

SEMI EMPIRICAL SATELLITE MODELS

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Abstract

This chapter discusses basic principles of solar irradiance modeling based on the use of input data from geostationary satellites and atmospheric models. Two operational approaches (SUNY/SolarAnywhere and SolarGIS) based on the use of semi-empirical models are presented in the context of recent developments.

1. Introduction

Weather satellites include polar orbiting and geostationary platforms. Although polar orbiters achieve higher resolution and accuracy because they are closer to the earth surface (~850 km vs. ~36,000 km), the geostationary platforms are preferred for solar resource monitoring because they view the same part of the globe continuously and are thus amenable to produce the hourly, or higher frequency, site-specific data time series used for solar engineering applications. These satellites are equipped with several radiation sensors covering specific spectral bands of the solar (shortwave) and Infrared (terrestrial) spectra. Table xx1, xx2 and xx3 describe these spectral bands for the current generation of satellites in the US (GOES 8-15), Europe (Meteosat Second Generation) and Australia and Pacific (MTSAT).