SPIE abstract for, Asia Pacific Remote Sensing 2010

The characterization of deep convective cloud albedo as a calibration target using MODIS reflectances

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250 word abstract

There are over 25 years of historical satellite data available to climate analysis. The historical satellite data needs to be well calibrated, especially in the visible, where there is no onboard calibration on operational satellites. The key to the vicarious calibration of historical satellites relies on invariant targets, such as the moon, Dome C, and deserts. Deep convective clouds (DCC) also show promise of being a stable invariant or predictable target viewable by all satellites, since they behave as solar diffusers. However DCC have not been well characterized for calibration. Ten years of well-calibrated MODIS is now available. DCC can easily be identified using IR thresholds, where the IR calibration can be traced to the onboard blackbodies. The natural variability of DCC albedo will be analyzed geographically and seasonally, especially difference of convection initiated over land or ocean. Functionality between particle size and ozone absorption with DCC albedo will be examined. Although DCC clouds are nearly Lambertion, the angular distribution of reflectances will be sampled and compared with theoretical models. Both Aqua and Terra MODIS DCC angular models will be compared for consistency. Normalizing angular geostationary DCC reflectances, which were calibrated against MODIS, with SCIAMACHY spectral reflectances and comparing them to MODIS DCC reflectances will inspect the usage of DCC albedos as an absolute calibration target.

100 word abstract

The key to the vicarious calibration of historical satellites relies on invariant targets, such as the moon, Dome C, and deserts. Deep convective clouds (DCC) also show promise of being a stable invariant or predictable target viewable by all satellites, since they behave as solar diffusers. However DCC have not been well characterized for calibration. Ten years of well-calibrated MODIS is now available. DCC can easily be identified using IR thresholds, where the IR calibration can be traced to the onboard blackbodies. The natural variability of DCC albedo will be analyzed geographically and seasonally, especially difference of convection initiated over land or ocean.

Author BIO

Mr. Doelling is responsible for the diurnal averaging of CERES footprint cloud property and radiative fluxes for the CERES project at NASA-Langley. He calibrates the geostationary satellite radiances for CERES diurnal averaging and is a member of the GSICS calibration community and is the lead for geostationary MODIS inter-calibration and DCC calibration.