Geophysical Fluid Dynamics Laboratory Review

June 30 - July 2, 2009

Applications of High-Resolution AGCMs to Climate and Weather Studies

Presented by

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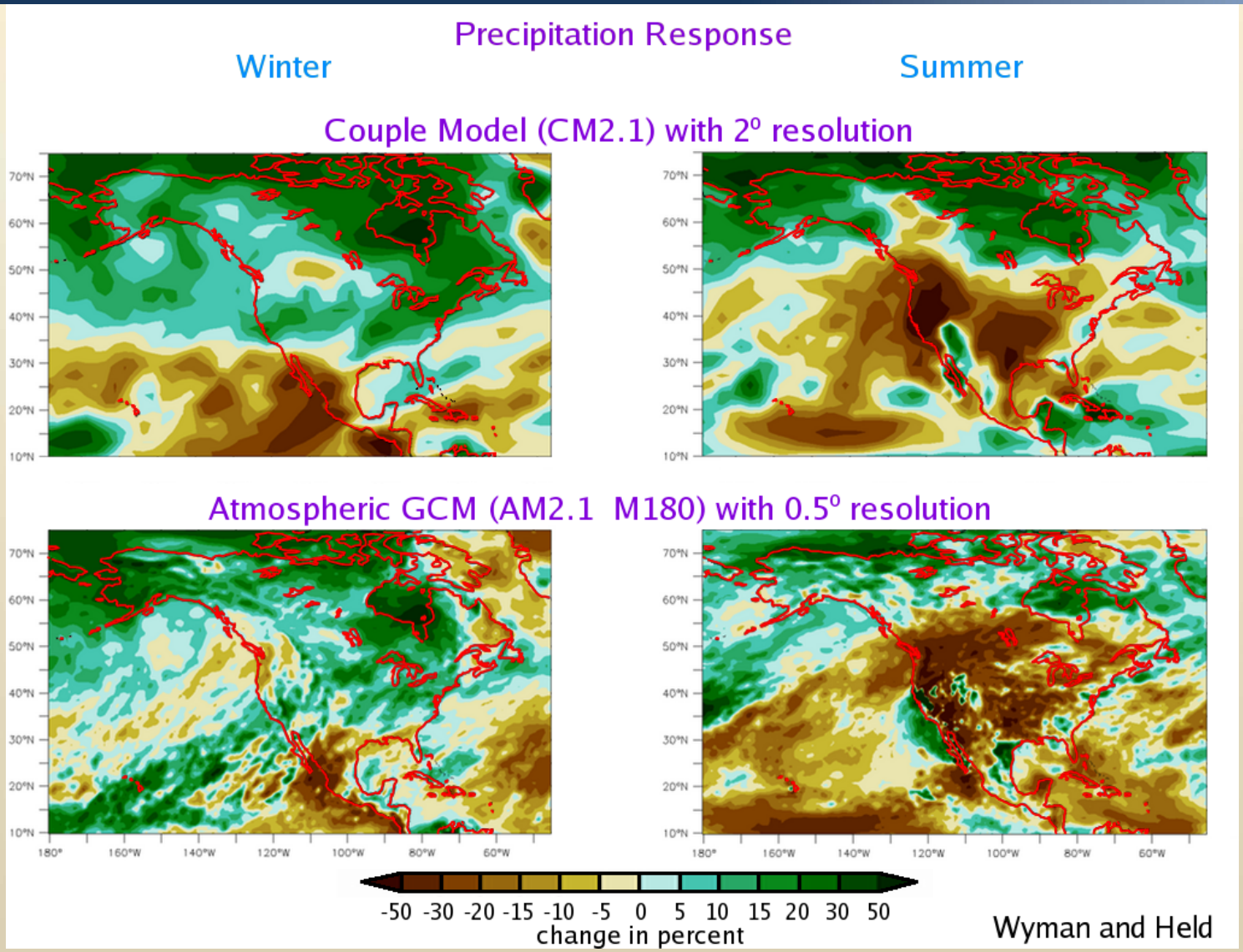
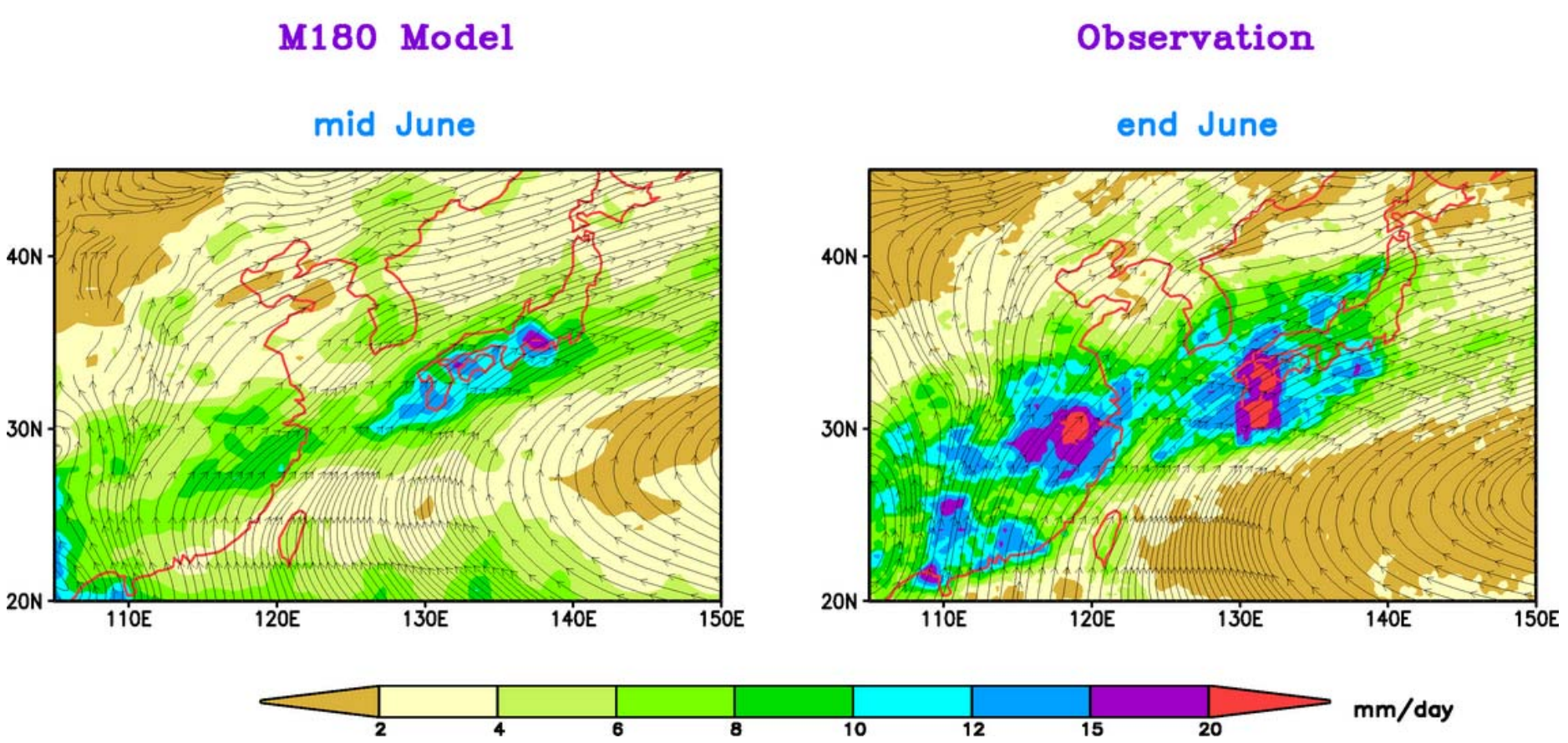
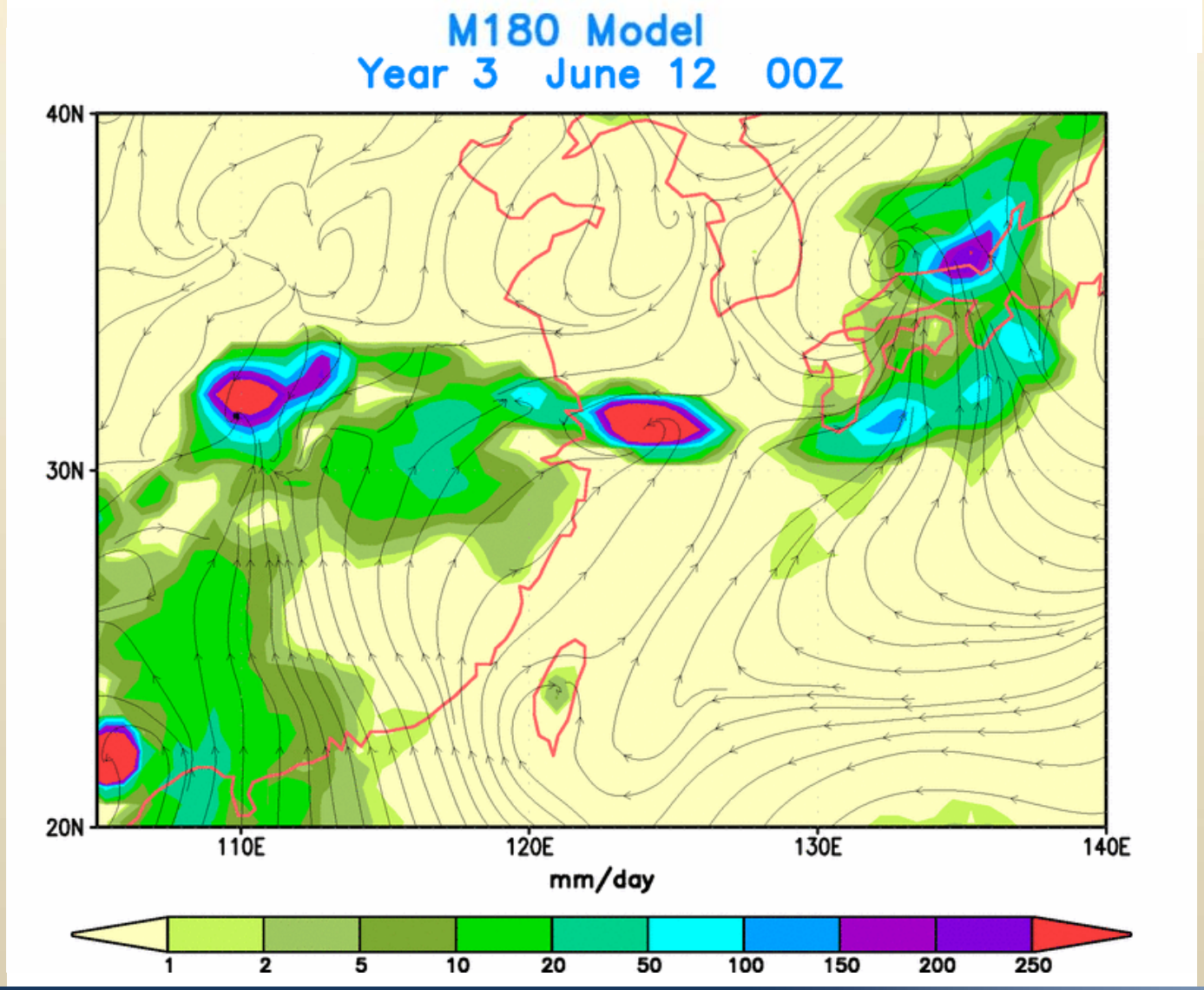
GFDL Contribution to North American Regional Climate Change Assesment Program



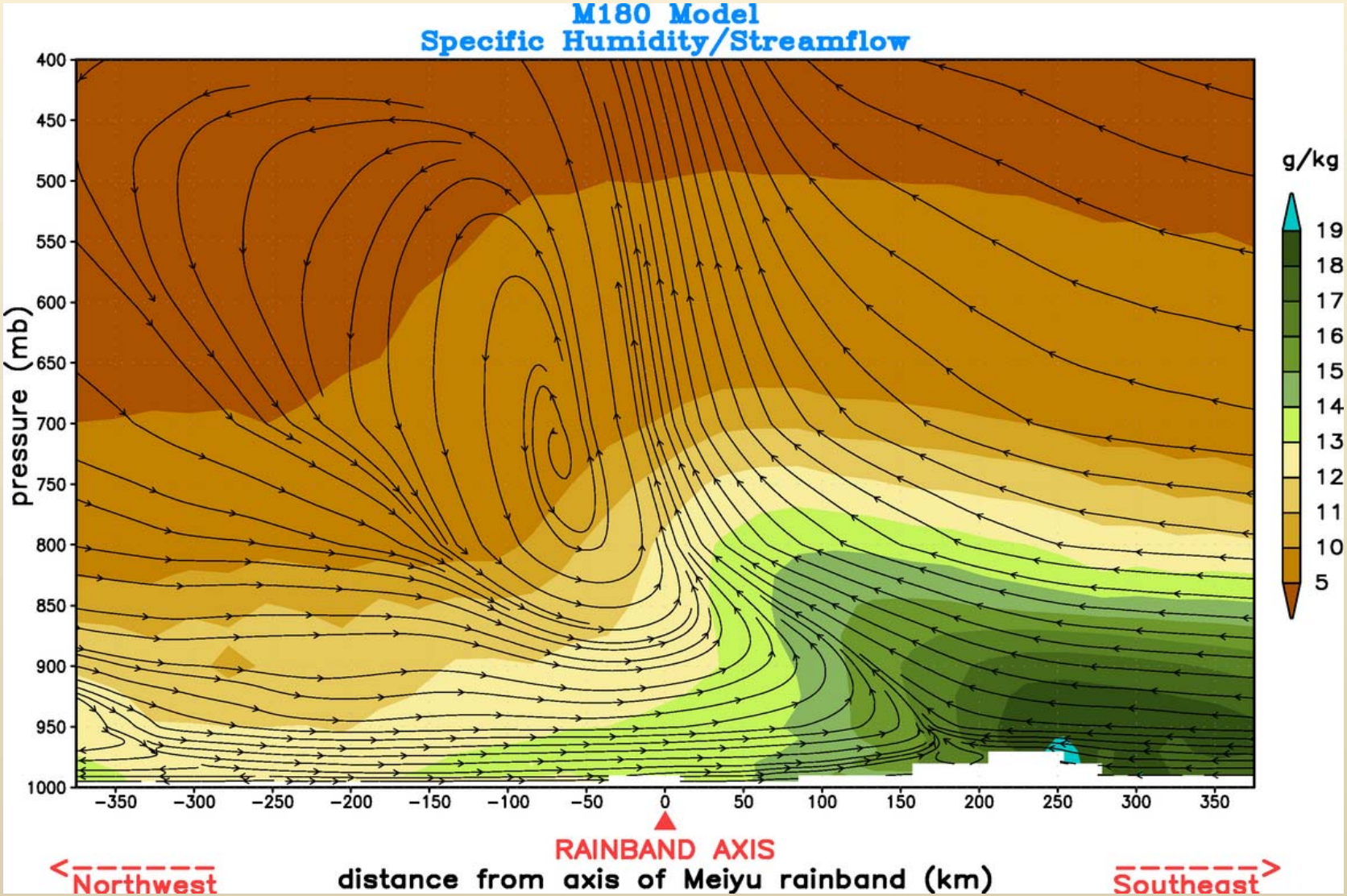
Climatological Precipitation and Circulation Patterns Associated With Plum Rain (Meiyu) Over East Asia



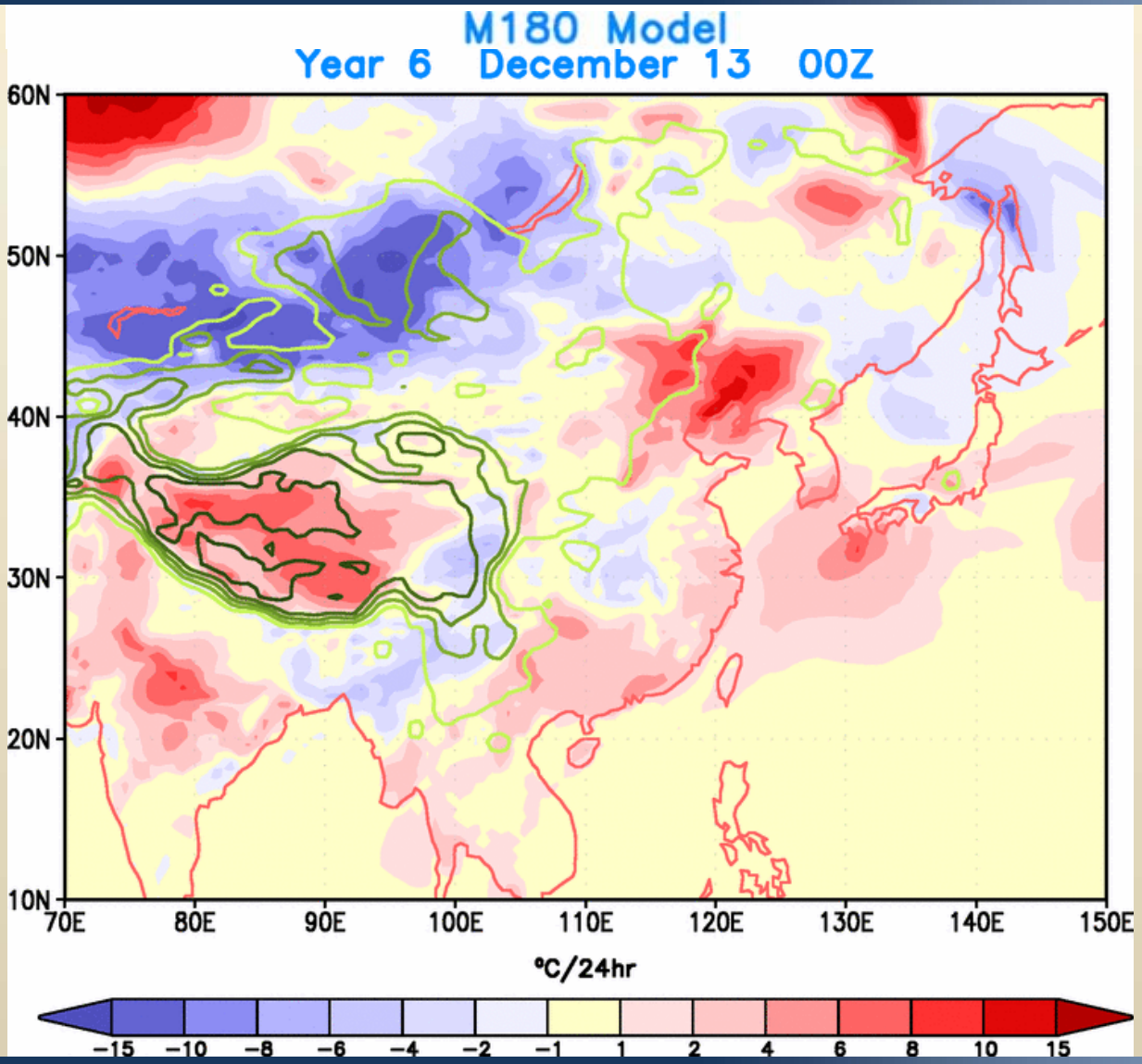
Precipitation and Circulation Patterns During an Outstanding Episode of "Meiyu" Development



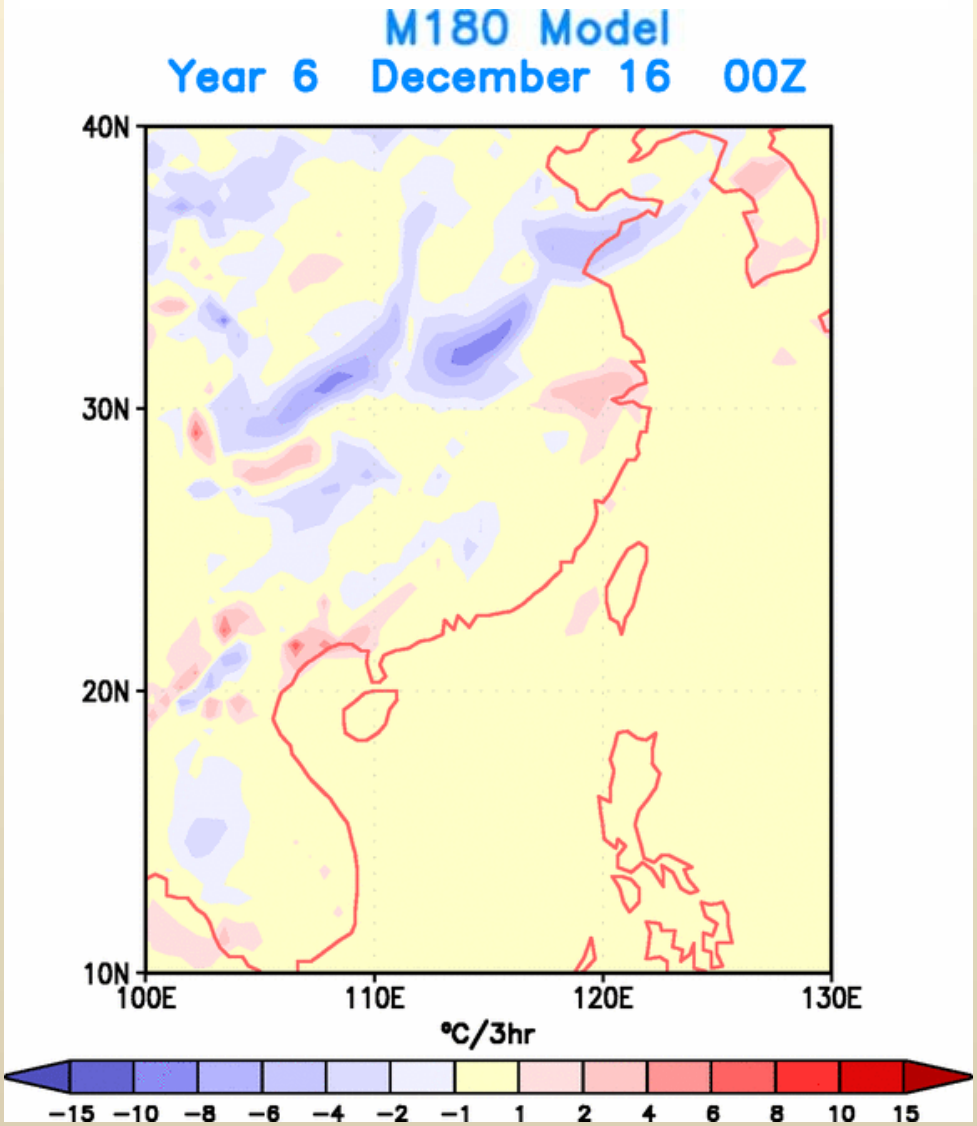
Cross-Section Perpendicular to "Meiyu" Rainband During Outstanding Episode



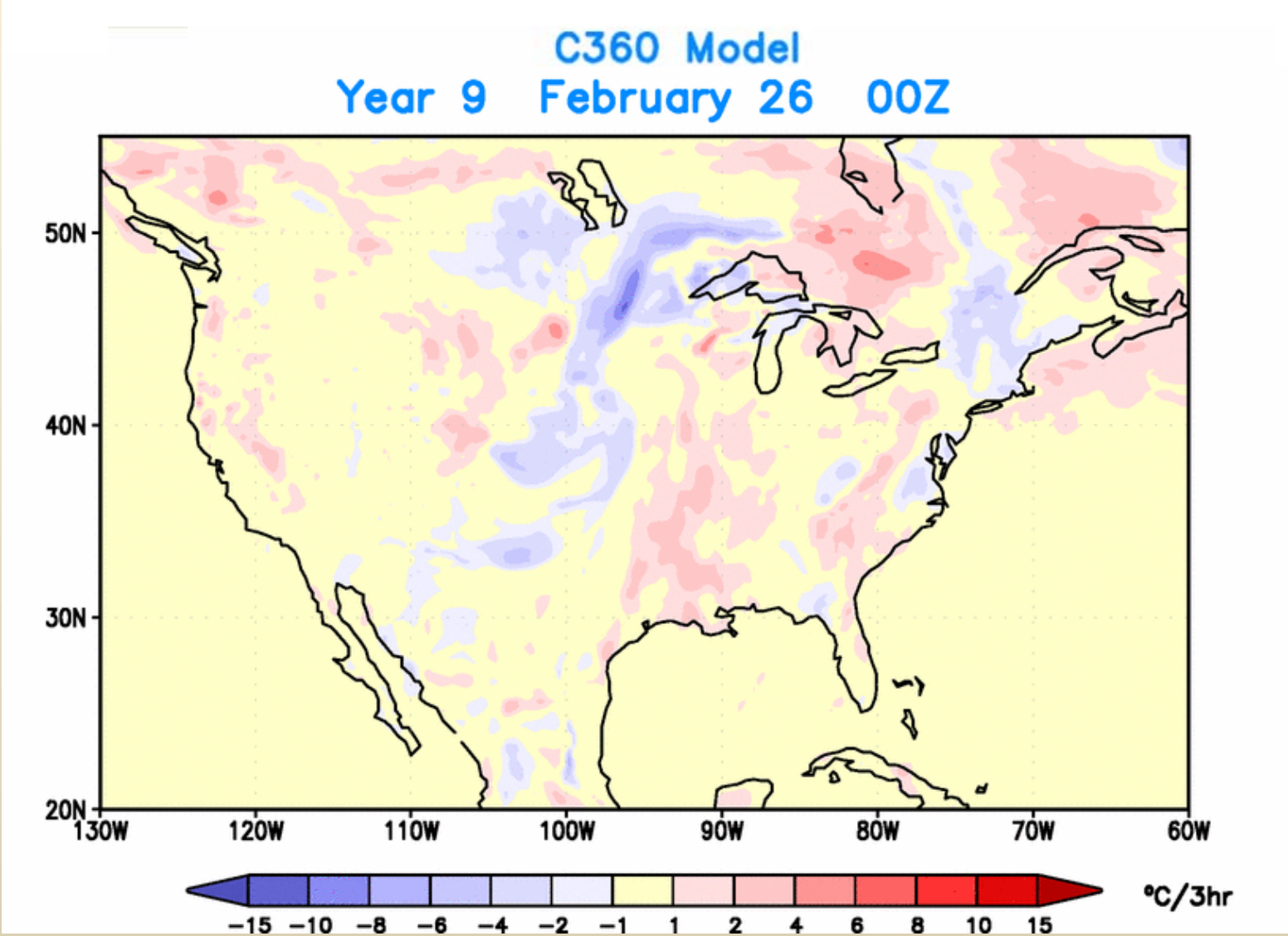
24-Hour Surface Temperature Change During an Intenese Cold Air Outbreak



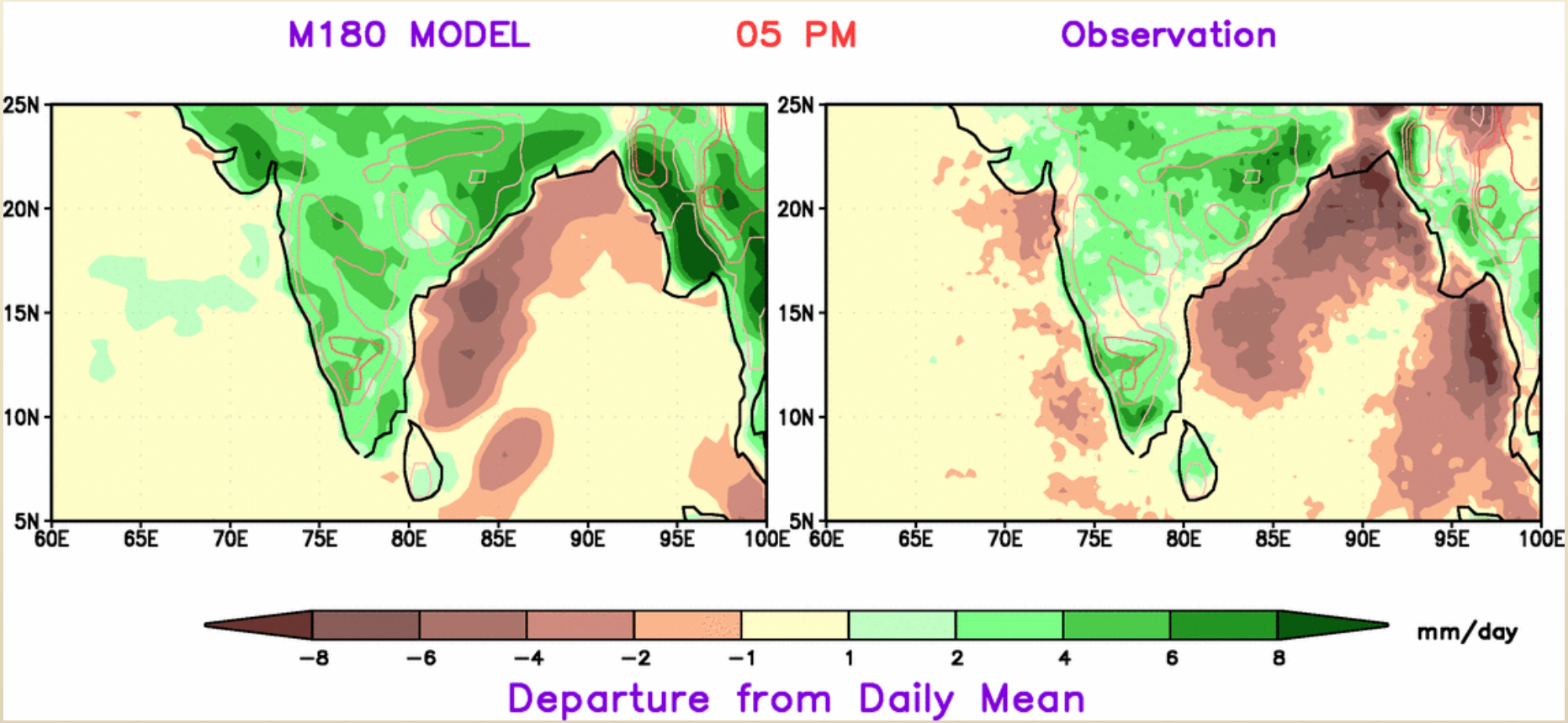
3-Hour Surface Temperature Change During an Intense Cold Air Outbreak



3-Hour Surface Temperature Change During an Intense Cold Air Outbreak Over the Eastern US



Diurnal Cycle of Precipitation Over India / Bay of Bengal in Summer



Summary

- **Small-scale atmospheric phenomena and extreme weather events are important considerations for the mean and changing climates in many geographical regions**

- **High-resolution global GCMs are powerful tools for understanding and projecting regional details of climate variations by virtue of their capability to simulate the prevalent local mesoscale weather systems**

- **It is demonstrated that the current high-resolution AGCMs at GFDL can reproduce the fine structures of various synoptic features, such as**
  - Plum Rain (Meiyu) fronts over East Asia
  - Intense cold air outbreaks over East Asia and North America
  - Diurnal cycle of convection over South Asian monsoon region

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