Geophysical Fluid Dynamics Laboratory Review

June 30 - July 2, 2009

Research on Hydrology, Water Resources and Climate at GFDL

Presented by

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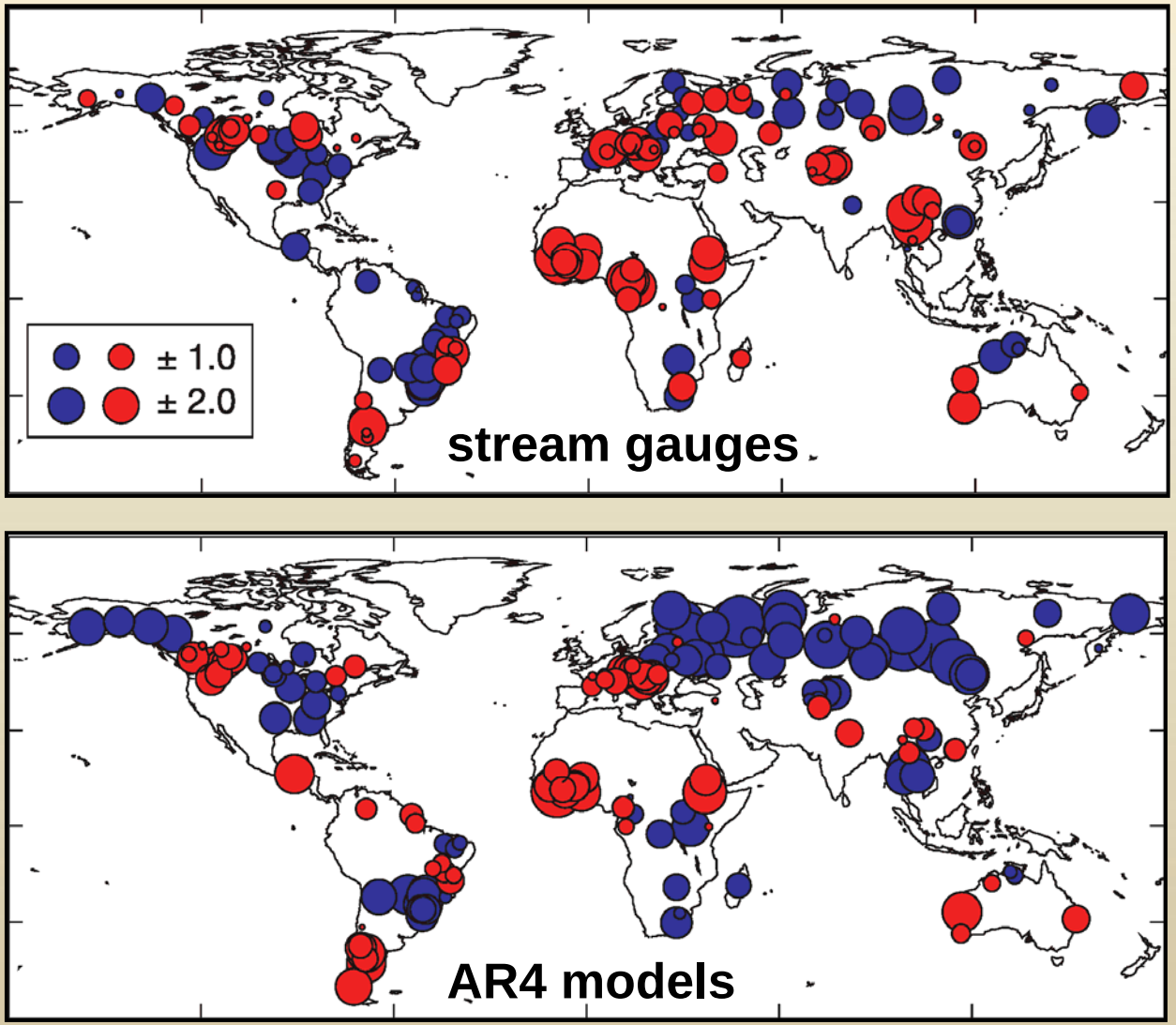
Objectives of USGS project at GFDL

- **Improved representation of hydrologic processes in GFDL climate models**
- **Improved understanding of hydrology-climate connections**
  - Climatic controls of hydrologic variability and change
  - Terrestrial water influences on the climate system
  - Human dimension: water resources, flooding, drought

AR4 models skillfully reproduced global pattern of historical streamflow trends

Normalized trend in streamflow, 20th century (local z statistic)

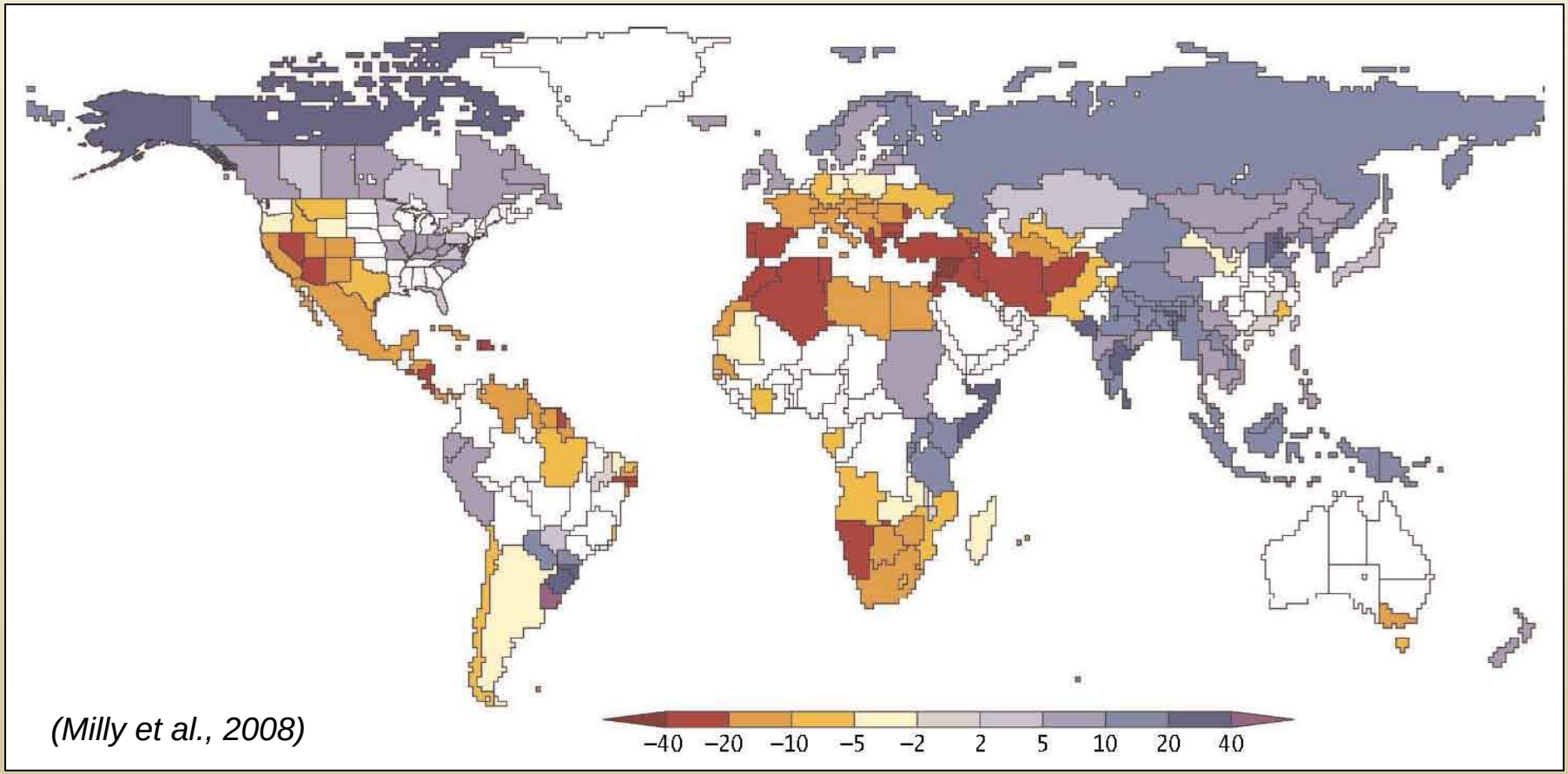
(Milly et al., 2005)



AR4 models project changing freshwater availability

Projected change in runoff by mid 21st century (%)

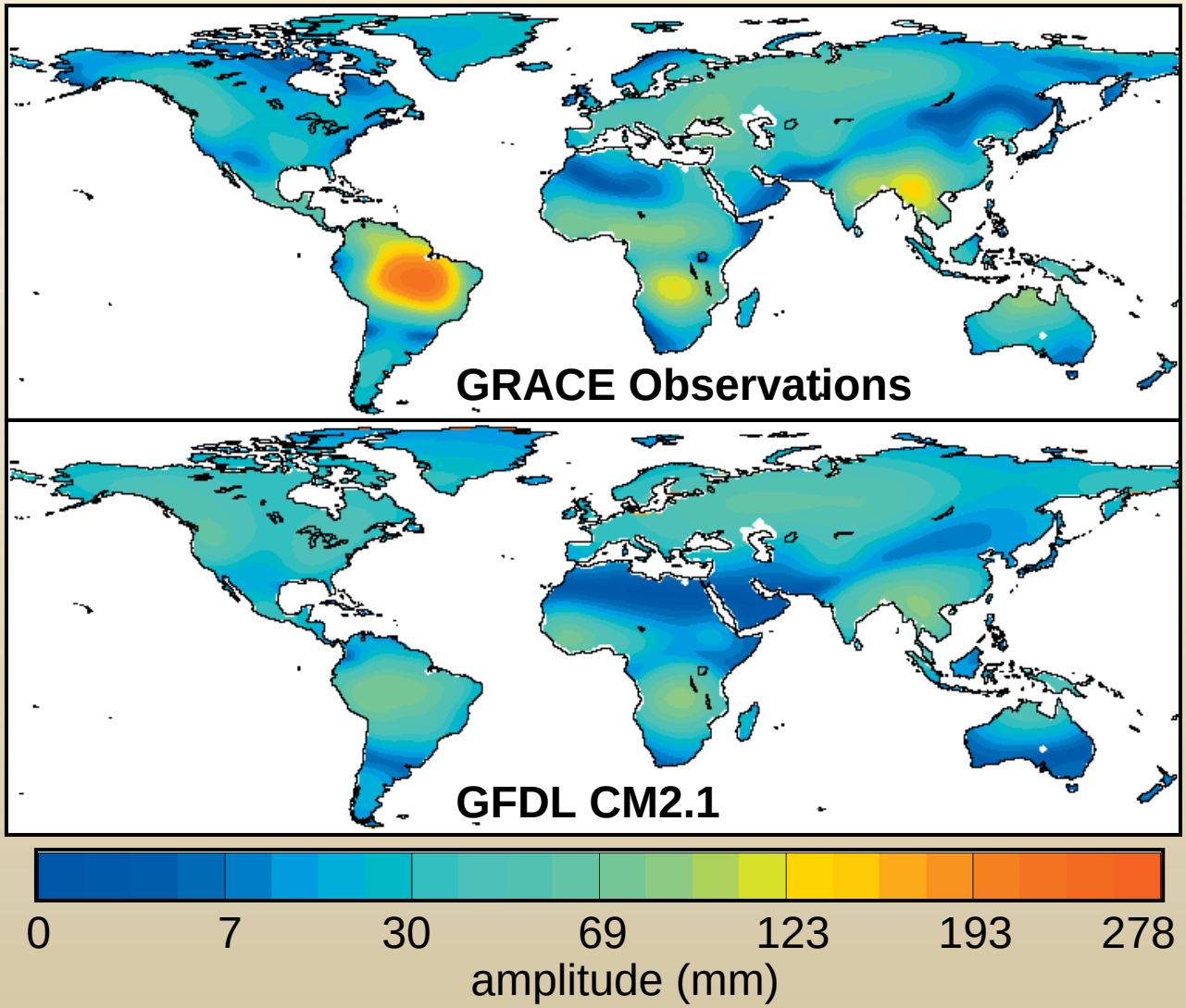
median response of 12 AR4 models to SRES A1B scenario



(Milly et al., 2008)

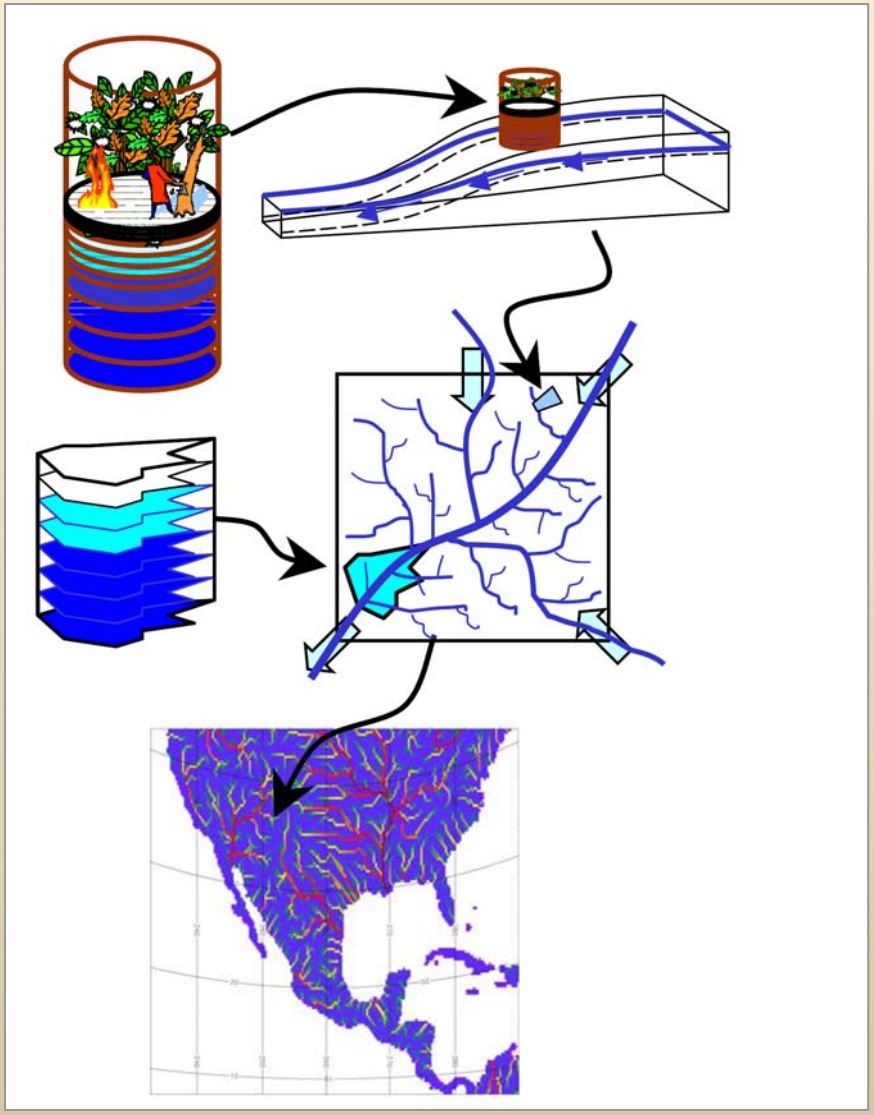
Land water-storage bias in CM2.1 was revealed, influencing LM3 developments

Amplitude of annual cycle of land water storage (mm)



(Swenson and Milly, 2006)

Looking ahead: LM3 will support new research



Research Areas

- Water availability, variability, and scale
- Vegetation, climate, and hydrologic change
- Water development as driver of climate change
- Aquatic environment
- Seasonal soil freezing and permafrost
- Sea-level variability

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