

# ECMWF-JCSDA Workshop on Assimilating Satellite Observations of Clouds and Precipitation into NWP models, 15 – 17 June 2010

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**Co-chairs: Peter Bauer and George Ohring**

**Committee members: Lars-Peter Riishojgaard, Christian Kummerow, Greg Tripoli, Min-Jeong Kim, Ron Errico, Fuzhong Weng, Philippe Lopez**

**Location: ECMWF, Reading, UK**

**Date/Time: 15-17 June 2010, 2 days for presentations, 1 day for working groups followed by a plenary session**

**The Problem:** To date, assimilation of satellite measurements has focused on the clear atmosphere. But satellite observations in the visible, infrared, and microwave provide a great deal of information on clouds and precipitation as well as the clear regions above the clouds. The issue is how to use this information to improve the initialization of cloudy and precipitating atmospheric regions in NWP models. Since clouds and precipitation often occur in sensitive regions for forecast impacts, such improvements are likely 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, modelling 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.

**Purpose:** Document developments since the 2005 workshop and make recommendations to ECMWF, JCSDA, and other NWP centres and scientific communities for future research developments and collaboration. Note the focus on operational application.

## **Workshop set-up:**

- Introduction will include brief summary of 2005 workshop.
- Workshop sessions will cover current status of cloud/precipitation assimilation in NWP, observation, radiative transfer modelling, cloud and precipitation modelling, and special issues related to data assimilation of cloud/precipitation-affected observations.
- Presenters will be tasked to present status and issues/solution 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 observation, modelling and data assimilation. Each group 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 (QJ); publication in ECMWF Proceedings (and online) in any case. A short workshop summary will be submitted to AGU's EOS.

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## Programme

### Tuesday 15 June 2010

8:00 - 8:30	<i>Check in</i>	
8:30 - 8:45	Erland Källén and Lars-Peter Riishojgaard	Welcome
8:45 - 9:15	T N Krishnamurti	Some observational and forecast issues, on different space time scales, for clouds using CLOUDSAT/ CALIPSO/ISCCP and model ensembles
9:15 - 9:30	George Ohring and Peter Bauer	Recommendations of 2005 workshop and objectives of current workshop

### Session 1 Cloud/precipitation assimilation at NWP centres

Chair: Greg Tripoli

9:30 - 9:55	Peter Bauer	Status of cloud and rain assimilation at ECMWF
9:55 - 10:20	Lars-Peter Riishojgaard	Clouds and precipitation data in the Joint Center for Satellite Data Assimilation
10:20 - 10:40	<i>Coffee break</i>	
10:40 - 11:05	Richard Renshaw	Cloud and precipitation assimilation at the Met Office
11:05 - 11:30	Masahiro Kazumori	Operational status and recent developments on cloud and precipitation assimilation at JMA
11:30 - 11:55	Sylvain Heilliette	Assimilation of cloud-affected infrared radiances at Environment Canada
11:55 - 12:20	Thomas Auligné and Xiang-Yu Huang	Assimilation of cloud/precipitation data at regional scales
12:20 - 12:45	Vincent Guidard and Lydie Lavanant	Cloudy infrared radiances: status of assimilation at Météo-France and intercomparison exercise
12:45 - 14:00	<i>Lunch</i>	

### Session 2 Satellite observation of clouds and precipitation

Chair: Fuzhong Weng

14:00 - 14:30	Christian Kummerow	Cloud and Rainfall observations using microwave radiometer data and a-priori constraints
14:30 - 15:00	Robin Hogan	Radar and lidar observations from space
15:00 - 15:30	Arthur Hou	Precipitation estimation using combined active/passive sensor information within the GPM framework
15:30 - 15:50	<i>Coffee break</i>	

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## Session 3 Radiative transfer modelling in presence of clouds/precipitation

Chair: Min-Jeong Kim

15:50 - 16:20	Thomas Greenwald	Solar/IR forward modeling in direct cloud-affected radiance assimilation: status and prospects
16:20 - 16:50	Ralf Bennartz	Microwave radiative transfer modeling of clouds and precipitation
16:50 - 17:20	Fuzhong Weng	Advances in CRTM surface emissivity models and database
17:20 - 18:30	<i>Cocktails</i>	

## Wednesday 16 June 2010

### Session 4 Modeling of clouds and precipitation

Chair: Ron Errico

8:30 - 9:00	Peter Yau	Representing cloud and precipitation in NWP models in Canada
9:00 - 9:30	Gregory J. Tripoli	The guiding principles, realities and future of cloud resolving models
9:30 - 10:00	Richard Forbes	Future directions for parametrization of cloud and precipitation microphysics
10:00 - 10:20	<i>Coffee break</i>	
10:20 - 10:50	Philippe Lopez	Linearized physics: Progress and issues

### Session 5 Specific data assimilation issues

Chair: Lars-Peter Riishojgaard

10:50 - 11:20	Ron Errico	Review of cloud and precipitation data assimilation issues
11:20 - 11:50	Elias Hólm	Use of cloud condensate in the background error formulation
11:50 - 12:20	Thibaut Montmerle	Modelling of background error covariances for the analysis of clouds and precipitation: challenges and possible strategies
12:20 - 13:40	<i>Lunch</i>	
13:40 - 14:10	Alan Geer	All-sky observations: errors, biases, representativeness, linearity and gaussianity
14:10 - 14:40	Niels Bormann and Carla Cardinali	Observation-space diagnostics for microwave imager radiances
14:40 - 15:10	Marion Mittermaier	Observations use in data assimilation and verification: Similar but not the same

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15:10 - 15:30	<i>Coffee break</i>
15:30 - 16:00	<u>FORMATION OF WORKING GROUPS</u> Chairs: George Ohring, Thomas Auligné, Chris Kummerow
16:00 - 18:00	Working group meetings
19:00	<i>Workshop dinner</i>

## Thursday 17 June 2010

8:30 - 10:00	Working group meetings
10:00 - 10:20	<i>Coffee break</i>
10:20 - 11:20	Mid-term plenary
11:20 - 12:30	Working group meetings
12:30 - 13:50	<i>Lunch</i>
13:50 - 15:00	Working group meetings
15:00 - 15:20	<i>Coffee break</i>
15:20 - 17:20	Plenary meeting
17:20	Workshop adjourns