48th Annual Climate Diagnostics and Prediction Workshop

21st Annual Climate Prediction Applications Science Workshop

Joint Meeting

Florida State University
Turnbull Conference Center
Tallahassee, Florida
March 26-29, 2024

NOTES:

48th Annual Climate Diagnostics and Prediction Workshop
21st Annual Climate Prediction Applications Science Workshop
Joint Meeting

Tuesday, March 26th ***** All Times Eastern Time Zone *****

8:00am **Turnbull Center Room 208 Open**

8:30am **OPENING REMARKS / WELCOME**

Vasu Misra
Professor of Meteorology, EOAS, COAPS, Florida State University

Sam Huckaba
Dean of College Arts and Sciences, Florida State University

David DeWitt
Director, NWS Climate Prediction Center

Marina Timofeyeva
Chief, NWS Climate Services Branch

9:00am **KEYNOTE SPEAKER**

Lessons Learned at the Intersection of Research and Service in the Southeastern U. S.
Pam Knox, Director of the University of Georgia Weather Network, Extension Climatologist, UGA

9:30am **BREAK**

9:45am **SESSION 1: COMMUNICATING AND RESPONDING TO THE RISK OF EXTREME HEAT**
Moderator: Wassila Thiaw, NWS Climate Prediction Center

NIHHIS: Building an Equitable Climate Ready Nation through Extreme Heat Scenarios
Maggie Allen, NOAA Climate Program Office

The Heat Is On: Forecasting and Communicating Human-Caused Climate Change in Real Time
Daniel Gilford, Climate Central

Exploring Heat-related Vulnerability using NOAA's Urban Heat Watch Mapping Campaigns
Chris Fuhrmann, NOAA's Southeast Regional Climate Center

Experimental HeatRisk: Expanding a New Heat Service to the CONUS
Michael Staudenmaier, NWS WRH STID

NOTES:

10:45am	**Break**
11:15am	**Session 2: Understanding and Predicting Extreme Heat** *Moderator: Aaron Salter, National Institutes of Health*
	Comparing the Causes and Unusualness of the Texas Heatwaves in 2022 and 2023 *Carl Schreck, North Carolina State University*
	Sources of U.S. seasonal extreme heat predictability diagnosed from the GFDL Seamless System for Prediction and EArth System Research (SPEAR) *Nathaniel Johnson, NOAA Geophysical Fluid Dynamics Laboratory*
	Regional Analysis of the 2023 Summer via a CPC-Internal Week 2 Extreme Heat Forecasting Tool *Evan Oswald, NWS CPC*
Noon	**Lunch (Served On-Site)**
1:30pm	**Session 3: Advances in Climate Monitoring and Prediction Tools** *Moderator: Michael Goss, NWS Climate Prediction Center*
	CPC-PSL LIM Enhancements for Weeks 3-4 Temperature Forecasts: Updates and Challenges *Yuan-Ming Cheng, CIRES, University of Colorado/NOAA PSL*
	ENSO and non-ENSO (low frequency!) Variability from the Modern Reanalysis Data Sets and Implications! *Muthu Chelliah, NWS CPC*
	Informing Major Pattern Change Messaging at the Climate Prediction Center via the Regime Change Prognostic Tool *Cory Baggett, NWS CPC*
	CPC New OLR Data Set *Shaorong Wu, NWS CPC*
	Investigating SST Bias in the UFS Seasonal Forecast *Shan Sun, NOAA GSL*
2:45pm	**Break**

Notes:

3:15pm	**Session 4 - Panel: Air Quality Research, Applications, and Products** *Moderator: Monika Kopacz, NOAA OAR Climate Program Office*
	Overview of Air Quality science and products at NOAA *Monika Kopacz, OAR /CPO*
	Experimental Pollen Forecast *Jordan Schnell, OAR/GSL*
	Satellite Data for Wildfire Smoke *Amy Huff, NESDIS/STAR*
	Evolving Urban Air Quality *Brian McDonald, OAR/CSL*
	Dust and Health *Karin Ardon-Dryer, Texas Tech University*
4:05pm	**Discussion**
4:30pm	**Break**
5:30-7:30pm	**Poster Reception (See Poster List on Pages 15-16)**

End of Day 1

Tuesday Morning Keynote Speaker:
Pam Knox, Director of the University of Georgia Weather Network, Extension Climatologist, UGA

Pam Knox is an Extension Climatologist specializing in impacts of weather and climate variability and change on agriculture. She is also the Director of the University of Georgia Weather Network, a group of 90 automated weather stations across the state which provide weather and climate data to farmers, utilities, Extension agents and private citizens. Knox is a past Assistant State Climatologist for Georgia and has also served as the Wisconsin State Climatologist in University of Wisconsin-Extension and in the National Weather Service Office of Hydrology studying extreme rainfall. She was an author for the 5th National Climate Assessment chapter on the Southeast released in November 2023.

Notes:

Wednesday, March 27th ***** All Times Eastern Time Zone *****

8:00am	**Turnbull Center Room 208 Open**
8:30am	**INVITED TALK**
	Foundation Models for Weather and Climate Science *Paris Perdikaris, Microsoft*
9:00am	**SESSION 5: LEVERAGING AI / ML TO ADVANCE CLIMATE PREDICTION AND APPLICATIONS** *Moderator: Matthew Rosencrans, NWS Climate Prediction Center*
	Deep Learning Based Long Short-Term Memory (LSTM) Prediction System for the Indian Ocean Dipole *Ehsan Bhuiyan, NWS CPC*
	Identify Potential to Improve Ensemble Sub-seasonal Precipitation and Temperature Forecasts with Machine Learning Technology *Yun Fan, NWS CPC*
	Comparison of Conventional and Novel Deep Neural Network Methods to Post-process Sub-seasonal, Accumulated Precipitation Forecasts over the United States *Rochelle Worsnop, NOAA/Physical Sciences Laboratory*
	XCast: An AI/ML based S2S forecasting tool for Climate Services *Nachiketa Acharya, CIRES/NOAA-PSL*
	Generative AI Enabled Disaster Scene Computing for Climate Risk-Informed Communication *ZhiQiang Chen, University of Missouri Kansas City*
10:15am	**BREAK**

NOTES:

10:45am	**Session 6 - Panel: National, Regional, and Local Tools for Climate Decision Support** *Moderator: Marina Timofeyeva, NWS Climate Services Branch*
	Climate Key Messages at CPC and a Review of Events Over the Past Year *Jon Gottschalck, NWS CPC*
	Improving User Interactivity with Climate Tools at HPRCC *Gannon Rush, High Plains Regional Climate Center*
	Climate-based DSTs for Row Crop and Specialty Crop Producers *Daniel Brouillette, Midwestern Regional Climate Center*
	Empowering Climate-Sensitive Decisions: The Next-Generation Local Climate Analysis Tool *Stephen Baxter, NWS CSB*
11:25am	**Discussion**
Noon	**Lunch**
1:30pm	**Session 7: Bridging Science and Service to Improve Decision Making** *Moderator: Cory Baggett, NWS Climate Prediction Center*
	Status and Plan in Developing and Implementing Subseasonal and Seasonal (S2S) Forecast Systems Based on the Unified Forecast System at NOAA: Towards Meeting Stakeholder's Needs and Requirements *Jason Anderson, NOAA OSTI*
	Probabilistic Decision Modeling using S2S Forecasts: the Importance of Calibration and Reliability to Decision Support System Design *Brian Zimmerman, Salient Predictions*
	Decision Support Research Recommendations to Improve Forecast Understandability and Service Equity *Melissa Kenney, University of Minnesota*
	R&D Complete. Now What? *Fiona Horsfall, NOAA OAR*
	The Value of Environmental Information from NOAA's National Centers for Environmental Information *Tamara Houston, NOAA NCEI*
2:45pm	**Break**

Notes:

3:15pm **Session 8: Building Preparedness and Reslience Through Applied Climate Services**

Moderator: Sarah Strazzo, Embry-Riddle Aeronautical University

Applied Climate Services: Managing Risk for Food Production, Fire Mitigation, and Energy Production in Guatemala

Diego Pons, University of Denver

Climate Services Development: Experiences from Taiwan

Meng-Shih Chen, Central Weather Administration, Taiwan

Developing New Climate Risk Indicators to Ensure Crops against Drought in the Southeastern USA

Clyde Fraisse, University of Florida

Climate Adaptation Science Investigators Workgroup (CASI): A Partnership between Scientists and Facility Managers to Enhance Climate Resilience at NASA

Cynthia Rosenzweig and Nick Pelaccio, NASA Goddard Institute for Space Studies

The Importance of Climate Diagnostics and Prediction for Resilient Water Resources Management in South Florida: Practitioner Perspective

Carolina Maran, South Florida Water Management District

4:30pm **Sessions End**

End of Day Two

Wednesday Invited Speaker:

Paris Perdikaris, Microsoft

Paris Perdikaris is a Principal Researcher at Microsoft Research AI4Science and an Associate Professor of Mechanical Engineering and Applied Mechanics at the University of Pennsylvania. He received his PhD in Applied Mathematics at Brown University in 2015, and, prior to joining Penn in 2018, he was a postdoctoral researcher at the department of Mechanical Engineering at the Massachusetts Institute of Technology. His current research interests include foundation models for weather and climate modeling, physics-informed deep learning, generative models and uncertainty quantification.

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Thursday, March 28th ***** All Times Eastern Time Zone *****

8:00am	**Turnbull Center Room 208 Open**
8:30am	**INVITED TALK**
	Florida Climate Recap: 2023 and Beyond *David Zierden, State Climatologist, FL / Florida State University - Center for Ocean-Atmosphere Prediction Studies*
9:00am	**WELCOME FROM THE FSU PRESIDENT** *Richard McCullough, Florida State University President*
9:10am	**BREAK**
9:25am	**SESSION 9: CLIMATE PREDICTION AND APPLICATION OVER THE SOUTHEAST U.S.** *Moderator: Adam Hartman, NWS Climate Prediction Center*
	Summertime Seasonal Rainfall Predictability over Florida *Vasu Misra, Florida State University*
	The Value of Dynamical Downscaling in the Seasonal Predictability of the Winter Seasonal Forecasts Over Florida *C.B. Jayasankar, COAPS, Florida State University*
	The Tropical Indian Ocean Matters for U. S. Winter Precipitation Variability and Predictability *Zeng-Zhen Hu, NWS CPC*
	Application-specific Model Selection and Model Weighting of Global Climate Models with Application to Regional Environmental Management of Red Tide *Ming Ye, Florida State University*
	Climate Change Impact on Harmful Algal Blooms: An Integration of Data-Driven and Downscaling Approaches *Zhengxiao Yan, Florida State University*
10:40am	**BREAK**

NOTES:

11:05am	**Session 10 - Panel: Best Practices in Local and Regional Climate Services Delivery** *Moderator: Stephen Baxter, NWS Climate Services Branch*
	Messaging Impacts from Extreme Weather and Climate Along the Northeastern Gulf Coast *Parks Camp, NWS Tallahassee*
	Subseasonal Forecasts and Applications for West Michigan's Transportation Sector *Brandon Hoving, NWS Grand Rapids*
	The Alabama Office of the State Climatologist Innovating Climate Service Delivery *Robert Junod, University of Alabama in Huntsville*
	Improving National Weather Service Communication of Subseasonal to Seasonal (S2S) Sea Ice Information to Underserved Communities in Alaska *Nathan Kettle, University of Alaska Fairbanks*
11:45am	**Discussion**
12:15pm	**Lunch**
1:45pm	**Session 11: Advances in S2S Hydroclimate Prediction** *Moderator: Hailan Wang, NWS Climate Prediction Center*
	Influences of Large Scale Circulation and Atmospheric Rivers on US Winter Precipitation Beyond ENSO *Qinghua Ding, University of California Santa Barbara*
	Understanding and Predicting the U.S. Hydroclimate from Weather Regime and Climate Perspectives *Grace Affram and Wei Zhang, Utah State University*
	Skillful Prediction of Seasonal Mean United States Precipitation Based on Past Global Sea Surface Temperatures *Hui Wang, NWS CPC*
	Precipitation distributions are not normal; can we make them look the part? *Michael Goss, NWS CPC & ERT*
	Potential Physical Mechanisms Driving Central Great Plains Extreme Precipitation Increases During Winter *Paul Flanagan, USDA*
3:00pm	**Break**

Notes:

3:30pm	**Session 12: Applications of Hydroclimate and Associated Extremes** *Moderator: C.B. Jayasankar, COAPS, Florida State University*
	Tailoring climate information and Services for Water Resources Management in Taiwan *Tzu-Ting Lo, Central Weather Administration , Taiwan*
	Updating Intensity-Duration-Frequency (IDF) Curves for Sub-Daily Precipitation Events under CMIP6 Climate Change Scenarios: The Case of Pensacola and Perdido Bays Watersheds *Samiul Kaiser, Florida State University*
	Observed Changes in Extreme Precipitation Associated with United States Tropical Cyclones *John Uehling, North Carolina Institute for Climate Studies*
	An Alaska Case Study in Extreme Snowfall Verification *Brian Brettschneider, NOAA, NWS*
	Projecting Future Trends in Extreme Rainfall over Peninsular Florida with a High-resolution Climate Model of the Southeastern United States *Jason Bellino, U.S. Geological Survey*
4:45pm	**Sessions End**
6:00-8:00pm	**Banquet** *Turnbull Center Room #108* *Banquet Speaker: Michael Berkowitz, Executive Director of the University of Miami's Climate Resilience Academy*

End of Day Three

Notes:

Thursday Invited Speaker:

David Zierden, State Climatologist, FL / Florida State University - Center for Ocean-Atmosphere Prediction Studies

David Zierden earned his Bachelor of Science degree in Meteorology in 1996 at Florida State University. He followed that with a Master of Science in Meteorology under the direction of Dr. James J. O'Brien, then director of FSU's Center for Ocean-Atmospheric Prediction Studies. Following graduation, David served under Dr. O'Brien, a recognized world leader in ocean modeling and climate application studies, as the Assistant State Climatologist from 1998 through 2005. In 2006, Mr. Zierden was appointed State Climatologist and has served that role ever since.

David is a full member of the American Association of State Climatologist and the American Meteorological Society, and the Florida Climate Institute. He has published journal articles on satellite meteorology, climate variability and wildfire threat, and applications to agriculture in the Southeast U.S. and presented these findings at many professional conferences. He is well know among growers, producers, and Extension in the Southeast for providing seasonal climate forecasts and presents this information at many workshops, trade shows, and commodity meetings. David Zierden is involved in many other climate applications projects in Florida and the Southeast involving agriculture, water resources, environment, and human health.

David Zierden grew up in Panama City, but has lived in Tallahassee since 1995. He is married to Pastor Betsy Ouellette-Zierden and has two teenage children, Ian and Adam. Growing up in the outdoors and continuing to enjoy fishing, surfing, skiing, and running, helped spur his interest in weather and climate.

Thursday Banquet Speaker:

Michael Berkowitz, Executive Director, University of Miami's Climate Resilience Academy

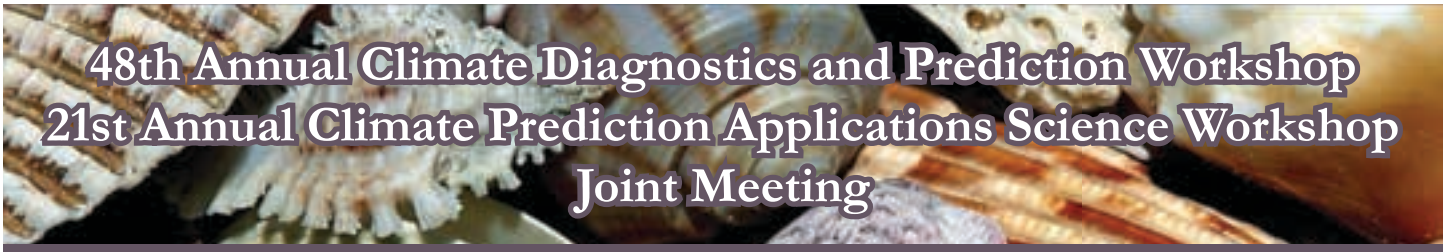
Michael Berkowitz is the Executive Director of the University of Miami's Climate Resilience Academy. He is also the Eric T. Levin Endowed Chair in Climate Resilience. The Academy is an operational unit connecting and amplifying the work the University's 12 schools and colleges.

Previously he was a Founding Principal at Resilient Cities Catalyst, a global non-profit helping cities and their partners tackle their toughest challenges.

In August 2013, he joined the Rockefeller Foundation to shape and oversee the creation of 100 Resilient Cities (100RC). He served as the 100RC President from 2013 to 2019. The cities in the 100RC network created more than 80 holistic resilience strategies, which outlined over 4,000 concrete actions and initiatives, resulting in more than 150 collaborations between private sector and public sector to address city challenges, including $230 million of pledged support from platform partners and more than $25 billion leveraged from national, philanthropic, and private sources to implement resilience projects.

From 2005 to 2013 he worked at Deutsche Bank in a variety of risk management roles including as the global head of Operational Risk Management, where he oversaw the firm's operational risk capital planning efforts and connected the myriad operational risk management efforts group-wide.

From 1998 until 2005, he was Deputy Commissioner at the Office of Emergency Management in New York City. He worked on planning initiatives, including the city's Coastal Storm, Biological Terrorism and Transit Strike plans. He also responded to major incidents including the crash of American Airlines 587, the 2003 Northeast blackout, as well as the 2001 World Trade Center disaster.



Friday, March 29th ***** All Times Eastern Time Zone *****

8:00am **Turnbull Center Room 208 Open**

9:00am **SESSION 13: UNDERSTANDING AND PREDICTING S2S CLIMATE DRIVERS**

Moderator: Nathaniel Johnson, NOAA Geophysical Fluid Dynamics Laboratory

Constructing Equatorial Wave Indices for Historical Analysis with Application to Real-time Ensemble Model Systems using Objectively Filtered 200-hPa Velocity Potential Anomalies over the Global Tropics

Nick Novella, NWS CPC

On the Role of Indian Ocean SST in Influencing the Differences in Atmospheric Variability between 2020-2021 and 2021-2022 La Niña Boreal Winters

Tao Zhang, NWS CPC & ESSIC/UMD

Prediction of the Indian Ocean Dipole with Canonical Correlation Analysis

Zewdu Segele, CPC & CPAESS

How Well Did 2023-24 Winter Climate Anomalies Match Expected El Niño Impacts?

Michelle L'Heureux, NWS CPC

NOTES:

10:00am	**Break**
10:30am	**Session 14: Innovations in Drought Monitoring and Prediction** *Moderator: Brad Pugh, NWS Climate Prediction Center*
	Addressing Contemporary Drought Challenges: Ongoing NIDIS Efforts to Gather and Act on New Service Requirements and Innovation *Amanda Sheffield, NOAA NIDIS; CIRES CU Boulder*
	An Objective, Near Real-time US Drought Indicator *Li Xu, NWS CPC*
	Development of NOAA CPC Probabilistic Drought Outlooks *Hailan Wang, NWS CPC*
	Converging Deep Learning and Numerical Prediction for Skillful Subseasonal Soil Moisture Forecasts *Kyle Lesinger, Auburn University*
	Increasing Drought Occurrence in the Coastal Carolinas May Impact Oyster Farming *Kaitlin Karaffa, North Carolina State University*
11:45am-Noon	**Closing Remarks** *Vasu Misra, FSU, Professor of Meteorology, EOAS, COAPS* *David DeWitt, NWS Climate Prediction Center Director* *Marina Timofeyeva, NWS Climate Services Branch Chief*
End of Meeting and Adjourn	

Notes:

Poster List

1. **Development of an Improved Week 3-4 Temperature Consolidation First Guess**
   Danny Barandiaran, NWS CPC
2. **Detecting Major Pattern Changes at the Climate Prediction Center via the Regime Change Prognostic Tool**
   Cory Baggett, NWS CPC
3. **Key Messages at the Climate Prediction Center**
   Johnna Infanti, NOAA/NWS/NCEP/CPC
4. **The Impact of the Madden-Julian Oscillation on the Frequency of Extreme Winter Weather over the Contiguous United States**
   Stephen Foskey, University of Oklahoma
5. **Short-term Bias of the MJO in the Hindcast Inter-comparison of Weather and Climate Models**
   Meng-Pai Hung, Chinese Culture University, Taipei, Taiwan
6. **Discovering Global Sources of Regional Flash Drought Predictability using Causal Networks**
   Sudhanshu Kumar, Auburn University
7. **The Role of Indian Ocean SST Variability on African Winter and Summer Seasons**
   Bhaskar Jha, CPC/ERT
8. **Operationalizing the Evaporative Demand Drought Index (EDDI) and Value-added Products for CONUS Drought Monitoring and Early Warning at the NOAA Climate Prediction Center**
   Yutong Pan, NOAA/NWS/NCEP/Climate Prediction Center; Earth Resources Technology (ERT) Inc.
9. **Developing a New CPC Long-term and Real-time Land Surface Monitoring Product**
   Li Xu, NWS CPC
10. **Extensions of the TCLOGG Tropical Cyclone Formation Guidance to all Basins and through Two Weeks Lead Time**
    Ryan Remondelli, Florida State University
11. **Process-Oriented Diagnostics for Tropical Cyclones and Disturbances in Climate Models Using the Column-Integrated Moist Static Energy Variance Budget**
    Jarrett Starr, Florida State University
12. **Model Agreement in the North American Multi-Model Ensemble: Forecast of Opportunity or Source of False Confidence?**
    Sarah Strazzo, Embry-Riddle Aeronautical University
13. **Improving the CMORPH2 Real-Time Production Through Infusing GPE and PMW Retrievals from Direct Broadcasts**
    Pingping Xie, Shaorong Wu, and Xiujuan Su, NWS CPC & ERT
14. **Empowering Climate-Sensitive Decisions: The Next-Generation Local Climate Analysis Tool**
    Jenna Meyers, NWS Climate Services Branch
15. **Towards a Process-Oriented Diagnostic for Tropical Disturbances: Tracking in ERA-5**
    Allison A. Wing, Department of Earth, Ocean and Atmospheric Science, Florida State University, Tallahassee, Florida
16. **Impact of Arctic Sea Ice Concentration on Winter Temperature over East Asia since the 2000s**
    Youjin Won, Korea Meteorological Administration (KMA)
17. **Exploring Seasonal Prediction Skill Potential of U.S. NAMS Precipitation in CFSv2 through Statistical Post-processing**
    Yanyun Liu, NOAA/NWS/NCEP Climate Prediction Center and Earth Resources Technology Inc
18. **Verification and Potential Usage of Sub-seasonal to Seasonal Tropical Cyclone Activity Forecast based on the JMA/MRI–CPS3**
    Akio Nishimura, Japan Meteorological Agency

19. **Post-processing for Week 2 Forecasting of (absolute) Extreme Heat Metrics**
    Evan Oswald, NWS CPC
20. **Supporting At-Risk Aquatic Species Management with Hydrologic Projections**
    Catherine A. Nikiel, ORISE/SECASC USGS
21. **On Establishing the U.S. Weekly Drought Prediction System based on Empirical, Dynamical, and Machine Learning Frameworks**
    Lisi Pei, Climate Prediction Center, NOAA/NWS/NCEP
22. **The Navy Earth System Prediction Capability: Overview and Future Developments**
    Carolyn Reynolds, U. S. Naval Research Laboratory Marine Meteorology
23. **Towards a Distributed Soil Moisture Network in Alabama: Opportunities for Low-cost, Easy Deployable Sensors**
    Lee Ellenburg, University of Alabama in Huntsville
24. **Integrating the Global Hydro Intelligence Sub-Seasonal-to-Seasonal Subsystem into 14th Weather Squadron Climate Operations**
    Alexa Rohling, USAF 14th Weather Squadron
25. **Usability Testing of Drought Forecast Visualizations for Improved Understanding and Decision Making**
    Apoorva Joshi, Institute on the Environment, University of Minnesota
26. **Introduction to KMA Activities Based on ExCMOS Supporting to Several Sectors Against Extreme Climate Disasters**
    Jeongmok Choi, Korea Meteorological Administration (KMA)
27. **Audience Segmentation to Improve Usability Flood Inundation Mapping: Engagement and Testing with Technical Users and Impacted Communities**
    Sajani Kandel, Institute on the Environment, University of Minnesota
28. **Enhancing Climate Information Services for Underserved Communities: A Solution-Oriented Approach through National Weather Service Insights.**
    Shubhechchha Sharma, University of Minnesota
29. **Building Knowledge to Support Equitable Climate Resilience in the Upper Mississippi River Basin**
    Amelia Kreiter, University of Minnesota Institute on the Environment
30. **Hybrid Post-Processing of NOAA NCEP GEFSv12 Reforecasts for Predicting Extreme Rainfall Events on Sub-Seasonal Scale over CONUS**
    Murali Malasala, NOAA/NCEP/EMC; UCAR

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