

ENSO Tropical Cloud and TOA radiative signatures from CERES observation

*Moguo Sun¹, Le Trang Nguyen¹, David Doelling²

1. Science Systems and Applications, Inc, 2. NASA Langley Research Center

The Clouds and the Earth's Radiant Energy System (CERES) project now has over 17 years accurately observed top-of-the-atmosphere (TOA) flux record for climate monitoring and diagnostic studies. The *CERES FluxByCldTyp* dataset, which contains cloud properties and radiative fluxes for 42 cloud types sorted by cloud top pressure and cloud optical depth, is used to investigate the clouds and their associated TOA (top-of-the-atmosphere) fluxes changes over the tropical area during ENSO events during the observed period. Unlike past studies, this study shows the impact of ENSO on cloud properties like optical depth, cloud top effective pressure and temperature and TOA LW and SW fluxes for each sub cloud type. The study reveals the detailed contributions from different cloud types for radiative characteristics during different regimes of ENSOs. This is especially important for very small net TOA radiative balance due to the cancellation of the fluxes from different cloud types. *The dataset serves as a more stringent validation of climate models for cloud properties and radiative fluxes.*

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