Daily process retrieval model for sensible heat flux using geostationary satellite data

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Abstract Sensible heat flux is an important element in regional evapotranspiration estimation, which is of significant importance to the agriculture, hydrological cycle and regional climate, which greatly influence people’s daily life. This paper presents a diurnal model to compute daily sensible heat flux processes on the basis of Fourier analysis of the daily surface temperature process. Its main advantages are in requiring no \textit{in situ} ground meteorological data and having few unknowns to be calibrated. Calibration and validation of the model was conducted in a Spanish site of FLUXNET with data from the European geostationary satellite – Meteosat the Second Generation (MSG). Results show there is a higher correlation ($R^2 = 0.97$) and a better agreement (Nash-Sutcliffe efficiency coefficient = 0.97) between simulated and ground-measured sensible heat flux. Additionally, it has a root mean square error of 17.91 W m\textsuperscript{-2} in predicting sensible heat flux ($H$). After having obtained $H$, the energy balance equation can be employed to compute evapotranspiration.

Key words sensible heat flux; diurnal model; MSG; Fourier analysis