.54	28.69	68.58	13.19
	40 cm	22.28	60.95	27.40	22.58	114.7	46.30	64.87	20.96	39.90	13.15
	60 cm	31.93	55.95	22.39	22.53	121.5	79.81	66.54	26.88	68.62	12.34

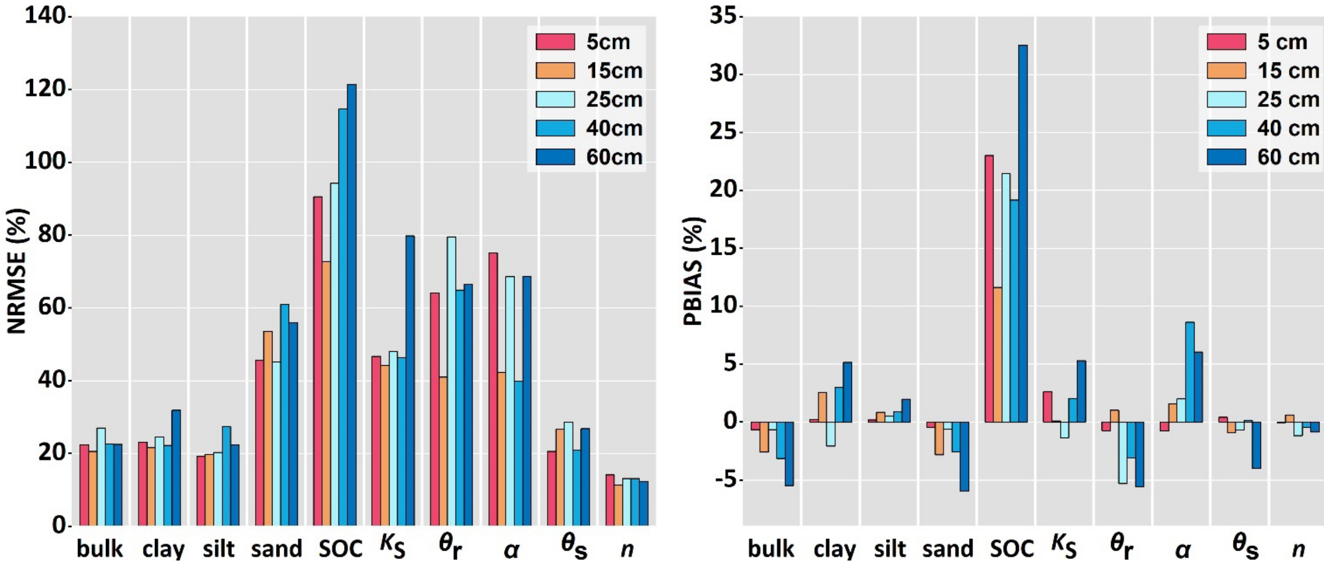

Figure R1. The uncertainty (NRMSE and PBIAS) of the generated SHP datasets through the Inverse Distance Weighted method based on the in-situ SHP observations.

RC: Please explain Figure 7b.

AR: Figure 7b represents the distribution of soil moisture range at different matrix heads for each soil layer. As the SWRC can be explained based on the parameters of Van Genuchten model. Specifically, θ_r and θ_s can reflect the lower boundary and upper boundary of the SWRC, respectively, n and α can reflect the shape and position of the curve, respectively (Mohawesh, 2014; Assouline et al., 2021). Figure 7b can be explained by the variation of the four parameters with depth (Figure 7a). It shows that the θ_s decreases from 5 cm depth (0.55 cm^3/cm^3) to 40 cm depth (0.46 cm^3/cm^3), then increases from 40 cm to 60 cm depth (0.50 cm^3/cm^3). The θ_r fluctuation increases with depth from 5 cm depth (0.11 cm^3/cm^3) to 60 cm depth (0.15 cm^3/cm^3). While α increases from 5 cm depth (0.022) to 40 cm depth (0.027), then decreases to 60 cm depth (0.021). n fluctuation increases from 5 cm depth (1.37) to 40 cm depth (1.41), then decreases to 60 cm depth (1.39). The explanation has been revised in the manuscript.

☐ Figure 7b represents the distribution of soil moisture range at different matrix heads for each soil layer. The variation of SWRC can be explained based on the parameters of Van Genuchten model. Specifically, θ_r and θ_s can reflect the lower boundary and upper boundary of the SWRC, respectively, n and α can reflect the shape and position of the curve, respectively (Mohawesh, 2014; Assouline et al., 2021).

RC: The reviewer thinks that the 'dry bulk density' is measured. Please refer to this soil property as dry bulk density in the manuscript and figures.

AR: Thank you for your comments. Yes, the bulk density is dry bulk density, which is measured using the oven-drying method (Gwenzi et al., 2011). We have changed the bulk density to dry bulk density in the revised manuscript.

RC: Please make the symbols of and consistently used in the manuscript but also in the legend in Figures, e.g., In Figure 6, theta_s and theta_r.

AR: Thank you for your comments. We have revised the manuscript thoroughly and made the symbols in the manuscript, figures and tables consistent. The symbols and their definitions are listed in Table R1.

Table R1. The symbols and their definitions in the manuscript.

Symbol	unit	Definition
SM	cm^3/cm^3	soil moisture
clay	%	soil clay content
silt	%	soil silt content
sand	%	soil sand content
SOC	%	soil organic carbon
bulk	g/cm^3	soil dry bulk density
K_S	cm/day	soil saturated hydraulic conductivity
α	cm^{-1}	parameter of Van Genuchten model that related to the suction at the air entry point [a]
n	_	shape parameter of Van Genuchten model [a]
θ_r	cm^3/cm^3	residual soil moisture
θ_s	cm^3/cm^3	saturated soil moisture

[a] the definitions come from Assouline (2021)

RC: L60, please delete the "." after "soil"

AR: Thank you, we have revised it.

☐ SM can generally only be retrieved for the uppermost 5 cm of the soil (Xing et al., 2021; Zhang et al., 2019).

RC: L82, Please specify the data, in-situ meteorologic data or other type of data?

AR: It's from the in-situ meteorological data in the study area (He et al., 2018). We have specified the type of data in the revised manuscript.

RC: L96, Please add one sentence to explain why you divide the area into 32?

AR: We divided the study area into 32 homogeneous zones based on the following main factors: 1). Adequate representation of the main types of land use/land cover, soil, and topography of the study area; 2). Relatively large, homogeneous zones of the LULC, soil, and topography (DEM); and 3). Constraints of project budget and personnel in carrying out the field work. The GIS analysis procedure is as follows: 1). Convert the collected land use/land cover (LULC), soil type and digital elevation model (DEM) datasets of the study area to ArcGIS (Environmental Systems Research Institute, 2012) shapefile format; 2). Overlay the aforementioned datasets to define LULC-soil-DEM classes (polygons); 3). Aggregate those similar LULC-soil-DEM classes to produce relatively large, homogeneous classes (ESRI, 2012). After the procedure, we got 32 main LULC-soil-DEM classes (Figure 1) in the study area. The details of the procedure can be found in Jin et al. (2015). The above explanation has been added to the revised manuscript.

☐ We divided the study area into 32 homogeneous zones based on the following main factors: 1). Adequate representation of the main types of land use/land cover, soil, and topography of the study area; 2). Relatively large, homogeneous zones of the LULC, soil, and topography (DEM); and 3). Constraints of project budget and personnel in carrying out the field work. The GIS analysis procedure is as follows: 1). Convert the collected land use/land cover (LULC), soil type and digital elevation model (DEM) datasets of the study area to ArcGIS (Environmental Systems Research Institute, 2012) shapefile format; 2). Overlay the aforementioned datasets to define LULC-soil-DEM classes (polygons); 3). Aggregate those similar LULC-soil-DEM classes to produce relatively large, homogeneous classes (ESRI, 2012). After the procedure, we got 32 main LULC-soil-DEM classes (Figure 1) in the study area.

RC: L110, Please clarify its representative on each zone.

AR: Thank you for your comments. After getting the spatial distribution of 32 main LULC-soil-DEM zones in the study area, we selected the specific locations of representative sites for each zone based on following principles: 1). The representative site is located near the center of the largest patch for each zone. 2). Each location is accessible within the walking distance from rural road for the installation and long-term maintenance of the equipment in the harsh high and cold mountainous areas. Despite this consideration, we had to walk 3 hours each way to get to two of our monitoring sites from rural road (Figure R2). 3). Representation of the surrounding environment. 4) Each location is some distance away from rural road to minimize the impact of human interference and keep the equipment safe. Unfortunately, we still suffered destruction and theft of our equipment in several locations, incurring several thousand dollars of loss (Figure R2). The explanation has been added to the revised manuscript.

- After getting the spatial distribution of 32 main LULC-soil-DEM zones in the study area, we selected the specific locations of representative sites for each zone based on following principles: 1). The representative site is located near the center of the largest patch for each zone. 2). Each location is accessible within the walking distance from rural road for the installation and long-term maintenance of the equipment in the harsh high and cold mountainous areas. 3). Representation of the surrounding environment. 4) Each location is some distance away from rural road to minimize the impact of human interference and keep the equipment safe.

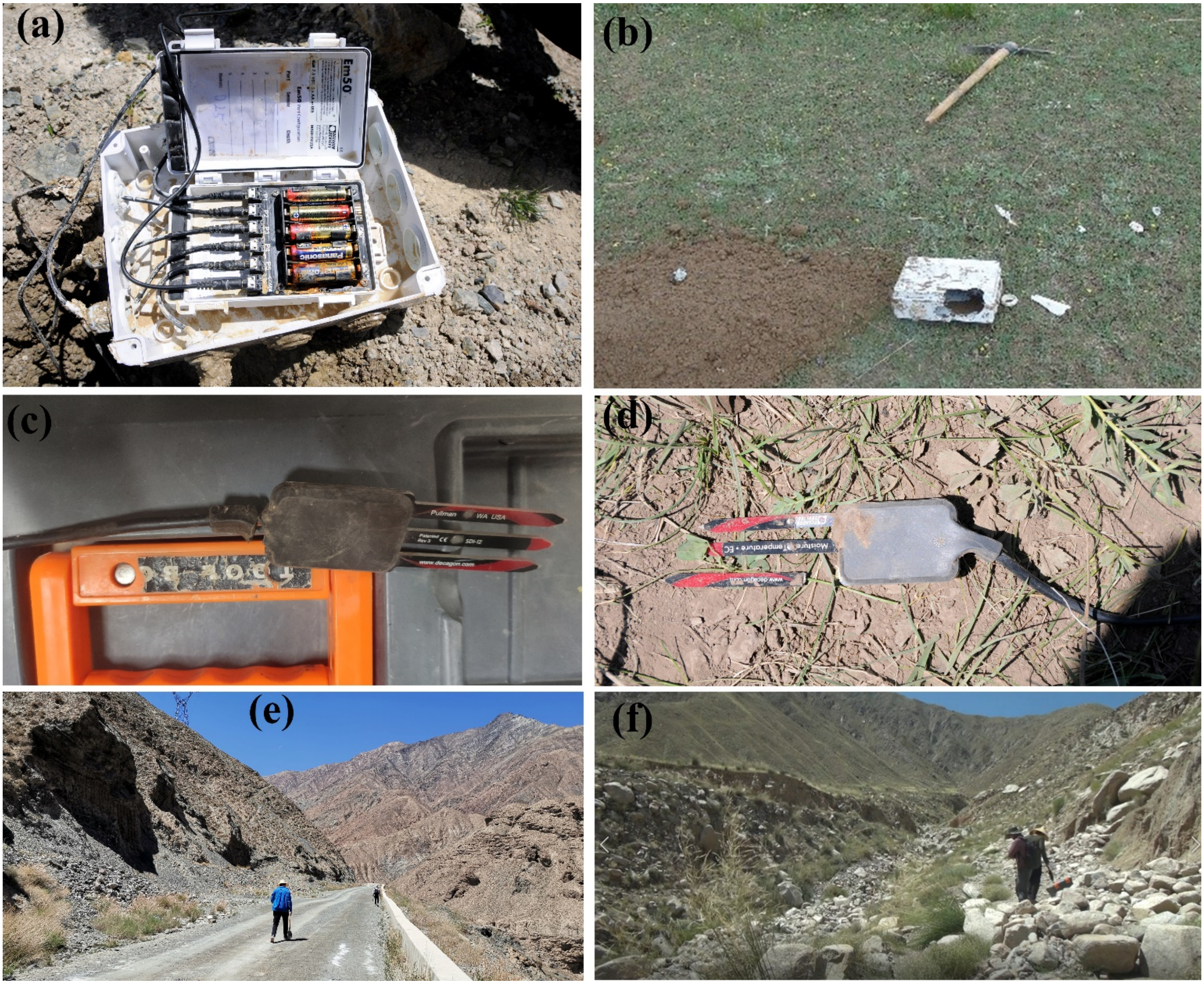

Figure R2. (a) Datalogger damage caused by water ingress, (b) the stolen of 5TE sensor and datalogger in the field (only the broken white waterproof box remains), (c)-(d) the destruction of 5TE sensor in the field. (e)-(f) two stations that need to walk 3 hours each way from rural road to collect data and maintain the instrument.

RC: L119, Please add one sentence to explain why you want to get reader's attention on monthly data

AR: Thank you for your comment, we have added the explanation as follows:

- SM variation trend during 2014-2020 and its spatial distribution in the study area are analyzed based on the in-situ measurements. As we focused on the long-term SM variation, the monthly-average SM data were applied to get robust results.

RC: L142, dry soil bulk density

AR: Thank you, we have changed it to soil dry bulk density.

RC: L145, Please clarify why 6359 hPa and the interval of matrix potential measured in your experiment? Please make measured SWRCC data accessible.

AR: We used the refrigerated centrifuge method (CR-GIII High-Speed Refrigerated Centrifuge, Hitachi, Ltd. Figure R3) to measure the SWRC. The limitation of the maximum rotation speed is 8200 rpm, and the corresponding maximum matrix potential is 6359 hPa. The SWRC curve was measured at the matrix potentials of 9 hPa, 91 hPa, 273 hPa, 454 hPa, 726 hPa, 909 hPa, 2657 hPa, 2542 hPa, and 6359 hPa, respectively. The above description has been added to the revised manuscript. As the Ph.D. candidates are still using the raw measured SWRC data (measured soil water content at different matrix potentials), we cannot upload all the raw SWRC datasets at this point of time. However, as stated above, the raw SWRC datasets of eight representative sites for the main land covers have been uploaded to the public datasets of this manuscript (https://doi.org/10.5281/zenodo.6514191). We are willing to share all the SWRC datasets later once the Ph.D. candidates complete their theses. Thank you for your understanding.

- Limited by the measurement method (CR-GIII High-Speed Refrigerated Centrifuge, Hitachi, Ltd.), the maximum matrix potential of the measurement is 6359 hPa. Specifically, the SWRC curve was measured at the matrix potentials of 9 hPa, 91 hPa, 273 hPa, 454 hPa, 726 hPa, 909 hPa, 2657 hPa, 2542 hPa, and 6359 hPa, respectively.

Figure R3. Picture of CR-GIII High-Speed Refrigerated Centrifuge

RC: L203, Please give the reference

AR: Thank you for your reminder. We have added the reference in the revised manuscript: (Derrac et al., 2011)

RC: L207, Please clarify the used interpolation method and the possible uncertainty.

AR: As suggested by Reviewer 1, the Inverse Distance Weighted method was adopted to get the spatial distribution of SHP products. The uncertainty has been stated above.

RC: L210-214, Please consider to move these contents in the field sampling. The reviewer is more interested to see the spatial/profile distribution of measured basis soil properties in Results.

AR: Thank you, we have moved this paragraph to the field sampling part in the revised manuscript.

RC: L214, Please clarify how these results are related to the information of .nc data.

AR: The .nc data is generated based on all the in-situ measurements of SHP datasets. The specific numbers of each soil property that were used to generate the .nc data (Table S3) have been added to the revised manuscript.

☐ **Table S3. The specific number of the measured soil properties in the datasets.**

depth/cm	clay	silt	sand	bulk	SOC	K_S	SWRC
5	198	198	198	158	30	174	140
15	25	25	25	25	25	25	25
25	162	162	162	64	30	65	56
40	23	23	23	30	28	30	22
60	21	21	21	30	24	24	19
all	429	429	429	307	137	318	262

Note: SWRC includes the parameters of Van Genuchten model (α, n, θ_s and θ_r) related to the soil water retention curve.

RC: L225, Please correct to '*n*'

AR: Thanks for the comment. We have revised it.

☐ and the soil hydraulic parameters (α, θ_s, θ_r, and n) were calculated for the samples using this model.

RC: L256, Please delete the "-" after "significant"

AR: Thanks. We have revised it.

RC: Tabe 3, Why is this value (Cv of theta_r at depth of 5 cm) so big? What is its indication if the reader tends to use your theta_r?

AR: Table 3 describes the statistic values of SHP and Figure 7 shows more statistics information of SHP.

From the results, we can see that θ_r has small value and with a relatively large variation range, e.g., the mean and standard deviation of θ_r are 0.11 cm^3/cm^3 and 0.06 cm^3/cm^3, respectively. That's why the θ_r showed high C_V value. Meanwhile, θ_r value determines the simulated minimum SM values in hydrological model (such as Hydrus-1D model, Simunek et al., 2005), the large C_V value of θ_r indicates it has strong spatial heterogeneity in the study area. Thus, θ_r dataset with high spatial resolution is recommended for the hydrological models to minimize the influence of spatial heterogeneity of θ_r on hydrological modeling in the study area.

RC: L289, decrease?

AR: Thanks for your reminder. We have rewritten this sentence.

☐ The SOC has a maximum at 5 cm depth (where it has a median value of 4.02%), then fluctuation decreases from 15 cm depth (1.47%) to 60 cm depth (1.24%).

RC: L290-291, Please check the consistency of your description.

AR: Thanks for your reminder. We have checked the description and rewritten this sentence.

☐ The θ_s decreases from 5 cm depth (0.55 cm^3/cm^3) to 40 cm depth (0.46 cm^3/cm^3), then increases from 40 cm to 60 cm depth (0.50 cm^3/cm^3).

RC: L407-408, Please rephrase this sentence. I did not see this paper establishing PTFs over the QTP.

AR: We have rewritten this sentence.

☐ This study has explored the relationships among the basic soil properties (such as soil texture and dry bulk density) with the soil hydraulic properties (such as soil saturated hydraulic conductivity, soil water retention curve), such information can be used to establish pedotransfer function over the study area in the future.

RC: L411, I do not think your monthly SM values can help on these purposes, unless you make SMST at the half-hourly scale available, which may become helpful a little bit.

AR: These researches are based on the in-situ SM measurements. However, as stated above, the raw SM data at 30 min intervals can't be uploaded at this point of time. We are willing to share the SM datasets later once the Ph.D. candidates complete their theses. Thank you for your understanding.

RC: L412, Please check the reference.

AR: Zhang et al. (2017) and Zhang et al. (2019) evaluated the SMAP (Soil Moisture Active Passive) and SMOS (Soil Moisture and Ocean Salinity) products under different vegetation types in the study area based on the in-situ SM observations. Su et al. (2020) evaluated the simulated SM using Eagleson's Ecohydrological Model based on the in-situ SM observations in the study area. We have revised the sentence.

- ☐ for evaluating satellite-based SM products (Zhang et al., 2017; 2019) and validating the hydrological simulation (Su et al., 2020).

RC: L451, I think 'new' is too much since Tibet-obs already provided very comprehensive dataset.

AR: We have revised it.

- ☐ In summary, this study provides a unique and comprehensive dataset of in-situ measurements of soil physical properties and observations from long-term SM monitoring over the northeastern margin of the QTP area.

References:

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