



Rtop – an R package for interpolation of data with a variable spatial support - examples from river networks

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Geostatistical methods have been applied only to a limited extent for spatial interpolation in applications where the observations have an irregular support, such as runoff characteristics or population health data. Several studies have shown the potential of such methods (Gottschalk 1993, Sauquet et al. 2000, Gottschalk et al. 2006, Skøien et al. 2006, Goovaerts 2008), but these developments have so far not led to easily accessible, versatile, easy to apply and open source software. Based on the top-kriging approach suggested by Skøien et al. (2006), we will here present the package rtop, which has been implemented in the statistical environment R (R Core Team 2012). Taking advantage of the existing methods in R for analysis of spatial objects (Bivand et al. 2008), and the extensive possibilities for visualizing the results, rtop makes it easy to apply geostatistical interpolation methods when observations have a non-point spatial support.

Although the package is flexible regarding data input, the main application so far has been for interpolation along river networks. We will present some examples showing how the package can easily be used for such interpolation. The model will soon be uploaded to CRAN, but is in the meantime also available from R-forge and can be installed by:

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> install.packages("rtop", repos="http://R-Forge.R-project.org")
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Bivand, R.S., Pebesma, E.J. & Gómez-Rubio, V., 2008. Applied spatial data analysis with r: Springer.

Goovaerts, P., 2008. Kriging and semivariogram deconvolution in the presence of irregular geographical units. Mathematical Geosciences, 40 (1), 101-128.

Gottschalk, L., 1993. Interpolation of runoff applying objective methods. Stochastic Hydrology and Hydraulics, 7, 269-281.

Gottschalk, L., Krasovskaia, I., Leblois, E. & Sauquet, E., 2006. Mapping mean and variance of runoff in a river basin. Hydrology and Earth System Sciences, 10, 469-484.

R Core Team, 2012. R: A language and environment for statistical computing. Vienna, Austria, ISBN 3-900051-07-0.

Sauquet, E., Gottschalk, L. & Leblois, E., 2000. Mapping average annual runoff: A hierarchical approach applying a stochastic interpolation scheme. Hydrological Sciences Journal, 45 (6), 799-815.

Skøien, J.O., Merz, R. & Blöschl, G., 2006. Top-kriging - geostatistics on stream networks. Hydrology and Earth System Sciences, 10, 277-287.