

COOPERATION WITH WCRP

Progress Report on Year of Tropical Convection (YOTC)

(submitted by David Parsons and Valery Detemmerman)

Purpose of Document and Major Decision(s) Requested

This document provides a progress report on the development of the WCRP-WWRP/THORPEX Year of Tropical Convection project and highlights in particular:

- i. The completion of a YOTC Science Plan.
- ii. The ECMWF high resolution modelling data with diagnostic fields being made available to YOTC researchers through initial support from US funding agencies
- iii. Future plans for YOTC

The Management Group is requested to:

- i. Comment on this paper as appropriate
- ii. Support the general YOTC concept and objectives
- iii. Support efforts to facilitate access to relevant satellite data sets, additional numerical models, and observational data sets

Summary of Activity

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. The initial concept for a YOTC was formulated at the WWRP/THORPEX-WCRP Multi-Scale Convection/MJO Trieste Workshop, March 2006.

2. Status of YOTC

2.1 Description of the YOTC Effort

YOTC 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 data-base 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 data-base are envisioned to 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.
- A satellite data base containing selected quantities from multi-sensor satellite platforms. Ideally these measurements should be at high resolution include relevant observations not used in the data assimilation system.

At the current time, the **only** YOTC data readily available is the high resolution fields from the ECMWF. These fields are available through

<http://data-portal.ecmwf.int/data/d/yotc>

The standard fields exist and the 31 extra diabatic and other special fields are being progressively generated and back months will be added in the next few weeks (and so on). To our knowledge this data set marks the first time that these extra diabatic terms have been made available to the broad international research community allowing detailed examination of the behavior of the model parameterizations.

2.2 YOTC Science Plan

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 the 13/14th 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 programs, 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 by the WWRP JSC, and the THORPEX, GEWEX and CLIVAR research communities. The Science Plan is now available in final form. The YOTC Science Plan is now being printed as a WCRP-WWRP/THORPEX Joint Technical Document.

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 and Next Steps

The YOTC initiative provides an important opportunity to tackle a key issue in weather prediction and climate projection, i.e. organised tropical convection and its two-way interaction with the large-scale. The success of YOTC begins with easy access of the required data sets by participating researchers. YOTC is now focusing on seeking greater involvement of the satellite community and has made some contact and request from several providers of satellite data. A satellite plan is being developed by the YOTC scientific planning group to specify the needs from the various providers. The support of CGMS was also requested in regard to establishment of the satellite component, which will enable evaluation and assessment of numerical model predictions. A meeting is planned to be held in 2009 that will bring together satellite providers and YOTC researchers. Later in 2009, a science workshop will be held in addition to YOTC presentations at the 3rd THORPEX Science Symposium.