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различных задач рассмотрены предварительные результаты привлечения спутниковой информации путем сопоставления ее с данными наблюдений.

The possibility of joint use of solar radiation sums obtained by different methods in basic researches of radiation climate

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To use the actinometric observations in basic studies of the radiation climate and to assess its changes and solar energy resources, it is necessary to have a sufficiently dense network of actinometric stations and the unity of the methods for calculating the sums of radiation at each station to ensure their comparability. It is known, that the Russian actinometric network is quite rare and is characterized by extreme unevenness. In addition, there is a inhomogeneity of the daily (and, respectively, monthly) radiation amounts due to different methods of obtaining them – by the recorders and observations into standard actinometric time intervals (by the trapezium method). All this makes highly urgent the research of the possibility of joint use of the heterogeneous (by the method of calculating the sums) actinometric network data for solving various scientific and applied problems.

The purpose of this work is to consider the possibility of extending of the solar radiation series and filling the gaps in observations without disrupting their homogeneity, using parallel observations on recorders and into actinometric time intervals. It will allow to calculate reliable values of "norms" for the periods 1961–1990, 1971–2000 and 1981–2000, which are accepted as basic in modern climate studies. In order to increase the spatial density of observations of solar radiation for solving various problems, the preliminary results of the satellite information using are considered by comparing it with the observational data.

Empirical dependences between global UV and global solar irradiances obtained from the multiyear direct observations at the ARG station, Kishinev (Moldova)

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The aim of the research is to derive a simple relationships between the broadband components of global UV(-B, -A, erythemal) irradiance and global shortwave (SW) solar irradiance onto the horizontal plane from direct observations at the ground-based station. Radiometric sensor CM-11 (200–3000 nm) was used to measure global SW solar irradiance E_{SW}. Two sensors of UV-S-B-C (280–315 nm) type and one sensor of UV-S-A-C (315–400 nm) type were used to measure global UV-B and UV-A solar irradiances: E_{UVB} and E_{UVA}. Erythemal irradiance E_{UVery} was derived from UV-B irradiance by using of the lookup tables with the pre-calculated adjustment factors after the calibration at the Kipp&Zonen. These factors were computed as convolutions between the UV spectral response function for each of sensors and CIE 1987 Erythemally weighting spectral function for the set of zenith angles and total ozone content values. We shall deal with time-series of the daily mean values of UV and SW solar irradiances, which are designated as $\langle E \rangle_d$. Cloud conditions are also taken into account: two datasets are generated for cloud-free (CF) and for all-sky (AS) conditions, respectively. Time-series of daily mean values of UV and SW solar irradiances is composed of data obtained from of continuous observations in the course of period from 2004 to 2015.

The following power-type formula is used for approximation of the dependence between UV(in a different broadband subranges) and SW solar irradiances:

$Y = a X^b$, where $Y \in \{\langle E_{UVB}\rangle_d, \langle E_{UVA}\rangle_d, \langle E_{UVery}\rangle_d\}$ and $X \in \{\langle E_{SW}\rangle_d\}$.

Choice of this formula is also due to the fact that it satisfies the condition $Y = 0$ at $X = 0$. Parameters (a,b) of the applied power-type approximation for the time-series of observational data at all-sky and cloud-free conditions in the course of multi-year period (2004–2015) are presented below:

(AS) a=0.2275, b=0.7982, R^2=0.987 for UV-A;
a=0.0003876, b=1.2663, R^2=0.969 for UV-B;
a=0.0000684, b=1.2061, R^2=0.972 for UV_{ery};

(CF) a=0.1499, b=0.8662, R^2=0.973 for UV-A;
a=0.0000725, b=1.5510, R^2=0.961 for UV-B;
a=0.0000134, b=1.4826, R^2=0.961 for UV_{ery}.

All measurements were performed at the ground-based solar radiation monitoring station placed in an urban environment at the Institute of Applied Physics (IAP) of ASM, Kishinev, Moldova (47.001°N, 28.816°E), http://arg.phys.asm.md.