

Modeling of solar UV reaching ground level for the purpose of the antipsoriatic climatotherapy in Poland

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Nowadays, the forecasting of surface UV radiation is focusing on the erythema and vitamin D3 effects of solar radiation. UV index, i.e. the daily maximum of the erythema irradiance, for the next-day has been routinely calculated in many countries by NWS. The forecast of UV radiation may be also used in the antipsoriatic heliotherapy planning. We build a novel forecasting model to provide an optimal starting time and duration of the next-day antipsoriatic sunbathing, which has the same healing potential as a single medical cabinet session with typical phototherapy exposure of 1J/cm² (unweighted) by TL01 fluorescent tubes with the UV spectrum 311 nm +/- 1 nm. The model uses the 24 h forecast of the column amount of ozone (to predict next day clear sky UV irradiance), and low- and mid-level cloudiness (to estimate a reduction of the clear-sky UV irradiation due to clouds). The predicted duration of sunbathing equivalent to the cabinet dose of 1 J/cm² matches the observed value, i.e. the correlation coefficients is 0.68. If the model predicts the antipsoriatic exposure over 1 J/cm² threshold the observed dose will be also above this threshold in 91% of cases. Hourly resolved maps, starting from 6 am up to 1 pm (GMT), showing the duration of antipsoriatic exposure over Poland are made public. The duration of antipsoriatic heliotherapy is usually much longer than that required for an appearance of solar erythema. Thus, the patients should undergo special photoadaptation procedure starting with the erythema exposure below his personal MED value and ending after a few days with exposure of 3-4 MED.