

**AMIE:
Observations of the Madden-
Julian Oscillation for Cloud
Modeling Studies**

AMIE

ACRF MJO Investigation Experiment

ARM Climate Research Facility

Madden-Julian Oscillation

Atmospheric Radiation

Measurement Program

AMIE Science Steering Committee

AMIE Co-Experimenters (ACEs):

**Tony DelGenio, Bill Gustafson, Bob Houze,
Christian Jacob, Mike Jensen, Steve Klein,
Ruby Leung, Xaihong Liu, Ed Luke, Peter
May, Sally McFarlane, Pat Minnis, Courtney
Schumacher, Andy Vogelmann, Yi Wang,
Xiaoqing Wu, Shaohong Xie**

Chuck Long

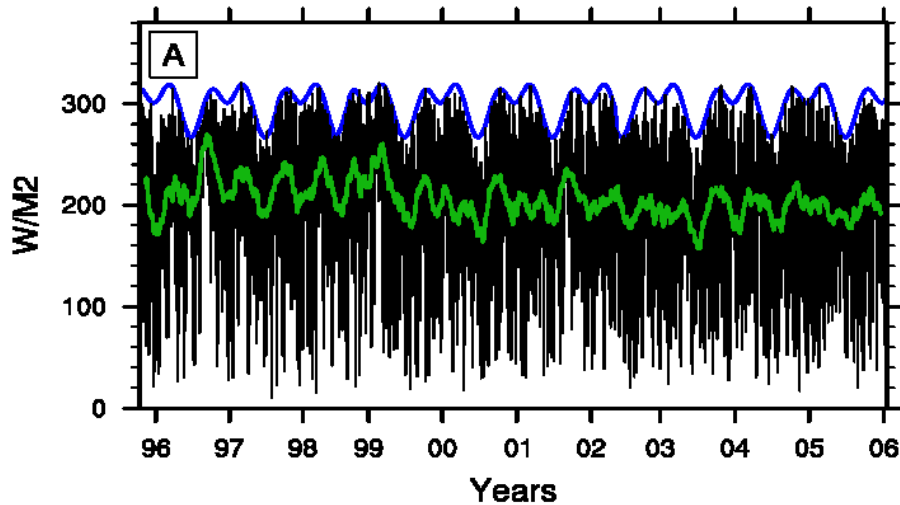
AMIE Principle Experimenter (APE)

ARM TWP Sites

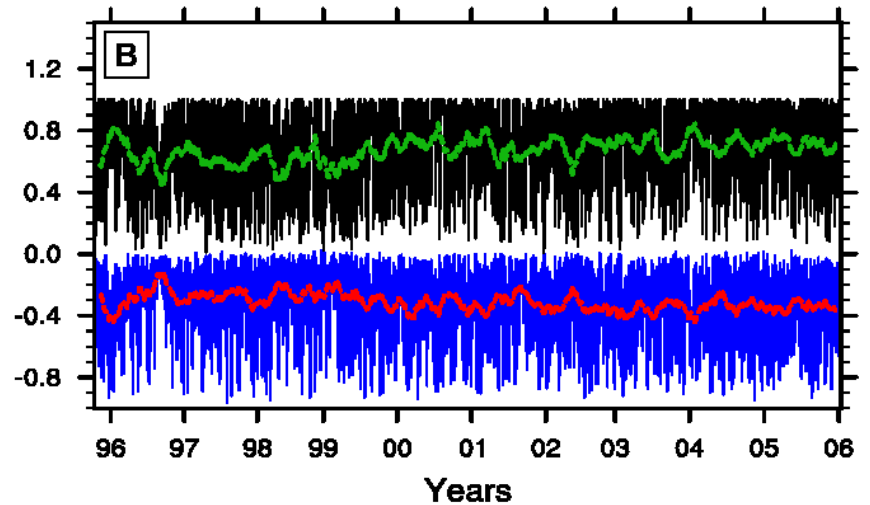


Manus MJO Signal

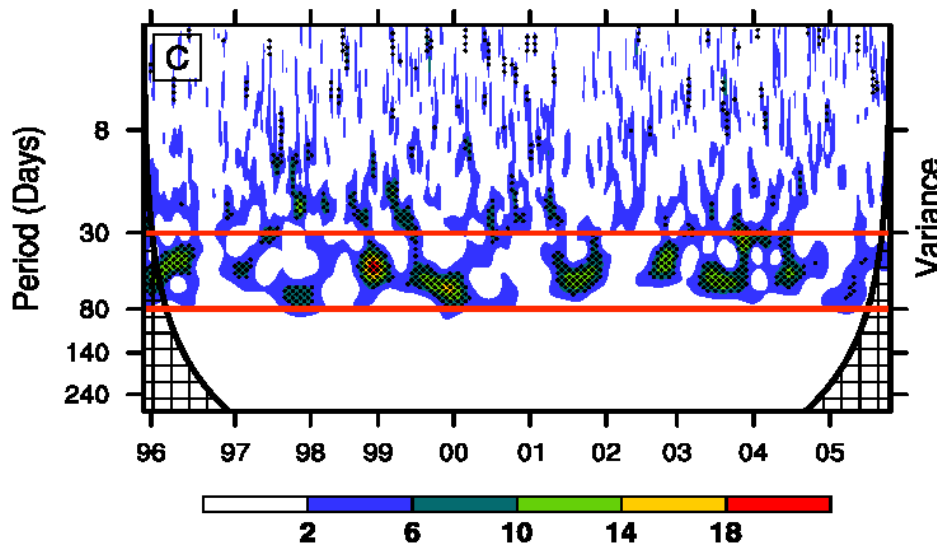
Manus Shortwave Downwelling Fluxes



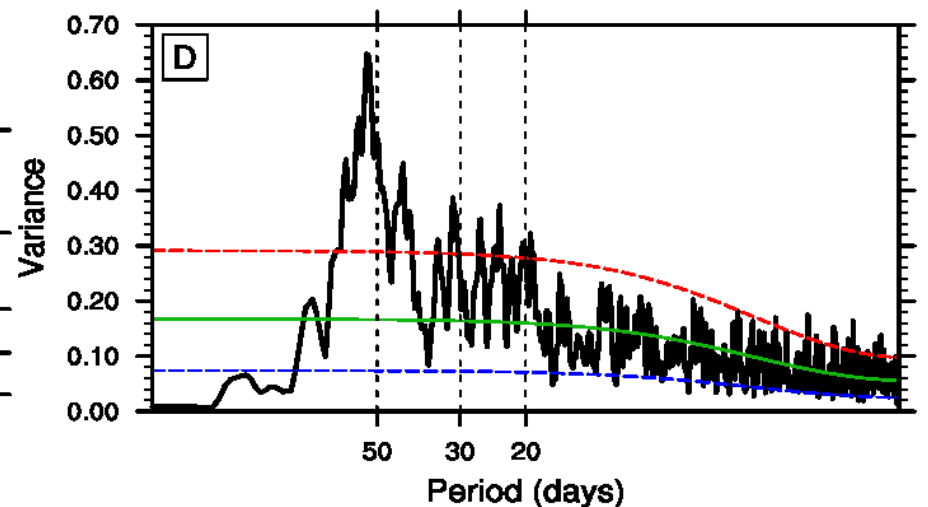
Manus FSC (black) and CRF (blue)



CRF Wavelet Power



CRF Power Spectrum



AMIE and CINDY Sites



ARM Modeling Paradigm

- **Single Column and Cloud Resolving models need context**
- **ARM has developed Variational Analysis data product for this**
- **Typically required surrounding the domain with sonde launches**
- **Not practical/possible for ARM TWP equatorial sites**
- **TWP-ICE showed the powerful constraint afforded by C-POL precipitation information**

Original Proposal

- **Oct. 2010 – March 2011**
- **Field the SMART-R C-POL radar on Manus**
- **Increase sonde launches**
- **Used in conjunction with ECMWF reanalysis**
- **Produce Variational Analysis product**
- **SMART-R deployment major cost of the proposal**

“Stimulating” news!



- American Recovery and Reinvestment Act (ARRA)
C-POL on Manus!
- Scanning dual-channel cloud radar
- Surface LH/SH flux system

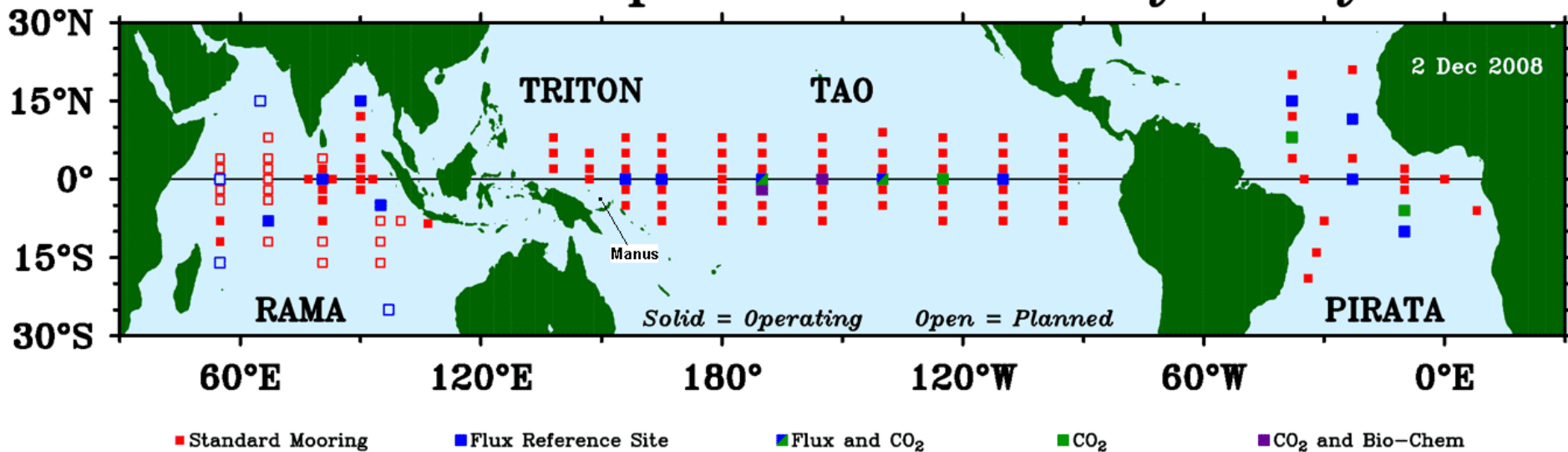
New Scientific Synergy

- **Pushed back AMIE one year**
- **Now Oct/Nov 2011 – March 2012**
- **Moved to coincide with
CINDY2011/DYNAMO**
- **Will allow study of initiation and
propagation/evolution of the MJO**

Synergy

- **Surface latent/sensible heat flux Manus**
 - Models show decrease in MJO as it propagates through maritime continent
 - One hypothesis is the difference in land/ocean surface/atmosphere energy exchange
 - Manus forest tower to represent land?
 - TAO array (buoys) for ocean

Global Tropical Moored Buoy Array



AMIE Design

- **Launch 8 sondes/day for duration**
 - Better capture the vertical evolution
 - Add profiling microwave radiometer to interpolate sonde profiles through time
- **Deploy small system at Navy Base**
 - study small scale variability
- **Take advantage of C-POL, scanning cloud radar, flux measurements, etc.**

Questions?