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A Mesoscale Convective Systems Database Over the Tropics Derived from the Meteorological Geostationary Fleet (2012-2016)

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Mesoscale convective systems (MCs) are central to the water and energy cycle of the tropical region. Global satellite observations can provide a useful resource to constraint theoretical and modelling perspectives on the convective systems. In particular, satellite climatology can statistically improve our understanding of the MCS. Thus, the MCS life cycle information can only be readily obtained using high frequency imagery available from the geostationary orbit.
We will present a five-year tropical MCS database built from a homogenized geostationary infrared archive and a tracking algorithm called TOOCAN. The brightness temperature images obtained by the operational meteorological geostationary satellite fleet at full space and time resolution are used over the 30°S–30°N latitude belt. The satellite fleet exhibits some slight spectral window channels disparities, different temporal resolutions, and slight variability in the spatial resolution of the sensors. The calibration procedure of each instrument is also performed at the individual level with instruments specifics mode of operation. The cloud tracking can be impacted by these various sources of inhomogeneity and requires some technical specifications to elaborate a homogenous MCS dataset: a high and homogenous spatial resolution, a minimum of 30 min time sampling, a tracking platform by platform, a homogenous brightness temperature through spectral and calibration adjustment. An inter-satellite normalization processing has then been performed to reduce the geostationary sensors differences and to ensure the validity of the MCS tracking. A homogenization of the spatial resolution has been performed by remapping each geostationary native projection to an Equal-angle grid. To face the calibration issues, we have applied the Global Space-based Inter-Calibration System (GSICS) calibration coefficients and we have also inter-calibrated and spectrally corrected the geostationary brightness temperatures with respect to the brightness temperature measurements derived from the MEGHA-TROPIQUES/SCARAB radiometer used as a reference.
The tracking algorithm has been applied to this homogenous level 1C infrared dataset. We will then conclude by presenting the five-year MCS database over the tropics and we will detail the morphological parameters of the MCS database as well as the estimation of the possible uncertainty induced by the residual of the homogenization procedure.