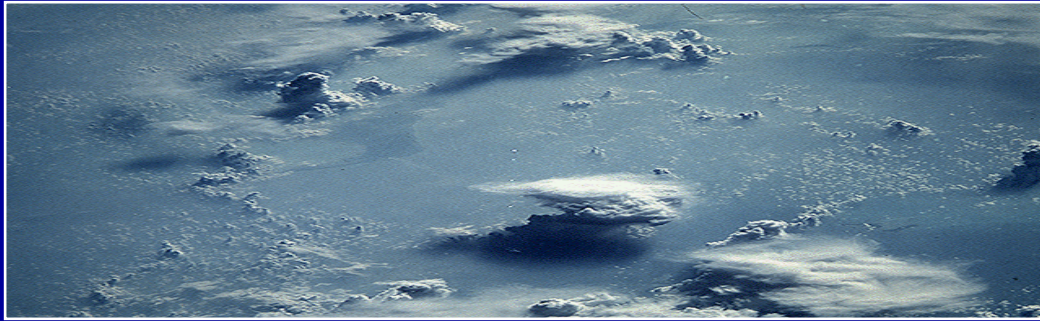


NCAR Nested Regional Climate Model and Tropical Channel Model in the context of YOTC and DYNAMO



Mitch Moncrieff
NCAR/MMM

Model configuration

- Based on NCAR WRF
- Meridional boundary conditions of tropical channel model supplied by NCEP global analysis
- Specified SST
- 36-km grid in outer domain (run for 10 years)
- 12-km (run for ~ year) and 4-km inner domains placed over Maritime Continent (run ~ months)
- Kain-Fritsch *convective parameterization* in outer and 12-km domain, *explicit convection* in 4-km domain
- No data assimilation

Hybrid

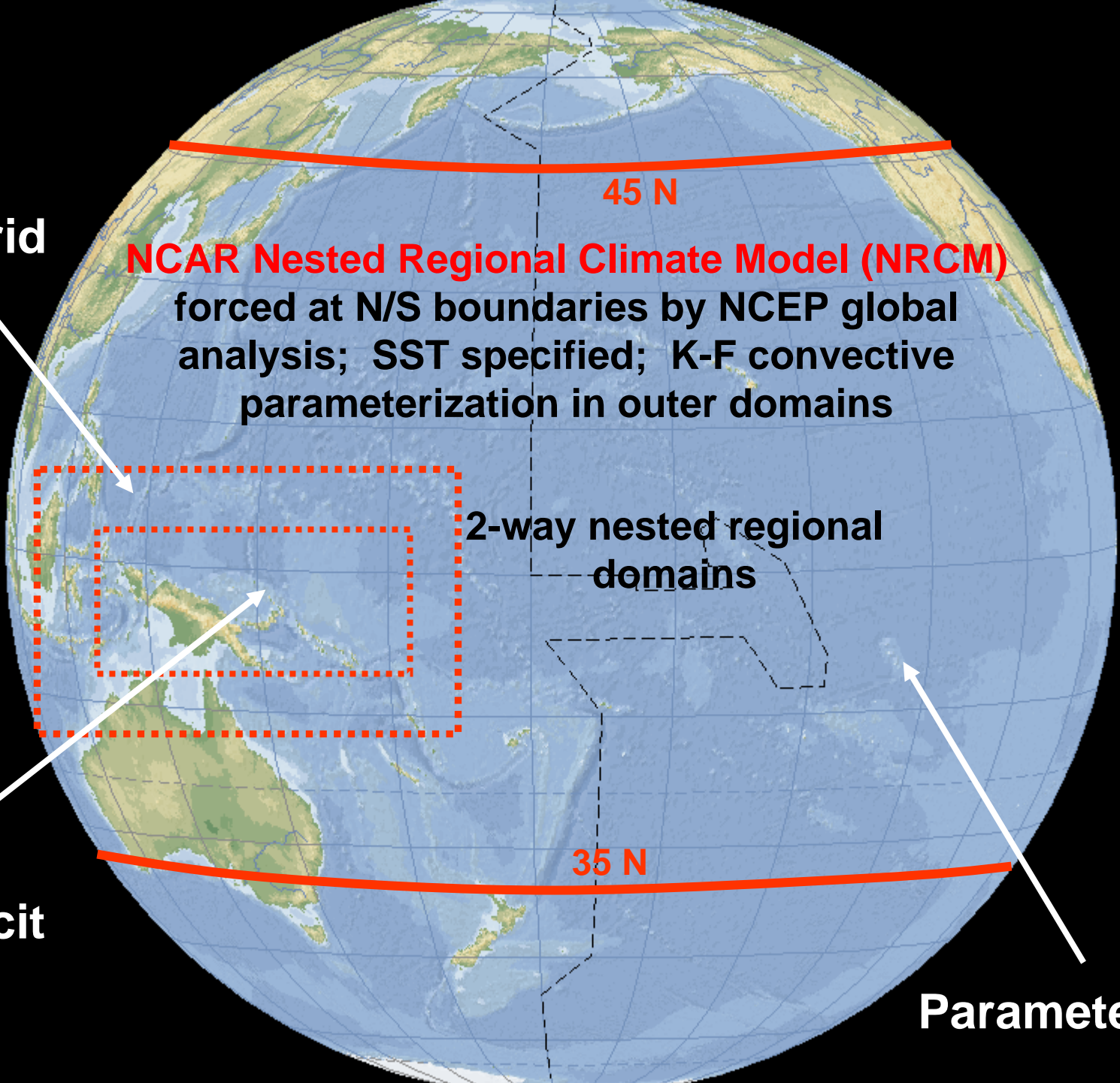
NCAR Nested Regional Climate Model (NRCM)

forced at N/S boundaries by NCEP global analysis; SST specified; K-F convective parameterization in outer domains

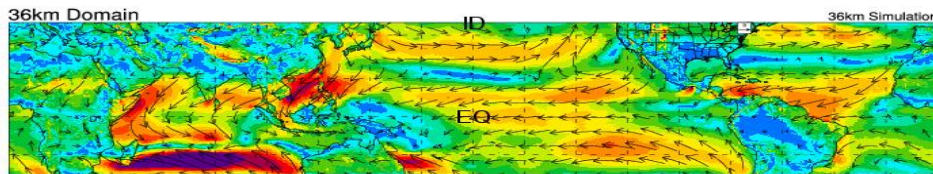
Explicit

2-way nested regional domains

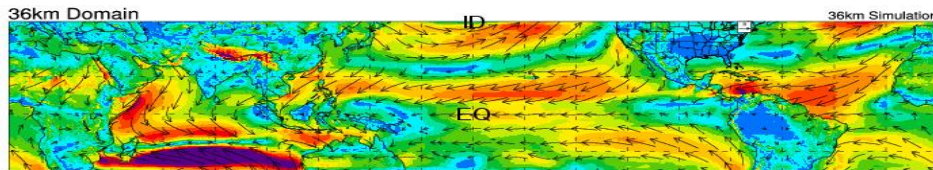
Parameterized



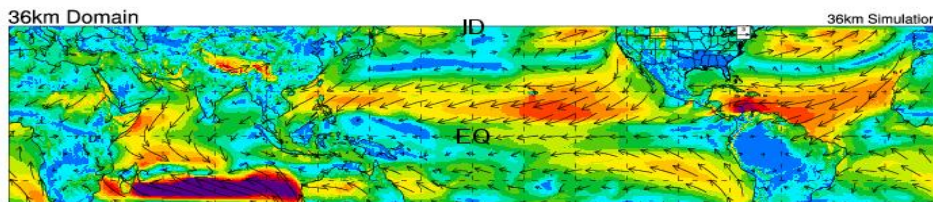
Wind Speed at 10m (m/s) - January 1997



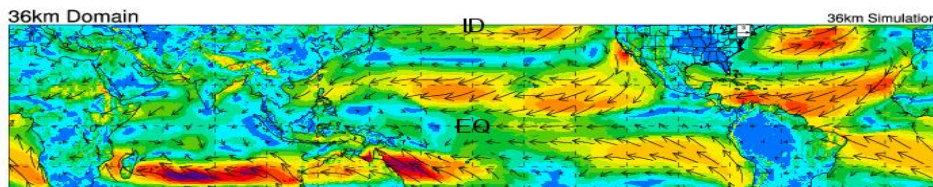
Wind Speed at 10m (m/s) - February 1997



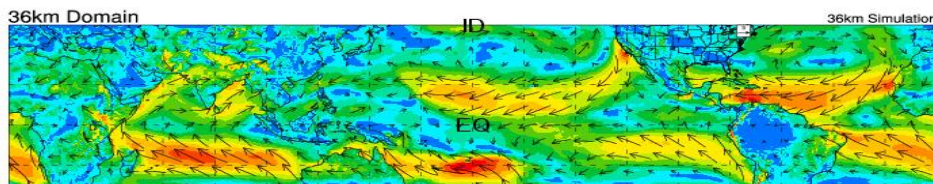
Wind Speed at 10m (m/s) - March 1997



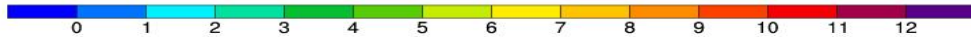
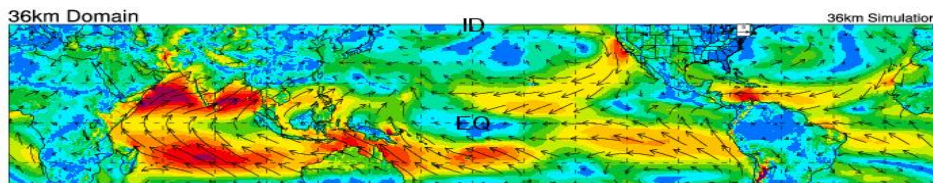
Wind Speed at 10m (m/s) - April 1997



Wind Speed at 10m (m/s) - May 1997



Wind Speed at 10m (m/s) - June 1997



Seasonal Cycle of 10-m wind (Jan - June 1997)

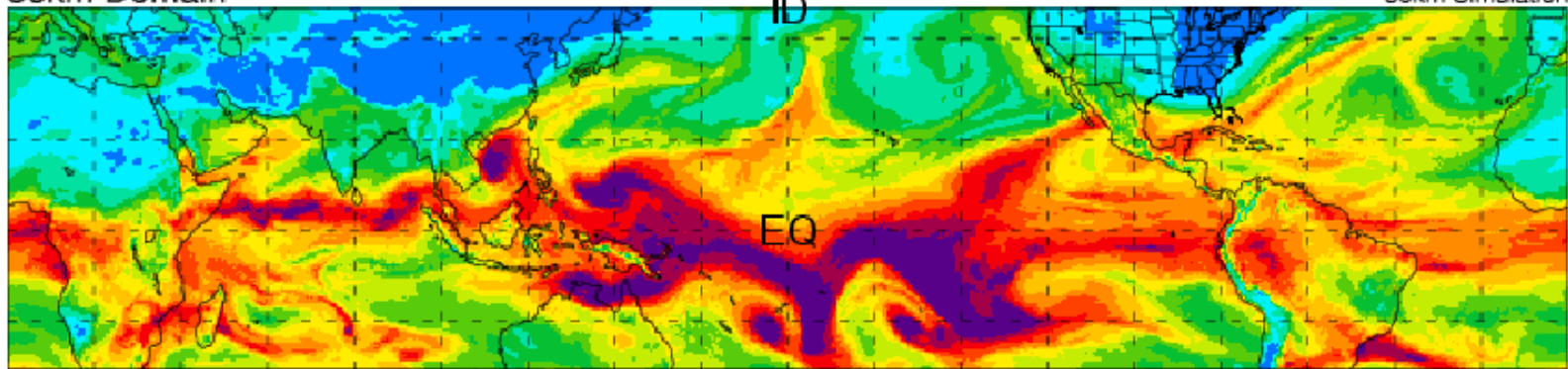
Salient features i.e.,

- Asian winter & Australasian summer monsoon
- E. Pacific trade winds
- Atlantic trade winds

PW (mm) - 19980101 00Z

36km Domain

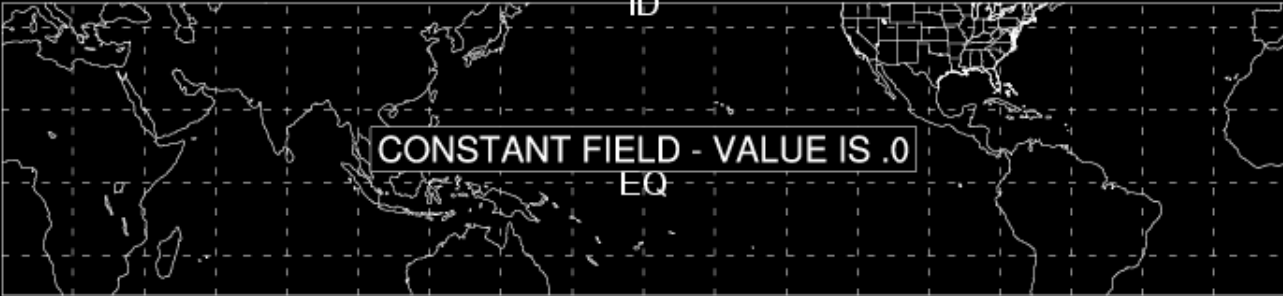
36km Simulation



OLR (W/m-2) - 19960101 00Z

36km Domain

36km Simulation



300

OLR_1996_1dom

MJOs in channel model

- Weaker than in reality
- Higher resolution (12 km and 4 km) nested domains did little to improve MJO ... except for cases identified with extratropical excitation
 - interesting distinction, relates to observations
 - possible (disruptive) effect of Maritime Continent
 - parameterized convection in outer domain *biases the mean state* and hence (4-km) inner-domain environment

NCRM/Channel Model and DYNAMO

- NCRM links the mesoscale/regional observations and modeling of the DYNAMO field campaign to the large-scales of the tropics/extratropics
- NCRM addresses the *representation* of tropical convection (*parameterization, hybrid, explicit*) in global NWP/climate models that's a major issue for YOTC
- NCRM links DYNAMO to the YOTC MJO theme
- DYNAMO is a prospective future YOTC case study
- Prospective YOTC "Virtual DYNAMO" prior to the 2011 field campaign -- help formulate/ sharpen scientific hypotheses