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# An R Package for the Distributed Hydrological Model GEOtop

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## Abstract

Eco-hydrological models are increasingly used in the contexts of hydrology, ecology, precision agriculture for better management of water resources and climate change impact studies at various scales: local, hillslope or watershed scale. However, with increasing computing power and observations available, bigger and bigger amounts of raw data are produced. Therefore, the need to develop flexible and user-oriented interfaces to visualize and analyze multiple outputs, e.g. performing sensitivity analyses, comparing and optimizing against observations (for specific research) or extraction of information (for data science), emerges. We present here the R open-source package **geotopbricks** (<https://CRAN.R-project.org/package=geotopbricks>), which offers an I/O interface and R visualization and optimization tools for the GEOtop hydrological distributed model (<https://www.geotop.org> - GNU General Public License v3.0). This package aims to be a link between the work of environmental engineers, who develop hydrological models, and the ones of data and applied scientists, who can extract information from the model results. Applications related to the simulation of water cycle dynamics (model calibration, mapping, data visualization) in some alpine basins are shown.

**Keywords:** Hydrology, Environment, Environmetrics, Climate, Weather, Model, Topography, Water, Time Series, Snow, GeoComputation, Terrain, GeoSpatial, Spatio, Temporal

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