



ATMOSPHERIC POLLUTION EVALUATION IN BRASOV ROMANIA BASED ON TURBIDITY FACTOR ANALYSIS

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Abstract

Turbidity factor (T_R) varies from one geographic area to another according to the specific in-field conditions: site altitude, atmospheric pollution, water vapor and gasses in the air etc. Therefore the turbidity factor is a synthetic parameter that offers information on how much solar radiation is lost when passing through cloudless atmosphere and moreover it can be used to evaluate the atmospheric pollution on a given site.

To obtain a realistic and accurate T_R estimation for Brasov, Romania, the beam solar radiation values, registered by the Delta-T meteorological station, were modeled according to three stages of refinement, based on a method proposed by the German meteorological services (the considered meteorological database contains registrations for 2006 – 2009 interval).

For the first and second stages, were considered only the days with the highest and densest beam solar radiation values, registered on each month; accordingly, the daily mean solar radiation values and the correspondent T_R were calculated. Because the first stage results were inconsistent to the real situation, on the second stage were considered only the beam radiation registrations corresponding to a solar elevation above 20° ; still the results were inconsistent with reality. On the third stage, the single instantaneous maximum beam solar radiation value is considered, for each month, based on 2006 – 2009 database, and only for these twelve values is calculated the corresponding monthly T_R ; the consequently results are consistent to the in-field values. Moreover, based on the third stage's results, the optimum annual constant $T_R=3$ is identified for Brasov, Romania.

Key words: atmospheric pollution, beam solar radiation, turbidity factor (T_R)

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