

INTERPOLATION by NTUA



GEO-ACADEMY
GEO-Hub for teachers in Europe



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Interpolation

- Data refer to true or conceptual points called control points
- Interpolation uses measurements that we have made about some phenomenon at these points to make a prediction about that phenomenon at other locations where we have not made measurements.
- Interpolation is used to position the isarithms

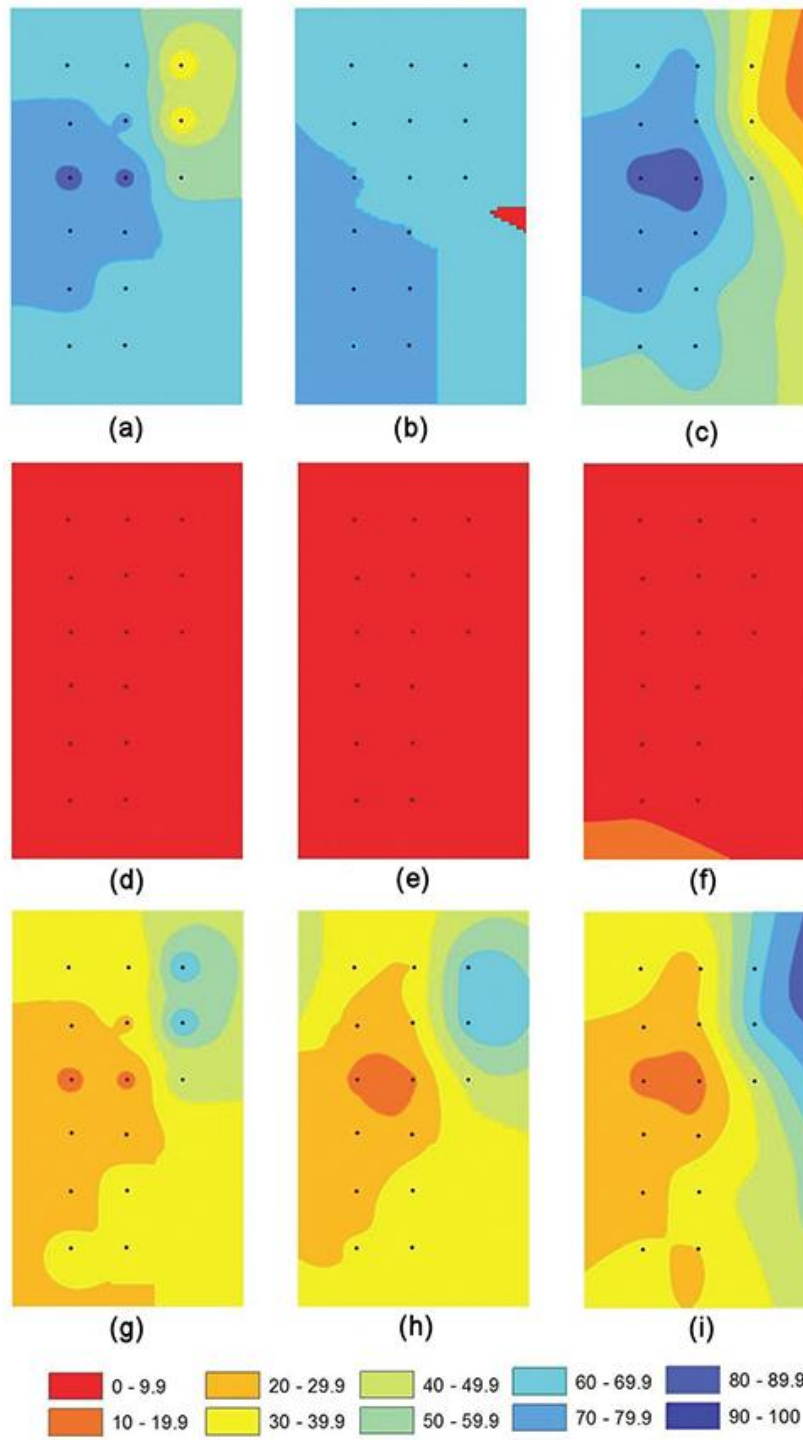
Interpolation methods

Triangulation fits a set of triangles to control points and performs interpolation along the edges of these triangles

Inverse-distance lays a grid over control points and estimates values at each grid point as a function of its distance from control points; then performs interpolation between control points

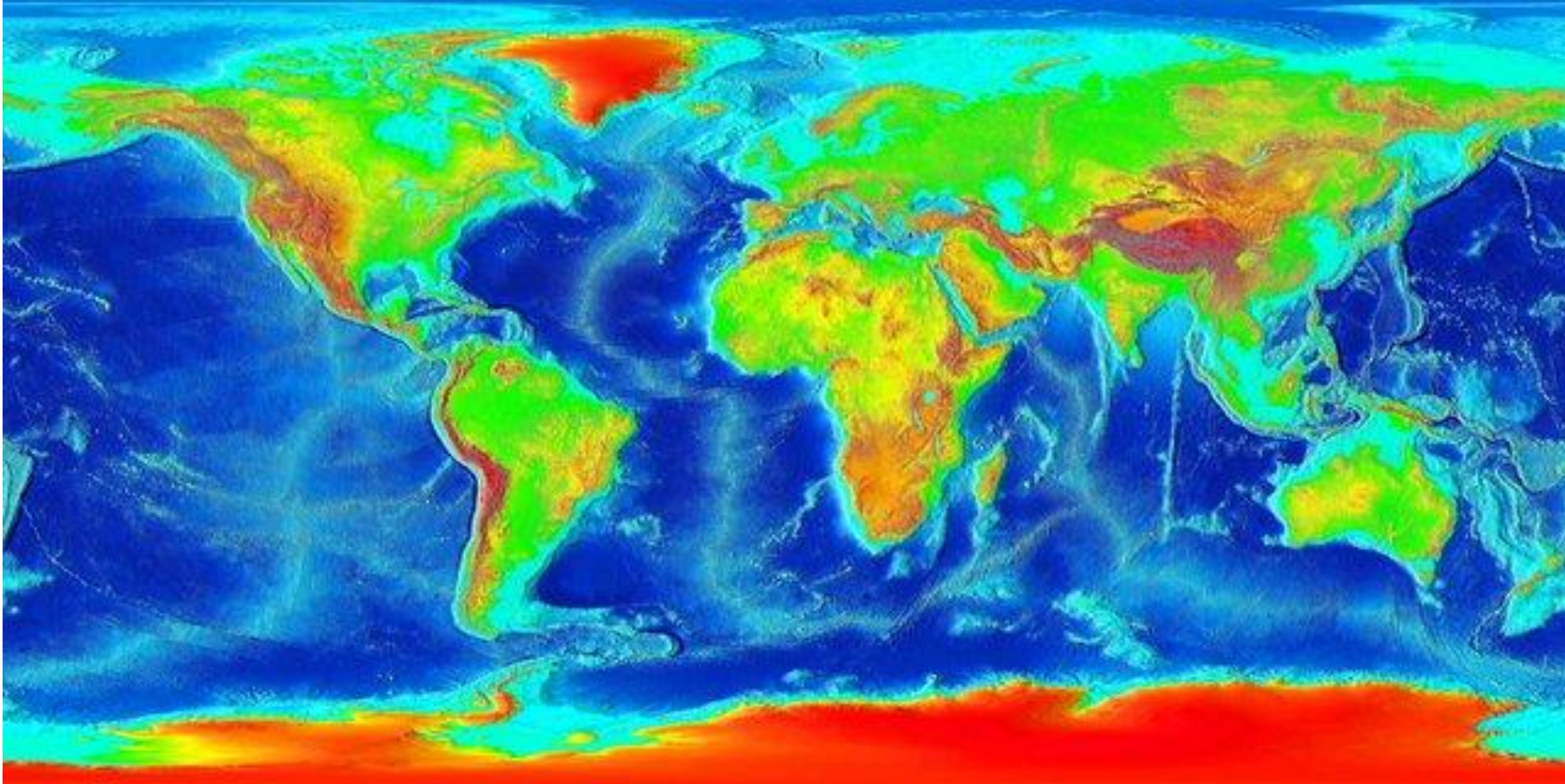
Kriging is an advanced geostatistical procedure that generates an estimated surface from a scattered set of points with z-values; considers the spatial autocorrelation in the data

Spline estimates values using a mathematical function that minimizes overall surface curvature, resulting in a smooth surface that passes exactly through the input points.



Nine interpolated surfaces for percentage vegetation, impervious surface, and soil, created by IDW, kriging, and spline spatial interpolation methods, respectively. (a) Veg: idw; (b) Veg: kriging; (c) Veg: spline; (d) Imp: idw; (e) Imp: kriging; (f) Imp: spline; (g) Soil: idw; (h) Soil: kriging; (i) Soil: spline.

Yi-Hwa (Eva) Wu and Ming-Chih Hung (2016). Comparison of Spatial Interpolation Techniques Using Visualization and Quantitative Assessment, Applications of Spatial Statistics, Ming-Chih Hung, IntechOpen, DOI: 10.5772/65996. Available from: <https://www.intechopen.com/books/applications-of-spatial-statistics/comparison-of-spatial-interpolation-techniques-using-visualization-and-quantitative-assessment>, Creative Commons Attribution License

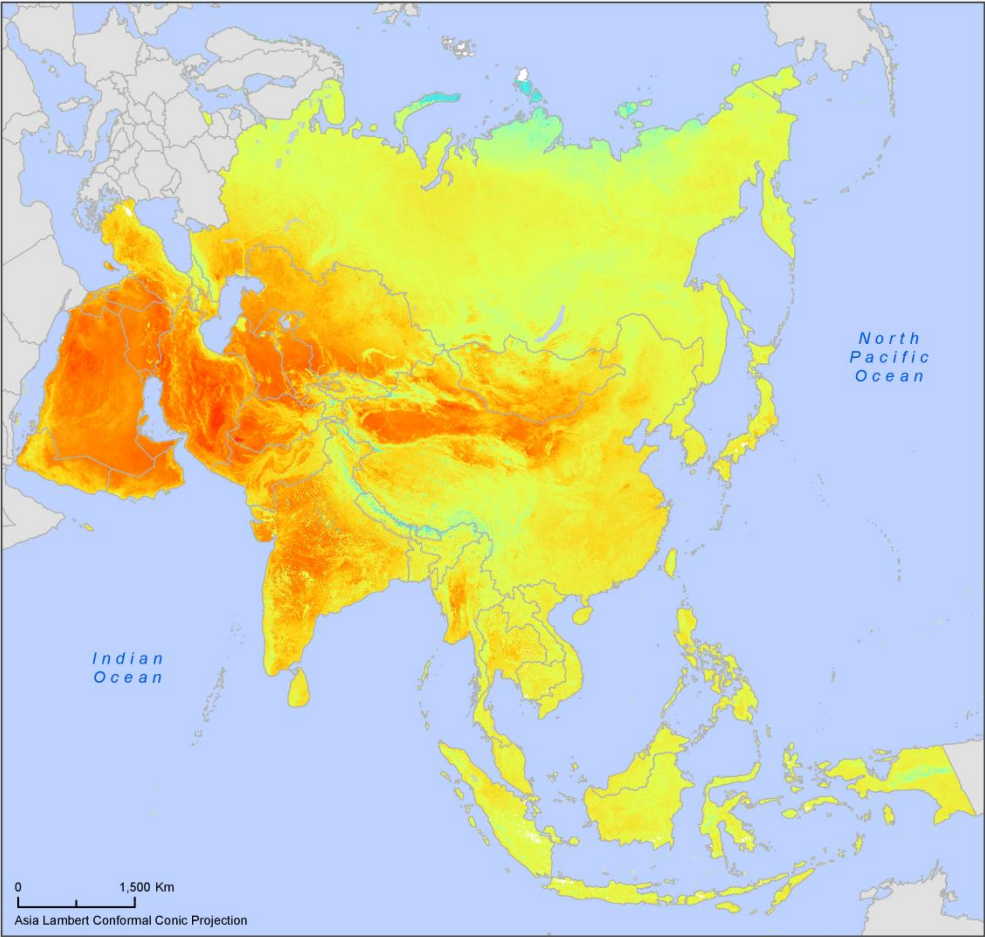


Global Land & Undersea Elevation - Surface symbols used to depict qualitative variations; hue used as a primary visual variable to represent qualitative variations described by an ordinal ratio scale.

Image Source: commons.wikimedia.org (Public Domain Author: U.S. Government)

Summer Daytime Maximum Land Surface Temperature (LST), 2013: Asia

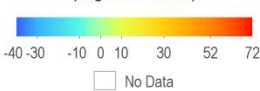
Satellite-Derived Environmental Indicators



Map Credit: CIESIN Columbia University, February 2016.

The Global Summer Land Surface Temperature (LST) Grids, 2013, part of the Satellite-Derived Environmental Indicators collection, estimate daytime (1:30 p.m.) maximum temperature and nighttime (1:30 a.m.) minimum temperature in degrees Celsius at a spatial resolution of ~1km during summer months of the northern and southern hemispheres for the year 2013. The LST grids are produced using the Aqua Level-3 Moderate Resolution Imaging Spectroradiometer (MODIS) Version 5 global daytime and nighttime LST 8-day composite data product (MYD11A2).

Daytime Maximum Temperature
(degrees Celsius)



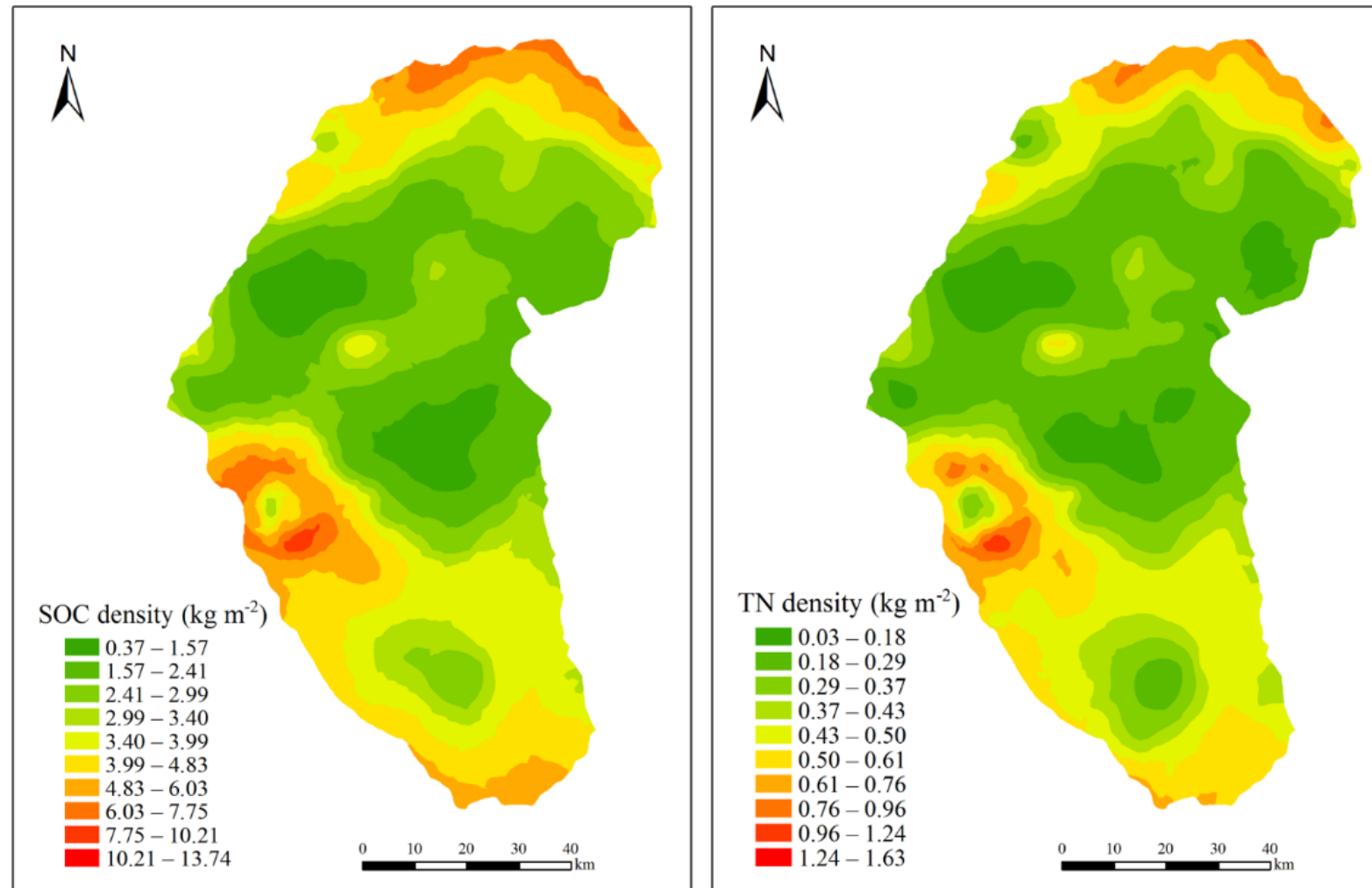
Center for International Earth
Science Information Network
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Data Source: Center for International Earth Science Information Network - CIESIN - Columbia University, 2016. Global Summer Land Surface Temperature (LST) Grids, 2013. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). <http://dx.doi.org/10.7927/H408638T>.

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Interpolated distributions (by simple kriging) of the soil organic carbon (SOC) and total nitrogen (TN) densities to a depth of 100 cm in Naiman Banner.

Wang X, Li Y, Chen Y, Lian J, Luo Y, Niu Y, et al. (2018) Spatial pattern of soil organic carbon and total nitrogen, and analysis of related factors in an agro-pastoral zone in Northern China. PLoS ONE 13(5): e0197451. <https://doi.org/10.1371/journal.pone.0197451>, [Creative Commons Attribution License](#),