Supplement of

A 1-km daily soil moisture dataset of China based on in-situ measurement using machine learning

Qingliang Li et al.

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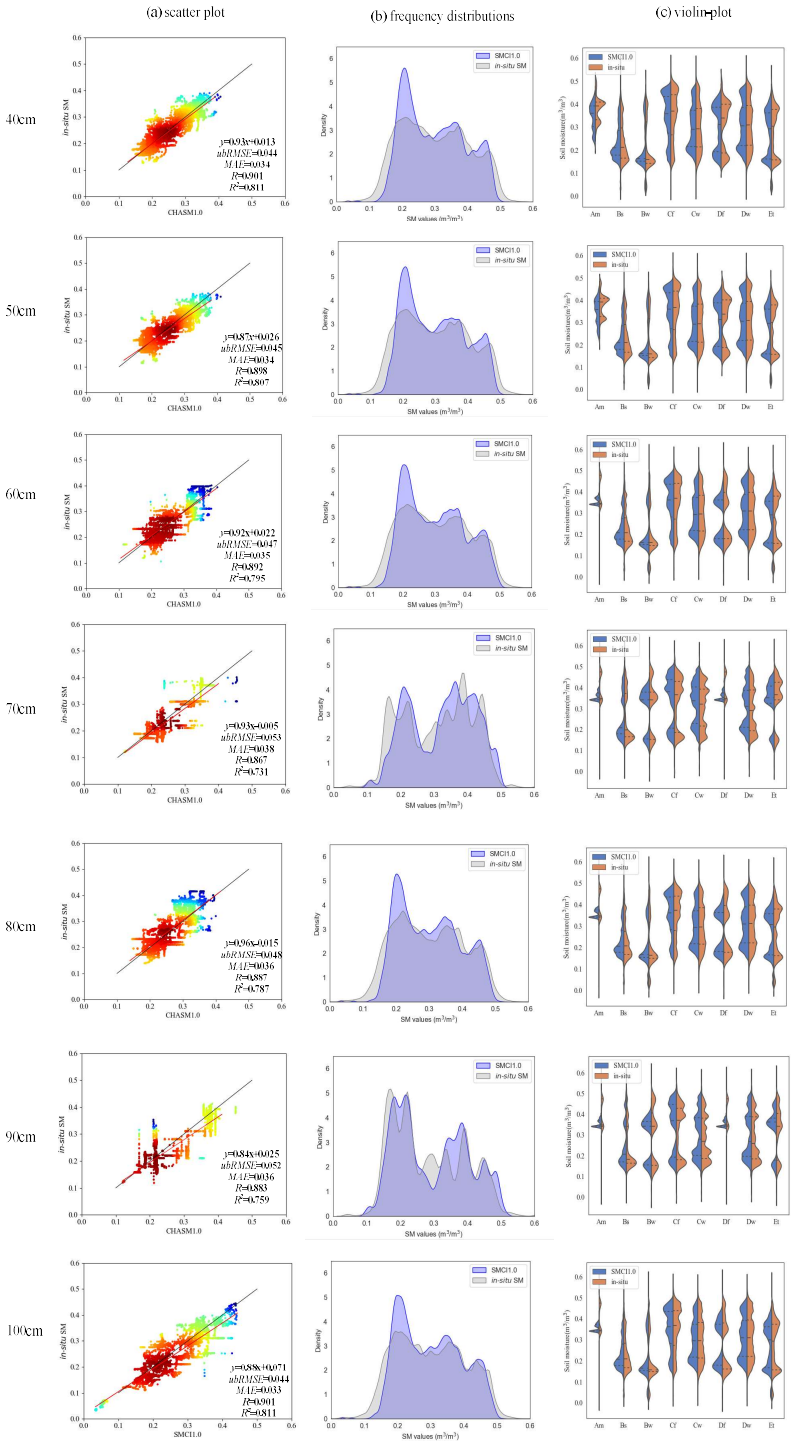
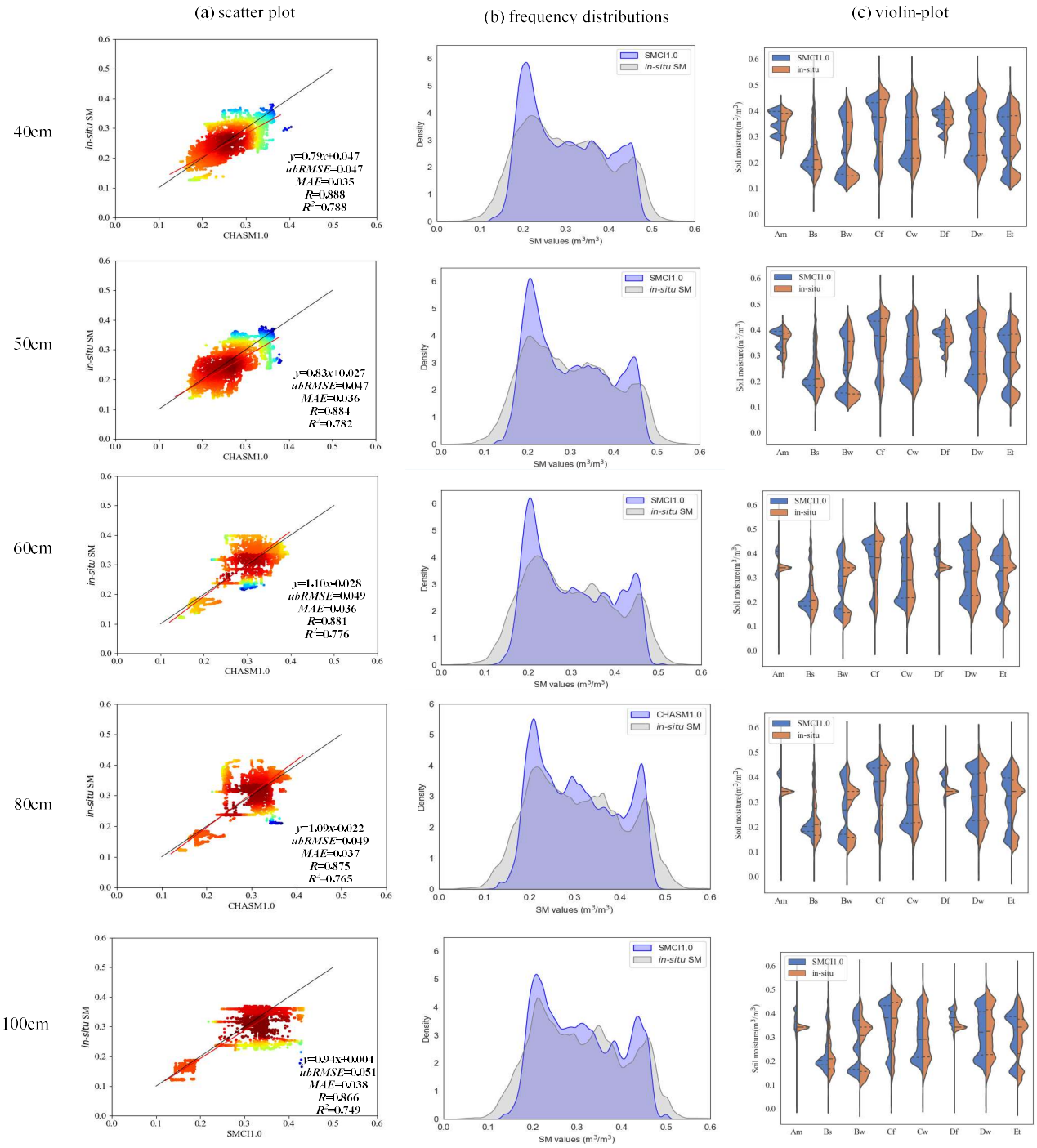


Figure S1. Comparisons between SMCI1.0 and in-situ SM from 10 to 30 cm soil depth: comparison of (a) the scatter plot between the mean of CHASM1.0 and that of in-situ SM at each station, (b) the frequency distributions of the whole SM values in SMCI1.0 and that in in-situ measurement networks, (c) the violin-plot for the distribution of daily SM from stations for each climate type.



15 **Figure S2. Same as Fig. S1 but for station-to-station mappings. There is no test set at 70 and 90 cm due to the few in-situ observations.**

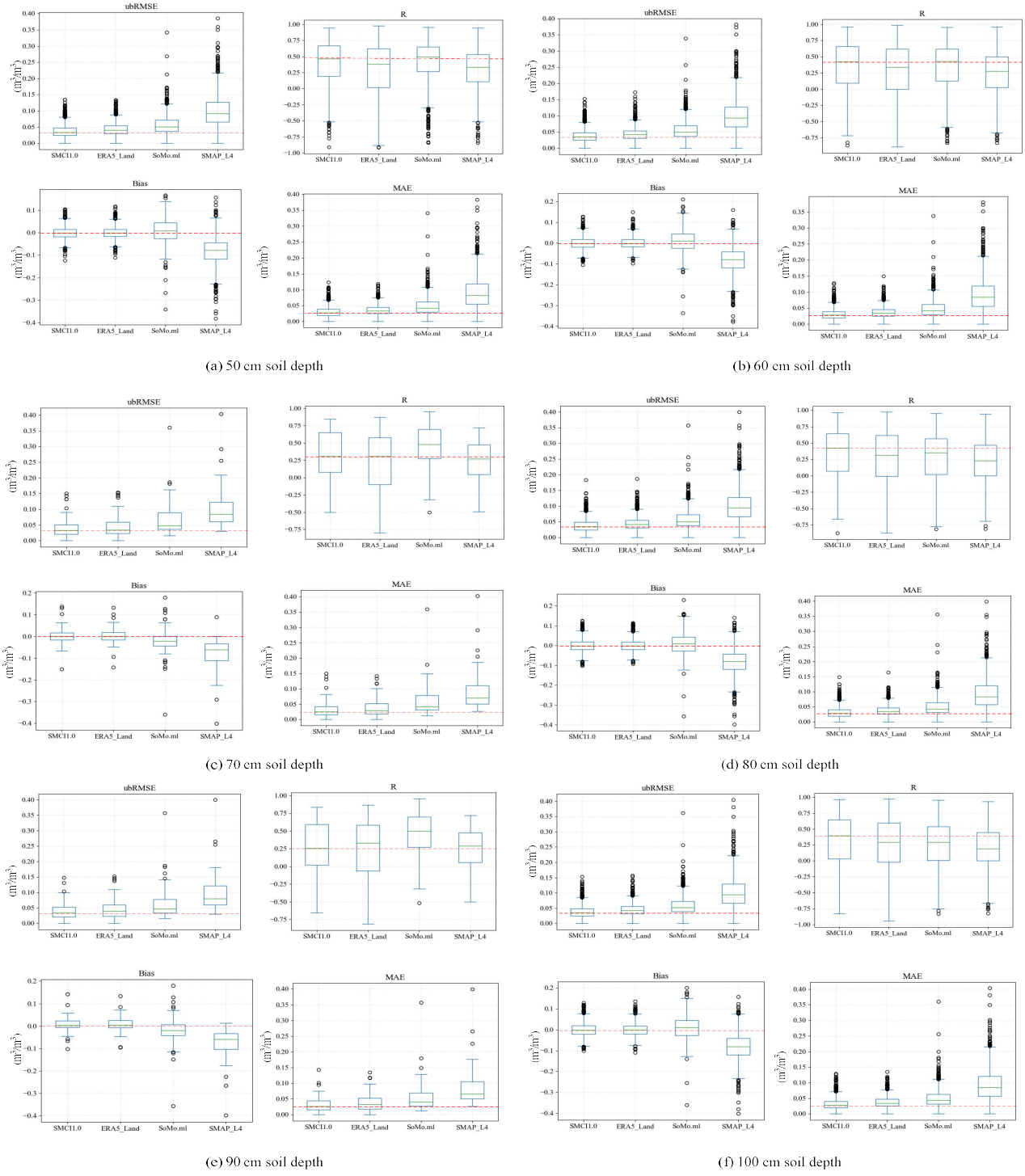


Figure S3. Comparison with other gridded datasets (a) at 50 cm soil depth, (b) at 60 cm soil depth, (c) at 70 cm soil depth, (d) at 80 cm soil depth, (e) at 90 cm soil depth, (f) at 100 cm soil depth.

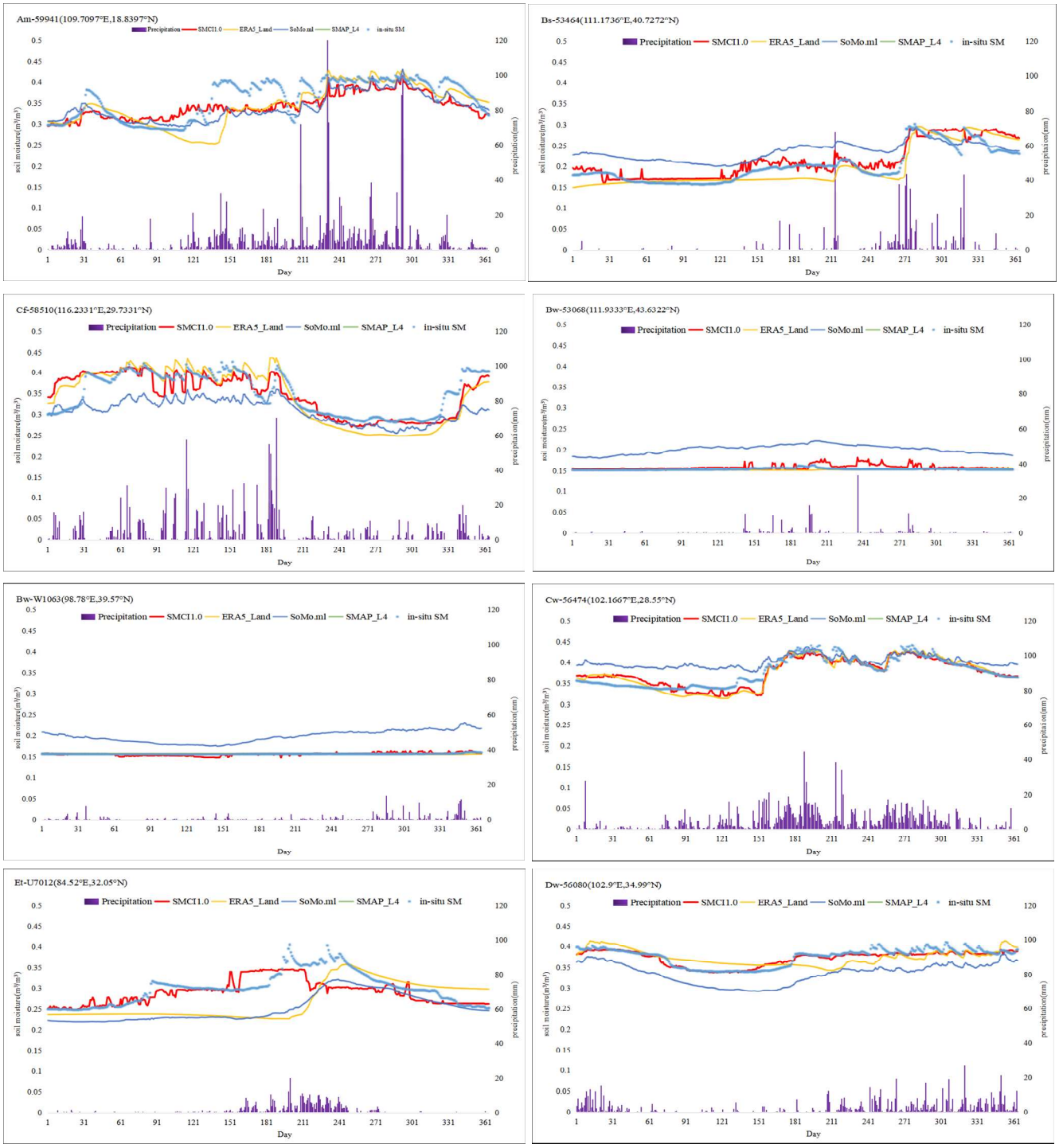
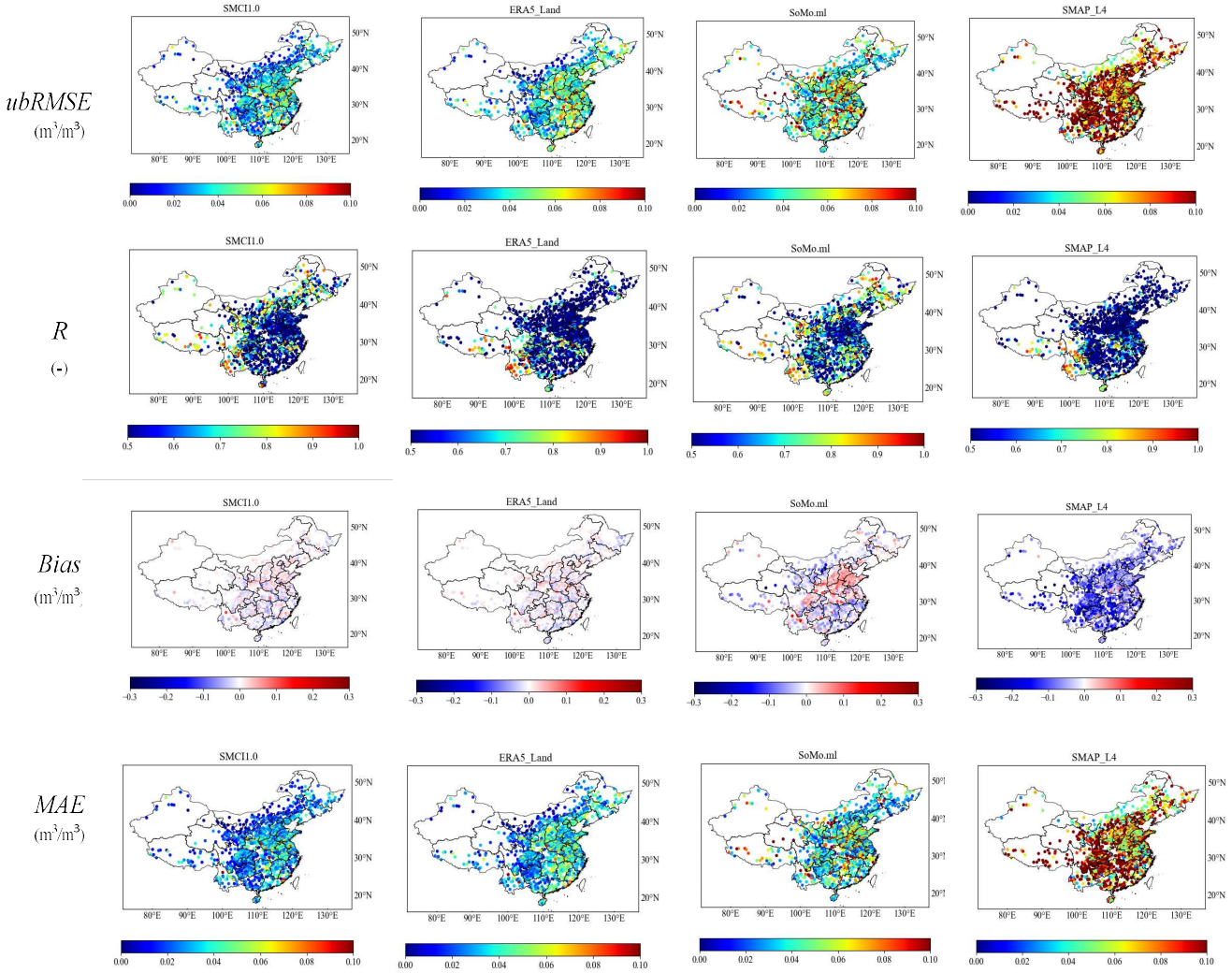
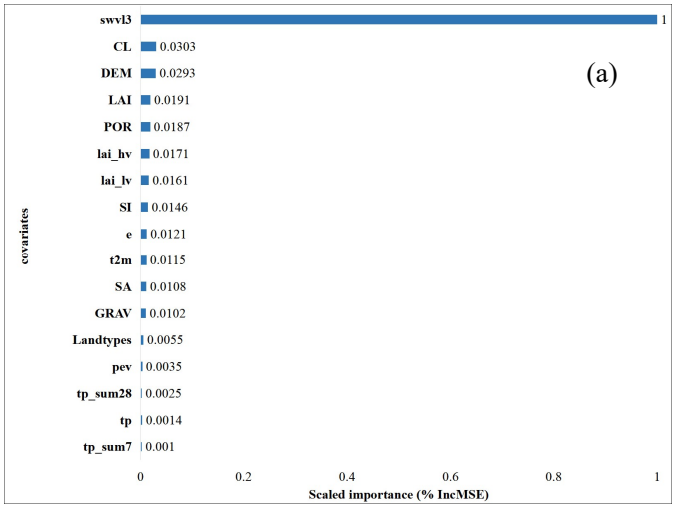
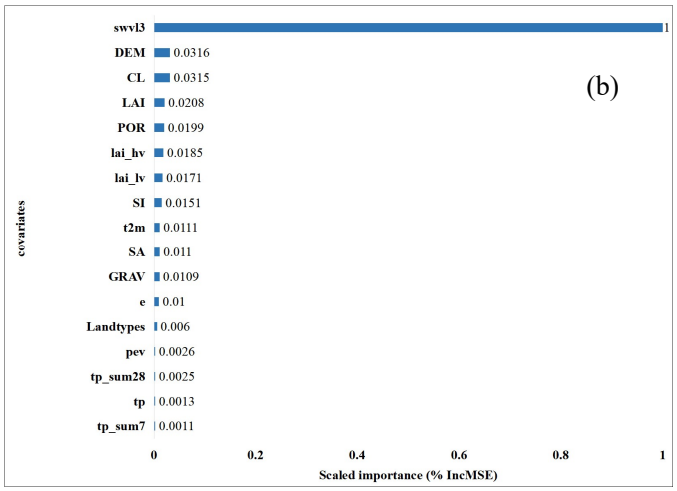


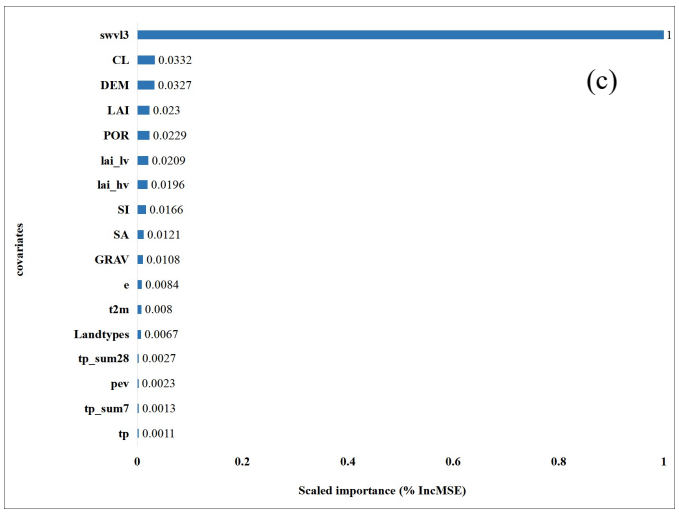
Figure S4. Time series of 30 cm soil depth in different climate regions. Each plot contains in-situ and estimated SM along with daily precipitation.



25 **Figure S5. Goodness of fit statistics (ubRMSE, R, Bias, and MAE) at 30 cm soil depth during the tested period.**


swvl3 1
CL 0.0303
DEM 0.0293
LAI 0.0191
POR 0.0187
lai_hv 0.0171
lai_lv 0.0161
SI 0.0146
e 0.0121
t2m 0.0115
SA 0.0108
GRAV 0.0102
Landtypes 0.0055
pev 0.0035
tp_sum28 0.0025
tp 0.0014
tp_sum7 0.001
covariates
0 0.2 0.4 0.6 0.8 1
Scaled importance (% IncMSE)
(a)


swvl3 1
DEM 0.0316
CL 0.0315
LAI 0.0208
POR 0.0199
lai_hv 0.0185
lai_lv 0.0171
SI 0.0151
t2m 0.0111
SA 0.011
GRAV 0.0109
e 0.01
Landtypes 0.006
pev 0.0026
tp_sum28 0.0025
tp 0.0013
tp_sum7 0.0011
covariates
0 0.2 0.4 0.6 0.8 1
Scaled importance (% IncMSE)
(b)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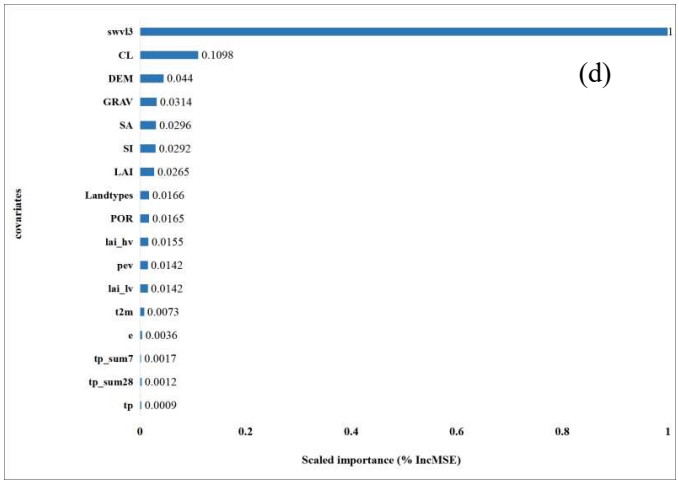
DEM 0.0327
LAI 0.023
POR 0.0229
lai_lv 0.0209
lai_hv 0.0196
SI 0.0166
SA 0.0121
GRAV 0.0108
e 0.0084
t2m 0.008
Landtypes 0.0067
tp_sum28 0.0027
pev 0.0023
tp_sum7 0.0013
tp 0.0011
covariates
0 0.2 0.4 0.6 0.8 1
Scaled importance (% IncMSE)
(c)


(d)
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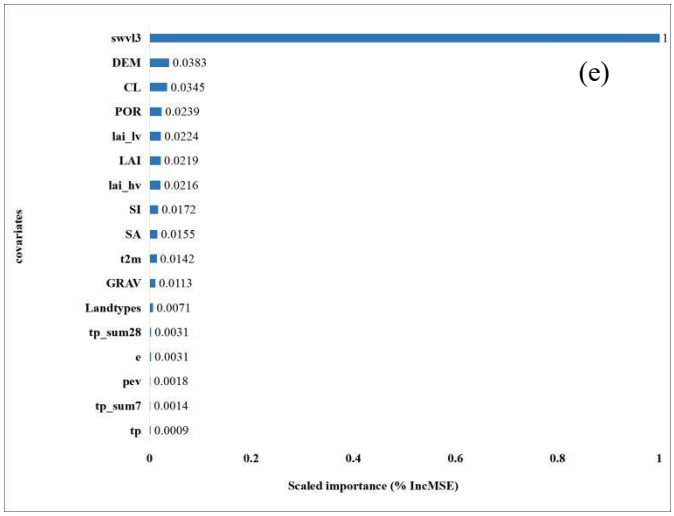
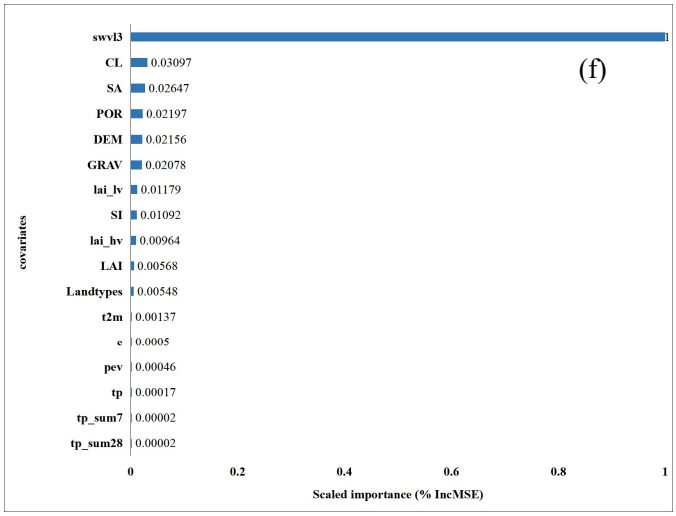
DEM 0.044
GRAV 0.0314
SA 0.0296
SI 0.0292
LAI 0.0265
Landtypes 0.0166
POR 0.0165
lai_hv 0.0155
pev 0.0142
lai_lv 0.0142
t2m 0.0073
e 0.0036
tp_sum7 0.0017
tp_sum28 0.0012
tp 0.0009
covariates
0 0.2 0.4 0.6 0.8 1
Scaled importance (% IncMSE)


(e)
swvl3 1
DEM 0.0383
CL 0.0345
POR 0.0239
lai_lv 0.0224
LAI 0.0219
lai_hv 0.0216
SI 0.0172
SA 0.0155
t2m 0.0142
GRAV 0.0113
Landtypes 0.0071
tp_sum28 0.0031
e 0.0031
pev 0.0018
tp_sum7 0.0014
tp 0.0009
covariates
0 0.2 0.4 0.6 0.8 1
Scaled importance (% IncMSE)

30


(f)
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SA 0.02647
POR 0.02197
DEM 0.02156
GRAV 0.02078
lai_lv 0.01179
SI 0.01092
lai_hv 0.00964
LAI 0.00568
Landtypes 0.00548
t2m 0.00137
e 0.0005
pev 0.00046
tp 0.00017
tp_sum7 0.00002
tp_sum28 0.00002
covariates
0 0.2 0.4 0.6 0.8 1
Scaled importance (% IncMSE)

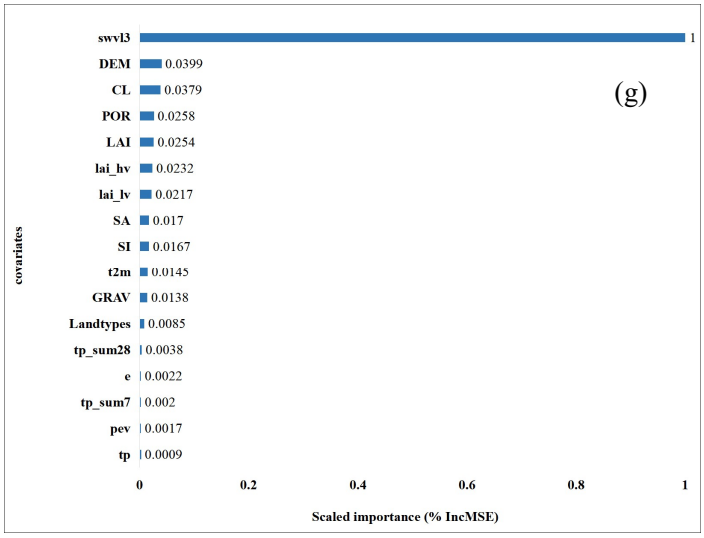

Figure S6. Relative importance of covariates for the RF model from 40 to 100 cm soil depth. (a) at 40 cm soil depth, (b) at 50 cm soil depth, (c) at 60 cm soil depth, (d) at 70 cm soil depth, (e) at 80 cm soil depth, (f) at 90 cm soil depth, (g) at 100 cm soil depth.