

Radiative Processes Working Group: Value Added Product (VAP) Updates

Sally McFarlane
RPWG Translator

RPWG Breakout March 23, 2009

Status of RPWG Operational VAPs



- ▶ BE Flux (Best Estimate Flux from 3 radiometers at SGP)
 - run daily up through current
- ▶ QC RAD (Data Quality Assessment for Radiation Data)
 - c1, s1 level data –current at all sites
 - c2 level data – processing global shortwave correction; waiting for information on instrument swap-outs
 - c1, s1 level data in archive for AMF from Pt. Reyes and COPS
 - Investigating tracker problem in Niamey data
 - Will begin processing China data shortly
- ▶ Shortwave Flux Analysis
 - Runs monthly on all fixed sites except Darwin (processed once/year) and NSA (not implemented); 1-2 months behind current
 - Adding NSA data; code implemented, currently evaluating test cases
- ▶ SFC Cld Grid (Surface cloud grid)
 - Run ~twice/year - currently processed through August, 2008

Current Development Efforts



- ▶ **BAEBBR** (Best-Estimate Fluxes From EBBR Measurements and Bulk Aerodynamics Calculations)
- ▶ **SfcSpecAlb** (Surface Spectral Albedo)
- ▶ **QCRad** for AMF deployments
- ▶ **BBHRP** (Broadband Heating Rate Profile)

BA-EBBR

Krista Gaustad, Dave Cook, S. Xie, S. McFarlane



- ▶ Best-Estimate Fluxes From EBBR Measurements and Bulk Aerodynamics Calculations
 - Important for variational analysis
 - Data currently available only through 2003
- ▶ Updates
 - Corrected use of fixed vegetation height; now using site specific height
 - Corrected errors in logic in VAP
 - Improved qc checks and flagging
 - Updated variable names to comply with new ARM conventions
 - Created vegetation height files for missing data
 - Created automated method of using monthly vegetation heights file
- ▶ Current status:
 - Initial version in archive as Evaluation Product (does not contain updated qc tests)
 - Implementing new qc tests suggested by Shaocheng Xie
 - Writing Technical Report (Dave Cook)
 - Data should be archived by end of April, 2009

Surface Spectral Albedo VAP

Krista Gaustad, Sally McFarlane, Chuck Long, Eli Mlawer



- ▶ Objective: produce high-resolution surface spectral albedo for use in radiative transfer calculations
- ▶ Develop best estimate broadband and MFRSR surface albedos
 - Apply qc and gap filling
 - Preliminary data exist as Evaluation Product
- ▶ Predict surface type based on 6-channel values
 - Surface types are snow, brown, vegetated, or partial vegetation
 - Updated Mlawer algorithm; evaluated against surface data
- ▶ Extrapolate albedos to high-resolution, extended spectral range
 - Implemented Mlawer algorithm
 - Evaluated against field data and broadband measurements
- ▶ Current efforts:
 - Examining outliers (input or algorithm problems?); improving qc flags
 - Finalizing output file format and variable names
 - Writing technical report
- ▶ Will release as Evaluation Product by June 2009

BBHRP (Broadband Heating Rate Profiles)

Tim Shippert, Sally McFarlane, Eli Mlawer



► Recent Updates

- Identified problem with aerosol treatment during data gaps (particularly important at NSA)
- Developed aerosol climatology and new aerosol methodology
 - Implemented for new NSA runs
 - Will be implemented for ver1.6 at SGP
- Performed multi-year runs at SGP and NSA

BBHRP (Broadband Heating Rate Profiles)

Tim Shippert, Sally McFarlane, Eli Mlawer



► Runs Currently Processed (fixed sites)

■ SGP

- Have processed 6 years of ver1.5 at SGP ([Mlawer et al poster](#))
- 200003 – 200102 available in archive as Evaluation Product
- 200103 – 200602 processed and being evaluated
 - ◆ Available from Sally on request; [will be archived end of April](#)
- Microbase development intercomparison at SGP:
 - ◆ Have run: Microbase, Frisch, Sengupta, Microbase unscaled
 - ◆ Will run: Matrosov, Boudala

■ NSA

- Processed 2 years at NSA (2004-2005) using Shupe-Turner ([Turner et al poster](#))
- Processed 2004 at NSA with Microbase; will run 2005
- Shupe-Turner and standard Microbase runs [will be archived](#)

BBHRP (Broadband Heating Rate Profiles)

Tim Shippert, Sally McFarlane, Eli Mlawer



► Runs Currently Processed (AMF)

■ CLOUD-BBHRP Intercomparison

- Using BBHRP to evaluate retrieval algorithms for CLOUD-type clouds at Pt Reyes ([Lo et al poster](#))
- Have calculated heating rates and fluxes for one month at Pt Reyes for five different retrieval algorithms

BBHRP – Future Plans



- ▶ Archive multiple years of ver 1.5 at SGP and ver 2.5 at NSA
- ▶ Improve utility for CMBE and users
 - Produce 1-min output on uniform height grid
 - Include vertical profile of cloud and aerosol information in average files
- ▶ Focus on testbed development ([see talk in CPWG breakout](#))
 - Make BBHRP inputs more modular
 - Currently aerosol input is primary problem
 - Improve efficiencies of BBHRP processing
 - Improve error tracking in BBHRP runs
 - Reduce size of saved output
- ▶ Improve surface albedo treatment
 - Implement SfcSpecAlb VAP in BBHRP at SGP
 - Implement methodology for considering cloud effect and spatial heterogeneity on surface albedos
- ▶ Develop BBHRP for TWP sites
 - ABE not available; runs will be no aerosol
 - Develop a surface albedo dataset

Upcoming RPWG VAP Efforts?



- ▶ Full Radiative Flux Analysis (RFA) – approved; planned start in June
 - Adds LW information to SW Radiative Flux Analysis
 - Will include revamping of SW codes to make processing more efficient
- ▶ Potential Efforts – for discussion
 - Radiative Flux Analysis for AMF
 - Modest effort required for Pt. Reyes, COPS
 - More substantial effort for Niamey and China due to aerosol loading
 - AERI noise filter
 - Improve/update processing code
 - Extend AERI PROF to TWP (Nauru, Darwin)
 - Nauru: historical data only as AERI, MMCR, MPL now removed
 - GVR 183-GHz Radiometer
 - MWRRET-type retrieval?
 - Combine with current MWR for best estimate over entire range?
 - Interfaces to radiative transfer codes
 - New microwave radiometers
 - Stimulus instruments?