Controlling sunbathing safety during the summer holidays – the solar UV campaign at Baltic Sea coast in 2015

Jakub Guzikowski, Agnieszka Czerwińska, and Janusz W. Krzyścin

Institute of Geophysics PAS, Atmospheric Physics, Warsaw, Poland (jguzikowski@igf.edu.pl)

Information regarding the intensity of surface UV radiation, provided for the public, is frequently given in terms of a daily maximum UV Index (UVI), based on a prognostic model. The quality of the UV forecast depends on the accuracy of column amount of ozone and cloudiness prediction. Daily variability of UVI is needed to determine the risk of the UV overexposure during outdoor activities. Various methods of estimating the temporary UVI and the maximum duration of UV exposures (received a dose equal to minimal erythemal dose – MED), at the site of sunbathing, were compared. The UV indices were obtained during a field experiment at the Baltic Sea coast in the period from 13th to 24th July 2015. The following UVI calculation models were considered: UVI measurements by simple hand-held biometers (Silver Crest, Oregon Scientific, or more advanced Solarmeter 6.5), our smartphone models based on cloud cover observations at the site and the cloudless-sky UVI forecast (available for any site for smartphone users) or measured UVI, and the 24 h weather predictions by the ensemble set of 10 models (with various cloud parameterizations). The direct UV measurements, even by a simple biometer, provided useful UVI estimates. The smartphone applications yielded a good agreement with the UV measurements. For app "smart1" the correlation coefficient for all-sky conditions was 0.86, for clouded-sky 0.7. Underestimation of UVI could pose a risk for user, thus this led to the calculation of the percentage of possibly dangerous cases (PrUVI). For "smart 1" PrUVI =15.52% for all-sky and PrUVI=27.78% for cloudy-sky. The weather prediction ensemble system for cloudless-sky conditions could provide valuable information if almost cloudless-sky conditions (cloudless-sky or slightly scattered clouds) were observed at the sunbathing site. The best value of correlation coefficient for ensemble model was obtained for ens1 0.56, the worst 0.45 for ens5. PrUVI values for the cases based on the WRF predictions were similar (from ∼50 to 60%).