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Influence of biomass burning events on surface solar irradiation in Southern Brazil

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Currently, the Brazilian energy scenario is point out to an increase of solar and wind energy share in Brazilian energy matrix. Thus, it is necessary to improve knowledge on resource variability and the impact of climate and anthropic events on resource availability. This work analyzes the impact of aerosol plumes emitted by biomass burning events during dry season on the surface solar irradiation in central region of Rio Grande do Sul state in Brazilian Southern region. Aerosol particles in the atmosphere alter the surface's radiative balance, because they absorb and/or reflect solar radiation. For this purpose, this study used ground data acquired only in clear sky days in order to eliminate the uncertainties associated to cloud transmitance. The selection of clear sky days is done through the evaluation of global and diffuse solar radiation ground data. The global solar irradiation is measured by a pyranometer CM21 (Kipp & Zonen) and the diffuse radiation is measured by pyranometer CM22 (Kipp & Zonen) combined to a solar tracker avoid the direct radiation exposure of the sensor. The sensors are installed at the SONDA site identified as SMS (http://sonda.ccst.inpe.br/), located at the Southern Space Observatory – OES/CRS/CCR/INPE – MCT, in São Martinho da Serra, RS, Brazil. The aerosol optical depth data (AOT) were obtained from the AERONET measurements at the same site. Empirical models were developed by linear regression between daily AOT measurements and the Kt index (surface and the top of the atmosphere global solar irradiation ratio). The fires data were obtained in http://www.dpi.inpe.br/proarco/bdqueimadas, provided by CPTEC / INPE - MCTI. The results showed that biomass burning aerosols transported from Central region of Brazil has important influence on the solar energy resource in the Brazilian Southern region during dry season (from May till October).