GEWEX Radiative Flux Assessment: Overview and Update

5th CERES-II Science Team Meeting

2-4 May 2006

Presenter: Lin Chambers (NASA LaRC)

Oversight Committee: Atsumu Ohmura (ETH), Erhard Raschke (U. of Hamburg), William Rossow (NASA GISS), Paul Stackhouse (NASA LaRC) and Bruce Wielicki (NASA LaRC)

~75 assessment participants (TOA, surface, and both)

Local Contributors: Laura Hinkelman (NIA), J. Colleen Mikovitz (AS&M), Danny Mangosing, Yan Chen (SAIC), Juliet Pao, Walter Baskin, Churngwei Chu, Sherry King, Penny Oots, Nancy Ritchey, Tomeka Watkinson and others (ASDC)

Radiative Flux Assessment Overview

- **Purposes:**
  - **Assess our current understanding and capability to**
    - ***derive TOA and surface radiative fluxes from analysis of satellite observations***
    - ***validate these fluxes with surface observations***
    - ***simulate these fluxes with models and assimilation***
  - **Assess uncertainties and outstanding issues in flux estimation, particularly long-term variability**
    - ***sources include satellite calibration, input data sources, and assumptions (particularly in regards to spatial and temporal gap filling)***
    - ***Compare surface fluxes to surface based measurements***
    - ***intercompare existing data products***
    - ***identify largest uncertainties and needs***
  - **Report methods and uncertainties to be useful for future IPCC reports on long-term data uncertainty.**
  - **Develop climate system observation requirements for radiative fluxes and compare to current product accuracies.**
  - **Assess GCM and reanalysis products.**

GEWEX RFA Activities to Date

- 1st Workshop held (Oct. 2004)
  - Discussed issues
  - Developed pieces of draft document
  - Assigned TOA and surface groups
- Draft Document Outline
  - Proposed intercomparison activities
- 2nd Workshop held (Feb. 2006)
  - Refined document outline
  - Defined surface/TOA actions and goals
  - Assigning authors
- Web Site (Rel. 1.2) Now Operational
  - Includes document framework
  - Provides for ingest and download of all data sets
- Preliminary Results
  - See Hinkelman and Weatherhead talks

Surface Data Product Time and Space Scale Matrix

Priorities set at 2nd Workshop

Clear sky separate from All sky

Space Scale Ave-raging	Instan-taneous	15-30 min	1 hour	3 hour avg	daily	pentad	month/ monthly diurnal	sea-sonal	annual	decade
Global	A				A	A	RFA	A	A	A
Zonal	A				A	A	RFA	A	A	A
1000 km	A	A	A	A	A	A	A	A	A	A
280 km		A	A	A	RFA?	A	RFA	A	A	A
100 - 120 km	X	X	A	X	A	A	A	A	A	A
40 - 60 km	X	X	A	A	A	A	A	A	A	
20 - 40 km	X		A	A	A	A	A	A	A	A
FOV	RFA									
5 - 10 km	X	X	X	A	A	A	A	A	A	
< 2 km	X									

Time Scale Averaging

Land vs Water vs Snow/Ice

B. layer/conv. Cloud regions: objects not ready

X - Native space and time averaging
A - Existing or derivable by averaging existing data products

Cloud object
Synoptic
Intermediate
Climate

GEWEX RFA Web Tools: Goals

- Provide mechanisms for exchange of data files, text files, images, and discussion
- Easy accessibility
- Simple file formats
  - ASCII format
  - One data value per line
  - Common grid
- Long-term central data archival
  - Final assessment data set will be available to community after report is released
  - Follow-on assessment would begin a new data collection

GEWEX-RFA Site

INTRODUCTION

The ultimate goal of the Global Energy and Water Cycle Experiment (GEWEX) global data analysis projects is to obtain observations of the elements of the global energy and water cycle with sufficient detail and accuracy to diagnose the causes of recent climate variations in terms of the energy and water exchanges among the main climate components (atmosphere, ocean, land, cryosphere, biosphere).

The GEWEX-Radiative Flux Assessment (RFA) project will provide a forum for consistent analysis of long-term radiative flux products, primarily top-of-atmosphere (TOA) and surface fluxes, to establish a foundation for better global radiation budget analysis.

Read more »

GEWEX RFA Web Tools

Starting address: http://gewex-rfa.larc.nasa.gov/

- **About**
  - Purpose, draft document
- **Data Access (eosweb.larc.nasa.gov/GEWEX-RFA)**
  - "How to participate" document gives step by step instructions to prepare and submit data sets
  - Data ordering currently limited to assessment participants
- **View Sample Data**
  - Limited data visualization tools (access restricted)
- **GEWEX-RFA forum**
  - Capability for threaded, archived discussion
- **FTP site**
  - Exchange repository for talks and report writing (access restricted)
- **E-mail list(s)**
  - TOA and surface (some are on both)

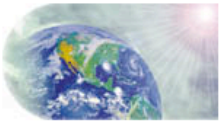
To Get Involved

- Data Access -- through site
  - Downloading: must be approved assessment participant (see site)
  - Providing data: account application (info in "How to Participate")
- Live Access Server
  - Access limited by IP (see FTP site). No data download.
- FTP site and discussion forum
  - Submit name, institution, e-mail address, and IP address to rfa_admin@larc.nasa.gov
- E-mail list(s)
  - Submit name, institution, and e-mail address to rfa_admin@larc.nasa.gov

GEWEX RFA Web Site

ATMOSPHERIC SCIENCE DATA CENTER

GEWEX Radiative Flux Assessment



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Data access is restricted to assessment participants until the data are made publicly available (currently anticipated to be May 2007). To access the interim data you need an ASDC user account and approval from the LaRC GEWEX-RFA organizing committee. Join the assessment team.

Assessment Activity Summary | How to Participate | File Conventions | News and Discussion | List of Participants | Acknowledgement

Top of Atmosphere (TOA) Data Products	Surface Data Products	Ground-Based Measurements
• Maps • Time Series • Hovmöller Diagrams • High Time/Space Resolution	• Maps • Time Series • Hovmöller Diagrams • High Time/Space Resolution	• Time Series

Note: The data files provided here are subsets of larger data sets. Links to the full data archive for each product can be found in the corresponding product description files.

Acknowledgement

When data from the GEWEX Radiative Flux Assessment are used in a publication, we request the following acknowledgment be included: "*The GEWEX Radiative Flux Assessment data were obtained from the NASA Langley Research Center Atmospheric Science Data Center.*" In addition, the provider of each data set used should be specifically acknowledged. See the product description file(s) for details.

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GEWEX RFA Web Site

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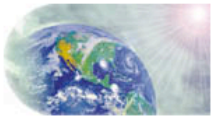
GEWEX Top of Atmosphere (TOA) Data Products: Time Series



Select categories to view and order data.
JavaScript must be enabled for optimal performance.

Averaging interval	All available averaging intervals Precession cycle Monthly Monthly (LST) Daily Daily (LST) Hourly
Spatial scale	All available spatial scales Global: All available global time series Hemisphere: All available hemispheric time series Zonal: All available zones Region: All available regions Site: All available sites
Sky condition	All available sky conditions Clear sky: Type 1 (measured) Type 2 (computed) Both All sky
Parameter	All available parameters Shortwave (SW) downward (total) flux SW upward flux SW net (total down + up) flux SW broadband albedo Longwave (LW) upward flux Total (SW + LW) net flux
	View Files Reset

Data access is currently restricted to assessment participants. Join the assessment team. All data will be made available to the public upon completion of the assessment (anticipated date: May 2007).

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GEWEX RFA Web Site

ATMOSPHERIC SCIENCE DATA CENTER

GEWEX Ground-based Measurements: Time Series

Select categories to view and order data.
JavaScript must be enabled for optimal performance.

Temporal Resolution	All available temporal resolutions Monthly (UTC) Monthly (LST) Monthly mean of diurnal cycle (15 minute resolution) Daily (UTC) Daily (LST) Hourly 15 minute
Site	All available sites
Sky condition	All available sky conditions Clear sky: Type 1 (measured) Type 2 (computed) Both All sky
Parameter	All available parameters Shortwave (SW) direct (horizontal) downward flux SW diffuse downward flux SW total (direct + diffuse) downward flux SW hemispheric downward flux * SW upward flux SW net (total down + up) flux SW broadband albedo Longwave (LW) downward flux LW upward flux LW net (down + up) flux Total (SW + LW) net flux
View Files	Reset

* Single instrument measurement of broadband SW downward flux including both direct and diffuse components.

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Radiation Flux Assessment Next Steps

- Data ingest and analysis
  - Rel. 1.2 data ingest began in April, 2006
  - Begin to derive statistics of own datasets for submission including comparisons against surface site data
- Chapter lead authors to get chapters written
- Collaborative analysis towards draft assessment document by Feb. 2007
  - Hold follow-up telecons and workshops as needed