

Program for the 44th Annual Climate Diagnostics and Prediction Workshop

Durham, North Carolina, October 22–24, 2019

Invited Speakers (in order of appearance in the program)



Dr. Grey Nearing

Dr. Grey Nearing is an Assistant Professor in the Department of Geological Sciences at the University of Alabama. His PhD is in Hydrology from the University of Arizona (2013). Grey's research focuses on hydrological modeling and data assimilation, with a particular focus on uncertainty characterization, model diagnostics, and hypothesis testing. He currently works on applications of information theory and machine learning to hydrology-related model/data fusion.

Dr. Raymond Schmitt

Dr. Raymond Schmitt is a Physical Oceanographer and Emeritus Research Scholar at the Woods Hole Oceanographic Institution in Massachusetts. He received his PhD in Physical Oceanography at the University of Rhode Island after obtaining his BSc in Physics at the Carnegie Mellon University in Pennsylvania. His early work on the small-scale double-diffusive mixing phenomena of “salt fingers” led him to his later interest in the water cycle and global salinity patterns. In 1997 Dr. Schmitt was named as a J. S. Guggenheim Fellow and in 2012 became a Fellow of the American Geophysical Union and was appointed to the Van Allen Clark Sr. Chair for Excellence in Oceanography. Dr. Schmitt has published or co-authored over one hundred papers, and continues to research a range of oceanographic topics, including the global water cycle and oceanic mixing. He also advocates for improving and sustaining a global ocean observing system. He participated in the National Research Council's panel on “America's Climate Choices” and contributed to the report, “Advancing the Science of Climate Change”. He has served on numerous panels and boards, currently including the Earth Science Advisory Committee of NASA.



Dr. Charles “Chip” Konrad

Dr. Konrad is an atmospheric scientist and geographer who studies extreme weather and its impacts on society. Konrad directs the NOAA-funded Southeast Regional Climate Center (SERCC), which provides a wide range of weather & climate services and expertise for the region. Konrad is also part of the Carolinas Integrated Science and Assessment Team (CISA) that connects climate science and decision-making in the realms of water, coast and health.

Konrad's research deals with extreme weather events, especially heavy rainfall, hurricanes, and hot events, whose impacts on society are expected to increase in the future. Much of this work falls within the realm of climate-public health and provides a wide range of applications that benefit, among others, weather forecasters, health professionals and emergency management specialists. This research utilizes state-of-the-art datasets and technologies that untangle complex spatiotemporal patterns and relationships. Konrad's research provides an explicit geographic context for unraveling this complexity, both in the atmospheric processes and patterns that produce extreme weather events and the societal impacts of these events across the landscape.

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Tuesday, October 22, 2019

7:30 – 9:30 am Registration

8:30 – 8:50 am *Welcoming Remarks from Duke and CPC*

8:50 – 9:10 am *Challenges of S2S Prediction*
David Dewitt, Climate Prediction Center

Session 1

ENSO

Chair: David DeWitt, CPC

9:10 – 9:30 am *Errors in the Tendency of Nino– 3.4 from Northern Hemisphere Spring to Winter*
Michelle L'Heureux, Michael Tippett, Arun Kumar, Emily Becker, NOAA/CPC, Columbia University, Cooperative Institute for Marine & Atmospheric Studies

9:30 – 9:50 am *On the delayed coupling between ocean and atmosphere in recent weak El Niño episodes*
Nathaniel C. Johnson, Michelle L'Heureux, Chueh– Hsin Chang, Zeng– Zhen Hu, Princeton University/GFDL, NOAA/CPC, Center for Climate/Environment Change Prediction Research, Ewha Womans University

9:50 – 10:10 am *The influence of wintertime SST variability in the Western North Pacific on ENSO diversity*
Boniface Fosu, Jie He, S.– Y. Simon Wang, Georgia Institute of Technology, Utah State University

10:10 – 10:30 am **Break**

Session 2

Subseasonal and Seasonal Prediction, part 1

Chair: Mike Halpert, CPC

10:30 – 10:50 am *Seasonal Prediction of Wintertime Teleconnections – Empirical Model Compared to CFSv2*
Stephen Baxter, Jacob Stuijvenolt Allen, NOAA/CPC, Utah State University

10:50 – 11:10 am *Sources of Tropical Subseasonal Skill in the CFSv2*
Carl Schreck, Matthew Janiga, Stephen Baxter, North Carolina State University, Naval Research Laboratory, NOAA/CPC

11:10 – 11:30 am *Diagnosing and predicting ENSO SSTA development from Moored–Buoy and Scatterometer Winds*
Andrew Chiodi, D. E. Harrison, University of Washington and NOAA Pacific Marine Environmental Laboratory

11:30 – 11:50 am *On the Challenge for ENSO Cycle Prediction*
Zeng– Zhen Hu: NOAA/CPC

11:50 – 01:00 pm **Lunch**

Session 3

Subseasonal and Seasonal Prediction, part 2

Chair: Laifang Li, Duke

1:00 – 1:20 pm

Extension of empirical-based tools for prediction of US temperature at Weeks 3–4 using extratropical stratospheric predictors

Laura Ciasto, Dan Harnos; Michelle L'Heureux, NOAA/CPC, Innovim

1:20 – 1:40 pm

Improving Prediction of Large-Scale Regime Transitions

Paul Roebber, John Gyakum, Lance Bosart, University of Wisconsin– Milwaukee, McGill University, State University at Albany

1:40 – 2:00 pm

A Priori Identification of Skillful Subseasonal Forecasts

John Albers, **Matthew Newman**, University of Colorado/CIRES and NOAA/ESRL/PSD

2:00 – 2:20 pm

SubX MME Project: Do the research center models improve the skill of the operational center models?

Emerson LaJoie, NOAA/CPC, Innovim

2:20 – 2:40 pm

Break

Session 4

Tropical Monitoring and Prediction

Chair: Carl Schreck, NCICS

2:40 – 3:00 pm

Assessing the influence of tropical forecast errors on higher latitude predictions using nudging experiments

Juliana Dias, Stefan Tulich, Maria Gehne, George Kiladis, CIRES, University of Colorado, NOAA ESRL Physical Sciences Division

3:00 – 3:20 pm

A Statistical/Dynamical Hybrid Model Approach to Atlantic Basin Seasonal Hurricane Prediction

Philip Klotzbach, Louis– Philippe Caron, Colorado State University, Barcelona Supercomputing Centre

3:20 – 3:40 pm

Tropical Diagnostics for NWP

Maria Gehne, Juliana Dias, George Kiladis, CIRES, University of Colorado Boulder, PSD ESRL NOAA

3:40 – 4:00 pm

Improving Model Representation of Interactions between Moisture and Tropical Convection

Brandon Wolding, Juliana Dias, George Kiladis, Fiaz Ahmed, Eric Maloney, Mark Branson, NOAA PSD, UCLA, Colorado State University

4:00 – 4:15 pm Break

4:15 – 5:00 pm

Lightning Talks – Poster Session

5:00 pm – end

Poster Session 1 including food and drink

Wednesday, October 23, 2018

7:30 – 9:00 am

Registration

Session 5

Machine Learning / Statistical Prediction

Chair: Kyle MacRitchie, CPC

8:30 – 8:50 am

Invited: *Physically – Based Machine Learning for Hydrological Modeling*

Grey Nearing, Craig S. Pelissier, Frederik Kratzert, Hoshin V. Gupta, Alden K. Sampson, University of Alabama, NASA, Institute for Machine Learning, Johannes Kepler University; Austria, Department of Hydro

8:50 – 9:10 am

Improving CFS Week 3–4 Precipitation and Temperature Outlooks with Machine Learning

Yun Fan, Vladimir Krasnopolsky, Chung– Yu Wu, Jon Gottschalck, NOAA/CPC; NOAA/EMC, Innovim

9:10 – 9:30 am

Invited: *Ocean Salinity and Machine Learning for Improved S2S Rainfall Forecasts on Land*

Ray Schmitt, Woods Hole Oceanographic Institution

9:30 – 9:50 am

Calibrated Probabilistic Seasonal Forecasts at IBM/The Weather Company: Business Applications

Todd Crawford, The Weather Company, an IBM business

9:50 – 10:20 am

Machine Learning Discussion

10:20 – 10:40 am

Break

Session 6

Subseasonal and Seasonal Prediction, part 3

Chair: Emerson LaJoie, CPC/Innovim

10:40 – 11:00 am

Improving Week 3–4 Temperature and Precipitation Outlooks by Incorporating the Stratospheric Quasi-biennial Oscillation as a Predictor

Cory Baggett, Laura Ciasto, Daniel Harnos, Stephen Baxter, Craig Long, Michelle L'Heureux, Jon Gottschalck, NOAA/CPC, Innovim

11:00 – 11:20 am

Skillful Seasonal Prediction of Eurasian Winter Blocking and Extreme Temperature Frequency

Douglas E. Miller, Zhuo Wang, University of Illinois at Urbana– Champaign

11:20 – 11:40 am

Persistent and re-emergent sea surface temperatures: a recipe for better seasonal climate forecasts

Matthew Switanek, Joe Barsugli, Michael Scheuerer, Tom Hamill, CIRES, University of Colorado Boulder, NOAA Physical Sciences Division

11:40 – 12:00 pm

Improved extended and long-range prediction based on better performing ensemble members?

Muthuvel Chelliah, Huug van den Dool, NOAA/CPC

12:00 – 01:20 pm

Lunch

Session 7

Hydrological Analysis and Prediction

Chair: Arun Kumar, CPC

- 1:20 – 1:40 pm *Assessment of CPC sea ice initialization system (CSIS) and CPC weekly experimental sea ice forecasts*
Yanyun Liu, Wanqiu Wang, Arun Kumar, Thomas Collow, NOAA/ CPC, Innovim
- 1:40 – 2:00 pm *Rapid Arctic Sea Ice Loss on the Synoptic Time Scale and Related Atmospheric Circulation Anomalies*
Zhuo Wang, John Walsh, Sarah Szymborski, Melinda Peng, University of Illinois at Urbana–Champaign, University of Alaska, Fairbanks, University of Colorado– Colorado Spring
- 2:00 – 2:20 pm *The NCEP GEFSv12 Reforecasts to Support Subseasonal and Hydrometeorological Applications*
Hong Guan, Yuejian Zhu, Bing Fu, Xiaqiong Zhou, Eric Sinsky, Xianwu Xue, Dingchen Hou, Bo Cui, Wei Li, SRG, NOAA/EMC, IMSG
- 2:20 – 2:40 pm *The Remote Effects of Tibetan Plateau Spring Land Temperature on Global Summer Precipitation – The GEWEX/GASS/LS4P First Phase Activity*
Helin Wei, Yongkang Xue, Ismaila Diallo, Tandong Yao, Aaron Boone, Xubin Zeng, Ye Liu, William Lau, Constantin Ardilouze, Zhaohui Lin, Yuhe, IMSG at NCEP/EMC, University of California at Los Angeles

2:40 – 3:40 pm Poster Session 2 & break

Session 8

Detection and Attribution

Chair: Yuqiang Zhang, Duke

- 3:40 – 4:00 pm *Synoptic Precursors to Subseasonal to Seasonal Extreme Precipitation Events across the United States*
Jason C. Furtado, Gregory C. Jennrich, Jeffrey B. Basara, and Elinor R. Martin, School of Meteorology, University of Oklahoma
- 4:00 – 4:20 pm *Forecast Attribution*
Arun Kumar, Peitao Peng, Mingyue Chen: NOAA/CPC
- 4:20 – 4:40 pm *A New Persistent Anomaly Index: Design and Application to a Reanalysis*
Gary Lackmann, Miller, and Robinson, North Carolina State University, US Environmental Protection Agency
- 4:40 – 5:00 pm *Predictions and Predictability of North American Winter 2018/19 Below Normal Surface Temperature Anomalies*
Mingyue Chen, Arun Kumar, Peitao Peng, NOAA/CPC

6:00 – 9:00 pm

Banquet

Thursday October 24, 2019

Session 9

Synoptic and Larger Scale Meteorology

Chair: Jon Gottschalck, CPC

8:30 – 8:50 am

Spatial and Temporal Trends in Cold Air Outbreaks across the Globe
Erik Smith, Kent State University

8:50 – 9:10 am

Prediction Skill of the MJO, NAO, and PNA in the NCEP FV3-GEFS 35-day Experiments
Wei Li, Yuejian Zhu, Xiaqiong Zhou, Bing Fu, Dingchen Hou, Hong Guan, Eric Sinsky and Xianwu Xue, EMC/NCEP/NWS/NOAA, IMSG, SRG

9:10 – 9:30 am

The atmospheric bridge between the subpolar and tropical North Atlantic
Yochanan Kushnir, **Walter A. Robinson**, Donna Lee, Mingfang Ting, Columbia University, North Carolina State University

9:30 – 9:50 am

Sensitivity of Trends in Persistent Anomaly Activity to Anomaly Threshold Definition
Greg Tierney, Rebecca Miller, Walter Robinson, and Gary Lackmann, Marine, Earth, and Atmospheric Sciences Department, North Carolina State University

9:50 – 10:10 am

Break

Session 10

Analysis, Reanalysis, and Ensemble Forecasts

Chair: Walter Robinson, NCSU

10:10 – 10:30 am

Calibrating the real-time NMME: General verification and forecasts-of-opportunity
Sarah Strazzo, Emily Becker, Dan Collins, Andrew Schepen, QJ Wang, Embry-Riddle Aeronautical University, CPC, CSIRO, University of Melbourne

10:30 – 10:50 am

A Conventional Observation Reanalysis (CORG) for Climate Monitoring
Wesley Ebisuzaki, Leigh Zhang, Arun Kumar, Jeffrey Whitaker, Jack Woollen, NOAA/CPC, NOAA/PSD, NOAA/EMC, Innovim, IMSG

10:50 – 11:10 am

Two-Stage Bias-Correction and Multi-Ensemble Post-Processing of NMME for Subseasonal to Seasonal Forecasting over CONUS
William Scheftic, Xubin Zeng, University of Arizona

11:10 – 11:30 am

A Preliminary Examination of the Second Generation CMORPH Satellite Precipitation Estimate
Pingping Xie, Robert Joyce, Shaorong Wu, and Bert Katz, NOAA/CPC

11:30 – 11:50 am

Distinguishing features of ensemble spread between drought and flood years of Indian summer monsoon in the past 58 years (1958– 2015) reforecasts
Ravi Shukla, Chul- Su Shin, Center for Ocean-Land-Atmosphere Studies, George Mason University

11:50 – 01:00 pm

Lunch

Session 11

User Engagement and Communication, part 1

Chair: Marina Timofeyeva, NWS

1:00 – 1:20 pm

Invited: *The Delivery of Impact-Based Decision Support Tools: Lessons Learned from a Physical Scientist*
Charles “Chip” Konrad, SERCC, UNC Chapel Hill

1:20 – 1:40 pm

Understanding Community Needs during a Period of Dramatic Warmth in Alaska
Eugene Petrescu, NOAA/NWS/Alaska Region

1:40 – 2:00 pm	<p><i>An Initial Use of Social Science Research at CPC to Inform Enhancement and Development of Current and Future CPC Products and Services</i> Jon Gottschalck, Melissa Kenney, Michael Gerst, Allison Baer, Melissa Kenney, Michael Gerst, Allison Baer, NOAA/CPC, Cooperative Institute for Climate and Satellites – University of Maryland</p>
2:00 – 2:20 pm	<p><i>Tailoring the Bureau's climate outlook service development and delivery through customer engagement</i> Avijeet Ramchurn, Robyn Duell, Andrew Watkins, David Jones, Debra Hudson, Helen Bloustein, Australian Bureau of Meteorology</p>
2:20 – 2:40 pm	Break
Session 12	<p>User Engagement and Communication, part 2 Chair: Stephen Baxter, CPC</p>
2:40 – 3:00 pm	<p><i>User Engagement and Discovery of Needs for Climate Service</i> Marina Timofeyeva, Fiona Horsfall, Jenna Meyers, Viviane Silva, Margaret Hurwitz, James Zdrojewski, NOAA/NWS</p>
3:00 – 3:20 pm	<p><i>Innovating Approaches to Drought Communications with North Carolina Decision Makers</i> Rebecca Ward, Corey Davis, Kirsten Lackstrom, NC State University/State Climate Office of NC, NOAA</p>
3:20 – 3:40 pm	<p><i>From Drought to Floods: Communicating Climate Impacts of the Middle East and Southwest Asia Winter 2018– 2019</i> Justyn Jackson, Andrew Lahr, U.S. Air Force 14th Weather Squadron</p>
3:40 – 4:00 pm	
4:00 – 4:30 pm	Conference Wrap– Up
4:30 pm	End Workshop