Future Enhancements to GOES-R Retrievals of Nighttime Cloud Optical and Microphysical Properties

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The retrieval of Nighttime Cloud Optical and Microphysical Properties (NCOMP) for GOES-R is based on a variation of NASA Langley's Solar infrared-Infrared-Split window Technique (SIST) that has been adapted for application to Spinning Enhanced Visible and Infrared Imager (SEVIRI) data, serving as the proxy for Advanced Baseline Imager (ABI). NCOMP utilizes SEVIRI thermal channels to derive cloud optical depth, effective particle size and liquid/ice water content, but can also be applied to Moderate Resolution Imaging Spectroradiometer (MODIS), Advanced Very High Resolution Radiometer (AVHRR) and similar instruments, including Visible/Infrared Imager Radiometer Suite (VIIRS) aboard Suomi NPP. Validation of NCOMP results has yielded comparisons that meet the GOES-R program accuracy and precision specifications, yet efforts to extend and improve these comparisons and the algorithm are ongoing. This poster will present and discuss candidate methods for improving NCOMP retrievals, including the development and application of a new technique that uses 8.7- and 13.3-µm radiances to extend the range of retrieved optical depths. Currently, NCOMP is sensitive to optically thin clouds with decreasing accuracy at larger optical depths, but utilization of the additional channels shows potential for extending the range of optical depth to larger than 20 for many cloud types. This increase in optical depth will allow for an accompanying extension of liquid and ice water path ranges, thereby adding value for aviation and other product applications. Accuracies of the NCOMP retrievals are also enhanced by applying a CO2-slicing technique developed at NASA Langley that allows the discerning of multi-layer clouds and their respective radiative signals. This multi-layer technique utilizes the retrieved cloud optical depths, so any increases in accuracy and/or range of nighttime optical depths consequently extends the accuracy of multi-layer retrievals.