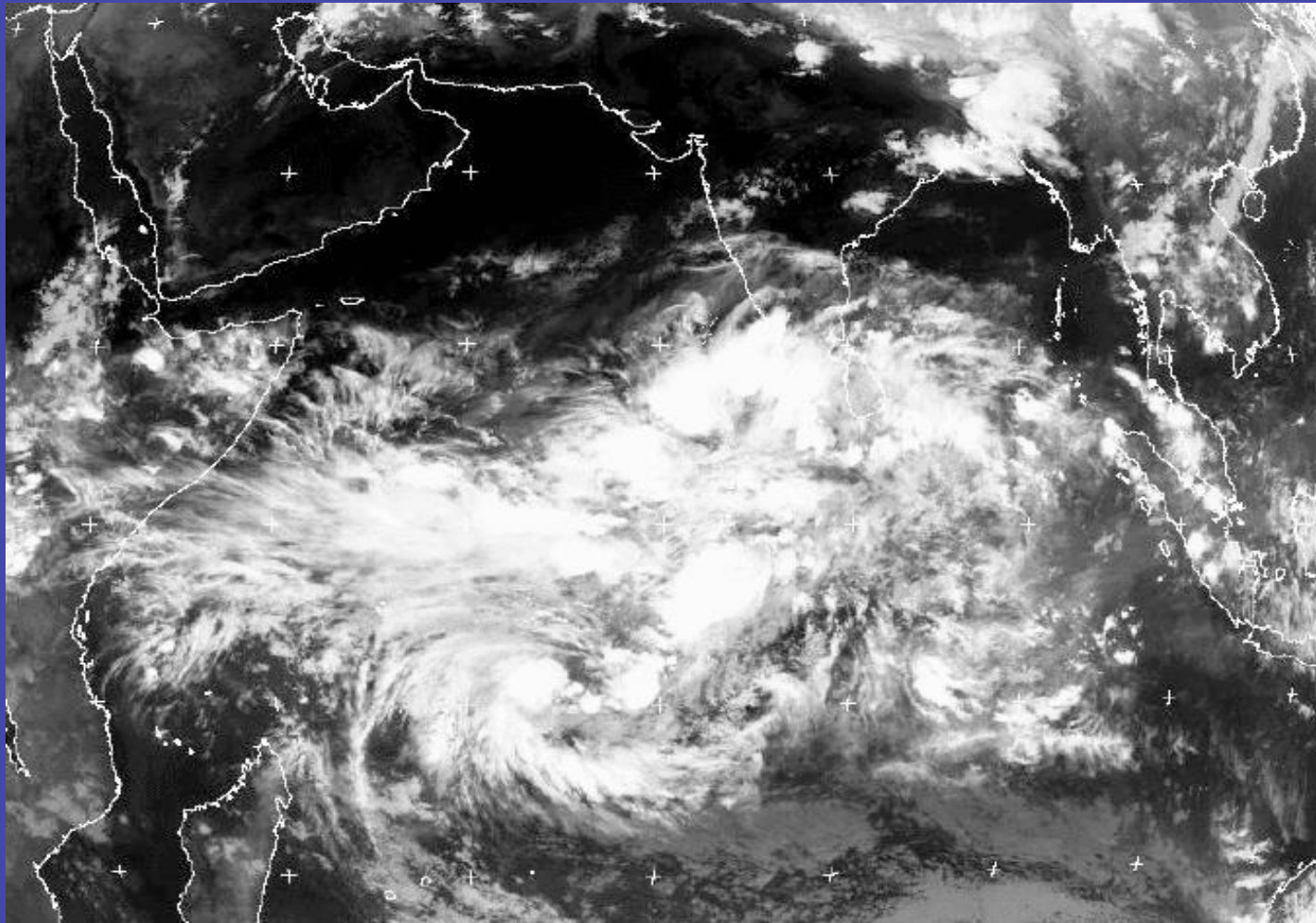


MJO Focus Theme Breakout

Marat Khairoutdinov & Mitch Moncrieff



During the past 5 years or so, greatly increased international interest/activity in tropical convection, its large-scale organization, MJO and their global effects

... backdrop for the CMMAP MJO Theme

Strategic goals

- **Understand the MJO and its lifecycle at a basic level (mathematical-dynamical analogs)**
- **Simulation of the MJO in MMF (explicit convection)**
- **Validation of MJO in MMF (satellite data)**
- **Further development of MMF: GCRM, superparameterization**
- **MJO in high-resolution deterministic NWP models**
- **Improve traditional convective parameterization**

Science questions

- **What's the importance of: i) upscale effects of convective organization; ii) effects of the extratropics on the MJO**
- **Can the MJO be properly and consistently represented in global models by: i) parameterized convection, ii) explicit convection?**
- **Is the MJO predictable?**
- **Is the MJO significant in the genesis/demise of El Nino Southern Oscillation (ENSO), and by what mechanism(s)?**

Agenda: MJO Breakout Session

Validation of MMF the main theme:

**Kate Thayer-Calder (CSU): Moisture budgets and the MJO
CAM and SP-CAM**

**Duane Waliser (JPL/CalTech): US CLIVAR MJO Working
Group activities**

**Tom Ackerman (UW): Comparisons between MMF and
CloudSat**

Yunyan Zhang (LLNL): Diurnal cycle in MMF vs. nature

Trude Einhammer (CSU) Microphysics issues

Progress since August 2007

- Continued verification of SP-CAM and comparison with CAM ... Kate Thayer-Calder
- Application of CLIVAR MJO Working Group diagnostics to SP-CAM, observed MJOs and parameterized models.... Duane Waliser
- Validation of MMF using CloudSat data ... Tom Ackerman
- Comparison of diurnal cycle in MMF with nature using TRMM measurements... Yunyan Zhang
- Nested domain simulation of natural MJOs - role of mesoscale organization, ... Mitch Moncrieff & Hsiao-ming Hsu)

Ongoing & near-term work

- MMF validation:

- CLIVAR MJO WG diagnostics (Duane Waliser and the group)
- Validation against CloudSat data (Tom Ackerman)
- Validation of MMF at CSU (Kate Thayer-Calder & Jim Benedict)
- ISSCP (Bill Rossow)

- CRM and superparameterized simulation:

- MMF simulations with T85 truncation (Marat)
- Complete simulation of natural MJO (Mitch & Hsiao-ming Hsu)
- Analysis of *Deep and Shallow Convection Theme* very high-resolution CRM simulations (cumulonimbus parameterization)

- NWP:

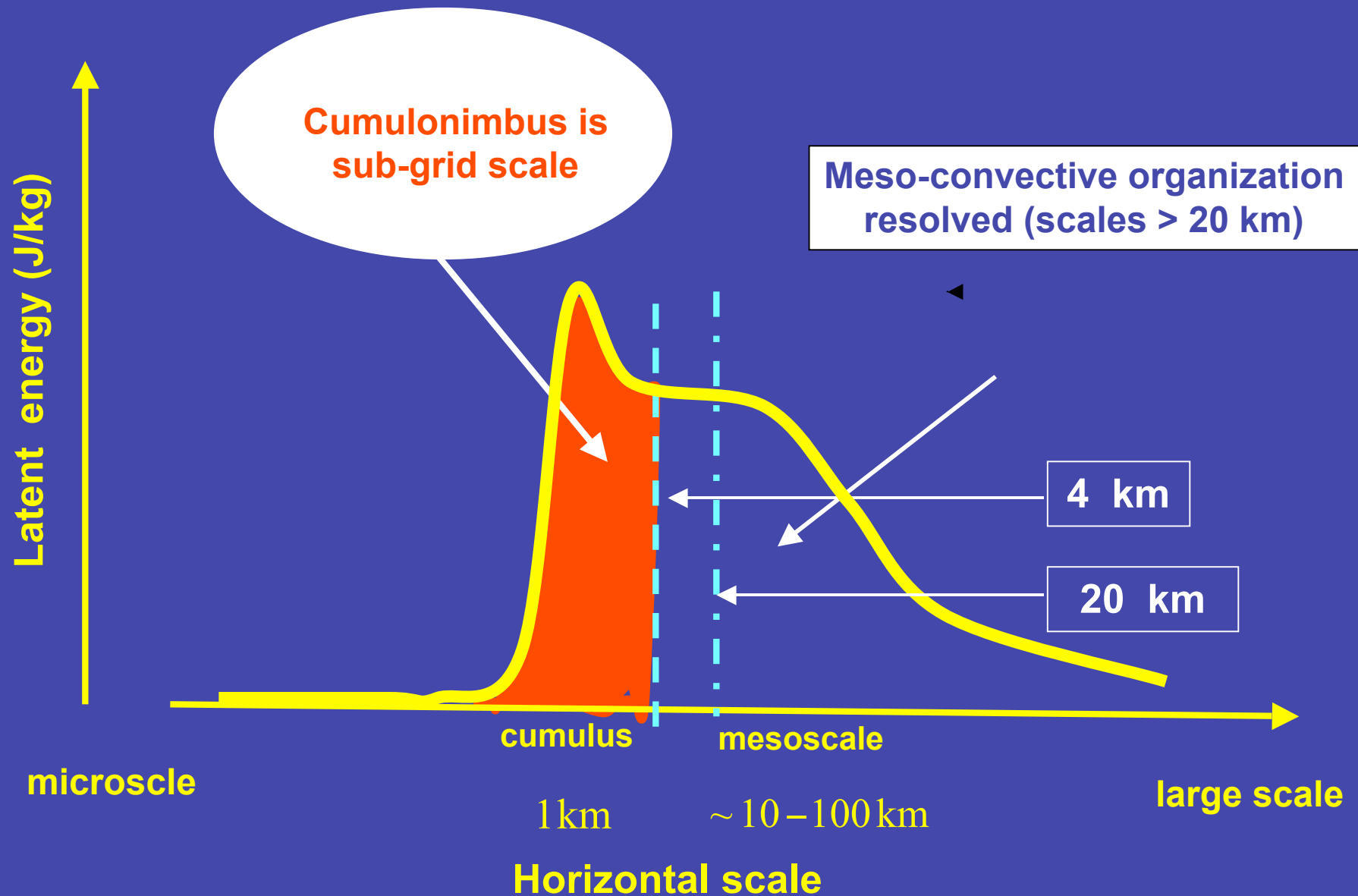
- High-resolution NWP analysis/forecasts and multi-sensor satellite data (Duane Waliser, Mitch Moncrieff, Bill Rossow)

Why are MJOs too active in CRMs (and GCRMs) ?

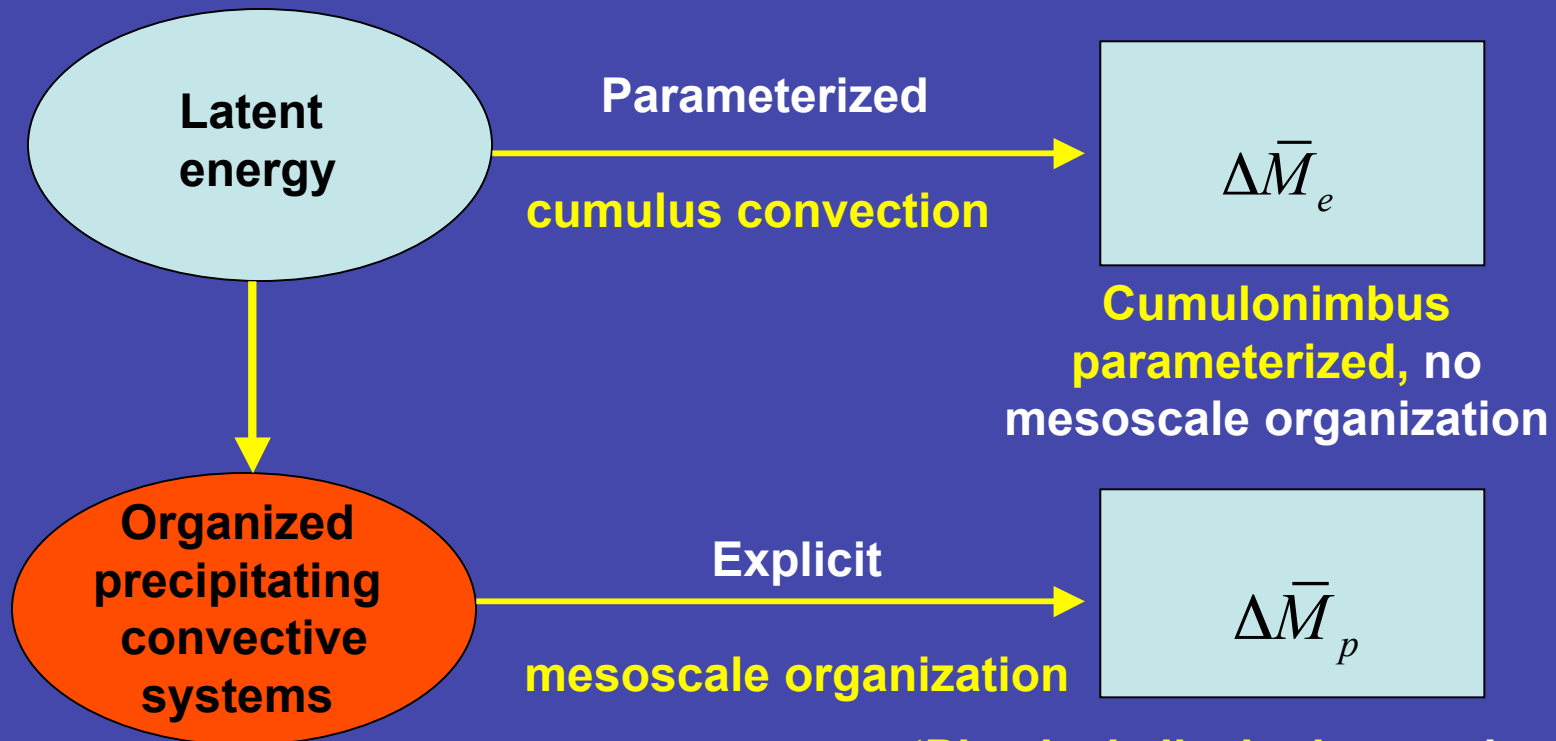
... and troposphere too moist

... suggestive of a convection--mean-state feedback issue

Representation of precipitating convection in CRMs



Latent energy and the mean state



'Physical aliasing': cumulonimbus represented as resolved meso-convective organization

Change in mean state:

$$\Delta\bar{M}_e \neq \Delta\bar{M}_p$$