

**ARM Radiative Heating Profile Workshop**  
Scripps Institute of Oceanography (host: V. Ramanathan)  
Jan 8-9, 2007

**Jan 8**

8:00 - 8:30 Coffee and breakfast snacks

8:30 Wiscombe: Introduction: Past attempts to measure flux divergence, culminating in ARESE

8:50 Howard Barker: Radiative heating rates in the model intercomparison ICRCM-3

**ARM's formal efforts:**

9:10 Eli Mlawer: An overview of ARM's BroadBand Heating Rate Profile (BBHRP) effort

9:30 Mark Miller: The BBHRP effort for cloudy situations

**Field Campaigns & Instruments:**

9:50 Jim Mather: Challenges in measuring radiative flux profiles from an aircraft: TWP-ICE experience

10:10 Eli Mlawer: The ARM Arctic experiment "Radiative Heating in Underexplored Bands": A first step toward understanding upper tropospheric radiative cooling

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BREAK 10:30 - 11:00  
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11:00 Marty Mlynchak: INFLAME instrument for the direct measurement of net fluxes

11:20 Chuck Long: A method for correcting downwelling direct and diffuse shortwave measurements for aircraft tilt without using mechanical stabilization

11:40 Ramana: Measurement of flux divergences from small UAVs

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LUNCH (brought in) 12-1

Lunch speaker: V. Ramanathan: Stacked small-UAV measurements of radiative heating profiles

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1 - 1:45 Tour of Ramanathan-team small UAV operation

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2:00 Wenying Su: Performance of standard radiometers on high-altitude platforms

2:20 Ells Dutton: The Japanese radiometersonde

2:40 Dave Turner (Mlawer substituting): Measure radiative flux divergence in the dark!

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BREAK 3:00 - 3:30

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**3:30 - 4:30 DISCUSSION OF IN-SITU MEASUREMENT:**

What is a good strategy forward from an in situ measurement point of view?

Do we need a long-term strategy where we perfect our tools first?

Are episodic measurements enough, or do we need long-term routine measurements?

What if we had unlimited funds?

**Jan 9**

8:30 - 9:00 Coffee and snacks

**CERES, TRMM and CloudSat efforts:**

9:00 Fred Rose: The CERES Surface and Atmospheric Radiation Budget (SARB) project: Heating rate profiles

9:20 Wei-kuo Tao: Retrieval of latent heating profile from TRMM measurements

9:40 Bob Houze: Linking TRMM-based latent heating profiles to radiative heating profiles in precipitating regions

10:00 Tristan L'Ecuyer: Radiative heating profile products from TRMM and CloudSat

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BREAK 10:20-10:40  
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**10:40 - 11:20 DISCUSSION OF REMOTE SENSING MEASUREMENT:**

How successful are the formal efforts by ARM and NASA to get radiative heating profiles?

Have we reached an asymptote or is there a lot more that could be done?

Are new kinds of measurements needed before further progress can be made?

Would there be an advantage to considering latent+radiative heating in unison?

**Measurement analyses:**

11:20 Jay Mace & Sally Benson: The vertical structure of cloud radiative forcing at the SGP ARM site as revealed by 8 years of continuous data

11:40 Sally McFarlane: Characterizing tropical radiative heating profiles using the ARM BroadBand Heating Rate Profile (BBHRP) paradigm

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LUNCH (brought in) 12 - 1:30  
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1:30 Alex Trishchenko: Surface albedo mapping from satellites: Present capabilities and future needs

**Theoretical studies:**

1:50 Kim: Interpretation of small-UAV data with 3D radiative transfer models

2:10 Bill Collins: Beer's Law, Langley plots, and enhanced solar absorption in atmospheric windows

2:30 Qiang Fu: Radiative heating rate profiles in tropical stratosphere:  
Implication to stratosphere upward mass fluxes and the top of the tropical  
tropopause layer

2:50 Anthony Davis: Time-domain radiative transfer in the O<sub>2</sub> A-band: A new  
observational constraint on the solar heating rate prediction problem in the  
presence of clouds

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BREAK 3:10-3:30  
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3:30 - 4:30 DISCUSSION OF NEEDED THEORETICAL WORK:  
What further theoretical studies would be useful?  
Would routine O<sub>2</sub> A-band measurements constrain the problem?  
Are further model intercomparisons called for?