

Program for the 46th Annual Climate Diagnostics and Prediction Workshop

Virtual, October 26–28, 2021

Invited Speakers (in order of appearance in the program)

Adam Sobel is a professor at Columbia University's Lamont-Doherty Earth Observatory and Engineering School. He studies the dynamics of climate and weather, particularly in the tropics. In recent years he has become particularly focused on understanding the risks to society from extreme weather events and climate change. He is author or co-author of over 175 peer-reviewed scientific articles; a book, *Storm Surge*, about Hurricane Sandy; and numerous op-eds and articles in the mainstream media, including semi-regular contributions to the *New York Times* and CNN. He currently hosts a podcast, *Deep Convection*, featuring wide-ranging conversations with other climate scientists.

Timothy DelSole is a full professor in the Department of Atmospheric, Oceanic, and Earth Sciences at George Mason University, and a senior research scientist at the Center for Ocean-Land-Atmosphere Studies. His research focuses on the extent to which weather and climate changes can be predicted on time scales from weeks to year. He currently serves as co-Chief Editor of *Journal of Climate*.

Prof. Paul Dirmeyer conducts research on the role of the land surface in the climate system. This includes the development and application of land-surface models, studies of the impact of land surface variability on the predictability of climate, interactions between the terrestrial and atmospheric branches of the hydrologic cycle, and the impacts of land use change on regional and global climate.

Mike Jacox is a physical oceanographer working between NOAA's Southwest Fisheries Science Center lab in Monterey, CA and Physical Sciences Laboratory in Boulder, CO. His primary research focus is on physical-biological interactions in the ocean and their connections to climate, particularly in the northeast Pacific. Recently, he has focused on ocean variability and change off the US West Coast, including extreme events such as marine heatwaves, and the response of marine ecosystems from phytoplankton to top predators. Dr. Jacox is currently leading new efforts to develop end-to-end assessments of climate impacts on US west coast fisheries, including seasonal forecasts and centennial-scale projections of ocean conditions, distributions of targeted and bycatch species of interest to US fisheries, socio-economic impacts of changing living marine resources, and evaluations of fisheries management strategies in a changing climate. He holds a Ph.D. in Ocean Sciences from the University of California, Santa Cruz, and a B.S. in Aerospace Engineering from the University of Colorado.

Dr. Maria J. Molina is a research scientist working at the Climate and Global Dynamics Laboratory of the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. Her research focuses on using machine learning and climate model simulations to better understand climate and weather extremes and to improve predictions of subseasonal temperature and precipitation. Previously, Maria was an Advanced Study Program postdoctoral fellow at NCAR and also spent six years working as a broadcast meteorologist in New York City. She earned a bachelor's degree in Meteorology from Florida State University, a master's degree in Climate and Society from Columbia University, and a PhD in Earth and Ecosystem Science from Central Michigan University.

Dan Pisut is a principal engineer and leads development teams for Esri's Living Atlas of the World, the foremost collection of community contributed and curated GIS-enabled data layers in the world. In doing so he works collaboratively with government agencies, academic institutions, NGOs, and private industry to identify authoritative data, define and implement best practices for web services, and make content more easily accessible to Esri's millions of users worldwide. Prior to Esri, Dan worked at the NOAA Center for Satellite Applications and Research and NESDIS Headquarters for two decades, leading visualization efforts on behalf of the entire agency. In doing so, he has become fluent in the language of NOAA data, from observations to analyses and models, historical to predictive. He continues to work closely with NOAA, including the redesign of NCEP's Integrated Dissemination Program GIS system, development of observation-based Sustainable Development Goals, and building a modern, cross-agency open data infrastructure to support the Biden Administration's climate initiatives.

Michael Palecki is the Normals Project Manager for NOAA's National Centers for Environmental Information, and also Science Project Manager for the U.S. Climate Reference Network. Before joining NCEI in 2008, he was the Regional Climatologist for the Midwestern Regional Climate Center, a NOAA affiliate, and also spent time in academia. Mike studied issues of in situ climate observations, ranging from early 19th Century Forts reports to the state-of-the-art USCRN, focusing on climate observation quality, climate information product development, and studies of climate variation and change. He has a Ph.D. from Penn State, Master's from U of Colorado, and Bachelor's from U of Massachusetts.

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Tuesday, October 26, 2021

12:45 – 1:00 pm *Welcoming Remarks CPC*

Session 1 **S2S Precipitation Prediction (Part 1)**

Chair: Mike Halpert, CPC

1:00 – 1:20 pm *A unified moisture mode theory for the MJO and the BSISO*

Adam Sobel (Invited)

1:20 – 1:40 pm *Do Models Generate Realistic Simulations of the North Atlantic SST?*

Tim DelSole (Invited)

1:40 – 2:00 pm *Preconditions for Extreme Wet Winters over the Contiguous United States*

Andy Hoell

2:00 – 2:20 pm *The impact of the Madden-Julian Oscillation on extreme winter weather over the United States*

Stephen Foskey

2:20 – 2:40 pm *Seasonal prediction challenges associated with errors in mean bias and trends of tropical Pacific sea surface temperature in the North American Multi-Model Ensemble*

Michelle L’Heureux

2:40 – 2:50 pm **Break**

Session 2 **S2S Precipitation Prediction (Part 2)**

Chair: Jason Furtado, OU

2:50 – 3:10 pm *Skillful long-lead prediction of summertime heavy rainfall in the US Midwest from ocean salinity*

Laifang Li

3:10 – 3:30 pm *The Effect of Soil Moisture in an Empirical Dynamical Model on Weeks 3-4 Temperature Forecasts over North America*

Sam Lillo

3:30 – 3:50 pm *Evaluating the Potential of Incorporating a Blocking Predictor to Improve Week 3-4 Temperature and Precipitation Outlooks*

Cory Baggett

3:50 – 4:10 pm

Examining the Utility of Random Forests to Forecast Subseasonal Extreme Precipitation in the Contiguous United States

Ty Dickinson

4:30 – 6:00 pm

Poster Session 1

Wednesday, October 27, 2021

11:00 am – 12:30 pm **Poster Session 2**

Session 3 **Extremes and Extreme Events (Part 1)**

Chair: Emerson Lajoie, CPC

1:00 – 1:20 pm *An overview of land-atmosphere feedbacks as a source of predictability on S2S timescales*

Paul Dirmeyer (Invited)

1:20 – 1:40 pm *Towards a global seasonal forecast system for marine heatwaves*

Mike Jacox (Invited)

1:40 – 2:00 pm *Concurrence of long duration marine heatwaves in the Northeastern Pacific and the U.S. hydroclimatic extremes*

Fan Wu

2:00 – 2:20 pm *Was the February 2021 cold air outbreak over the central U.S. a subseasonal forecast of opportunity?*

John Albers

2:20 – 2:30 pm

Break

Session 4 **Extremes and Extreme Events (Part 2)**

Chair: Michelle L'Heureux, CPC

2:30 – 2:50 pm *A predictability comparison of 2018/19 and 2019/20 winter CPC outlooks and model forecasts*

Arun Kumar

2:50 – 3:10 pm *The Differing Influence of the Stratosphere on Cold Air Outbreaks in the Great Plains of the United States*

Oliver Millin

3:10 – 3:30 pm *Causes and Predictability of the 2020-21 Southwestern U.S. Drought*

Hailan Wang

3:30 – 3:50 pm *Predictability of a North American tornado environment index from tropical Pacific SST and the Arctic Oscillation*

Mike Tippett

3:50 – 4:10 pm *Subseasonal to Seasonal Prediction of Tropical Cyclone Formation in the Northern Hemisphere: Using Statistical-Dynamical Methods to Leverage the Strengths and Mitigate the Weaknesses of CFS Version 2*

David Meyer

4:30 – 6:00 pm

Poster Session 3

Thursday October 28, 2021

11:00 am – 12:30 pm **Poster Session 4**

Session 5 Applications of Modern Technologies

Chair: Johnna Infanti, CPC

1:00 – 1:20 pm *Deep Learning for Subseasonal Precipitation and Temperature Errors.*
Maria Molina (Invited)

1:20 – 1:40 pm *A Modernized Geographic Approach to S2S Forecasting*
Dan Pisut (Invited)

1:40 – 2:00 pm *Developing a Linear Inverse Model for Improved Model Guidance of CPC's Week 3-4
Temperature Outlooks*
Matt Newman

2:00 – 2:20 pm *Ensemble Predictability of Week 3-4 Precipitation and Temperature over the United
States via Cluster Analysis of the Large-Scale*
Greg Jennrich

2:20 – 2:30 pm **Break**

Session 6 Development and Use of Climate Data Records

Chair: Dan Collins, CPC

2:30 – 2:50 pm *U.S. Climatological Standard Normals: A Utilitarian Workhorse*
Mike Palecki (Invited)

2:50 – 3:10 pm *Retrospective Processing of the Second Generation CMORPH*
Pingping Xie

3:10 – 3:30 pm *Calibration, Bridging, and Merging (CBaM) of North American Multi-Model Ensemble
(NMME) Seasonal Forecasts Given Updated Climate Normals*
Johnna Infanti

3:30 – 3:50 pm *Communicating uncertainty in SST analyses*
Caihong Wen

3:50 – 4:10 pm *Updating CPC's T2M Observational Verification Dataset and Impact on the Seasonal
T2M Skill Scores*
Mike Halpert

4:10 – 4:30 pm *Conference Wrap-Up*

4:30 pm End Workshop