Air temperature gradient in the Romanian Carpathians derived from satellite images

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In the recent years, the scientific and the economic interest in the development of the Romanian Carpathians is constantly growing. The climatic research of the area is basically supported by interpolation of data provided by a limited number of weather stations. In order to solve the climate-related issues in areas with a small number of weather stations, satellite images may add valuable information. They may improve both the accuracy and the spatial extension of the data, so that the results become more trustful.

Eventually, for a given location and for a given moment, one may have the air temperature obtained from a ground-based weather station and the surface temperature obtained from satellite images. A statistical relationship between the two data can be easily reclaimed (Vogt, 2003). Further, this relationship can be used in interpolations, making possible the retrieving of air temperature in locations with no weather stations established can be retrieved.

This paper aims at calculating the air temperature gradient in the Romanian Carpathians derived from MODIS images. We have used the product MOD11_L2, respectively daily images, selected according to their quality, and covering the interval 2000-2006. The study focusses on the month of July, and the gradient was calculated for both day and night situations. The altitude was derived form the Processed SRTM 90 m Digital Elevation Data (DEM).

The gradient was calculated based on linear and logarithmic trend, and it was compared with values obtained from ground weather stations.

The results might be used in forestry and land planning, with a significant societal impact in the mountaineous areas.