

THIRD CIRCULAR

The 3rd Joint JCSDA-ECMWF Workshop on Assimilating Satellite Observations of Clouds and Precipitation into NWP Models

Theme: Simulation, Inversion, NWP Assimilation, Modeling and Actual Measurements of Radiometric, Microphysical & Optical Properties

December 1-3, 2015

will be held at the

NOAA Center for Weather and Climate Prediction (NCWCP)

5830 University Research Court
College Park, Maryland 20740

(Please note that although the conference center is located outside the secure zone and no building pass is required, photo ID may be required.)

For Dining and accommodation options in College Park, MD:

<http://shopcollegepark.org>

Science & Organization Committee:

- | | | | |
|-------------------------|-----------------|----------|--------------------------------|
| - S. English | (ECMWF). | Co-chair | Stephen.English@ecmwf.int |
| - T. Auligne | (JCSDA). | Co-chair | Thomas.Auligne@noaa.gov |
| - S-A. Boukabara | (JCSDA) | | Sid.boukabara@noaa.gov |
| - A. Collard | (NOAA) | | andrew.collard@noaa.gov |
| - N. Baker | (NRL, JCSDA) | | nancy.baker@nrlmry.navy.mil |
| - B. Bell | (UK Met office) | | william.bell@metoffice.gov.uk |
| - W. Petersen | (NASA) | | walt.petersen@nasa.gov |
| - B. Olson | (NASA) | | bill.olson@nasa.gov |
| - Q. Liu | (NOAA) | | quanhua.liu@noaa.gov |
| - Kazumasa.Aonashi | (JMA) | | aonashi@mri-jma.go.jp |
| - Nai-Yu Wang | (NOAA) | | nai-yu.Wang@noaa.gov |
| - Jean-Francois Mahfouf | (Meteo-France) | | jean-francois.mahfouf@meteo.fr |

Local Organizing Committee:

- Junye Chen, IT and Technical Coordination
- Rene Brown, logistics
- Ana Carrion, administration
- Erin Jones, webmaster

The Problem:

Satellite observations in the visible, infrared, and microwave (active and passive) provide a great deal of information on clouds and precipitation and therefore are strongly linked to hydrometeors (ice, non-precipitating cloud, liquid and frozen precipitation, mixed phase) geophysical characteristics (Particle size, distribution, density, shape, amount, etc). Both satellite observations and measurements from ground (or field) experiments have been and are continuing to be studied in order to (1) understand the interaction and correlations between the various hydrometeor parameters and the state parameters supporting the clouds and precipitation, (2) simulate their optical and radiative properties, (3) invert the satellite observations to provide cloud and precipitation parameters, (4) assimilate the same observations into NWP models and to (5) improve cloud modeling parameterizations. The workshop intends to bring together the scientific communities involved in these applications in order to make progress and learn from each others' results. The outcome is hoped to lead to improved data assimilation and therefore initialization of clouds and precipitation in models, to improved accuracy in the simulation of cloud and precipitation- impacted measurements, to higher-quality inverted cloud and precipitation products and to a full utilization of the field campaign results. Since clouds and precipitation often occur in sensitive regions for forecast impacts, such improvements are necessary for continuing significant gains in weather forecasting.

Background:

In 2005, the JCSDA sponsored an international workshop that covered the three main topics related to assimilating observations in cloudy/precipitating regions: satellite observing capabilities, modeling radiative transfer and cloud/precipitation formation, and data assimilation. The papers presented at the 2005 workshop were published as a Special Section of the Nov. 2007 issue of JAS. In spring 2010, the European Centre for Medium-Range Weather Forecasts (ECMWF) hosted a joint ECMWF-JCSDA workshop to document the developments since the 2005 workshop and to produce recommendations to ECMWF, JCSDA, and other NWP centers and scientific communities for future research developments and collaboration. About 65 participants attended the workshop, representing most major NWP centers around the world as well as research institutes and universities. See more details in this summary article: <http://journals.ametsoc.org/doi/pdf/10.1175/2011BAMS3182.1>

Since then, and because of their importance and expected significant value to extreme weather prediction and NWP forecast skill, major efforts are being undertaken in operational and research centers to tackle the problem of assimilating data impacted by cloud and precipitating. In parallel, the remote sensing community involved in cloud and precipitation retrievals have invested significantly in the improvement of the physical methods employed to invert the same data used in the NWP assimilation, for the determination of cloud and precipitation and other atmospheric and surface products obtained in these areas. In addition, major efforts have taken place, in particular in preparation of the Global precipitation Mission (GPM), to understand hydrometeors parameters interaction, correlation, through multiple field campaigns. Some of this progress was recently highlighted in the International Precipitation Working Group (IPWG) meeting held in Tsukuba, Japan.

The purpose of this workshop follows the tradition of 5-year cycle joint ECMWF-JCSDA workshops dedicated on tackling this problem, this time extending the invitation to scientific

communities involved in tackling the interpretation and utilization of satellite observations impacted by hydrometeors for the purpose of the simulation, inversion, NWP assimilation and modeling and actual measurement of microphysical and optical properties.

Purpose:

Accelerate the cross-fertilization of knowledge in the different communities to benefit all activities. Document recent developments and make recommendations to ECMWF, JCSDA, and other NWP centers and scientific communities for future research developments and collaboration.

Workshop set-up:

- The introduction will include a brief summary of the previous workshops as well as a summary of the relevant recommendations presented in the recent IPWG.
- Workshop sessions will cover current status of cloud/precipitation assimilation in NWP, their observations, radiative transfer and optical properties modeling, cloud and precipitation modeling and special issues related to inversion and data assimilation of cloud/precipitation-affected observations.
- Presenters will be tasked to present status and issues/solutions that can be addressed in working groups and not to present well-known results.
- Working groups run in parallel and each group comprises experts in different fields. Each group, led by co-chairs, should devise an implementation plan across disciplines. Final report will merge individual reports into one consistent document.
- Selected papers will be submitted for a special issue of a peer review journal [TBD]. A short workshop summary will also be submitted to ECMWF and JCSDA newsletters [TBD].

Workshop Objectives:

- Critically review the current state of the art in:
 - Modeling of clouds and precipitation in NWP (specific attention to what current and near future generation models can realistically represent, and therefore what observations could be ingested).
 - Science validation: Reviewing the findings from the field campaigns, targeting the hydrometeors and their microphysical and macrophysical properties: *focusing on uncertainties*.

- Satellite observations of clouds and precipitation: *focusing on what exists and information content*
 - Simulating the optical properties and radiative transfer in cloudy and rainy conditions: *Focusing on how accurately can we model observations*
 - Physically-based Inversion methodologies using satellites data impacted by cloud and precipitation.
 - Assimilating satellite observations of clouds and precipitation.
- Identify the key issues for successful assimilation of cloud and precipitation information
 - Develop a prioritized list of additional examinations of issues, further evaluations of techniques, and needed new developments
 - Plan coordination mechanisms to facilitate progress on needed developments

How:

By bringing together experts in: cloud/precipitation remote sensing, radiative transfer in cloudy or precipitating atmospheres, modeling clouds and precipitation, and assimilating cloud and precipitation-impacted observations as well as the actual measurements of the hydrometeors microphysical and macrophysical characteristics.

Expected Outcome:

A workshop report that will summarize various workshop groups deliberations and include a prioritized list of plans requiring further research and development. These plans should include details on how these groups could better coordinate activities across institutions.

Preliminary Program:

Day One: Tuesday – December 1, 2015

8:00 - 9:00	Registration	Chairs	1h
9:00	Introduction, Opening Remarks from meeting Workshop co-chairs (announcement of IBGs)		15'
9:15-10:15	<p>Session 1: Cloud/Precipitation Modeling in NWP -Overview</p> <p>Co-chairs & Discussion Facilitators: Thomas Auligné and Stephen English</p> <p>Overview talk: Speaker 1 (60'): Jean-Francois Mahfouf (Meteo-France)</p>		1h
10:15-10:30	Session 1 Wrap up / Discussion		15'
Break			
11:00-12:00	Session 2: Where are the uncertainties in scientific understanding of cloud and precipitation processes?		1h

	<p>Co-chairs & Discussion Facilitators: Jean-Francois Mahfouf and Will McCarty</p> <p>Two Overview talks:</p> <p>Speaker 1 (30'): Olaf Stiller (DWD) Speaker 2 (30'): Ben Johnson (JCSDA)</p>		
12:00-12:15	Session 2: Wrap up/Discussion		15'
12:15-13:30	Lunch		1h15'
13:30-14:30	<p>Session 3: Satellite observations of clouds & precipitation for Data Assimilation</p> <p>Co-chairs & Discussion Facilitators: Fuzhong Weng and Ziad Haddad</p> <p>Overview talk:</p> <p>Speaker 1 (30'): Chris Kummerow (CSU) Speaker 2 (15'): George Huffman (NASA) Speaker 3 (15'): Steve English (ECMWF)</p>		1h
14:30-14:45	Session 3: Wrap up/Discussion		15'
14:45-15:45	<p>Session 4: Break & Poster Session 1 (Satellite Observations and Simulation)</p> <p>Chair & Introducer: Paul VanDelst (NOAA)</p> <ul style="list-style-type: none"> - 1min introductions of poster (10') - Discussions/Interactions with poster presenters (50') <p>Poster 1 : Quanhua Liu (NOAA) Poster 2 : Lin Lin (JCSDA) Poster 3 : Ben Johnson (JCSDA) Poster 4 : Jean-Luc Moncet (AER) Poster 5 : Jason Otkin (U.Wisc.) Poster 6 : Therese Ladwig (NOAA) Poster 7 : Florian Harnisch (LMU) Poster 8 : Arlindo de Silva (NASA)</p>		1h
15:45-16:45	<p>Session 5: Optical Properties and Radiative Transfer -Overview</p> <p>Co-chairs & Discussion Facilitators: Quanhua Liu and Chris Kummerow</p> <p>Overview talk:</p> <p>Speaker1 (30'): Bingqi Yi (Texas A&M) Speaker 2 (30'): Paul van Delst (JCSDA)</p>		1h
16:45-17:00	Session 5: Wrap up/Discussion		15'
17:00-17:15	Meeting of Breakout Group Leaders (to prepare discussion items)		15'
19:00-21:00	First No-host Group Dinner		2h

Day Two: Wednesday – December 2, 2015

8:00 – 9:00	Registration continued	Chairs	1h
9:00-10:00	<p>Session 6: Physically-Based Inversion of Cloud & Precip</p> <p>Co-chairs & Discussion Facilitators: Sid Boukabara and Stefano Migliorini</p> <p>Overview talk: Speaker 1 (30'): Pete Weston Speaker 2 (30'): Kevin Garrett</p>		1h
10:00-10:15	Session 6 Wrap up / Discussion		15'
10:15-11:15	<p>Session 7: Break and Posters Session 2 (Physical Inversion and Data Assimilation)</p> <p>Chair & Introducer: Ziad Haddad</p> <ul style="list-style-type: none"> - 1min introductions of poster (10') - Discussions/Interactions with poster presenters (50') <p>Poster 1 : Joe Munchak (GSFC) Poster 2 : Kazumasa Aonashi (JMA) Poster 3 : Ziad Haddad (JPL) Poster 4 : Nai-Yu Wang (NOAA) Poster 5 : Kevin Garrett (JCSDA) Poster 6 : Elias Holm (ECMWF) Poster 7 : Ziad Haddad (UCLA) Poster 8 : Yanqiu Zhu (NOAA) Poster 9 : Sara Zhang (NASA)</p>		1h
11:15-12:15	<p>Session 8: Data Assimilation -Overview</p> <p>Co-chairs & Discussion Facilitators: John Derber and Stephen English</p> <p>Overview talk: Speaker 1 (30'): Alan Geer Speaker 2 (30'): Min-Jeong Kim</p>		1h
12:15-12:45	Session 8: Wrap up/Discussion		30'
12:45-14:00	Lunch		1h15'

14:00-15:30	Session 9: Practical experience of Assimilation of Radiometric & Geophysical Data (<i>Impacted by Clouds and Precipitation</i>) Six short talks: Speaker 1 (15'): Stefano Migliorini (Met) Speaker 2 (15'): Philippe Chambon (MetF) Speaker 3 (15'): Thomas Auligne (JCSDA) Speaker 4 (15'): Jason Otkin (CIMSS) Speaker 5 (15'): Kozo Okamoto (JMA) Speaker 6 (15'): Andrew Collard (NOAA)		1h30
15:30-16:00	Session 9: Wrap up/Discussion		15'
16:00-17:45	Session 10: Interdisciplinary Breakout Groups –IBG- (Discussion/Debate)		1h45'
19:30-21:30	Second No-host Group Dinner		2h

Day Three: Thursday – December 3, 2015

9:00-10:50	Session 10: Interdisciplinary Breakout Groups –IBG- (Discussion/Debate)		1h 50'
Break (40')			
11:30-12:30	Session 11: IBG Reports to plenary session (summary/recommendations) <i>Three reports 15' each with 5' Q&As for each (20' total for each report)</i>		1h
12:30-12:45	Concluding Remarks by co-chairs		15'
12:45	Workshop Adjourns		
14:00-14:45	Scientific/Editorial Committee Meets		45'
14:45	Scientific/Editorial Committee Meeting adjourns		

Interdisciplinary Breakout Groups (IBGs):

- IBG#1: Satellite Observations and Simulation (Instruments, Radiative Transfer, Optical Properties):
co-chairs: **Alan Geer and Quanhua Liu**
- IBG#2: Physical Inversion and Data Assimilation of cloud- and precip- impacted measurements:
co-chairs: **Stefano Migliorini and Ben Ruston**
- IBG#3: Hydrometeor microphysics and models / Coordination with Data Assimilation
co-chairs: **Jean-Francois Mahfouf and Brad Ferrier**

Presentation uploading:

Presenters are encouraged to submit their presentations ahead of time, by sending an email to Erin.Jones@noaa.gov with CC to Rene.Brown@noaa.gov, Junye.Chen@noaa.gov. The preferred format is pdf or PPT.

Location:

The workshop will be hosted in the NCWCP building in College Park, Maryland. This location offers convenient access to the *Metro* public transit system of the Washington, DC area (College Park/Univ. of MD Metro station, and the Metro bus). It is also within walking distance of downtown College Park, MD.

Parking:

For parking, participants are invited to park in the NCWCP parking. Note that a Government-issued ID may be required. We would like to draw your attention to the fact that some State ID's are considered Non-Compliant for U.S. Federal Government building access. A list of those States and options for other forms of Government ID's and information are listed on the following link: <http://www.dhs.gov/real-id-enforcement-brief>

Food:

To cover the cost of beverages and coffee break refreshments, a fee of \$30 is requested from those wishing to attend the workshop. This fee can be paid in cash on site.

Boxed lunches will be available for \$13 each on the first and second day of the workshop (Tuesday and Wednesday). To request and purchase boxed lunches, please visit <https://kloudcafe.wufoo.com/forms/3rd-joint-jcscaecmwf-workshop/>.

Note that no-host Group dinners will be arranged during the workshop. Prepayment for dinner(s) will be expected at registration. For dining and accommodations during the workshop, see: <http://shopcollegepark.org/> .

Please contact René Brown (rene.brown@noaa.gov) if you have any questions.