
# RECONSTRUCTION AND SHORT-TERM FORECAST OF THE TOTAL SOLAR IRRADIANCE

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## ABSTRACT

The Total Solar Irradiance (TSI) is the radiation generated by the Sun in different wavelengths and received by the Earth (1AU). This radiation affects the Earth's climate on large time scales. The accurate values of the solar irradiance are important in climate and atmospheric models. The Total Solar Irradiance (TSI) were considered constant with a value approximately ~ 1.361 $Wm^{-2}$, but observations have revealed some variations in different time scales. These observations are restricted to the last few solar cycles and are subject to large uncertainties. We present a model to reconstruct in near-real time the evolution of the Total Solar Irradiance based on the solar surface magnetic field from the Helioseismic and Magnetic Imager (HMI) on board the Solar Dynamics Observatory (SDO) at 6173 A with a resolution of one arcsecond. Our model is based on the assumption that the irradiance variability is due to the evolution of the solar magnetic field. We employ a Layer-Recurrent Network (LRN) to model the relationship between the complex evolution of the photospheric magnetic field and the solar irradiance. The input parameters are determined from observations, the magnetic structures are identified and classified according to the area of the solar disk covered. This reconstruction of the total irradiance (TSI) in near real time is available on the website of the *Estudo e Monitoramento Brasileiro Do Clima Espacial* (EMBRACE) at the National Institute for Space Research (INPE).

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