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ABSOLUTE IMAGER INTERCALIBRATION ON ORBIT: QUANTIFYING THE POLARIZATION EFFECTS ON THE CLARREO'S REFLECTED SOLAR SPECTROMETER-IMAGER INTERCALIBRATION

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ABSTRACT:

The Climate Absolute Radiance and Refractivity Observatory (CLARREO) is a NASA Decadal Survey mission recommended by the National Research Council. CLARREO's objectives are to conduct highly accurate climate change observations and to serve as an on-orbit intercalibration reference for other active instruments by measuring spectral reflectance and monitoring their response function parameters including gain, offset, non-linearity, spectral response of the optics, and sensitivity to polarization. In this presentation we focus on polarization. Polarization effects bias the performance of various currently active spaceborne instruments, such as MODIS and VIIRS, as well as the geostationary imagers. It is essential to evaluate and correct for them in order to perform accurate measurements of the total reflectance at the top of the atmosphere. Relative degree of polarization, angle of linear polarization relative to the meridian plane and the instrument's sensitivity to polarization on orbit fully specify these polarization biases. Based on the 2006 dataset collected by the PARASOL instrument we have built a global set of the empirical Polarization Distribution Models (PDMs) as a function of a scene type and viewing geometry. We use the PDMs and estimated precision of the CLARREO instrument to find the uncertainties on the reflectance of the calibrated imager.

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