Temporal Interpolation Using Geostationary Data: An Update

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Summary from January Meeting

- Subsystem 10 Status (Data Product: SRBAVG)
  - Two Interpolation Methods (GGEO & non-GGEO)
  - Now Uses Cloud Properties from GGEO Data
  - Clear Sky Interpolation Using GGEO
  - Total-sky Fluxes Derived Using ERBE-like ADMs
- Validation
  - Clouds
    - Calibration
    - VIRS comparisons
    - Climatology Comparisons
  - Fluxes
    - ERBE-like Comparisons
    - Compare Monthly Means w/ and w/o GGEO
    - Surface Flux Comparisons

GGEO Cloud Property Retrievals

- GGEO Calibration Tied to VIRS
- Uses IR/VIS LBTM Retrievals (Run as Subset of CERES Cloud Algorithm)
- Uses CERES Surface Property Maps and MOA Soundings
- Properties
  - Cloud Amount
  - Cloud Temperature
  - Cloud Height (using standard 4 CERES layers)
  - Optical Depth/Emittance (Daytime Only)

Summary of GGEO Cloud Property Validation (February 1998)

- Zonal mean cloud amount
  - VIRS 56%
  - GGEO 66%
  - ISCCP 63%
- Instantaneous cloud amount
  - VIRS 73%
  - GGEO 69%
- Zonal mean optical depth
  - VIRS 11.8
  - GGEO 7.1
  - ISCCP 3.5

Development of GGEO Cloud Property Validation Tools

- Standard QC Reports
  - Parameters
    - Cloud Amount
    - Optical Depth
    - Temperature / Height
  - Zonal Means
  - Viewing and Solar Zenith Dependence
  - Deep Convective Cloud Albedos
- Intercomparisons
  - VIRS / MODIS
  - Overlapped GGEO Satellites
  - ARM Satellite & Surface Observations
  - Climatology (ISCCP)

ES4 ERBE-like and SRBAVG Flux Summary

40°N - 40°S W/m²		ERBE-like (ES-4)	SRBAVG nonGGEO	ES4 - SRBAVG
Total-Sky LW Flux	Mean	257.4	255.7	1.7
	Sigma	28.7	28.8	5.7
Total-Sky SW Flux	Mean	97.1	96.6	0.5
	Sigma	29.9	33.2	12.1
Clear-Sky LW Flux	Mean	285.9	283.6	2.3
	Sigma	14.2	14.3	4.7
Clear-Sky SW Flux	Mean	50.1	49.0	1.1
	Sigma	18.2	19.0	8.5

SRBAVG nonGGEO and GGEO Flux Summary

40°N - 40°S W/m²		SRBAVG nonGGEO	SRBAVG GGEO	nonGGEO - GGEO
Total-Sky LW Flux	Mean	255.7	255.1	0.4
	Sigma	28.8	28.7	3.4
Total-Sky SW Flux	Mean	96.6	100.4	-3.6
	Sigma	33.2	29.9	13.3
Clear-Sky LW Flux	Mean	283.6	282.5	0.8
	Sigma	14.3	14.9	2.8
Clear-Sky SW Flux	Mean	49.0	59.7	-10.8
	Sigma	19.0	21.7	8.8

Recent Developments

- Subsystems Delivered to ASDC
  - Geostationary Data Gridding and Analysis — GGEO
  - Spatial Gridding of SSF — SFC
  - Temporal Interpolation & Averaging — SRBAVG
- Narrowband-Broadband Relation
- Automating GGEO Calibration
- Column-Averaged Cloud Replaced by 4 Layers
- Cloud Interpolation Changes
  - Day-Night Difference Correction
- Flux Normalization Changes
  - Corrected Clear-sky SW Error
- Clear-Sky Flux Interpolation

Monthly Mean Error Analysis

- Defining Instantaneous and Monthly TISA Errors
  - Narrowband-Broadband Relation
    - Regional vs. Global
  - ADM errors
    - CERES fluxes
    - GGEO-Derived Fluxes (Do we need 110 km scale ADM?)
  - GGEO Calibration Errors
    - Flux Error
    - Cloud Property Errors
  - Spatial Gridding Errors
  - Time Sampling Errors

- Test Using March 2000 TRMM and Terra Data

Future Plans

- Create More Realistic Total-Sky Validation Product
  - ERBE-like Fluxes + VIRS Clouds
  - Preliminary ADM's
- Continued Validation
  - Cloud Comparisons
  - Calibration
  - Flux Comparisons
  - DRM Construction
- Study Cloud and SW Flux Normalization
- Finalize Error Analysis
- Compare SW Algorithms
- Scheduled Archival in Fall 2001