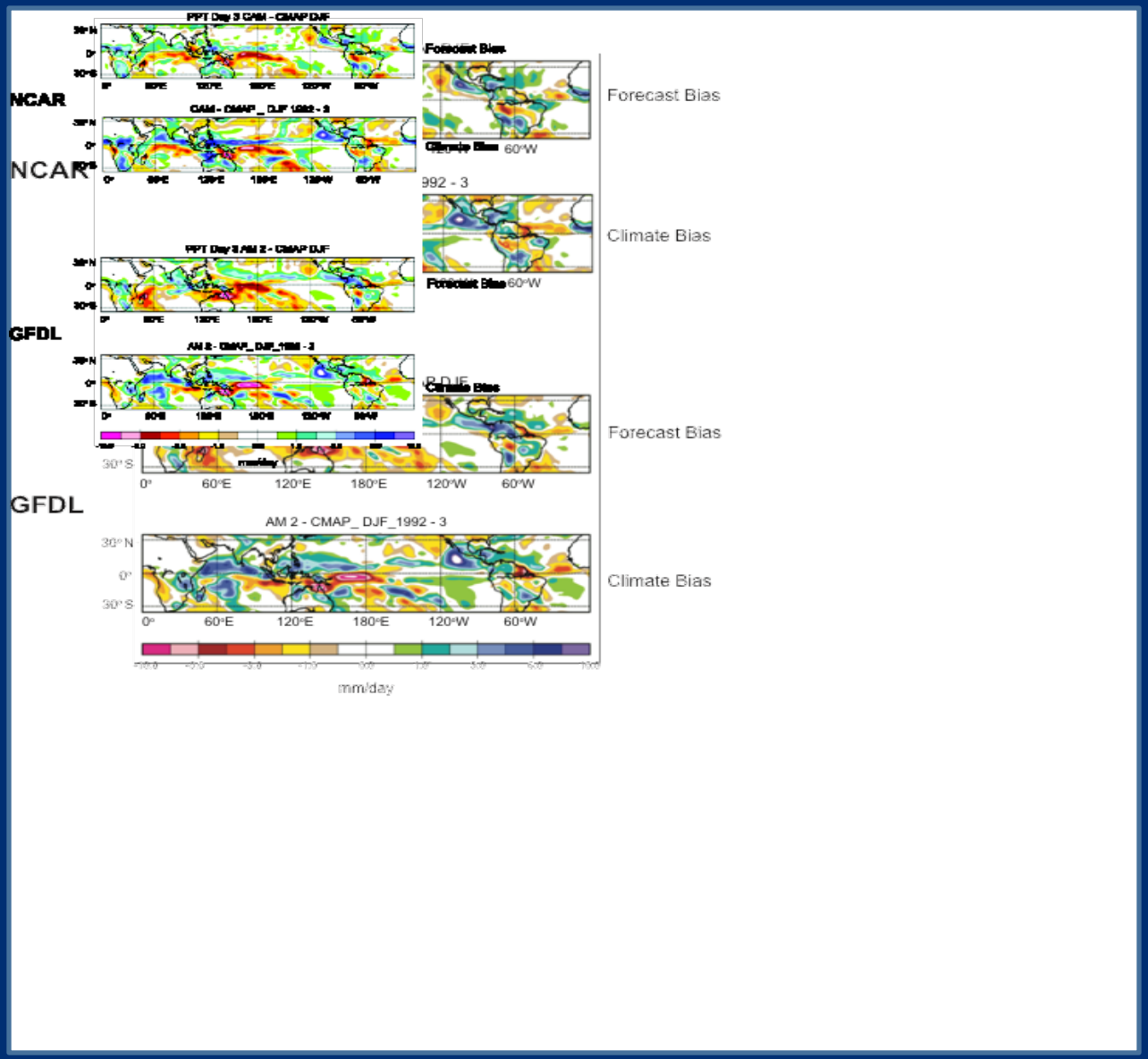
# Transpose-AMIP II simulations of the MJO for the Year of Tropical Convection (YOTC)

**Mitch Moncrieff, NCAR**

KT Breakout, CMMAP W**orkshop, Fort Collins, Aug 3-5 , 2010**

# Motivation for Transpose-AMIP: A WGNE Project




Courtesy: J Boyle

# Year of Tropical Convection (YOTC)

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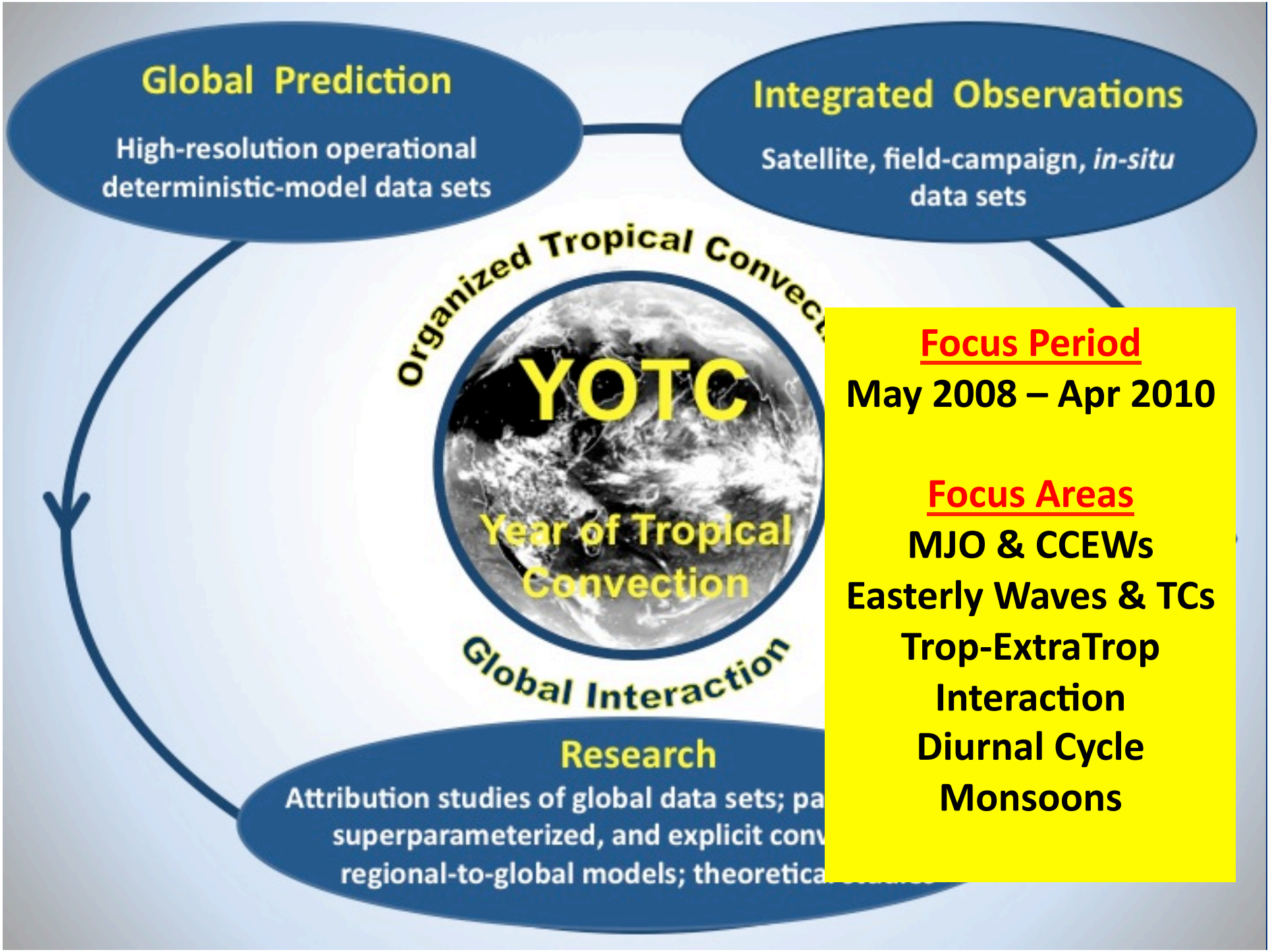
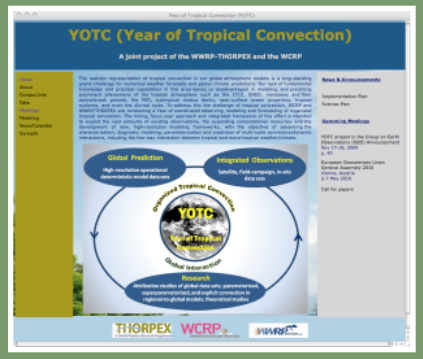
Co-chairs, YOTC Science Planning Group


Contribution to Seamless Weather-Climate Prediction


Global Prediction
High-resolution operational deterministic-model data sets
Integrated Observations
Satellite, field-campaign, in-situ data sets
Organized Tropical Convecti
YOTC
Year of Tropical Convection
Global Interaction
Research
Attribution studies of global data sets; pa
superparameterized, and explicit conv
regional-to-global models; theoretica
Focus Period
May 2008 – Apr 2010
Focus Areas
MJO & CCEWs
Easterly Waves & TCs
Trop-ExtraTrop Interaction
Diurnal Cycle
Monsoons

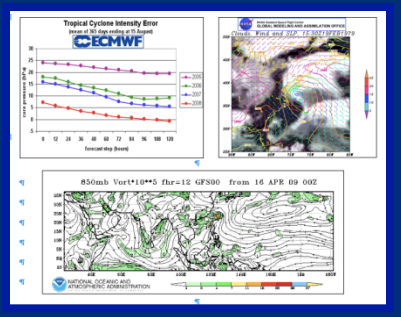
# Overview

- Science Plan – Published
- Implementation Plan drafted
- YOTC Project Office at NCAR, funded by NSF, NOAA, NASA

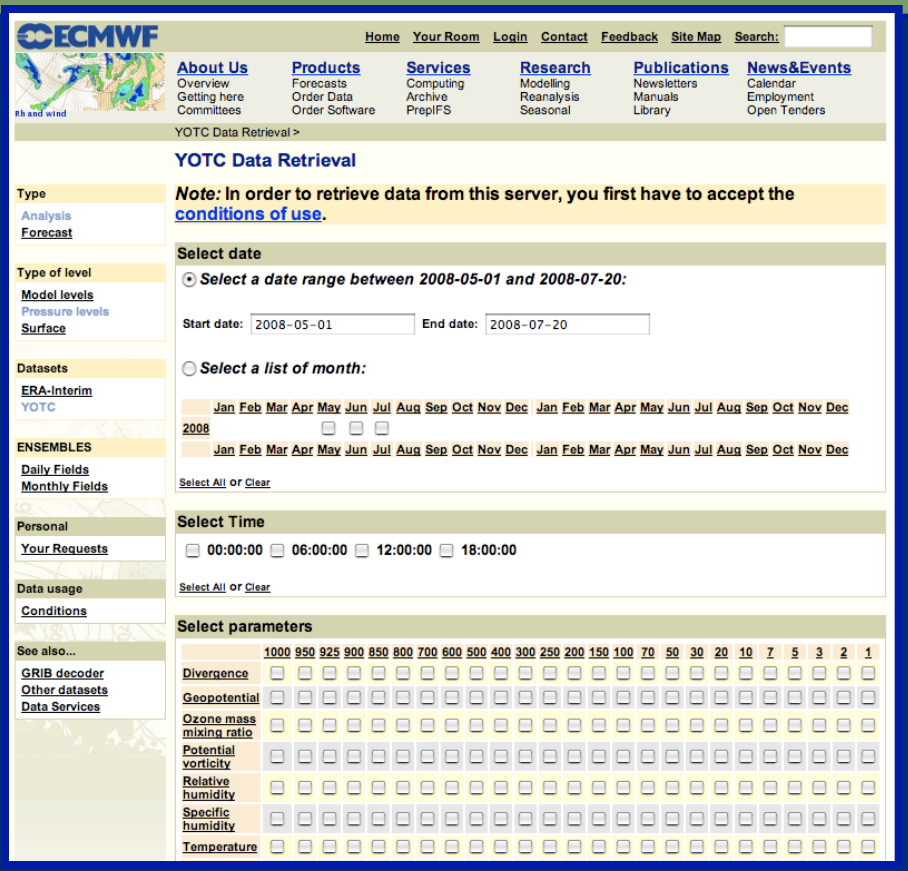



- Website http://www.ucar.edu/yotc
- YOTC Sessions – Fall AGU'08, AMS'09, Spring AGU'09, Fall AGU'09, AGU'10,

# Analyses, Forecasts & Special Diagnostics




- **Available from ECMWF for 1`May 2008 – April 2010 at mesh size of 25km (15 km Jan 2010 – April 2010)**



# Coordinated Research

## Weather as an initial-value problem for climate (seamless prediction)

- **Hindcasts**

i) WGNE CMIP5 Model studies.

ii) Multiple GCMs – European GEWEX/EUCLIPSE project.

iii) YOTC Transpose AMIP II

## MJO & Convectively-Coupled Equatorial Waves

- **High Resolution (~1 km -10 km) hindcasts: Cascade, NICAM, GMAO & NCAR.**
- **Multi-model 20-year hindcasts, CLIVAR Asian Australian Monsoon Panel (AAMP); Asian Monsoon Years (AMY)**
- **YOTC MJO Task Force**

# MJO dynamics in the Transpose-AMIP II/YOTC hindcasts

- YOTC-ECMWF 2-year database (May 2008-April 2010) -- high-resolution analysis, forecasts and special diagnostics for complete ENSO cycle. (La Nina conditions during the first year associated with weak short-lived MJOs followed by El Nino conditions and two strong MJOs. ) Asian-Australian summer monsoons during the "Year": normal rainfall of 2008 contrasted with a relatively dry 2009. Monsoons display intraseasonal variability due to the MJO and/or the northward propagation of the ITCZ in the Indian Ocean.

- Strong wintertime MJOs in El Nino conditions, weak MJOs in La Nina conditions raises some questions, e.g., i) What controls the amplitude of the MJO, is organized convection important? Do dynamics of summertime MJO differ from wintertime MJOs, especially in the Indian Ocean? Are weak MJOs more difficult to predict than strong ones? How does MJO amplitude depend embedded organized convection?

# YOTC Transpose AMIP focused studies

- 3 MJOs identified in the YOTC Implementation Plan www.ucar.edu/yotc are within the hindcast periods of Transpose-AMIP II project:
- i) mid-October 2008 MJO followed a suppressed phase subsequent to the mid-August MJO
- ii) late January 2009 MJO propagated into northern Australia associated with Queensland floods, tropical cyclones, and wildfires
- iii) April-May 2009 MJO, strongest in the "Year" up to that time, involved convectively coupled atmospheric Kelvin waves, ay beemn a factor in the transition to El Nino.

# YOTC hindcast design

- See YOTC AMIP II website: www. transpose-amip.info
- 4 sets of hindcasts initiated with YOTC 0000Z analysis starting on 15$^{th}$ of each of following months, continuing for 16 days at 30-hr increments – a total of 64 hindcasts:
  - Oct 2008
  - Jan 2009
  - Apr 2009
  - Jul 2009
- These hindcasts include examples of weak MJOs during La Nina conditions

# Participants

- Met Office
- NCAR
- MPI
- IPSL (Institut Pierre Simon Laplace)
- KNMI (running EC-Earth)
- Meteo France
- MMF: CMMAP SP-CAM (Cristiana Stan, COLA)
- MMF: Goddard ?