



meteo: package for automated spatio-temporal mapping

Milan Kilibarda, Branislav Bajat, and Aleksabder Sekulic

University of Belgrade, Faculty of Civil Engineering, Department of Geodesy and Geoinformatics, Belgrade, Serbia

Global spatio-temporal variograms and regression models described by Kilibarda et al. (2014) are stored in the meteo R package for the purpose of automated mapping of daily temperatures at 1 km/ 1 day resolution.

This article describes the R package meteo that is still under development. The package provides functionalities for the automated mapping of meteorological observations using spatio-temporal regression kriging. The automated spatio-temporal kriging interpolation procedure is a data driven approach designed for mapping with little or no human interaction. Currently, automated mapping with the meteo package can be decomposed in chunks:

1. defining input observations and covariates;
2. use of pre-calculated global models;
3. detecting and/or removing outliers;
4. creation of final prediction (and its export to GIS formats);
5. cartographic visualisation of results and/or creation of web maps (e.g. by using R package plotGoogleMaps (Kilibarda and Bajat 2012) for automatic creation of interactive web maps).

In addition, meteo offers the possibility of using user defined covariates, regressions and variograms; thereby giving more flexibility of using the package in a semi-automated approach.

The presented mapping framework enables the use of spatio-temporal regression kriging for meteorological mapping. The implementation of the fast searching algorithm provides an advantage in computing when completing interpolations over a large spatio-temporal grid. The advantage is especially noticeable in case of the grids containing longer time series (e.g. predictions made for the area of interpolation over a year period where each location contains around 365 observations).

References

- Kilibarda, M. and Bajat, B., 2012, plotgooglemaps: The R-based web-mapping tool for thematic spatial data, *Geomatica*, 66(1):37–49.
- Kilibarda, M., T. Hengl, G. B. M. Heuvelink, B. Gräler, E. Pebesma, M. Perčec Tadić, and B. Bajat, 2014, Spatio-temporal interpolation of daily temperatures for global land areas at 1 km resolution, *Journal of Geophysical Research: Atmospheres*, 119, 2294–2313.