2018 International Atmospheric Rivers Conference

Scripps Institution of Oceanography

25-28 June 2018

AGENDA

Monday, 25 June

Seaside Forum

8:00 Registration, Coffee, Tea, and Fruit Basket

Welcome and Introductory Session: F. Martin Ralph, Keynote

8:30 **Committee co-chairs**
Welcome, Introductions, and Opening Remarks

8:45 **F. Martin Ralph**, Center for Western Weather and Water Extremes, *Invited*
Recent advances in observations, models, tracking, and prediction of atmospheric rivers

9:15 **Alexandre Ramos**, Instituto Dom Luiz, University of Lisbon, *Invited*
Atmospheric rivers research in the Atlantic Ocean

9:45 **Anna Wilson**, Center for Western Weather and Water Extremes
Introduction of student scholarship recipients

10:00 BREAK

Winter 2016-17
Chair: Ben Hatchett

10:30 **John Sandmeyer**, City of San Diego, *Invited*
Public safety threat of short periods of intense precipitation in San Diego's urban zone

10:50 **Ruby Leung**, Pacific Northwest National Laboratory
Roles of SST versus internal atmospheric variability in winter extreme precipitation variability along the U.S. West Coast

11:05 **Benjamin Moore**, CIRES/University of Colorado and NOAA/ESRL/PSD
Large-scale dynamics of extreme precipitation events in California during winter 2016-2017

11:20 Winter 2016-17 discussion and session wrap

Airborne Observations of ARs
Chair: Marty Ralph

11:35 **Jack Parrish**, NOAA Aircraft Operations Center, *Invited*
Flying the atmospheric rivers – NOAA AOC achievements and challenges (2014-2018)

11:55 **Minghua Zheng**, Center for Western Weather and Water Extremes
Impacts of dropsonde observations on the predictability of two landfalling atmospheric river events in February 2016

12:10 **Jennifer Haase**, Scripps Institution of Oceanography
Use of airborne GNSS RO observations to investigate the dynamics of an extra-tropical cyclone in a data assimilation study of an atmospheric river

12:25 Airborne Observations of ARs discussion and session wrap

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12:40 LUNCH

Subseasonal to Seasonal Forecasting of ARs
Chair: Christine Shields

1:40 **Jeanine Jones**, CA Department of Water Resources, *Invited*
Sub-seasonal to seasonal forecasting of atmospheric rivers for water management – Where we want to go

2:00 **Michael DeFlorio**, NASA Jet Propulsion Laboratory/CalTech
Global prediction skill of atmospheric rivers on daily to subseasonal timescales: hindcast analysis and experimental real-time forecasting efforts

2:15 **Aneesh Subramanian**, Center for Western Weather and Water Extremes
Realtime subseasonal outlooks for atmospheric rivers

2:30 Subseasonal to Seasonal Forecasting discussion and session wrap

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2:45 BREAK

Applications and Communications
Chair: Anna Wilson

3:00 **Michael Anderson**, CA Department of Water Resources, *Invited*
Atmospheric rivers applications for integrated water management

3:20 **Daniel Swain**, University of California, Los Angeles, *Invited*
Atmospheric rivers as a scientific (and conversational) bridge between weather and climate

3:40 **Chris Smallcomb**, NOAA/NWS, *Invited*
Working with decision makers in Reno-Tahoe: stories from the relentless winter of 2016-17

Panel Discussion I
Advances in AR Research for Water Management
Moderator: Mike Anderson

4:00 Panel Members: Jeanine Jones
CA Department of Water Resources

Jonathan Rutz
NOAA/NWS

Nina Oakley
Western Region Climate Center

Ben Hatchett
Western Region Climate Center

5:00 ADJOURN

Tuesday, 26 June

Seaside Forum

8:00 Registration, Coffee, Tea, and Fruit Basket

AR Tracking
Chair: Ashley Payne

8:30 **Christine Shields**, National Center for Atmospheric Research, *Invited*
The Atmospheric River Tracking Method Intercomparison Project (ARTMIP): experimental design, goals, and current status

8:50 **Jonathan Rutz**, NOAA/NWS
The Atmospheric River Tracking Method Intercomparison Project (ARTMIP): quantifying the uncertainties in atmospheric river climatology and impacts

9:05 **Yang Zhou**, Stony Brook University
The origins, lifetimes, and terminations of atmospheric rivers: an object-based tracing algorithm

9:20 Grzegorz Muszynski, Department of Computer Science, University of Liverpool, United Kingdom & NERSC, LBNL, **Presenting Author: Karthik Kashinath**, Lawrence Berkeley National Laboratory
Topological data analysis and machine learning for detecting atmospheric river patterns in climate data

9:35 **Travis O'Brien**, Lawrence Berkeley National Laboratory
Assessing uncertainty in deep learning techniques that identify atmospheric rivers in climate simulations

9:50 AR Tracking discussion and session wrap

10:05 BREAK

Poster Session I
Lightning Round (19 posters)
Moderator: Anna Wilson

10:20 No slides, 30-60 seconds for each poster presenter to advertise their poster that will be up in the afternoon session

11:00 Breakout Groups

I. AR Reconnaissance and Data Assimilation
II. S2S Challenges and Ways Forward
III. AR Monograph Authors

12:00 LUNCH

Regional Perspectives on ARs I
Chair: Alexandre Ramos

1:00 Deniz Bozkurt, University of Chile, *Invited*
Presenting Author: Roberto Rondanelli, University of Chile
Foehn event triggered by an atmospheric river underlies record-setting temperature along continental Antarctica

1:20 **Rene Garreaud**, University of Chile, *Invited*
ARs along the west coast of South America

1:40 **Deanna Nash**, University of California, Santa Barbara
The role of atmospheric rivers in extratropical and polar hydroclimate

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1:55 BREAK

Regional Perspectives on ARs I, continued

2:25 Alexander Gavrikov, Shirshov Institute of Oceanology
Presenting Author: Natalia Tilinina, Shirshov Institute of Oceanology
The North Atlantic atmospheric rivers in high-resolution atmospheric WRF hindcast (1979+)

2:40 **Gudrun Magnusdottir**, University of California, Irvine
Extreme transient moisture transport in the high-latitude North Atlantic sector and impacts on sea-ice concentration

2:55 **Nelun Fernando**, Texas Water Development Board
Do atmospheric rivers sometimes drive the hydrological roller coaster over Texas?

3:10 Regional Perspectives I discussion and session wrap

3:30 Poster Session I (19 posters, ends 5:30)
Forum Lobby

5:00 Mixer/Cocktail Hour

6:00 Dinner
Forum Outside

Wednesday, 27 June

Seaside Forum

8:00 Registration, Coffee, Tea, and Fruit Basket

Poster Session II
Lightning Round (14 posters)
Moderator: Michael DeFlorio

8:30 No slides, 30-60 seconds for each poster presenter to advertise their poster that will be up in the afternoon session

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AR Dynamics I
Chair: Ben Moore

9:00 **Lance Bosart**, SUNY Albany, *Invited*
Rossby wave breaking as a governor of atmospheric river evolution and the occurrence of extreme weather events

9:20 **Zhenhai Zhang**, Center for Western Weather and Water Extremes
The extratropical cyclone and atmospheric river over the U.S. West Coast

9:35 **Forest Cannon**, Center for Western Weather and Water Extremes
Synoptic to mesoscale forcing of Southern California extreme precipitation

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9:50 BREAK

AR Dynamics II
Chair: Ben Moore

10:15 **Huancui Hu**, University of Illinois, Urbana-Champaign
The role of tropical moisture on atmospheric rivers' vapor transport and landfall

10:30 **Reuben Demirdjian**, Center for Western Weather and Water Extremes
On the use of a height tendency analysis for physical process studies

10:45 **Meredith Fish**, Center for Western Weather and Water Extremes
Coastal sea surface temperature variability in Northern California during landfalling atmospheric rivers

11:00 AR Dynamics discussion and session wrap

11:15 BREAK

AR Microphysics, aerosols, and chemistry
Chair: Ruby Leung

11:25 **Kim Prather**, University of California, San Diego, *Invited*
Impact of local versus long range transported aerosols on California clouds and precipitation

11:45 **Andrew Martin**, Center for Western Weather and Water Extremes
Contrasting local and long-range transported warm ice-nucleating particles during an atmospheric river in Coastal California

12:00 **Hari Mix**, Santa Clara University
Stable isotope constraints on post-condensation processes and precipitation efficiency during the March 5-7, 2016 atmospheric river event

12:15 **Kara Voss**, Center for Western Weather and Water Extremes
What makes an atmospheric river dusty?

12:30 AR Microphysics, aerosols, and chemistry discussion and session wrap

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12:45 LUNCH

Weather Forecasting of ARs
Chair: Chris Smallcomb

1:45 **Andrew Martin**, Center for Western Weather and Water Extremes, *Invited*
Identifying forecast errors in atmospheric river vapor transport, landfall location and duration through traditional and object-based verification

2:05 **Alexandre Ramos**, Instituto Dom Luiz, University of Lisbon
Predictability of Atmospheric Rivers in Europe

2:20 **Ivory Small**, NOAA/NWS
Atmospheric rivers in Southwestern California and their relationship to operational severe weather and flash flood forecasting

2:35 Brian Henn, Center for Western Weather and Water Extremes
Presenting Author: Rachel Weihs, Center for Western Weather and Water Extremes
Quantifying skill in forecasting rain-snow levels in atmospheric river storms in California across models

2:50 **Matt Masarik**, Boise State University
Modeling case study of an inland penetrating atmospheric river event, June 2^{nd}-4^{th}, 2010

3:05 Weather Forecasting of ARs discussion and session wrap

3:20 BREAK

Regional Perspectives on ARs II
Chair: Natalia Tilinina

3:30 **David Pierce**, Scripps Institution of Oceanography, *Invited*
The depiction of atmospheric rivers in downscaled data

3:50 **Douglas Miller**, University of North Carolina at Asheville
An expanded view on the climatology of atmospheric rivers impacting the southern Appalachian Mountains

4:05 Regional Perspectives on ARs II discussion and session wrap

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4:15 Poster Session II (14 posters)
Forum Lobby

5:30 ADJOURN

Thursday, 28 June

Seaside Forum

8:00 Registration, Coffee, Tea, and Fruit Basket

ARs and Hydrologic Impacts
Chair: Mike Dettinger

8:30 **Christopher Konrad**, US Geological Survey, *Invited*
Attributing flood trends to atmospheric rivers in Western Washington

8:50 **Tom Corringham**, University of California, San Diego
Atmospheric rivers drive flood damages in the Western US

9:05 **Laurie Huning**, University of California, Irvine
Uncertainty associated with atmospheric river-derived seasonal snowfall patterns

9:20 Charles Downer, US Army Engineer Research and Development Center, **Presenting Author: Steve Turnbull**, US Army Engineer Research and Development Center
Distributed hydrologic model simulations for forecasting stream flows and reservoir storage

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9:35 BREAK

ARs and Hydrologic Impacts
Chair: Mike Dettinger

9:45 **Christine Albano**, Desert Research Institute
Influences of atmospheric rivers on terrestrial water storage and fluxes in the Western US

10:00 **Hilary McMillan**, San Diego State University
Coupling a high-resolution weather model with a hydrological model for flood forecasting: design, implementation, and challenges

10:15 Homero Paltan, University of Oxford, **Presenting Author: Duane Waliser**, NASA Jet Propulsion Laboratory
Global floods and water availability driven by atmospheric rivers

10:30 ARs and Hydrologic Impacts discussion and session wrap

10:45 BREAK

ARs and Climate Variability: Past, Present, and Future I
Chair: Mike DeFlorio

10:55 **Juan Lora**, University of California, Los Angeles, *Invited*
Atmospheric rivers and the changing climate of Western North America since the Last Glacial Maximum

11:15 **Ben Hatchett**, Desert Research Institute
Applications of atmospheric rivers to Great Basin paleohydroclimate problems

11:30 **Bin Guan**, University of California, Los Angeles
Water vapor budget in atmospheric rivers: a multi-model evaluation

11:45 ARs and Climate Variability: Past, Present, and Future I discussion and session wrap

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12:00 LUNCH

ARs and Climate Variability: Past, Present, and Future II
Chair: Juan Lora

1:00 **Jesse Norris**, University of California, Los Angeles
Dynamic and thermodynamic controls on future changes to precipitation accumulations during atmospheric river events

1:15 **Katerina Gonzales**, Stanford University
Recent temperature trends and tracks of landfalling US West Coast atmospheric rivers

1:30 **Alexander Gershunov**, Scripps Institution of Oceanography
Precipitation regime change in California and the Western US: the role of atmospheric rivers

1:45 Vicky Espinoza, University of California, Merced
Presenting Author: Duane Waliser, NASA Jet Propulsion Laboratory, *Invited*
Global analysis of climate change projection effects on atmospheric rivers

2:05 **Michael Warner**, US Army Corps of Engineers, Seattle District
Atmospheric rivers, climate change, and the Howard Hanson Dam

2:20 ARs and Climate Variability: Past, Present, and Future II discussion and session wrap

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2:35 BREAK

Emerging Directions
Chair: Nina Oakley

2:45 **John Dumas**, NOAA/NWS
Floods After Fires - The Complicated Relationship Between Atmospheric rivers and debris flows in Southern California

3:00 **Steve Turnbull**, US Army Engineer Research and Development Center
Russian River watershed hydrograph separation using stable isotopes and natural geochemical tracers

3:15 **Alexander Tardy**, NOAA/NWS
Using the NOAA CFSv2 for long range forecasting and partner support[1]

3:30 Emerging Directions discussion and session wrap

3:45 BREAK

Panel Discussion II
AR Definition and New Directions
Moderator: Duane Waliser

4:00 Panel Members:
F. Martin Ralph
Center for Western Weather and Water Extremes

Mike Dettinger
US Geological Survey

Lance Bosart
SUNY Albany

Alexandre Ramos
Instituto Dom Luiz, University of Lisbon

Rene Garreaud
University of Chile

Natalia Tilinina
Shirshov Institute of Oceanology

4:45 Closing Remarks

5:00 ADJOURN

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[1] This talk was originally scheduled for Monday's *Subseasonal to Seasonal Forecasting of ARs* session, but moved to accommodate speakers travel plans.

Posters

Poster Session I (19 Posters)

Seaside Forum Lobby
Tuesday, 26 June 3:00-5:30p

Sol Kim, University of California, Berkeley
Influence of subtropical jets on atmospheric rivers

William Rudisill, Boise State University
Evaluation of land surface snow forcings during Central Idaho atmospheric rivers

Gavin Cornwell, University of California, San Diego
Identifying marine biological particles at Bodega Bay, CA using single-particle measurements

Terence Pagano, California State University, Los Angeles
Analysis of atmospheric rivers using satellite-observed HDO

Deveshi Buch, Vista del Lago High School
Climatological analysis of atmospheric rivers in the Eastern Pacific: a comparative study

Cody Poulsen, Center for Western Weather and Water Extremes
A comparison of West Coast atmospheric river axes of orientation using objective and subjective methods during the 2016-2017 cool season

Joe Witte, Aquent/NASA Jet Propulsion Laboratory
Science communication of the amazing atmospheric rivers

Kristian Mattarochia, NOAA/NWS
Localizing the proposed atmospheric river scale to events across the National Weather Service's Hanford County Warning Area, including the San Joaquin Valley and the Sierra Nevada Mountains

Christoph Boehm, University of Cologne
Moisture supply to the Atacama Desert by atmospheric rivers

Diego Campos, University of Chile
Teleconnections and precipitation in Central Chile: the neglected role of moisture transport

Aaron Jacobs, NOAA/NWS
Atmospheric river research in Alaska

Marshall Pfahler, SUNY Albany
The influence of atmospheric rivers on the 22-26 December 2013 Caribbean rainstorm

Alexandre Ramos, Instituto Dom Luiz, University of Lisbon
A review of atmospheric rivers in Europe

Felipe Saavedra, University of Chile
Atmospheric rivers contribution to the snow accumulation over the Southern Andes (26.5° S-37.5° S)

Matthew Sanders, Plymouth State University
A multiscale analysis of ice jam flooding in central New Hampshire in late February 2017

Jiexia Wu, George Mason University
The attribution of atmospheric rivers on drought demise in the U.S.

Sam Webber, Plymouth State University
Large-scale regime transitions and atmospheric river landfalls across Western North America

Ashley Payne, University of Michigan
The development of persistent atmospheric rivers

Meredith Fish, Center for Western Weather and Water Extremes
Atmospheric river families: definition and synoptic evaluation

Poster Session II (14 posters)

Seaside Forum Lobby
Wednesday, 27 June 4:30-6:00p

Huancui Hu, University of Illinois, Urbana-Champaign
Using a numerical water tracer model for understanding hydrometeorological impacts of an extreme atmospheric river

T.J. Jenkins, Scripps Institution of Oceanography
Atmospheric rivers and avalanches: LiDAR-based snowpack stratigraphic analysis

Nina Oakley, Desert Research Institute
Landslides, post-fire debris flows, and atmospheric rivers in California

Kelley Sterle, University of Nevada, Reno
Hydroclimate variability in snow-fed river systems: local water managers' forecast and science information needs under a new normal climate

Xiaojing Du, University of Michigan, Ann Arbor
Interannual hydroclimate variability and extreme precipitation reconstructed from Santa Barbara Basin sediments, Southern California, during the last 9,000 years

James Done, National Center for Atmospheric Research
Atmospheric river characteristics under decadal climate variability

Naomi Goldenson, University of California, Los Angeles
Influence of cumulative AR occurrence on snowpack in California and the Northwestern U.S.

Rosana Aguilera, University of California, San Diego
Atmospheric rivers drive coastal water pollution spikes in California

Carolyn Reynolds, Naval Research Laboratory
Naval Research Laboratory preliminary results from AR RECON 2018

Michael Murphy, Scripps Institute of Oceanography
Preliminary evaluation of airborne GNSS RO profiles collected during Atmospheric River Recon 2018

Rui Sun, Center for Western Weather and Water Extremes
Investigation of the ocean-atmosphere coupling in the atmospheric river events simulated by a coupled model

Xingying Huang, University of California, Los Angeles
Modeling and evaluation of the extreme historical atmospheric rivers over the U.S. West Coast

Rachel Weihs, Center for Western Weather and Water Extremes
Uncertainty estimates in extreme precipitation from numerical precision in a regional weather prediction model

Anna Wilson, Center for Western Weather and Water Extremes
The effect of atmospheric rivers on reservoir operations and flooding in California's Russian River watershed during water years 2017 and 2018