

Supplementary material

Modelling Soil $\delta^{13}\text{C}$ across the Tibetan Plateau Using Deep-Learning

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Table. S1. General descriptions of the dataset used in this study.

Ecosystem types	N	Mean	Standard Deviation	Minimum	Maximum
Forests	23	-25.89	1.15	-28.57	-23.87
Shrublands	29	-24.91	1.03	-27.32	-22.17
Grasslands	130	-22.95	1.44	-25.15	-18.54
Deserts	16	-18.88	2.37	-22.53	-15.08

N is the number of soil samples.

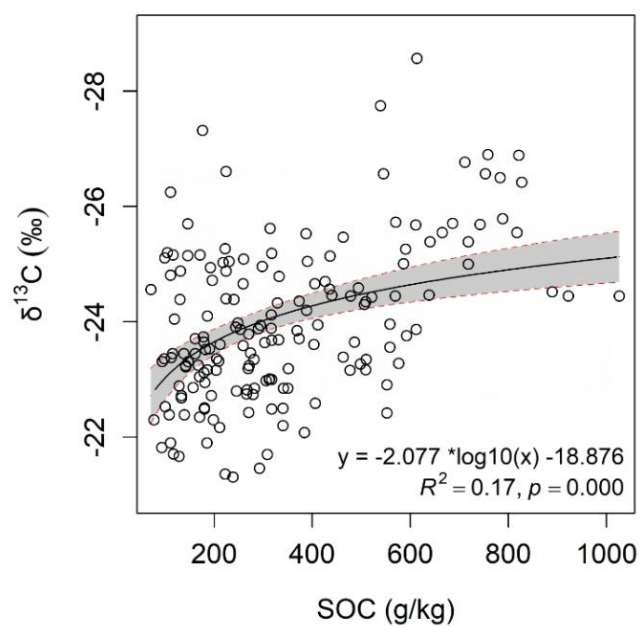


Figure. S1. Relationships of soil δ¹³C with SOC content in 0-3 cm.

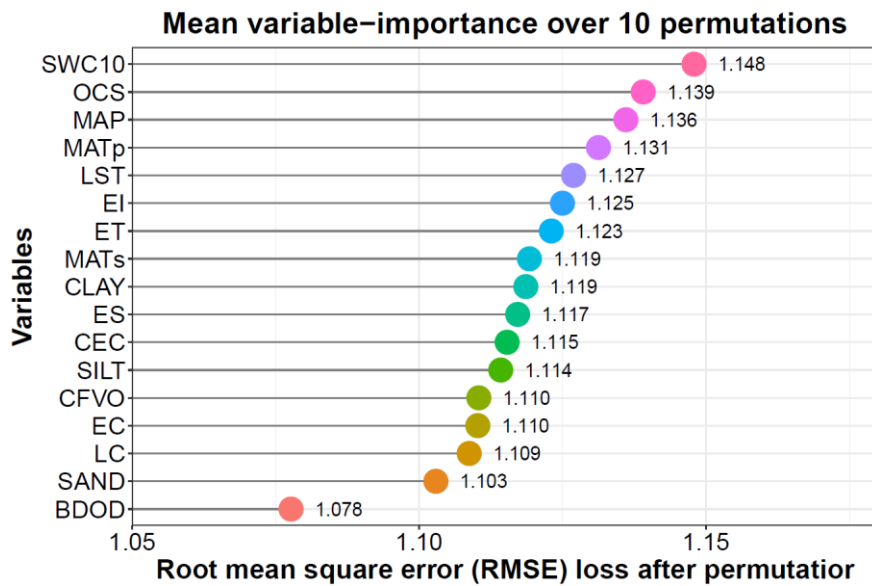


Figure. S2. Importance of variables, denoted by the loss of Root Mean Square Error (RMSE) was selected to measure how much a model’s performance would change if the effect of one variable were removed. MATp: mean annual 2m dewpoint temperature (°C); MATs: mean annual skin temperature (°C); MAP: mean annual precipitation (mm); ET: annual evapotranspiration (mm); EI: interception from vegetation canopy (mm); ES: soil evaporation (mm); EC: vegetation transpiration (mm); LC: landcover; LST: land surface temperature (°C); SWC: 10 cm depth of soil water content (%); OCS: soil organic carbon stock (t ha⁻¹); CLAY: soil clay content (g kg⁻¹); CEC: cation-exchange capacity (mmol(c) kg⁻¹); SILT: silt content (g kg⁻¹); CFVO: coarse fragments volumetric (cm³ dm⁻³); SAND: soil sand content (g kg⁻¹); BDOD: soil bulk density (cg cm⁻³).. The variables involved in the importance ranking were derived from VIF collinearity test results of all environment variables (threshold: 0.7).

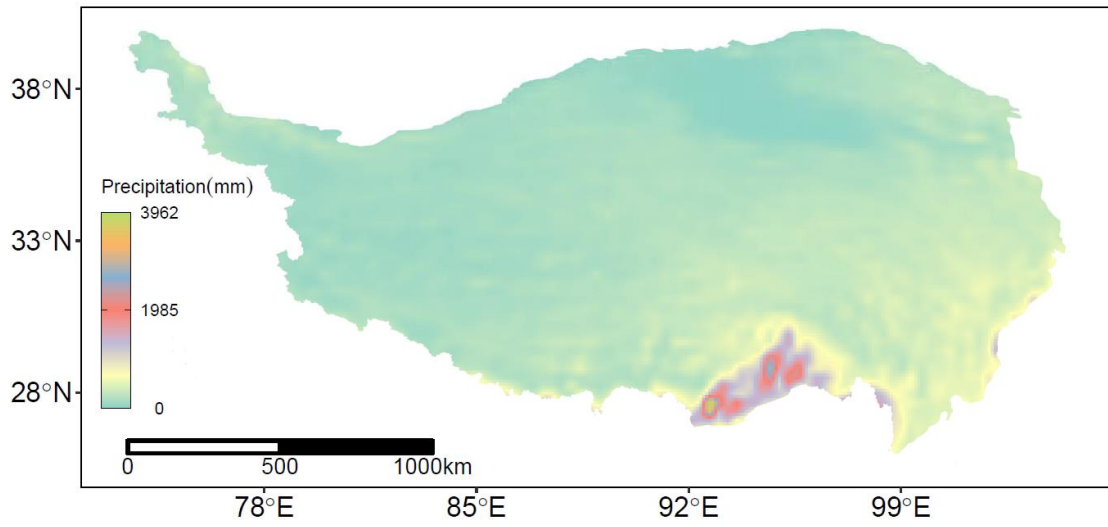


Figure. S3. The distribution of precipitation during 2000-2010.

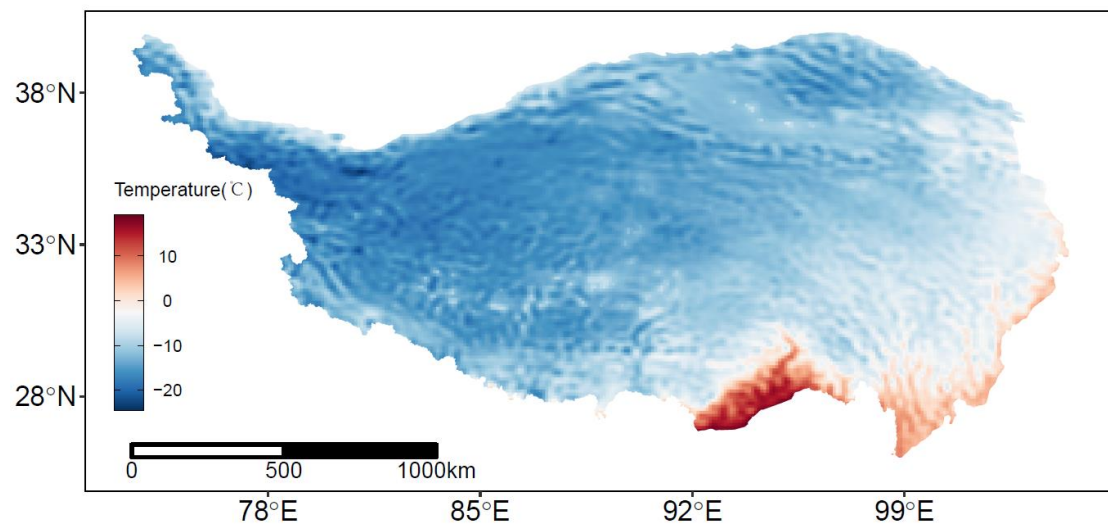


Figure. S4. The distribution of temperature during 2000-2010.

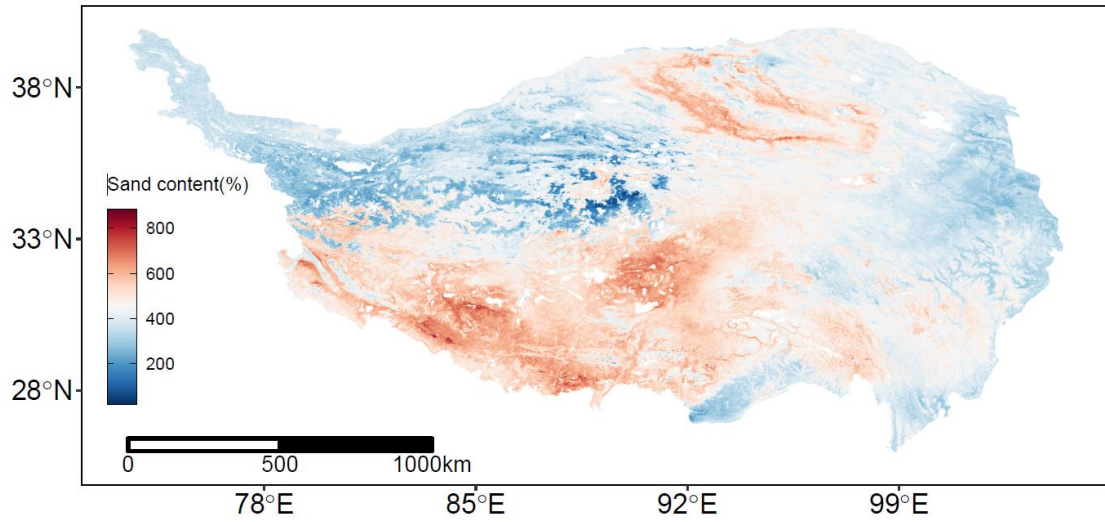


Figure. S5. The distribution of soil sand content on the Tibetan Plateau.

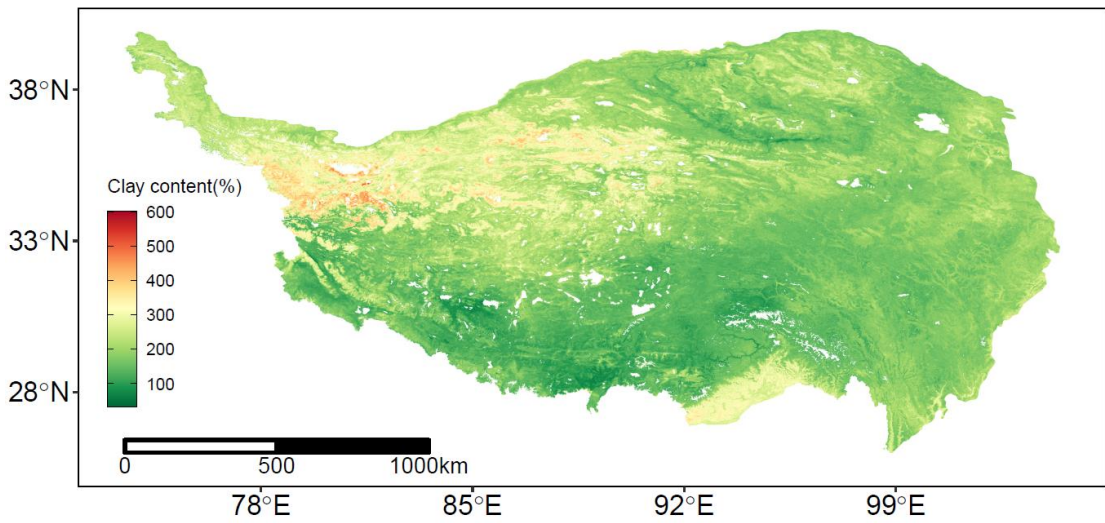


Figure. S6. The distribution of soil clay content on the Tibetan Plateau.