

# **An integrated procedure for the production of solar radiation maps coupling GIS and geostatistical techniques**

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## **Abstract**

Many ecological and hydrological processes depend on solar radiation at the ground level. Measurements at ground stations are often available, even for long time series, and are used as input for spatial interpolation models to produce continuous maps of solar radiation. The aim of this work is to evaluate the results of different interpolation approaches through comparison both with ground measures, not included in the input dataset, and the output of the GRASS module "r.sun". The developed procedure integrates GRASS capabilities and statistical analyses performed using R. As first step the output of "r.sun" is tuned/calibrated against GCP measurements and then used to validate interpolated values. The statistical analyses are performed with taking into account also local geomorphologic features as quantities correlated to the solar radiation value.

The analysis is performed at different spatial and time scales to evaluate how resolution affects the results.

Accuracy maps are produced and a brief analysis is also performed to check if some significant correlation is present between geomorphological features and biggest/smallest errors.

The solar radiation measurements analyzed in this work refer to a zone of the Italian Trentino-Alto Adige region located in the South-East part of the Alpine arc.