World Meteorological Organization
Organisation météorologique mondiale

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Notre réf.: OBS/OSD/IMO/RQQI

GENÈVE, le 15 novembre 2011

Annexe: 2 (disponibles en anglais seulement)

Objet: Participation à la première comparaison de la CIMO de l'OMM en matière de contrôle de la qualité des données radar et d'estimation quantitative des précipitations (RQQI)

Suite à donner: Communiquer au Secrétariat de l'OMM votre intention de participer à la comparaison mentionnée en objet, au plus tard le **15 décembre 2011**

Madame, Monsieur,

Ces dernières années, le recours aux données de radars météorologiques pour des applications météorologiques diverses s'est considérablement accru et, parallèlement, les besoins en matière de qualité des données et de normalisation se sont également renforcés. Les données de radars météorologiques commencent à être intégrées aux modèles de prévision numérique du temps (PNT), les applications hydrologiques régionales nécessitent des données radar exploitables et constantes, les applications climatologiques exigent que les données radar fournissent des informations sur les précipitations à une échelle plus grande que les réseaux de pluviomètres, et les données radar sont déjà utilisées pour la validation d'ensembles de données recueillies depuis l'espace. Ces éléments ont entraîné des exigences plus strictes en matière de qualité des données pour l'utilisation quantitative de données de radars météorologiques et leur échange aux niveaux régional et mondial.

La quinzième session de la Commission des instruments et des méthodes d'observation (CIMO-XV, Helsinki, Finlande, 2-8 septembre 2010) a décidé de comparer les algorithmes utilisés pour les radars météorologiques afin de déterminer ceux qui donnent les meilleurs résultats quant au contrôle qualité et de quantifier la qualité des produits radar, comme les estimations quantitatives des précipitations. Cette proposition a reçu l'appui du Conseil exécutif à sa soixante-deuxième session (EC-LXII, Genève, Suisse, 8-18 juin 2010).

Aux Représentants permanents (ou directeurs des Services météorologiques ou hydrométéorologiques) des Membres de l'OMM (PR-6602)
M. Bruce Sumner, HMEI

cc: Membres du Comité international d'organisation de la RQQI )
Experts invités à la première session du Comité international )
d'organisation de la RQQI ) (pour information)
Membres de l'Équipe d'experts pour les comparaisons d'instruments )
Président de la CIMO )

En conséquence, un Comité international d'organisation et une Équipe de projet ont été constitués en vue de la première comparaison de la CIMO de l'OMM en matière de contrôle de la qualité des données radar et d'estimation quantitative des précipitations. Des plans détaillés ont été élaborés pour la comparaison, notamment avec la préparation d'un Accord sur le protocole de données que tous les participants devront signer au préalable. Cette comparaison diffère de tous les autres projets de comparaison de la CIMO du fait qu'il s'agit d'une comparaison d'algorithmes informatiques et non pas d'instruments à proprement parler; ainsi les participants n'ont-ils pas besoin de se rencontrer pour mener à bien la comparaison.

La comparaison est prévue entre janvier et mai 2012. Des informations complémentaires sur les propositions faites pour la comparaison figurent dans le rapport final de la première session du Comité international d'organisation de la CIMO de l'OMM pour la comparaison en matière de contrôle de la qualité des données radar et d'estimation quantitative des précipitations (Exeter, Royaume-Uni, 14-15 avril 2011), qu'on peut trouver à l'adresse Web suivante: http://www.wmo.int/pages/prog/www/IMOP/reports.html. Les plans, programmes et autres documents pertinents détaillés et mis à jour seront bientôt disponibles sur le site Web de la CIMO:

http://www.wmo.int/pages/prog/www/IMOP/intercomparisons.html.

Le Comité international d'organisation de la RQQI souhaite désormais inviter les Membres de l'OMM et les membres de l'Association des fabricants d'équipements hydrométéorologiques (HMEI) à manifester leur intention de participer à la comparaison, pour soit fournir des données d'essai, soit traiter des données d'essai, soit les deux. Les candidats intéressés sont invités à remplir le questionnaire figurant à l'annexe I et à signer l'Accord sur le protocole de données figurant à l'annexe II. Le dossier complet devra parvenir au Secrétariat de l'OMM au plus tard le **15 décembre 2011**.

Comme le précisent le Rapport final mentionné plus haut et l'Accord sur le protocole de données, les participants retenus seront sélectionnés par l'Équipe de projet de la RQQI suivant que leur participation sera jugée utile, et chaque candidat se verra informé de la décision de l'Équipe de projet à ce sujet avant le début de la période de comparaison. Les personnes souhaitant participer à la comparaison doivent être prêtes à accomplir leurs tâches respectives entre janvier et mai 2012 et devront pouvoir assumer tous les frais liés à leur participation, étant donné que l'OMM ne sera pas en mesure de fournir une assistance financière.

Pour finir, je saisis cette occasion pour vous remercier de votre contribution aux activités du Programme des instruments et des méthodes d'observation.

Veuillez agréer, Madame, Monsieur, l'expression de ma considération distinguée.

(J. Lengoasa)
pour le Secrétaire général

**W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N**
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**OBS/OSD/IMO/RQQI, ANNEX I**

# WMO/CIMO Radar Quality Control and Quantitative Precipitation Estimation Intercomparison (RQQI)

## QUESTIONNAIRE

### Introduction

The Radar QC QPE Inter-comparison (RQQI) project is described in the project plan which is available on the WMO website at:

http://www.wmo.int/pages/prog/www/IMOP/reports.html

An updated version will soon be available at:

http://www.wmo.int/pages/prog/www/IMOP/intercomparisons.html

This questionnaire is intended to identify potential participants in the RQQI project and to gather information regarding the nature of that participation. You are requested to complete this questionnaire and return it to the WMO Secretariat, to the attention of Dr Roger Atkinson (ratkinson@wmo.int) with a copy to Dr Paul Joe, Chairman of the IOC-RQQI, (paul.joe@ec.gc.ca), by 15 December 2011. Follow up (in weeks) with further detail as requested will be acceptable. There are two ways to participate in this project:

- Data Provider
- Data Processor - Algorithm

On receipt of your completed questionnaire, the International Organizing Committee (IOC)-RQQI will contact you to obtain further information if required. Selection of participants in RQQI will based on completeness of the information provided and the diverse but also pragmatic requirements of the project.

### General Questions

| *Identification of Respondent/Contact Person for RQQI Participation:* | |
|---|---|
| Name: | |
| Organization: | |
| Email: | |

| *Are you interested in participating in RQQI?* | |
|---|---|
| ☐ | Yes (continue with the survey) |
| ☐ | No (skip the rest of the survey) |
| ☐ | Possibly, I need more information<br>(please provide questions at the end of the survey) |
| ☐ | I am only interested in the final report<br>(skip the rest of the survey) |

| *I am interested in participating in RQQI in the following roles* (Check those boxes that apply and continue on in the survey): | |
|---|---|
| ☐ | Data Provider |
| ☐ | Data Processor - Algorithm |

**Data Provider Question:**

If you indicated that you would participate as a **Data Provider**, please read and complete this section. Otherwise, skip to the **Data Processor** section below.

The objective of RQQI is to quantitatively evaluate various algorithms that improve the quality of the radar data for QPE, NWP and Nowcasting in a wide variety of environments (geographical, meteorological, electronic and scan strategies) using criteria of spatial continuity or smoothness (see project plan). This requires the processing of “raw data” to produce “processed data”. Depending on the meteorological environment, the “raw” data set length is variable. For example, very short data sets (~1 hour) can be used for analysis of widespread precipitation events and very long data sets (1 or more seasons) are needed for analysis of convective weather events. This first Intercomparison will focus on the removal of ground clutter, anomalous propagation, electromagnetic interference, target classification and partial blockage (see project plan).

| | |
|---|---|
| ☐ | I will provide a short description of the radar hardware and provide a more detailed description in a separate document.<br>- Short Description: |
| ☐ | I will provide a short description of the radar configuration, particularly the signal and data processing already performed to generate the “raw data”. I will provide a more detailed description in a separate document.<br>- Short Description: |
| ☐ | I have a challenging case and I am providing a short description of the case.<br>- Short Description: |
| ☐ | I have several good cases and these are described in a separate document that I will attach or submit shortly. |
| ☐ | My data is or can be provided in ODIM_H5 (EUMETNET OPERA HDF5) HDF5 format. |
| ☐ | My data will be provided in the following format:<br>Radar Format:<br>☐ I can provide a description of the radar format. |
| ☐ | I can provide synthetic or simulated radar data for this and will describe this in a separate document. |

**Data Processor Participant**

If you indicated that you would participate as a **Data Processor**, please read and complete this section of the survey.

| | |
|---|---|
| ☐ | I attach or will submit the following document(s) to describe the data processing system or algorithm(s): |
| ☐ | I can or will be able to process data in ODIM_H5 (EUMETNET OPERA HDF5) format. |
| ☐ | I can process many other formats including:<br>Formats that I can process: |
| ☐ | My data processing system requires the following conditions or ancillary data:<br>Requirements: |

**Any Additional Comments or Questions that you may have:**

| |
|---|
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| |

## ACCEPTANCE OF DATA PROTOCOLS FOR RQQI

I, ..... (insert your name) ....., … (insert your title/function) ……. hereby declare that I and my organization/company, ……..... (insert your org/co name) ……..., shall abide by the Data Protocols for RQQI as set out below.

Signature: .....

Date: …… … Place: ……

## DATA PROTOCOLS FOR RQQI

### 1. INTRODUCTION

1.1 The Radar Quality Control and Quantitative Precipitation Intercomparison (RQQI) is an international intercomparison project being conducted as part of the work programme of the Commission for Instruments and Methods of Observation (CIMO) of the World Meteorological Organization (WMO).

1.2 RQQI aims to quantify the similarities and differences in effectiveness of various automated techniques in use around the globe for improving the quality of output weather radar data used for quantitative precipitation analysis, data assimilation and nowcasting, using different radar signal and data processing systems, under different weather scenarios, climate regimes, geographical and topographical features and in the presence of different data-degrading phenomena, such as radiofrequency interference and clutter. It focuses on C and S band radars operated in conventional mode (relectivity only), Doppler mode, and dual polarization mode.

### 2. PROJECT GOVERNANCE AND EXECUTION

2.1 RQQI is being conducted under the leadership of its **Project Leader**, Dr Paul Joe, who was selected by CIMO's Management Group to fulfil this role.

2.2 Overall project governance is the responsibility of an **International Organizing Committee (IOC)**, which is chaired by the RQQI **Project Leader**. The IOC is responsible for project governance, broad organization and planning, including setting of project terms of reference, goals and objectives, for ensuring the scientific integrity of the project, for taking pragmatic steps to promote the project, for approval of the project conclusions and output recommendations for WMO Members, for reviewing the draft Final Report and for approving the Final Report. The IOC reports, through its Chair, to WMO through the CIMO Secretariat.

2.3 Membership of the **IOC** was proposed by the **Project Leader** in consultation with the CIMO Secretariat and has been approved by the Secretary-General of WMO. The **IOC** for RQQI comprises:

| | | |
|---|---|---|
| Paul JOE | Env. Canada | Canada (Chair) |
| Yoshihisa KIMATA | JMA | Japan |
| Liping LIU | CAMS/CMA | China |
| Alan W. SEED | BOM | Australia |
| Daniel B. MICHELSON | SMHI | Sweden, Representing BALTRAD |
| Timothy D. CRUM | NOAA/NWS/ROC | USA |
| Roberto CALHEIROS | IPMET/UNESP | Brazil |
| Estelle de CONING | SAWS | South Africa |
| John C. HUBBERT | NCAR | USA |
| Nicolas GAUSSIAT | Met Office | UK, Representing OPERA |
| Vincenzo LEVIZZANI | ISAC-CNR | Italy, Representing WCRP/IPWG |
| Daniel SEMPERE-TORRES | University of. Barcelona | Spain |

2.4 The main work of RQQI is being performed by its **Project Team**, a small group of experts selected by the **IOC** for this purpose. The **Project Team** is responsible for the selection of **Test Datasets** for the project, for organizing the processing and analysis of those datasets by participants, for analysis and review of all results, for preparation of draft conclusions and recommendations, and for drafting the Final Report. The **Project Team** reports, through its Chair, the **Project Leader**, to the **IOC**. The **Project Team** comprises:

| | | |
|---|---|---|
| Paul JOE | Env. Canada | Canada (Chair and Project Leader) |
| Norman DONALDSON | Env. Canada | Canada |
| Liping LIU | CAMS/CMA | China |
| Alan W. SEED | BOM | Australia |
| Daniel B. MICHELSON | SMHI | Sweden |
| John HUBBERT | NCAR | USA. |

## 3. SELECTION OF TEST DATASETS AND PROJECT PARTICIPANTS

3.1 WMO will call for expressions of interest in participation in RQQI from CIMO Members and from weather radar manufacturers (via HMEI) as prospective **Project Participants**: either **Test Dataset Providers**, and/or **Test Dataset Processors** (processors of **Test Datasets**, using their automated radar data processing software).

3.2 Prospective **Test Dataset Providers** will be requested to submit to the CIMO Secretariat their proposed **Test Dataset(s)**, and **Input Documentation** that describes it, including the respective weather radar system(s), the data processing steps already applied to the data, and the features of each submitted dataset that are likely to make it suitable for use as a **Test Dataset**.

3.3 Prospective **Test Dataset Processors** will be requested to submit to the CIMO Secretariat **Input Documentation** that describes the relevant algorithms used within their automated radar data processing software.

3.4 All proposed **Test Datasets** and/or **Input Documentation** that are/is received from prospective **Project Participants** will be provided to the **Project Team**, which will then select the RQQI **Project Participants,** based on the perceived value to RQQI of the participation of

that proposed **Test Dataset** and/or prospective **Project Participant's** automated radar data processing algorithms.

## 4. THE INTERCOMPARISON PROCESS

4.1 Once the **Project Team** has selected **Project Participants** and **Test Datasets**, **Test Dataset Processors** will be requested to process each of the **Test Datasets** using their automated radar data processing algorithms, to produce **Processed Datasets**.

4.2 The resulting **Processed Datasets** are to be submitted by each **Test Dataset Processor** to the **Project Team** for:

**(a)** **Individual Analysis and Assessment** (analysis and assessment of the **Processed Dataset(s)** from a single **Test Dataset Processor**, which resulted from the application of one or more of their algorithms); and

**(b)** **Comparative Analysis and Assessment** (i.e. comparative analysis and assessment of the **Processed Dataset(s)** from some or all **Test Dataset Processors**, which resulted from the application of one or more of their respective algorithms). This analysis and assessment will be performed using **Analysis and Assessment Algorithms and/or Software** (hereafter **AAAS**) developed for this purpose by the Project Team. The resulting **Analysis and Assessment Data and Information** (hereafter **AADI**) will then be used by the **Project Team** in drafting the **Final Report**.

## 5. PROTOCOLS

### 5.1 Test Datasets and Input Documentation

5.1.1 All proposed **Test Datasets** and/or **Input Documentation** provided by prospective **Project Participants** shall remain the intellectual property of the respective provider.

5.1.2 WMO will destroy copies of proposed **Test Datasets** and **Input Documentation** which are not selected for participation.

5.1.3 **Test Dataset Providers** agree to WMO retaining, using and publishing part or all of the selected **Test Datasets** and accompanying **Input Documentation,** as part of this and any similar future intercomparison project(s) that WMO may conduct. WMO will acknowledge the source of the data and/or information used in any resulting publication(s).

5.1.4 **Test Dataset Processors** agree to WMO retaining, using and publishing part or all of their **Input Documentation** as part of this intercomparison project, and for any repeat or follow-on analysis using the same or improved **AAAS.** WMO will acknowledge the source of the information in any resulting publication(s).

### 5.2 Processed Datasets

5.2.1 No manual intervention or software tuning is permitted in the production of **Processed Datasets**, and **Test Dataset Processors** agree to abide by this requirement.

5.2.2 **Processed Datasets** shall be the intellectual property of the **Test Dataset Processor** who produced them. **Test Dataset Processors** may independently publish their own **Processed Dataset(s)**, but not that of others, prior to the publication of the **Final Report**. Should they do so, they shall obtain prior permission of the **Test Dataset Processor** who produced the **Processed Dataset**.

5.2.3 **Test Dataset Processors** agree to WMO retaining, using and publishing part or all of their **Processed Datasets** in this intercomparison project and for possible future reanalysis using the same or improved **AAAS**. WMO will acknowledge the source of the data used in any resulting publication(s).

### 5.3 Analysis and Assessment Algorithms and/or Software (AAAS)

5.3.1 Pre-existing **AAAS** provided to RQQI by members of the **Project Team** will remain the intellectual property of the provider.

5.3.2 **AAAS** developed and published as part of RQQI by the **Project Team** will be in the public domain.

### 5.4 Analysis and Assessment Data and Information (AADI)

5.4.1 WMO shall be entitled to publish in the **Final Report** part or all of the **AADI** produced from the **Processed Datasets** using **AAAS** as part of RQQI, irrespective of the source of the **AAAS** WMO shall also be entitled to publish some or all **AADI** on its website after the publication of the **Final Report**.

5.4.2 The **Project Team** will provide to each **Test Dataset Processor** a copy of the **Individual AADI** corresponding to their **Processed Dataset(s)**. This **Individual AADI** will not be provided to other **Test Dataset Processors** or **Test Dataset Providers** before the publication of the **Final Report**.

5.4.3 Notwithstanding the foregoing, **Test Dataset Processors** may independently publish the **Individual AADI** corresponding to their **Processed Dataset(s)**, prior to the publication of the **Final Report**, on condition that WMO is acknowledged as the source of the **AADI**. However, in so doing, they agree to make neither statement(s) either directly or indirectly comparing the performance of their automated radar data processing algorithms to those of any other **Test Dataset Processor(s)**, nor statement(s) comparing the relative value of any of the various **Test Datasets**.

5.4.4 After publication of the Final Report, WMO will make all **AADI** available to whoever may request it, on condition that it is used solely for the purposes of scientific research and not in order to gain commercial advantage.

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