

Influence of the biomass burning aerosols and of the determination methods of cloud cover in the reliability of estimates of solar irradiation in the surface obtained with the physical model BRAZIL-SR.

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This study aimed at the development, and evaluation of parameterizations for the cloud cover index and for the aerosols that are generated during biomass burned events. The specific objective was to improve the estimates of incident solar radiation in the surface obtained by the model BRASIL-SR.

Two techniques were proposed for the image composition of clear sky and cloudy sky used in the determination of the coefficients of effective cloud coverage: (1) bi-spectral analysis using images in the visible and infrared spectral range (IR/VIS Ratio) and, (2) statistics on the five smaller values of visible radiance (Smaller Average of 5). Differences of the order of 5% were observed among the deviations of the estimates of solar radiation obtained with the use of each one of the algorithms. In 70 percent of the cases the bi-spectral analysis reduced the deviations of incident solar radiation, while the use of the second algorithm reduced the deviations in less than 10 percent of the studied cases. The visual analysis of the composed images showed that the IR/VIS ratio algorithm presented larger efficiency in the pixels identification with persistent clear sky and/or cloudy sky conditions for more than 30 days.

This study showed that in conditions of clear sky, the mean systematic deviation error (MBE) of model estimates grows about 3 times and the value of root mean squared error (RMSE) duplicates for stations close to burned sites. The proximity of burned sites produces an increment of MBE of the same order of that produced by the presence of clouds. The technique of parameterization of the biomass burned aerosols assumed optic properties obtained with base in values obtained in two field missions: TRACE-A and SCAR-B, and with the use of "Global Aerosol Data Set". Several approaches were used for obtaining the input data in this parameterization. The estimates thus obtained presented smaller systematic deviations in all the stations used in the validation process. By adopting a composition of 5% of elementary carbon in the aerosols, the correlation among estimated and measured values for surface incident solar radiation grew about 2,5 times. Those studies showed that the improvements in cloud and aerosol parameterizations allowed for better estimates for the model. However, the improvements are still masked by limitation imposed by the availability of only tri-hourly image schedules for the GOES-8 satellite in Southern Hemisphere.

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