Supplemental Materials

Table S1. Surface parameters used to calibrate the soil model parameters.

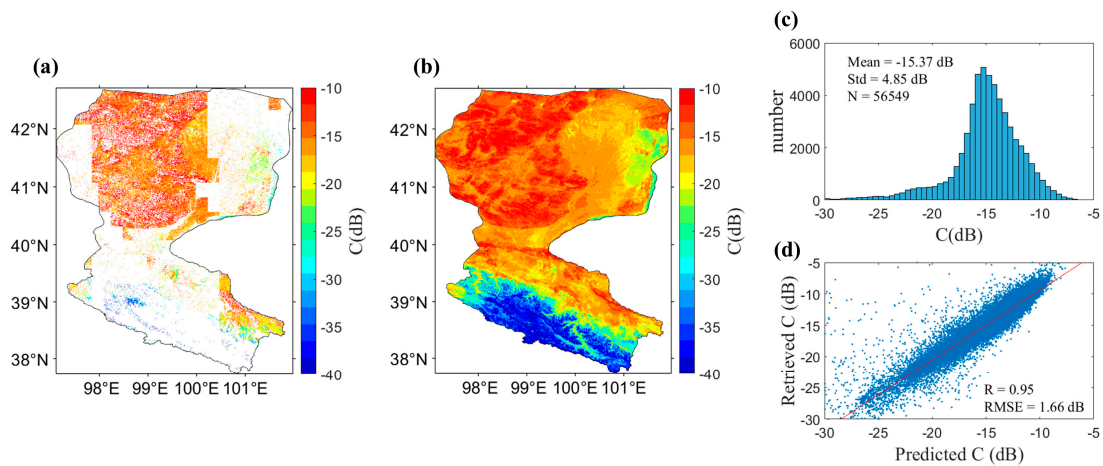| Type	Name	Description	Units
Soil Properties	C density	Organic carbon density	g/dm3
	C stock	Soil organic carbon stock	t/ha
	C content	Soil organic carbon content	dg/kg
	bulk density	Bulk density(fine earth)	cg/cm3
	clay	Clay content	g/kg
	coarse	Coarse fragments	cm3/dm3
	sand	Sand total	g/kg
	silt	Silt total	g/kg
	cation	Cation exchange capacity (at ph 7)	mmol(c)/kg
	N	Nitrogen	cg/kg
	PH	pH index measured in water solution	pH * 10
ST	ST_mean	Mean value of soil temperature	K
	ST_std	Standard deviation of soil temperature	K
	ST_cv	Coefficient of variance of soil temperature	/
Terrain Data	DEM mean	Mean value of elevation	M
	DEM std	Standard deviation of elevation	M
	DEM cv	Coefficient of variance of elevation	/
	slope	Surface gradient	Degree
	TSC	Measure of surface upwards convexity	/
	TST	Terrain surface texture	/
	TRI	Terrain ruggedness index	/
	PlanCur	Contour curvature	/
	ProfCur	Slope profile curvature	/

Figure S1. The computation results of the C values in 2019. (a) Map of the retrieved soil parameter; (b) Map of the RF predicted C soil parameter; (c) histograms of the retrieved C and (d) scatterplot
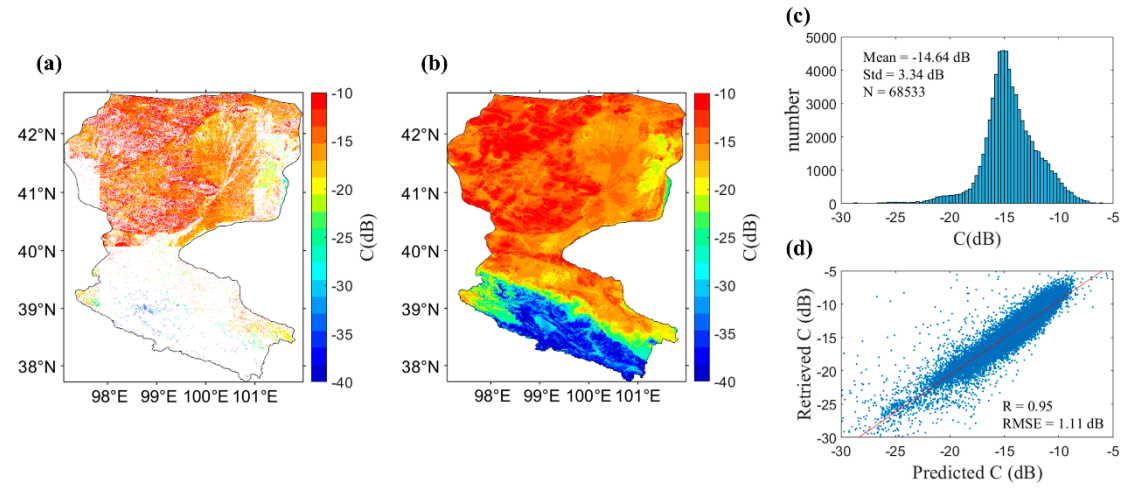
between the retrieved and RF predicted values for C value.

Figure S2. The computation results of the C values in 2020. (a) Map of the retrieved soil parameter; (b) Map of the RF predicted C soil parameter; (c) histograms of the retrieved C and (d) scatterplot between the retrieved and RF predicted values for C value.
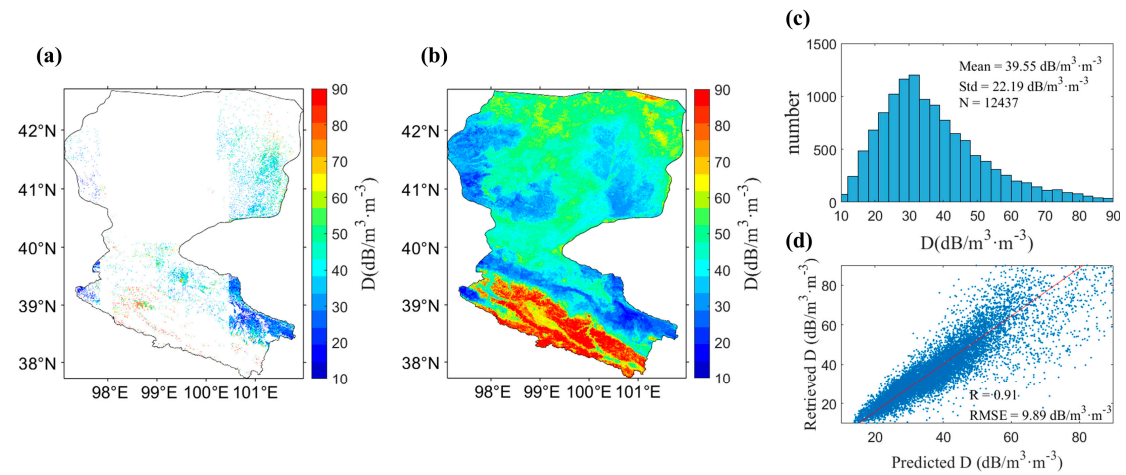

Figure S3. The computation results of the D values in 2019. (a) Map of the retrieved D soil parameter; (b) Map of the RF predicted D soil parameter; (c) histogram of the retrieved D and (d) scatterplot between the retrieved and RF predicted values for D value.
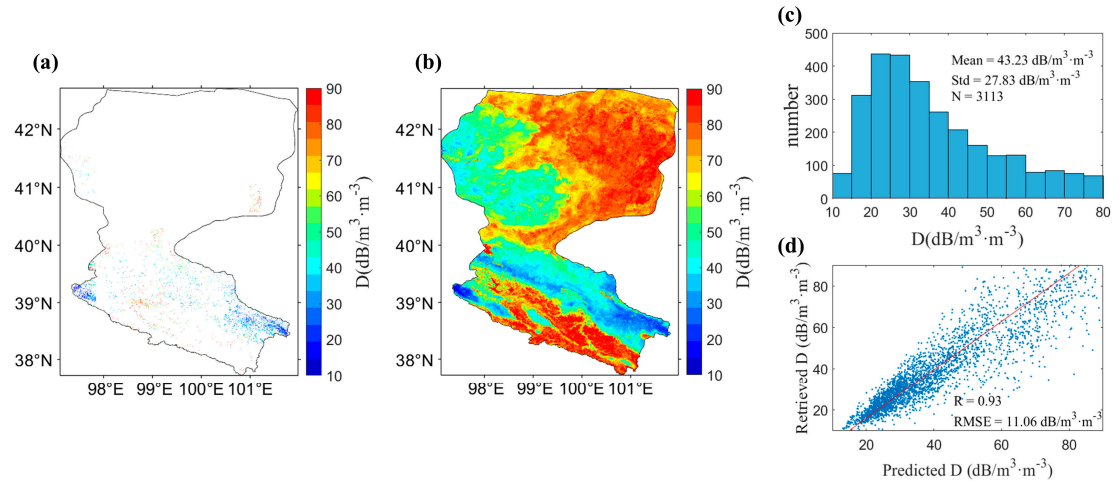
Figure S4. The computation results of the *D* values in 2020. (a) Map of the retrieved *D* soil parameter; (b) Map of the RF predicted *D* soil parameter; (c) histogram of the retrieved *D* and (d) scatterplot between the retrieved and RF predicted values for *D* value.