

Table S1. List of environmental covariates in the database.

Covariate	Number	Content
Soil and parent material	16	Soil Erosion, Soil Types, Lithology Types, Clay Content, Silt Content, Sand Content, the average of Brightness Index, Hue Index, Saturation Index, Bare Soil Index, Reflectance Absorption Index, Carbonate Index, Coloration Index, Ferrous Mineral, Gypsum Index and Iron Oxide in the bare soil period
Climate	32	Annual Mean Temperature, Mean Diurnal Range, Isothermality, Temperature Seasonality, Max Temperature of Warmest Month, Min Temperature of Coldest Month, Temperature Annual Range, Mean Temperature of Wettest Quarter, Mean Temperature of Driest Quarter, Mean Temperature of Warmest Quarter, Mean Temperature of Coldest Quarter, Annual Precipitation, Precipitation of Wettest Month, Precipitation of Driest Month, Precipitation Seasonality, Precipitation of Wettest Quarter, Precipitation of Driest Quarter, Precipitation of Warmest Quarter, Precipitation of Coldest Quarter, Minimum Temperature, Maximum Temperature, Average Temperature, Precipitation, Vapor Pressure, Wind Speed, Solar Radiation, Surface Soil Moisture, Daytime Land Surface Temperature, Nighttime Land Surface Temperature, Evapotranspiration, Potential Evapotranspiration and Normalized Difference Snow Index
Organism	54	Crop Types, Crop Intensity, the average and variance of Normalized Difference Vegetation Index, Enhanced Vegetation Index, Differenced Vegetation Index, Soil Adjusted Vegetation Index, Green Atmospherically Resistant Vegetation Index, Canopy Index, Ratio Vegetation Index, Normalized Difference Red/Green Redness Index, Normalized Difference Water Index, Gross Primary Production, Net Primary Productivity, Fraction Of Photosynthetically Active Radiation and Leaf Area Index in the crop period and the non-crop period
Relief	29	Elevation, Channel Network Distance, Channel Network Base Level, Valley Depth, Wind Exposition Index, Wind Shelter Index, Diurnal Anisotropic Heating, Terrain Wetness Index, Total Catchment Area, Closed Depressions, Flow Path Length, Flow Accumulation, Slope Length Factor, Slope Length, Positive Openness, Analytical Hillshading, Aspect, Downslope Curvature, Multiresolution Index Of Valley Bottom Flatness, Plan Curvature, Profile Curvature, Relative Slope Position, Slope, Terrain Ruggedness Index, Topographic Position Index, Upslope Curvature, Vector Terrain Ruggedness, Landform and Morphometric Feature
Position	10	Oblique Geographic Coordinates at 15°, 30°, 45°, 60°, 75°, 105°, 120°, 135°, 150° and 165°

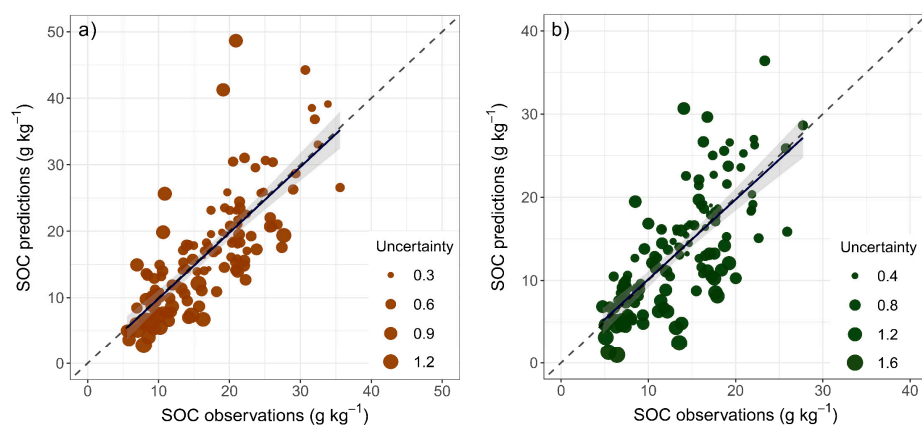


Figure S1. Scatter plot of SOC predictions (CV dataset) and SOC observations in (a) the plough layer and (b) the compacted layer.

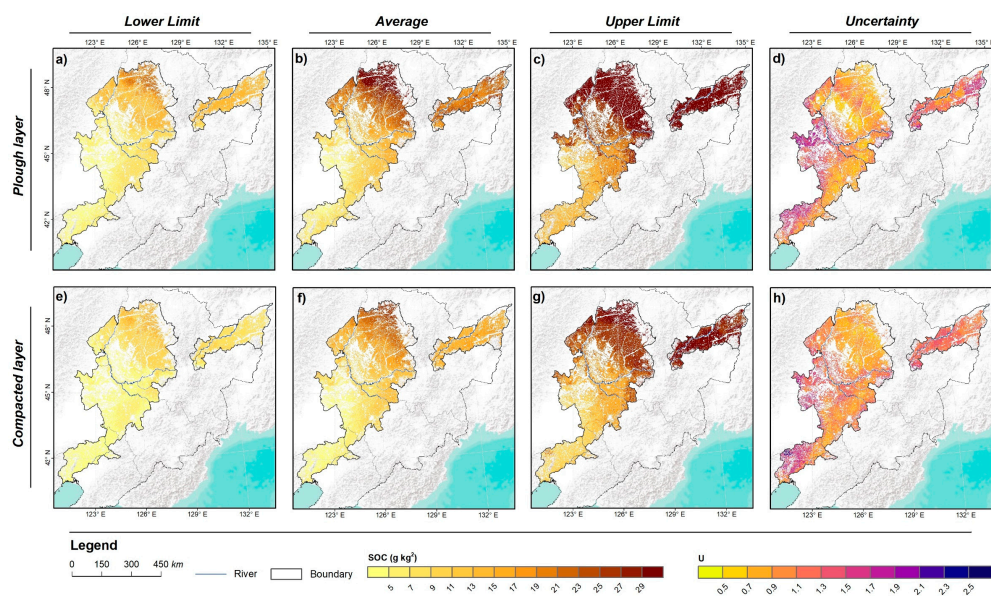


Figure S2. Spatial distribution pattern at 90 m spatial resolution of 5% quantile predictions (a and e), average predictions (b and f), 95% quantile predictions (c and g) and uncertainty (d and h) in the plough layer and the compacted layer.

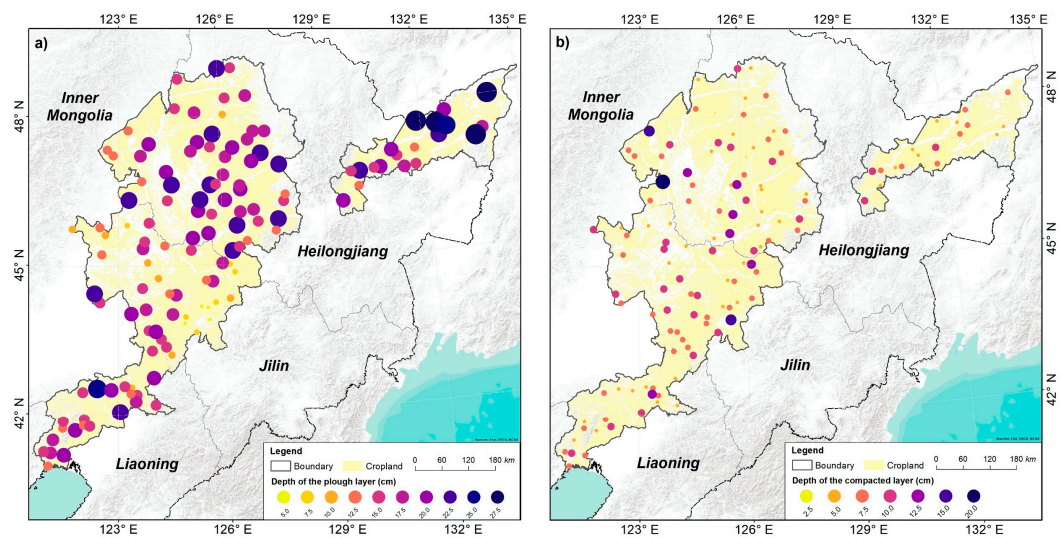


Figure S3. Spatial distribution of the thickness of (a) the plough layer and (b) the compacted layer.