Theme 3: Modeling the Physical System

Improving Model Processes - Summary

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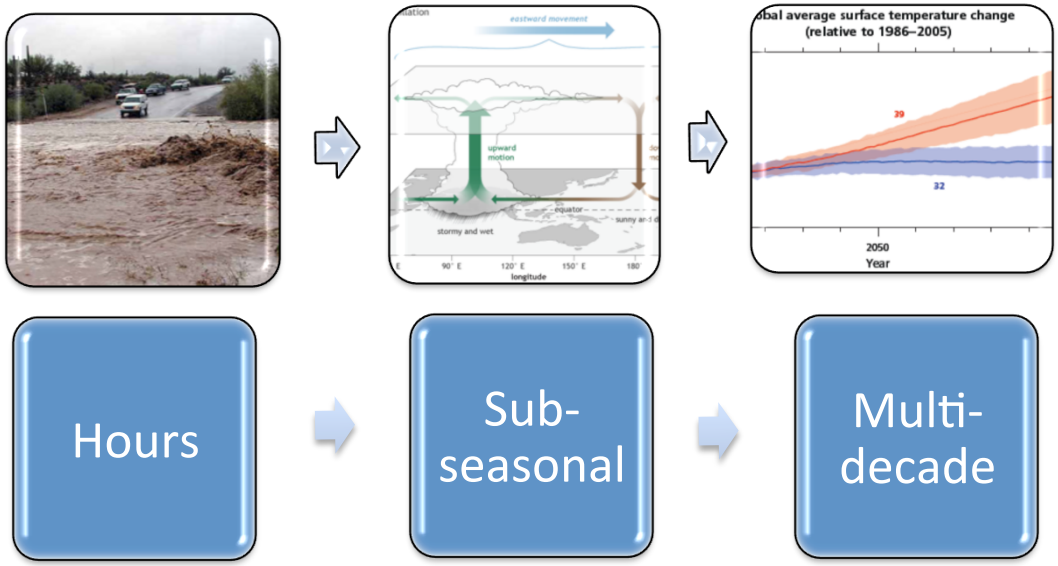
Science Issues Addressed

- Use-inspired research addressing PSD science goals
  - *Rigorously characterize and predict weather, water, and climate extremes and their uncertainties to inform decision-making*
  - *Develop new process understanding, observational and modeling capabilities to predict conditions associated with too much or too little water for improved early warnings, preparedness and resource management*

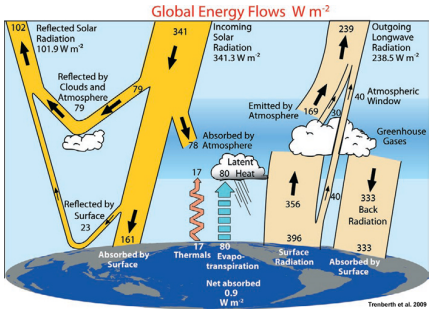
Notable Successes

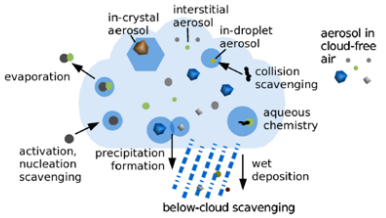
- PSD research is improving model predictions
  - Provide increased confidence in forecasts across time scales
  - Inform policy makers on regional to global variability and trends



What You Heard

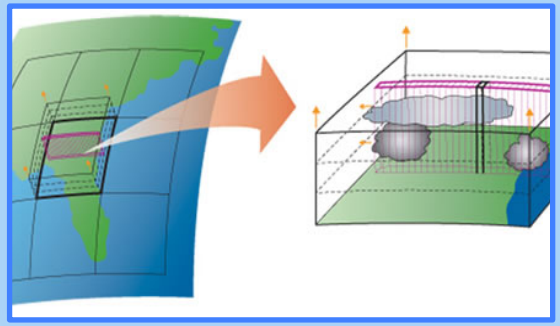
- Addressing PSD goals to *understand* and *predict* extremes across the weather-climate continuum
  - Accurate projections of future global climate require improved understanding of model uncertainty (R. Pincus)
  - Increased complexity in model physics doesn't necessarily translate to improved prediction (J.-W. Bao)

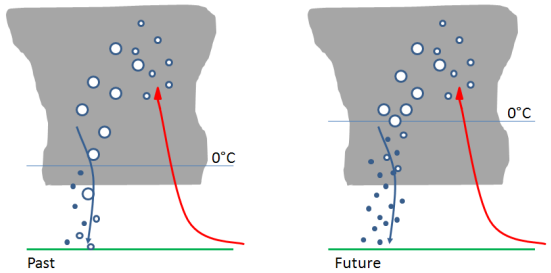




What You Heard

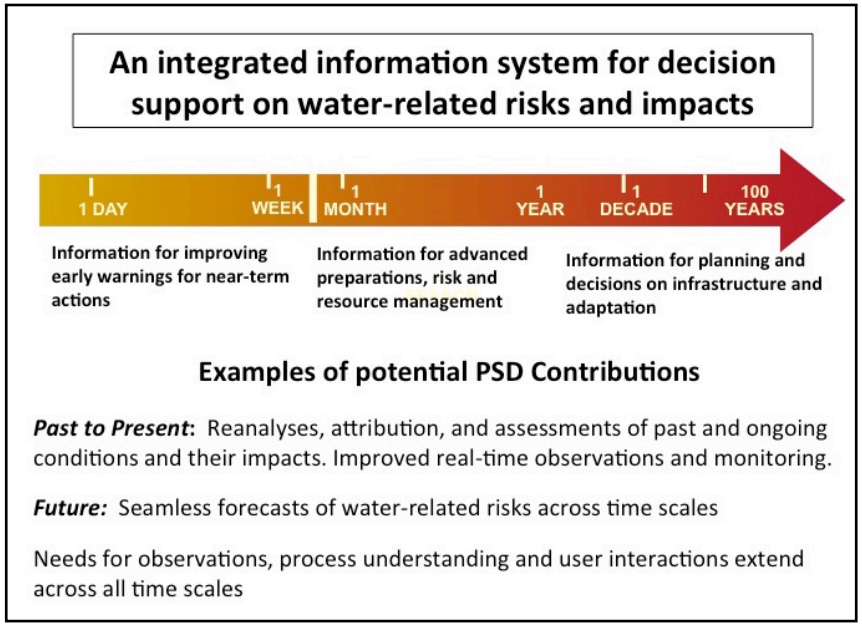
- Addressing PSD goals to *understand* and *predict* extremes across the weather-climate continuum
  - Using models with sophisticated parameterizations to inform models with simpler parameterizations, targeted at key weather-climate phenomena (S. Tulich)
  - High resolution modeling of extreme events to inform flood risk management (K. Mahoney)





Future Directions

- Apply lessons learned to produce "seamless water prediction"
  - Support NOAA concept for an Integrated Water Information System
  - PSD contributions are extensive
    - *Characterization of forecast uncertainty from flash floods to global climate change*
  - Provide policy makers with actionable information over a range of time scales
    - Flood risk
    - Water supply



Session Speakers

- Robert Pincus: *Radiative Forcing in CMIP6*
- Jian-Wen Bao: *Evaluation of Microphysics Schemes for Numerical Weather Prediction*
- Stefan Tulich: *Improving Weather and Climate Prediction Models Through the Super-Parameterization Approach*
- Kelly Mahoney: *High Resolution Modeling to Understand Flood Risk and Hail Impacts in Future Climates*