Introduction

- Top-of-atmosphere (TOA) broadband (BB) longwave (LW) and shortwave (SW) fluxes needed to evaluate Earth’s Radiation Budget (ERB)/climate change & to study cloud and radiative interactions
- Current satellites with long temporal record measure SWP fluxes at roughly the same local times daily
- TRMM observes at a range of times, so on-board CERES was only available Jan-Aug 1998
- Geostationary (GEO) satellites can estimate TOA fluxes 24/7 -narrowband (NB) radiances converted to BB SW and LW fluxes, using current empirical fits to CERES Terra data
- Difficult to adequately capture diurnal cycle with limited CERES overpasses

NASA/Langley Cloud group routinely derives cloud & radiative parameters from various satellites using VISST & SIST algorithms

GOES-8 vs CERES Terra NB-BB fits, accounting for seasonal and diurnal changes routinely used to convert GOES NB to BB fluxes over ARM SGP

- Examine ways to better estimate diurnal cycle/improve overall accuracy, in GOES-8 derived SW and LW fluxes
- Implement TRMM to increase SZA range of observations
- Investigate use of GOES-8 8.7 & 11-µm fluxes in LW NB-BB fit, after Sun et al

OBJECTIVE

- Develop & assess fits for SWP based on CERES Terra, TRMM & GOES-8 data

Approach

- Match 1st averages of GEO data with CERES SFC (32-42°N, 91-105°W)

**SW Validation with CERES**

Jun-Aug00 GOES-8 vs Terra

GOES-8 & Terra BB SW TOA Albedo (%)

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**LW Validation with CERES**

Independent Assessment: Jul-Aug02 GOES-8 vs Terra/Aqua

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**SW Validation with CERES**

Jun-Aug00 GOES-8 vs Terra

Comparison of GOES8 SW with Theory

- Fu-Liou Radiative Transfer Model (RTM) Fluxes

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Results

- Improved GOES8- derived BB SW TOA fluxes

Future work

- Evaluate Jan-Aug02 GOES8-TRMM SW on a seasonal basis
- Apply seasonal TRMM SZA observation capability to GOES8 SW TOA fluxes for other seasons/time periods, to evaluate improvement
- Further examine usage of both 6.7 and 11 channels in derivation of seasonal/diurnal LW GOES8-TRMM fluxes.

Summary

- Independent Assessment: Jul-Aug02 GOES-8 vs Terra/Aqua

TOA SW and LW fluxes validated for 3 years (1998-2000)

- Future work: Implementation of 8.7 & 11 µm in LW NB-BB fit

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