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Diurnal cycle of irradiance as found in the Clouds and the Earths Radiant Energy System (CERES) global gridded Synoptic (SYN) data products.

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The Synoptic Radiative Fluxes and Clouds (SYN) and Monthly Regional Radiative Fluxes and Clouds (AVG) archival data products contain 3-hourly (SYN), monthly regional mean (AVG), modeled surface and atmospheric fluxes consistent with CERES observed fluxes. The SYN and AVG fluxes and cloud properties can be compared directly with climate model results at either the 3-hourly (UTC based) or monthly time scale. These data products are a fundamental resource for the validation of climate models. Profile and surface fluxes are obtained from the Langley Fu-Liou radiative transfer code using merged CERES (MODIS derived) and 3-hourly geostationary cloud properties, which have been temporally interpolated to an hourly time step. Other input datasets include GEOS4 meteorological data, SMOBA ozone, MODIS MOD04 and MATCH aerosols, wind speed dependent ocean spectral albedos, and satellite retrieved broadband surface albedos over land and snow. The fluxes are derived hourly for pristine (clear-sky no aerosol), clear-sky, all-sky no-aerosol, and all-sky conditions. The radiative transfer fluxes are first computed with the initial input and labeled as "untuned" and then recomputed as "tuned" fluxes, which are partially constrained to CERES TOA observations by slightly changing the initial input, in order to achieve consistent flux and cloud property dataset. The constrainment adjustments to the GEOS4 and cloud properties are also provided. In this poster we consider the diurnal cycle of Earth's energy components, upward and downward longwave (LW) and shortwave (SW) irradiance at the Top of Atmosphere (TOA) and surface, as given the CERES SYN and AVG products. Model results are compared to surface observations at ~50 sites and to broadband CERES observations at TOA globally. (http://www-cave.larc.nasa.gov/cave/pages/syndc.htm) We also show a general overview of the products. There is a net imbalance in the tuned fluxes at the TOA of approximately 5.6W/m2 and 6.2W/m2 respectively for Terra and Aqua data products (for 2004, the year used to calculate the numbers.) The products also contain global maps for the diurnal cycle of PAR and UV radiation along with a calculation of erythemal radiation and the standard UV index and validation of this aspect will also be highlighted. Eventually CERES will release products containing hourly calculations where both the Terra and Aqua data streams are combined to provide the higher quality CERES observations and MODIS derived cloud properties for 2(SW) and 4(LW) hours each day. This will decrease the product's dependence on geostationary imager and interpolated estimates of irradiance and cloud properties.