
Resampling SRTM 3"-data with kriging

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Summary. SRTM data is distributed at horizontal resolution of 1arcsec (aprox. 30m) for areas within the USA and at 3arcsec (aprox. 90m) resolution for the rest of the world. A resolution of 90m can be considered suitable for small or medium-scale analysis, but it is too coarse for more detailed purposes. One alternative is to interpolate the SRTM data at a finer resolution; it won't increase the level of detail of the original DEM, but it will lead to a surface where there is coherence of angular properties (i.e., slope, aspect) between neighbouring pixels, an important characteristic when dealing with terrain analysis. This work intends to show how the proper adjustment of variogram and kriging parameters, namely the nugget effect and the maximum distance within which values are used in interpolation, can be set to achieve quality results on resampling SRTM data from 3arcsec to 1arcsec. The basic points of using kriging to interpolate terrain data are:

- Work only with the immediate neighbourhood of the predicted point, due the high spatial correlation of the topographic surface and omnidirectional behaviour of variogram in short distances;
- Add a very small random variation to the coordinates of the points prior to interpolation;
- Use a small value of nugget effect, to avoid smoothing that can obliterate terrain features; in our tests, a value of $10m^2$ was sufficient to eliminate noise.

Keywords: SRTM; DEM; kriging; geostatistics; nugget value; variogram; interpolation.