CGMS

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WCRP AND WWRP/THORPEX: THE YEAR OF TROPICAL CONVECTION (YOTC)

This Working Paper informs CGMS about the YOTC which is currently underway.

A satellite component of YOTC is essential to the success of the initiative and will involve establishing a database of key products for the evaluation and assessment of numerical model output. This should primarily involve data and products that have not been assimilated into the models.

Action/Recommendation proposed:

CGMS members are invited to:

- Comment on this paper as appropriate;
- Support the YOTC concept and objectives and in particular encourage member satellite agencies to help provide the verification data and products needed to make this project a success;
- Facilitate access to relevant satellite data sets;
- Assist where possible with the development of specific products for assessment and monitoring of the global numerical weather prediction analyses and forecast products;
- Identify a point of contact for further detailed discussion of requirements.

WCRP and WWRP/THORPEX: The Year of Tropical Convection (YOTC)

1 INTRODUCTION

The realistic representation of tropical convection (and its two way interaction with the general circulation) in global atmospheric models is a long-standing grand challenge for numerical weather prediction and climate projection. To address this challenge, WCRP and WWRP/THORPEX are implementing the Year of Tropical Convection: a coordinated observing, modelling and forecasting of organized tropical convection and its influences on predictability. YOTC is a contribution to the United Nations Year of Planet Earth to complement the International Polar Year (IPY).

2 MAIN TEXT

This effort is intended to advance the characterization, diagnosis, modelling, parameterization and prediction of multi-scale convective/dynamic interactions, including the two-way interaction between tropical and extra-tropical weather/climate. YOTC will exploit the vast amounts of existing and emerging terrestrial and satellite observations, the expanding computational resources and the development of new, high-resolution modelling frameworks. Rather than conduct a special and limited duration field campaign, YOTC will rely on the construction of a comprehensive database consisting of satellite data, in-situ data sets and global/high-resolution forecast and simulation model outputs relevant to tropical convection. YOTC activities and its ultimate success will be based on the coordination of a wide range of ongoing and planned international programmatic activities (e.g., GEWEX/CEOP/GCSS, THORPEX/TIGGE, EOS, GOOS) and on strong collaboration among the operational prediction, research laboratory and academic communities. Since improvements in the treatment of tropical convection will benefit numerical weather prediction, seasonal forecasts and climate predictions, YOTC will foster cooperation among these research communities and entrain a new generation of scientists, while reducing a common barrier to improved prediction.

The focus year for YOTC began on 1 August 2008. YOTC is intended to leverage the most benefit from recent investments in Earth Science infrastructure as well as entrain a new generation of young scientists into tackling the outstanding problems in the field of weather and climate prediction.

The first steps to establish the global database comprise include:

- High-resolution (T799/25km grid) ECMWF analysis and deterministic forecast data complete with all relevant quantities;
- An analogous data set from NCEP, GMAO and/or JMA;
- Modest enhancement of the routine TIGGE archive
- The establishment of an archive of the ECMWF output, which will allow access by the YOTC scientific community, is also underway.

Attention is now turning to the establishment of a satellite database containing selected quantities from multi-sensor satellite platforms. Ideally these should be at high resolution and not used in the data assimilation system. It is in this regard that the support and assistance of the member agencies of the CGMS is requested.

A draft YOTC Science Plan was developed by the planning team and discussed in detail at a Scientific Planning Group meeting held in Washington DC on 13 and14 November 2007. The overarching goals were endorsed at this meeting and the concept of targeted meteorological phenomena was agreed. The YOTC goals reflect the current key interests of the climate community including the value of addressing systematic errors and biases in models. Links with numerical weather prediction programmes, such as THORPEX and their relevant field-campaigns (including T-PARC) have been established. Cloud-system resolving modelling initiatives are included. YOTC will focus mainly on tropical convection issues on timescales from the diurnal up to the intra-seasonal. It will operate on a "live basis" i.e., focusing on events as they occur during the "year". This will capitalize on the interests of the operational communities and engage the research community directly with key issues in need of solution.

The YOTC Science Plan has been received enthusiastically and is now available in final form.

The Plan and a summarizing presentation can be found at:

http://hydro.jpl.nasa.gov/tmp/WCRP.WWRP.YOTC.scienceplan.pdf and

http://hydro.jpl.nasa.gov/tmp/WCRP.THORPEX.YOTC.ppt, respectively.

3 CONCLUSIONS

The YOTC initiative provides an important opportunity to tackle a key issue in weather prediction and climate projection i.e. organized tropical convection. The success of YOTC depends on access and utilization of satellite data by participating researchers. YOTC is in the process of seeking greater involvement of the satellite community and has made some contact and request from several providers of satellite data. The support of CGMS is sought to establish the satellite component, which will enable evaluation and assessment of numerical model predictions. In particular, CGMS is invited to

Support the YOTC concept and objectives and in particular encourage member satellite agencies to help provide the verification data and products needed to make this project a success;
Facilitate access to relevant satellite data sets;
Assist where possible with the development of specific products for assessment and monitoring of the global NWP fields;
Identify a point of contact for further detailed discussion of requirements.