

Workshop on Uncertainty Management in Remote Sensing of Climate Data

Convened jointly by the:
Climate Research Committee
Committee on Applied and Theoretical Statistics
Committee on Earth Studies

December 4, 2008

Room TBA
The Doubletree Hotel
1515 Rhode Island Ave., NW
Washington, DC 20005

Description:

A workshop convened jointly by the National Academies' Climate Research Committee (CRC), Committee on Applied and Theoretical Statistics (CATS), and Committee on Earth Studies (CES) will explore uncertainty management in remote sensing of climate information. Through invited presentations and discussion, participants will examine sources of uncertainty throughout satellite and other remote data collection systems, including issues of sampling, scale, processing, and validation; describe the statistical methods currently used to quantify these sources of uncertainty for climate-relevant data; and explore how modern statistical methods might be used to provide a more powerful framework for characterizing and propagating these uncertainties. An ad hoc committee will plan and conduct the workshop, and a designated rapporteur will prepare an individually-authored summary of the proceedings.

The workshop will focus on issues that could be studied more intently by individual researchers or teams of researchers, setting the stage for possible future collaborative activities. Specific issues and questions to be addressed include the following:

1. What methods are currently used to compare time series at single points in space with instantaneous but sparsely sampled area averages to “validate” remotely sensed climate data? Are there more sophisticated or advanced methods that could be applied to improve validation tools or uncertainty estimates? Are there alternate means of measuring the same phenomena to confirm the accuracy of satellite observations?
2. How can fairly short-term, spatially dense remote sensing observations inform climate models operating at long time scales and relatively coarse spatial resolutions? Are there remotely sensed data that could, through the use of advanced statistical methods, be useful for improving climate models or informing other types of climate research?
3. What are the practical and institutional barriers (e.g., lack of qualified statisticians working the field) for making progress on developing and improving statistical techniques for processing, validating, and analyzing remotely sensed climate data?

Workshop Agenda

- 8:30 Welcoming remarks and overall workshop goals
Speaker: Amy Braverman, *Jet Propulsion Laboratory*

Session A: Introduction

- 8:40 Differences in terminology, techniques, and approaches between statisticians and earth scientists
Speaker: Anna Michalak, *University of Michigan*

- 9:00 Remote sensing of surface winds
Speaker: Ralph Milliff, *Northwest Research Associates, Inc., CoRA*

- 9:30 Remote sensing and precipitation
Speaker: Tom Bell, *NASA*

- 10:00 Discussion Moderator: Amy Braverman, *Jet Propulsion Laboratory*

10:15 *Break*

Session B: Clouds

- 10:30 Different types of uncertainties in cloud data sets
Speaker: William Rossow, *CUNY-City University of New York*

- 11:00 Machine learning techniques for cloud classification
Speaker: Bin Yu, *University of California, Berkeley*

- 11:30 Validation of cloud property measurements from multiple instruments
Speaker: Jay Mace, *University of Utah*

- 12:00 Discussion Moderator: Karen Kafadar, *Indiana University*

12:30 *Working Lunch*

Session C: Aerosols

- 1:30 Uncertainty issues associated with remotely sensed data sets for aerosols
Speaker: Lorraine Remer, *NASA*

- 2:00 Spatial statistics with an emphasis on aerosol data
Speaker: Noel Cressie, *Ohio State University*

- 2:30 Discussion Moderator: Steve Platnick, *NASA*

3:00 *Break*

Session D: Integrating models and data

- 3:15 Aerosol and cloud representation in global models
Speaker: Joyce Penner, *University of Michigan*

- 3:45 Data assimilation as a hierarchical statistical process, interacting dynamically with modeling
Speaker: Chris Wikle, *University of Missouri*

4:15 Discussion Moderator: John Bates, *NOAA*

Session E: Making Progress through Practical and Institutional Barriers

4:30 The practical and institutional barriers for making progress on developing and improving statistical techniques for processing, validating, and analyzing remotely sensed climate data
Speaker: Doug Nychka, *NCAR*

5:00 Discussion Moderator: Amy Braverman, *Jet Propulsion Laboratory*

5:25 Wrap-up and final remarks

5:30 Adjourn

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