



18th Annual Climate Prediction Applications Science Workshop

April 20-22, 2021
Virtual Meeting

**Providing Services for the Cascading Effects of
Intensifying Heat in a Rapidly Growing Region**

18th Annual Climate Prediction Applications Science Workshop

Tuesday, April 20

*****All Times in Current Eastern Time Zone (EDT)*****

10:30 AM EDT Virtual Waiting Room Open

11:00 – 11:30 **Workshop Welcome**

Welcome to “Phoenix” Virtually

Mayor Kate Gallego, City of Phoenix

Opening Remarks

Elizabeth Wentz, Arizona State University

Nancy Selover, Arizona State University | Arizona State Climate Office

Marina Timofeyeva, NOAA National Weather Service Climate Services Branch

Welcome Address

John Murphy, NOAA National Weather Service

11:30 – 11:55 **Keynote Address**

“Climate and Society Challenges for Arizona and the Southwest”

Gregg Garfin, University of Arizona

Break (5 minutes)

12:00– 1:15
PM

Session 1: Climate Services in Action

Moderator: David Hondula, Arizona State University

Exploring Ways to Track and Characterize Monsoon Season Variability Across the Southwest U.S.

Mike Crimmins, University of Arizona

The Role of Climate IDSS in Supporting Hydrologic Efforts Before, During, and After the Extreme Mississippi River Flood of 2019

Ray Wolf, National Weather Service Quad Cities / Davenport

Supporting Decision Makers in Anchorage, Alaska, with Accurate Seasonal Snowfall Predictions

Joseph Wegman, National Weather Service Anchorage

The Value of Estimating Severe Weather Impacts

Melanie Gall, ASU Center for Emergency Management and Homeland Security

Multi-year Prediction of Colorado River Water Supply Using a Dynamical Climate Prediction System

Yoshimitsu Chikamoto, Utah State University

Climate Services for Farm-related Decision-making: Connecting Science for Societal Impacts in Coastal Bangladesh

Saleh Ahmed, Boise State University

1:15 – 2:00

Break with Virtual Field Trips (descriptions on page 9)

- ASU Decision Theater
- MaRTy the Heat Walker
- ASU Net Zero Carbon

Session 2 *Sponsored Panel* -- Air Quality Research and Applications

2:00 – 3:00

**** In Memoriam of Kenneth Mooney, NOAA Climate Program Office ****

Panel Facilitators: Monika Kopacz, NOAA Climate Program Office & Michelle Hawkins, NWS

Urban Air Quality

Ronald Cohen, University of California Berkeley

Volatile Chemical Products

Carsten Warneke, NOAA/ESRL Chemical Sciences Division

Dust Storms

Karin Ardon-Dryer, Texas Tech University

Wildland Fires

Carsten Warneke, NOAA/ESRL Chemical Sciences Division

Urban Greenhouse Gases

Derek Mallia, University of Utah

3:00 – 3:30

Discussion with Panelists

Break (10 minutes)

3:40 – 4:30

Session 3: Drought, Vegetation, and Heat Part 1

Moderator: Andrea Bair, NWS Western Region Headquarters

The Use of NWS COOP data and Historical Climate Normals by the USDA Risk Management Agency to Provide Insurance on Pasture, Rangeland, and Forage Acres

Victor Murphy, NWS Southern Region HQ

Dissecting Flash Droughts: Here Today, Gone Tomorrow....or are They?

Mark Svoboda, National Drought Mitigation Center / University of Nebraska-Lincoln

Understanding Weather and Climate-Driven Impacts to Arizona Agriculture Through Crop Insurance Indemnity Payments

Ashley Bickel & George Frisvold, University of Arizona

Threat Assessments on Military Operations, Training, and Planning

Jeff Zautner, USAF - 14WS

Break (10 minutes)

4:40 – 5:30

Session 4: Drought, Vegetation, and Heat Part 2

Moderator: Nancy Selover, Arizona State University

How Growers Help Identify When and Why Excessive Heat Matters in Vineyards

Jeremy Weiss, University of Arizona

Grass-Cast: An Experimental Grassland Productivity Forecast

Lauren Kramer, USDA Southwest Climate Hub

Insect Pest and Invasive Plant Phenology Forecasts Inform Managers When to Take Action

Alyssa Rosemartin, USA National Phenology Network

Impending Changes in Climatic Suitability for Plant Communities and their Characteristic species Across the Arid U.S. Southwest

Kathryn Thomas, US Geological Survey Southwest Biological Science Center

5:30 PM EDT

Adjourn

Tuesday Morning Welcome Speaker: Elizabeth Wentz, Arizona State University



Elizabeth Wentz is the Vice Provost and Dean of the Graduate College at Arizona State University (ASU). She also currently serves as interim director for ASU’s School of Geographical Sciences and Urban Planning, where she has been a professor since 1997. Her research and teaching have focused on geographic information technologies and how those tools are used to better understand urban communities, particularly in the Phoenix metropolitan area.

Tuesday Morning Welcome Speaker: John Murphy, NOAA National Weather Service



John D. Murphy is the Chief Operating Officer (COO) of NOAA’s National Weather Service. He has overall responsibility for day-to-day mission execution units responsible for delivering NWS weather, water, climate, and space weather products, services, and information as well as the budgetary planning for 11 National Service Programs. He joined NWS in 2011 after serving more than 29 years with the United States Air Force as a career meteorologist and finally as Commander of the Air Force Weather Agency and Deputy Foreign Policy Advisor to United States Strategic Command.

Tuesday Keynote Address Speaker: Gregg Garfin, University of Arizona



Gregg Garfin is Associate Professor and Associate Extension Specialist in the University of Arizona’s School of Natural Resources and the Environment, and University Director of the Southwest Climate Adaptation Science Center—a partnership between the USGS and a consortium of research institutions in the Southwest. He has worked extensively with natural resource managers, planners and concerned citizens in the southwestern United States and northern Mexico, to examine resource and community resilience issues and to improve preparedness for drought and other climate-related hazards. He was chapter lead for the Southwest chapter in the Third and Fourth National Climate Assessments.



18th Annual Climate Prediction Applications Science Workshop

Wednesday, April 21

***** All Times in Current Eastern Time Zone (EDT)*****

10:30 AM EDT Virtual Waiting Room Open

11:00 – 11:25 **Invited Talk**

Climate Prediction Center Forecasts of Climate Extremes

David DeWitt, NWS Climate Prediction Center

11:25 AM – **Session 5: Heat - Providing Better Predictions**

12:15 PM

Moderator: Jennifer Vanos, Arizona State University

NOAA/NWS Western Region Experimental HeatRisk Project: Prototyping a National Heat Service for a Weather Ready Nation

Michael Staudenmaier, NWS Western Region Headquarters

The Climate and Health Monitor and Outlook

Hunter Jones, NOAA Climate Program Office

Validating the Skill of Wet Bulb Globe Temperature Forecasts: Challenges with Microclimatic Variations

Charles Konrad, University of North Carolina at Chapel Hill

Soil Moisture and Regional Subseasonal Forecasting of Extreme Heat

Evan Oswald, NWS Climate Prediction Center

12:15– 1:30

Session 6: Heat - Social Vulnerability

Moderator: Paul Iniguez, NWS Phoenix

Environmental and Social Drivers of Multi-year Heat Mortality Trends in Maricopa County, AZ

David Hondula, Rachel Braun, & Matthew Fraser, Arizona State University

Building Resilient Neighborhoods (BRN) to Prepare for Extreme Heat Events

Barbara Warren, Physicians for Social Responsibility, AZ

Killer Heat in the United States: Actionable Results for All Audiences and Opportunities to Align Analysis and Legislative Priorities

Juan Declet-Barreto, Union of Concerned Scientists

Building Resilience Against and Tracking of Climate-Sensitive Public Health Hazards

Laura Fox, Arizona Department of Health Services

Cascading Impacts of Temperature Extremes in the Urban Northeast

Daniel Bader, Columbia University

Micro-scale Urban Adaptations to Mitigate Heat and Air Pollution Exposures and Improve Children's Health

Jennifer Vanos, Arizona State University

1:30 – 2:15

Break with Virtual Field Trips (descriptions on page 9)

- ASU Decision Theater
- MaRTy the Heat Walker
- ASU Net Zero Carbon

2:15 – 2:40	Invited Talk Phoenix Zoo Animals Keep Cool in the Sonoran Summer <i>Drew Foster, Animal Curator of the Phoenix Zoo</i>
2:45 – 3:45	Session 7: Heat - Urban Planning and Heat Islands <i>Moderator: Hunter Jones, NOAA Climate Program Office</i> Planning for Extreme Heat in U.S. Cities <i>Ladd Keith, University of Arizona & Sara Meerow, Arizona State University</i> Human-Scale Measurements and Modeling of Heat Exposure <i>Ariane Middel, Arizona State University</i> A Look at Arizona's Hottest Summer on Record <i>Paul Iniguez, NWS Phoenix</i> NWS Heat Program: A Unified Strategy for Messaging and Forecasting Extreme Heat <i>Kim McMahon & Danielle Nagele, NWS</i> The Heat is On: The Wildfire Science/Management Intersection in Alaska's Rapidly Changing Environment <i>Rick Thoman, Alaska Center for Climate Assessment and Policy (ACCAP)</i>
	Break (15 minutes)
4:00 – 4:30	Poster Session Introductions (lightning talks) <i>Moderator: Marina Timofeyeva, National Weather Service</i>
<i>Breakout #1 (Heat)</i>	Extreme Heat Phenomenon: A Hot Topic for Teaching and Communicating <i>Betsy Wilkening, University of Arizona</i> Extreme Heat Impacts on Energy, Infrastructure and Transportation Sectors <i>Evan Oswald, NWS Climate Prediction Center</i> Increasing Heat Resilience Through Thermal Comfort Assessment in Sun Link Streetcar Stops, Tucson AZ <i>Ida Sami, University of Arizona</i>
<i>Breakout #2 (Precipitation)</i>	Upcoming Enhancements to the Advanced Hydrologic Prediction Service (AHPS) Website <i>Daniel Roman, NWS Water Resources Branch</i> Tracing Satellite Precipitation Data Down to Decision-makers <i>Andrea Portier, NASA Goddard Space Flight Center / Science Systems and Applications, Inc.</i> An Updated Look at the Phoenix Rainfall Index <i>Paul Iniguez, NWS Phoenix</i>
<i>Breakout #3 (Other)</i>	The Effects of Drought and Drought Mitigation Payments for Arizona's Ranching-Dependent Counties <i>Ashley Bickel, University of Arizona</i> Using Hourly-Observed Data Web Services: A Climatology of Wind Chill and Heat Index in the Continental United States <i>Bryan Peake, Midwestern Regional Climate Center</i>
Breakout #4 (Heat Communication)	NWS Heat Program: A Unified Strategy for Messaging and Forecasting Extreme Heat <i>Kim McMahon & Danielle Nagele, NWS</i>
4:30 – 5:30	Poster Session Discussion Breakout Rooms 1, 2, and 3
5:30 PM	Adjourn

Wednesday Invited Speaker: David DeWitt, NWS Climate Prediction Center



David DeWitt is the Director of the NWS Climate Prediction Center. DeWitt joined NOAA's National Weather Service (NWS) in 2012 as the lead modeler within the Science Plans Branch of the Office of Science and Technology. During his tenure at NWS, he served a detail as the acting deputy director for NCEP's Environmental Modeling Center, and as a project manager for the Sandy Supplemental projects, which accelerated development of NOAA's foundational numerical guidance for weather prediction. David has provided leadership on several NWS and NOAA cross-line office activities targeted toward improving NOAA's products and services. Prior to coming to NOAA, DeWitt worked as a research scientist at the International Research Institute for Climate and Society (IRI) at Columbia University from 1999-2012. From 1994-1999, DeWitt worked at the Center for Ocean-Land-Atmosphere Studies developing coupled atmosphere-ocean models for seasonal forecasts and conducting research to better understand short-term climate variability.

Wednesday Invited Speaker: Drew Foster, Phoenix Zoo



Drew Foster has been an Animal Curator at the Arizona Center for Nature Conservation/Phoenix Zoo for 8 years. Long fascinated by animals and dedicated to wildlife conservation, he currently serves as the Chair of the Lizard Taxonomic Group Steering Committee, an Association of Zoos & Aquariums (AZA) Animal Population Management Committee member, the Louisiana Pine Snake Studbook Keeper, an AZA accreditation inspector and a Wildlife Trafficking Alliance Committee member. Drew has served on several professional panels, presented at numerous conferences, published over 30 articles and received various awards, including an AZA Outstanding Service Award in 2019. He holds a Bachelor of Science in Zoology and a Master of Science in Biological Sciences from Eastern Illinois University. Drew's zoo career path includes the Santa Barbara Zoo, Lincoln Park Zoo, Wildlife Conservation Society's Bronx Zoo, and now, the Phoenix Zoo. He seeks to protect animals from extinction and instill a passion for wildlife in all people.

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Thursday, April 22

*****All Times in Current Eastern Time Zone (EDT)*****

10:30 AM EDT Virtual Waiting Room Open

11:00 – 11:50 **Session 8: NACSP Past, Present, and Future**

Moderators: Margaret Hurwitz, NOAA NWS & Sylvain Deland, ECCC

Welcome from the North American Climate Services Partnership (NACSP) Forum Co-organizers

Margaret Hurwitz, NOAA NWS Climate Services Branch

Sylvain Deland, Environment and Climate Change Canada (ECCC)

NACSP Past, Present, and Future

Dr. Meredith Muth, National Oceanic and Atmospheric Administration, USA

Dr. Russ White, Environment and Climate Change Canada

Dr. Jorge Zavala Hidalgo, Servicio Meteorológico Nacional (SMN), Mexico

Break (10 minutes)

12:00 – 1:15 **Session 9: Regional Climate Services Partnerships**

Moderator: Elaine Barrow, ECCC

Gulf of Maine

Samantha Borisoff (Cornell University) and Ellen Mecray (NOAA)

Alaska / Northwest Canada

Rick Thoman, ACCAP; Brian Brettschnider, NOAA; & Mark Barton, ECCC

Great Lakes

Doug Kluck (NOAA)

1:15 – 1:45

Break (30 minutes)

1:45 - 3:00

Session 10: Sustaining International Partnerships

Moderator: Reynaldo Pascual Ramirez, SMN

Water Security in the Arid Americas: The AQUASEC Science-Policy Network

Christopher Scott, Robert Varady, & Adriana Zúñiga Teran, University of Arizona

**Engaging the International Research Community in the Delivery of Climate-ready Decision Support Tools:
Lessons Learned from Two Climate Integrated Modeling Projects**

Anne Hollowed, NOAA Alaska Fisheries Science Center

Global Perspective on Climate Services

Shanna Combley, NOAA National Weather Service

Enabling International Decision Support Services

Wassila Thiaw, NOAA Climate Prediction Center

Break (15 minutes)

3:15 – 4:30

Session 11: Tools and Practices for Effective User Engagement
Moderator: Meredith Muth, NOAA Climate Program Office

The North American Multi-Model Ensemble

Bill Merryfield, ECCC

Climate Change Attribution

Nathan Gillett, ECCC

Alaska Institute of Justice Project: Engaging with 15 Alaskan Communities at Risk

Rick Thoman, ACCAP

Climate Services and Water Resources in Central-eastern Mexico

Jorge Vazquez-Aguirre, Universidad Veracruzana

4:30 – 5:00

Meeting Wrap-up (Marina Timofeyeva & Nancy Selover)

5:00 PM

Adjourn

Virtual Field Trips:

Arizona State University Decision Theater. The Decision Theater is an immersive space for decision makers to examine all the potential outcomes of their decisions on a specific issue. The system uses high-speed computing to integrate all the data sets that bear on the issue at hand. These include natural resources, energy, infrastructure, economics, legal, social, and behavioral impacts. Decision makers can run scenarios in real-time to weigh all the impacts of their decisions. The system is in use not only in Arizona but in Washington DC and across the globe.

MaRTY the Heat Walker - a biometeorological instrument platform. Measures Mean Radiant Temperature to assess human thermal comfort. MaRTy has been used to evaluate comfort levels in sunny and shaded areas over a variety of surfaces and even within urban canyons to help with redevelopment of areas to achieve a great level of human comfort. The video shows MaRTy's set up and how it is used in the field.

ASU Net Zero Carbon - "Carbon is a Terrible Thing to Waste". A KEDtalk (Knowledge Enterprise Development) about collecting and reusing carbon from the atmosphere, presented by Klaus Lackner. Dr. Lackner shows the viewer his device to extract carbon from the atmosphere.

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