

CLOUD COVER INDEX OBTAINED FROM SATELLITE DATA AND ITS ROLE ON RELIABILITY OF SURFACE SOLAR RADIATION ASSESSMENT

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Cloud cover index (CCI) is a very important input data for radiative transfer models and great effort is being made to its determination from satellite images with high confidence. Cloud cover index is obtained from a linear relation between the clear and overcast radiances values measured in the visible range by satellite over a specific time period for each image pixel. The major key to obtain reliable CCI values is to correctly characterize clear skies and overcast skies from satellite images. This may be a complex and uncertain task in some circumstances. The importance of CCI becomes evident when it is used as input data to map surface solar irradiation over large continental areas such as over the Brazilian territory, with a wide range of climatic environments. Brazilian Northeast area presents a low annual precipitation (less than 700mm) and large insolation (about 120 clear sky days/year). In contrast, precipitation is high in the Amazonian region and it may occur long time periods (more than 30 days) with the sky cloudy at a specific daytime during the wet season (from November to April). The majority of the established methodologies to obtain CCI values from satellite images fail under any of these circumstances. Besides that, the comparison of CCI values obtained from satellite images with ground data is unfeasible in face of the different fields of view, and the subjectivity associated with observer in ground measurements, besides the lack of information on cloud optical thickness in ground data.

This work describes two techniques to obtain CCI information using visible (0.52-0.75 μ m) and infrared (10.2-11.2 μ m) data from GOES satellite in order to maximize the reliability of CCI input data to BRASIL-SR radiative transfer model. The new techniques are based on statistical and geometry analyses for each pixel of satellite data. The BRASIL-SR model is a radiative transfer model that evaluates surface solar irradiation over Brazilian territory using climatological values of atmospheric variables and cloud cover index obtained from satellite images. This work also presents a comparison among solar irradiation ground measurements and estimates provided by the BRASIL-SR using CCI data obtained with both new techniques and with threshold methodology. The ground data were measured in Caicó situated

in Brazilian Northeast region and producing solar radiation data since November 2002 for the SWERA project. Thanks are due to a grant from UNEP/GEF (project SWERA) and from FINEP/CNPq (project SONDA).