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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Spatial distribution of solar erythemal UV radiation over Poland

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The solar ultraviolet (UV) radiation contributes only about 8-9% of the total solar radiation energy at the Earth's surface but it is the most biologically effective part of the electromagnetic spectrum. It has a positive influence on both human health and natural environment but it may also be very harmful if UV exposure exceeds "safe" limits.

Knowledge about the spatial distribution of the biologically effective solar UV dozes seems to be very important for decision making towards sustainable development. A large set of maps depicting spatial variability of erythemal UV radiation over Europe was created within COST Action 726 – 'Long term changes and climatology of UV radiation over Europe'. Unfortunately the COST-726 maps are not sufficiently accurate to unambiguously identify regions and time periods of biologically effective solar UV energy surplus or deficit over Poland because of very poor spatial resolution.

The main objective of this study is to generate reliable maps in order to assess the spatial distribution of different solar erythemal UV radiation characteristics over Poland. As the broadband UV measurement network in Poland is very sparse, erythemaly weighted UV radiation data reconstructed from homogeneous global solar radiation records were used to create isopleth maps. The empirical model developed in Centre of Aerology (Institute of Meteorology and Water Management) in Legionowo made it possible to reconstruct hourly erythemal UV doses for 21 solar radiation measurement stations in the period 1985 – 2009. Regression kriging was applied to interpolate the discrete data samples. GIS was used for data processing and visualization.

The mapping procedure as well as evaluation of the spatial pattern of solar erythemal UV radiation over Poland in the last 25 year based on created maps will be presented.