

# CGMS

## International Cloud Working Group

### Terms of Reference

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#### 1. Introduction

The rationale behind the International Cloud Working Group (ICWG) within the Coordinated Group for Meteorological Satellites (CGMS) on the exploitation of passive imager cloud parameter retrievals is to enhance our knowledge on state-of-art cloud parameter retrievals from passive imager observations and pave the path towards optimising these retrievals for now casting, weather forecasting, climate monitoring, as well for the analysis of weather and climate models.

CGMS provides an international forum for the exchange of technical information on geostationary and polar orbiting meteorological satellite systems. The CGMS was established in 1972. Its members comprise current and prospective developers and operators of meteorological satellites, the World Meteorological Organisation (WMO), and space agencies operating R&D satellites contributing to WMO programmes. CGMS focuses on the coordination of long-term and sustainable satellite systems relevant to weather and climate. Through its working groups CGMS stimulates science development and the improvement and utilisation of satellite products, whereas it closely interacts with WMO, to respond to requirements from WMO and related programmes.

In 2006, EUMETSAT initiated the Cloud Retrieval Evaluation Workshops (CREWs) with the goal of providing a forum to evaluate instantaneous (level-2) cloud parameter retrievals from different passive imager algorithms and teams. Since 2006, three Cloud Retrieval Evaluation Workshops have been organised. An important component of these workshops was the inter-comparison of passive imager cloud parameter retrievals and their validation against active sensor measurements such as the NASA A-Train CALIPSO and CloudSat sensors. Through these workshops, operational and research users of observations from passive imaging satellites have exchanged information on their algorithms for the retrieval of cloud parameters from these observations, and have discussed the results of the inter-comparison and validation of level-2 cloud parameter retrievals from the different algorithms.

The scope of the CREWs fits well with the objectives of CGMS. The ICWG shall serve as a forum for operational and research users of passive imager observations to exchange knowledge on cloud parameter retrievals and enhance the impact of these retrievals in weather and climate applications. The ICWG shall prepare recommendations to guide the directions of future research and to influence the relevant programs of space agencies and WMO, such as the Global Observing System (GOS), Global Climate Observing System (GCOS), or the World Climate Research Programme (WCRP) core projects, in particular, Global Energy and Water Exchanges Project (GEWEX). This Terms of Reference outlines the objectives towards setting up the ICWG working group.

## 2. International framework

The ICWG shall establish close relationships with other CGMS working groups serving the meteorological community, as well as with working groups from relevant World Weather Research Program (WWRP) and WCRP that use information from cloud parameter retrievals (such as GEWEX). The communication with these working groups will be established through nominated focal points.

## 3. Composition of the Working Group

The ICWG shall include relevant scientists working in the field of cloud retrievals and atmospheric radiative transfer.

## 4. Terms of Reference

### Objectives

The goal of the ICWG is to enhance our knowledge on quantitative cloud parameter retrievals from state-of-art algorithms, and to pave the path towards optimising their retrieval algorithms for near-term (on the order of hours; now-casting), short-term (1-5 days; weather forecasting), medium-term (months to years; regional monitoring), and decadal (climatological cloud analyses), as well for potential improvements in the cloud and convection parameterizations adopted in weather and climate models. Users of the cloud products want assurances that the cloud products are well characterised, meaning that there is a well-defined assessment of the strengths and weaknesses of the various cloud parameters. An over-arching goal of the CREWs is for the community to reach harmony on the best practices for characterising each cloud data set. The ICWG builds upon the expertise of scientists who are involved in atmospheric radiative transfer and the retrieval of cloud parameters from satellite observations.

The overarching objectives of the ICWG are to:

1. foster commonality for level-2 and level-3 operational cloud parameter retrievals and/or products;
2. contribute to the assessment of differences between level-2 cloud parameter retrievals;
3. contribute to the validation of both level-2 cloud parameter retrievals and their error estimates;
4. identify and address research questions on level-2 cloud parameter retrieval algorithms and level-3 aggregation methods;
5. contribute to process studies of clouds and/or convection;
6. contribute to the definition of new space borne observation capabilities for cloud parameter retrievals and validation;
7. support and stimulate training of the operational and scientific community;
8. enhance the communication in this field and develop international partnerships;

In addressing these objectives, and to underpin the value of cloud parameter retrievals in weather and climate applications, the Working Group proposes to promote the:

- sharing of approaches among algorithm developers;
- performing of regular cloud parameter retrieval assessments;
- further improvement of level-2/level-3 cloud parameter retrievals;
- characterization of level-2/level-3 cloud parameter retrieval uncertainties at different space/time scales;

- adoption of standards for validation procedures and describing error estimates;
- adoption of self-describing data formats for level-2 cloud parameter products;
- use of common ancillary data;
- use of a common set of forward simulators to analyse algorithm differences;
- more efficient process for addressing the research questions identified by space agencies and WMO programs (e.g. GEWEX);
- establishment and coordination of sub-working groups addressing specific research topics.

### **Planned activities**

To achieve its objectives, ICWG needs a structure that provides:

- Biennial workshops;
- Training towards retrieving and interpreting cloud parameter products;
- Advice to CGMS member agencies at CGMS plenary;
- A forum to initiate and support validation efforts;
- Opportunities to participate in joint research projects;
- Outreach to users in the weather and climate communities.

## **5. Membership**

The ICWG shall include representatives nominated by the satellite operators of the CGMS, other members of CGMS and relevant research satellite operators. The Working Group shall also be widely open to participation from any representative of the user community expressing interest and/or willing to contribute to cloud retrieval science and its applications.

## **6. Rules of Procedure**

The ICWG shall be chaired by two co-chairs to be nominated by the ICWG representatives and appointed by the CGMS Plenary. The co-chairs will be initially appointed for a two-year term, with the possibility of renewals. The co-chairs shall oversee that the aims of the Working Group are accomplished, and coordinate the reporting between ICWG and CGMS.

Under the lead of the co-chairs, the ICWG shall organize scientific Workshops, co-sponsored by CGMS and WMO, approximately every two years. These biennial Workshops will promote the exchange of scientific and operational information between the producers of cloud parameter retrievals, the research community, and the user community.

The dialogue between CGMS and the ICWG shall be realised through a rapporteur. This rapporteur shall attend ICWG's biennial Workshops and report on ICWG at CGMS's annual meetings. The co-chairs shall compile a report on the relevant activities of, and recommendations made by, the ICWG and its sub-working groups.

The ICWG shall maintain a website that provides information on its Terms of Reference, the biennial Workshops and Trainings, as well as an overview of the sub-working groups and their composition. The website shall be hosted by one of the CGMS member agencies or by the CGMS secretariat.