



Supplementary material

Table S1. Description of selected topography and RS indices.

Environmental variables	Source	Definition	Description/Formula
Topographic	DEM	Channel Network Base Level	Interpolation of the height of waterway networks relative to the base level
		Watershed Basins	The area of land where surface water converges to the same lower elevation base point
		Valley Depth	Is a difference between the elevation and an interpolated ridge level
		Diffuse Insolation	It is the component of solar radiation that is scattered and reflected by the atmosphere, clouds, and other surfaces before reaching the target area.
RS indices	Landsat 8 images	Standardized Height	$\text{Sqrt}((1/n) \sum ((z_i - z_{\text{mean}})^2))$
		Normalized Ratio Vegetation Index	$[(R/NIR) - 1]/(R/NIR + 1)$
		Greenness	$[(-0.2884 \times (\text{Blue}) - 0.2435 \times (\text{Green}) - 0.5436 \times (R) + 0.7243 \times (NIR) + 0.840 (\text{SWIR1}) - 0.1800 \times (\text{SWIR2}))]$
		Difference Vegetation Index	$NIR - R$
		Soil Adjusted Vegetation Index	$[(NIR - R)/(NIR + R)] (1 + S)$
		Transformed Vegetation Index	$[(NIR - R)/(NIR + R) + 0.5]^{0.5}$

n: the number of cells in the analysis area, Z_i : the elevation of each cell, Z_{mean} : the mean elevation of all cells in the analysis area, and sum denotes the summation over all cells. R = RED is band 4 of the Landsat 8 image, NIR: near-infrared is band 5 of the Landsat 8 image, Blue is band 2 of the Landsat 8 image, Green is band 3 of the Landsat 8 image, SWIR1: short wave near infrared is band 6 of Landsat 8 image, and SWIR2: short wave near infrared is band 7 of Landsat 8 image. S: the soil line slope is usually equal to 0.50.

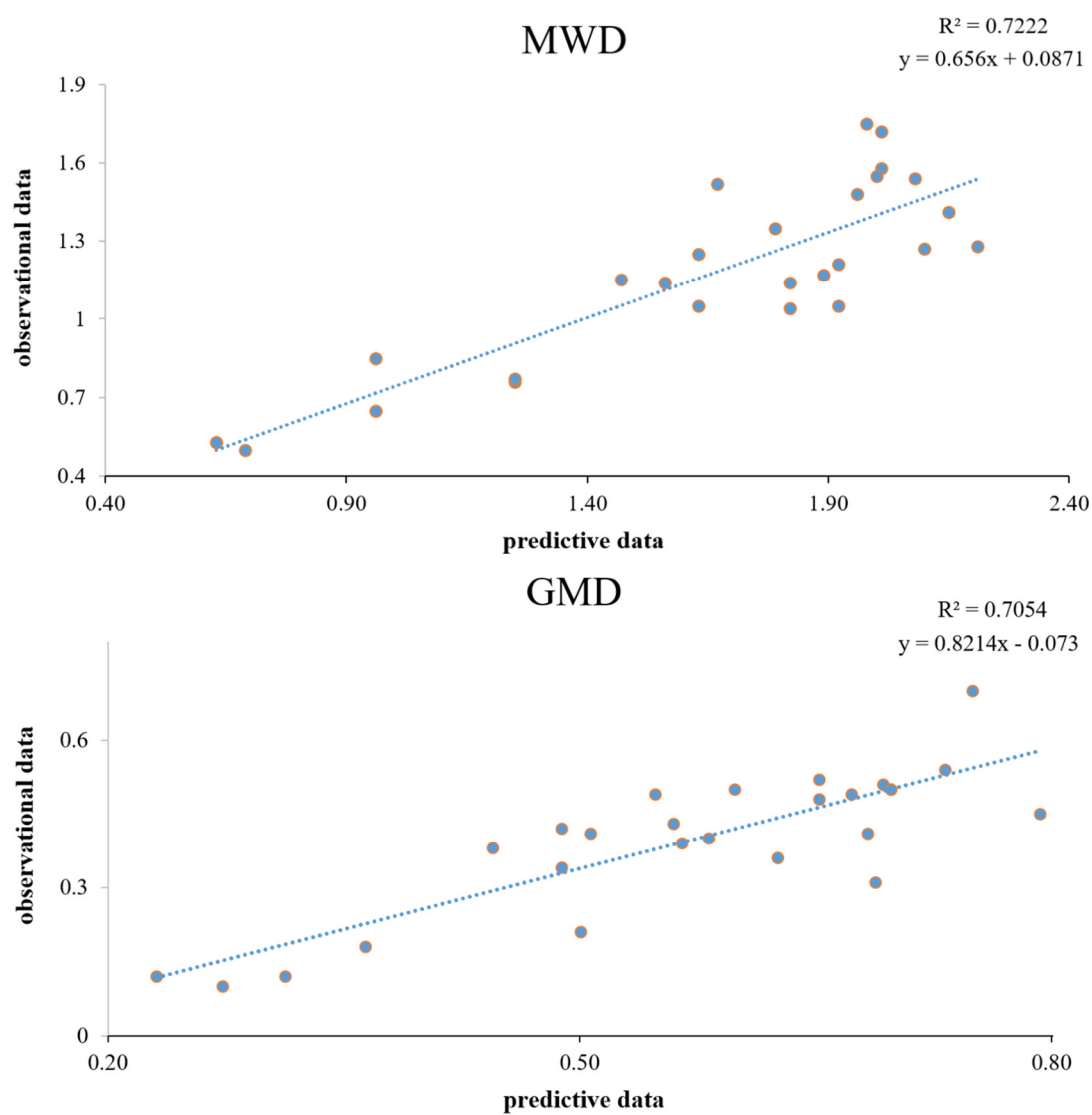


Figure S1. Scatter plot for a) MWD and b) GMD based on best model (RF) and best scenario (S1).

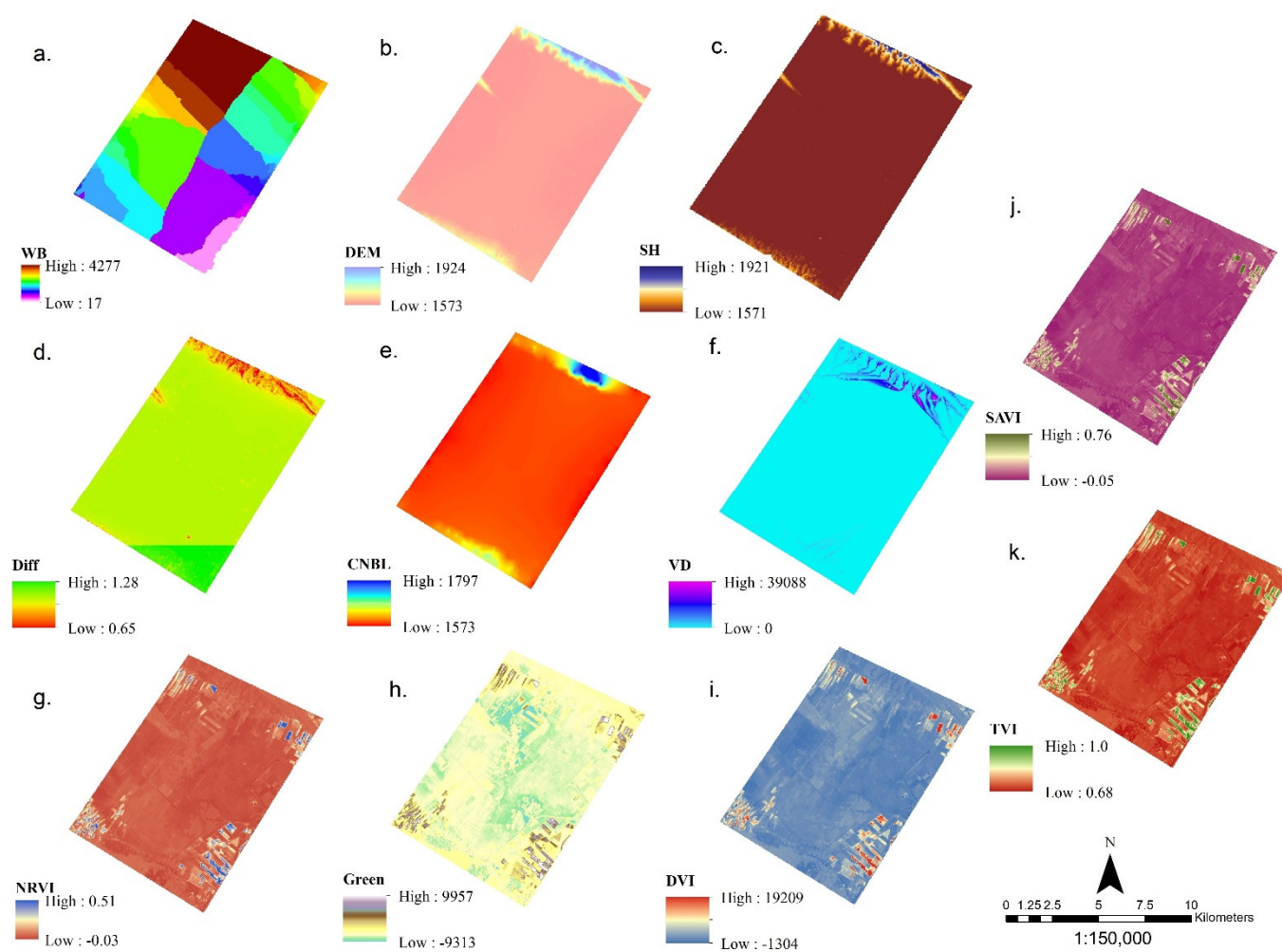


Figure S2. Map of Environmental variables.

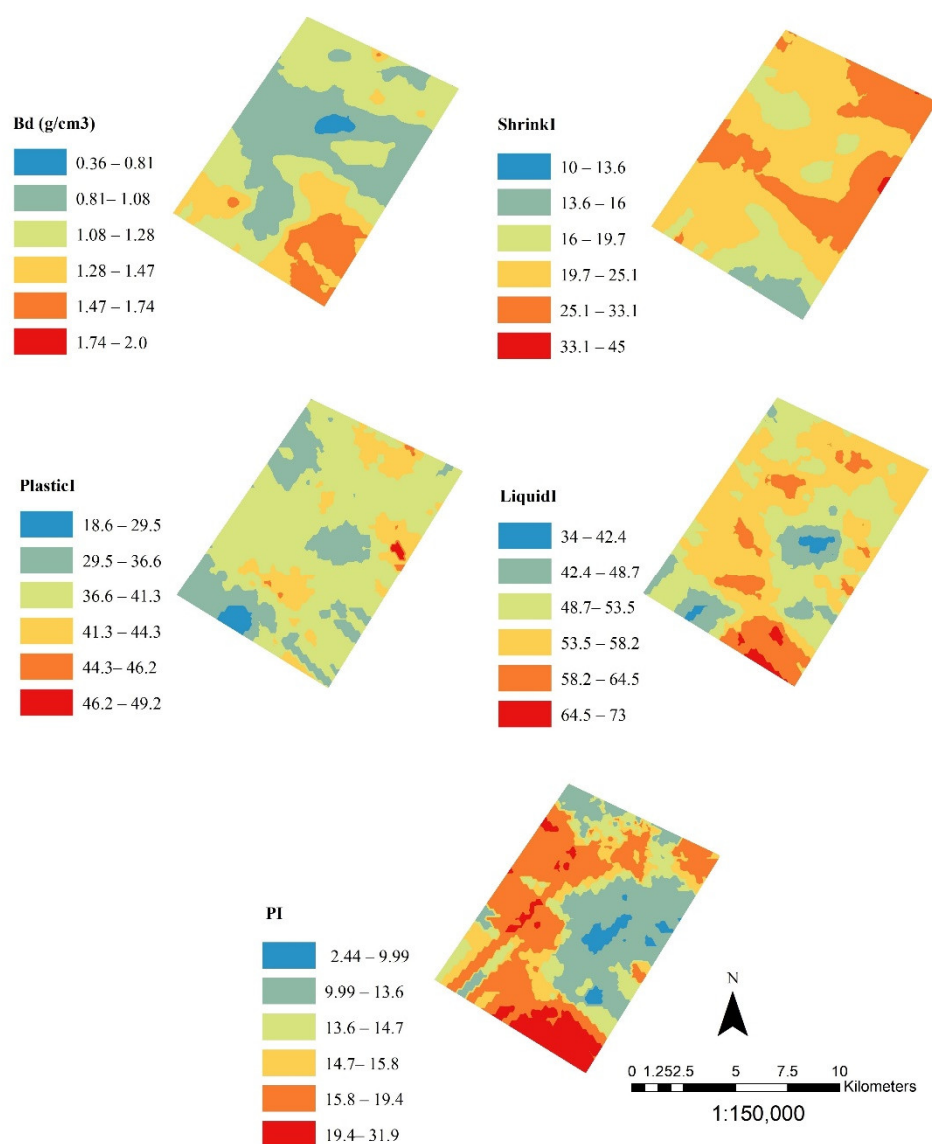


Figure S3. Map of soil variables.

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