Arctic

Integrating Observations and Models to Better Understand a Changing Arctic System
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Coupled-system Processes of the Central Arctic Atmosphere-Sea Ice-Ocean System: Harnessing Field Observations and Advancing Models
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Atmosphere and Cryosphere Coupling in the Arctic: Observations, Modeling, and Implications for Future Arctic Changes
Nicole Schlegel*, NASA Jet Propulsion Laboratory, Pasadena, United States,* ***Xianglei Huang****, University of Michigan Ann Arbor, Ann Arbor, MI, United States,* ***Brian H Kahn****, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, United States and* ***Tristan L'Ecuyer****, University of Wisconsin Madison, Madison, WI, United States*

Sea ice change and variability: Implications for the biophysical climate systems of the Arctic, Antarctic, and beyond
Michael Steele*, Applied Physics Laboratory University of Washington, Polar Science Center, Seattle, WA, United States,* ***Marilyn N Raphael****, UCLA, Los Angeles, CA, United States,* ***Laura Castro de la Guardia****, University of Alberta, Edmonton, AB, Canada and* ***Amy Solomon****, Cooperative Institute for Research in Environmental Sciences, Boulder, CO, United States*

Arctic and Midlatitude Linkage: Causes and Effects
Yutian Wu*, Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY, United States,* ***Xiangdong Zhang****, Univ Alaska, Fairbanks, AK, United States,* ***Qinghua Ding****, University of California Santa Barbara, Santa Barbara, CA, United States and* ***Baek-Min Kim****, Pukyong National University, Pusan, South Korea*

Connecting dots: Arctic Sea Ice Forecasting and local community needs
Ann-Christine Zinkann*, NOAA, Global Ocean Monitoring and Observing Program, Washington, DC, United States and* ***Matthew Druckenmiller****, University of Colorado at Boulder, Boulder, United States*

Atypical polar stratospheric winters in 2019 and 2020: causes and consequences
Natalya A Kramarova*, Science Systems and Applications, Inc., Lanham, MD, United States,* ***Irina V Petropavlovskikh****, Cooperative Institute for Research in Environmental Sciences, Boulder, CO, United States and* ***Diego G Loyola****, German Aerospace Center (DLR), The Remote Sensing Technology Institute (IMF), Oberpfaffenhofen, Germany*

Remote Sensing of the Cryosphere: Sea Ice
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High-Latitude Earth Systems - Their Local Responses to and Impacts on Global Climate Change
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Cryospheric impacts of COVID-19
***Ned Bair**, University of California Santa Barbara, Santa Barbara, CA, United States, **Karl Rittger**, University of Colorado at Boulder, Institute for Arctic and Alpine Research, Boulder, CO, United States and **McKenzie Skiles**, University of Utah, Salt Lake City, UT, United States*

Large-scale atmosphere-ocean dynamics of climate variability and climate change
***Robert Jnglin Wills**, University of Washington, Atmospheric Sciences, Seattle, WA, United States, **Dillon J Amaya**, University of Colorado, Boulder, CO, United States, **Natalie Burls**, George Mason University, Atmospheric, Oceanic and Earth Sciences, Fairfax, VA, United States and **Elizabeth Maroon**, University of Wisconsin Madison, Madison, WI, United States*

MOSAiC

Snow on Sea Ice: Processes, Models, Impacts on Ice Mass Balance, and Remote Sensing Signatures
***Chris Polashenski**, Organization Not Listed, U.S. Army Cold Regions Research and Engineering Laboratory, Washington, DC, United States; USACE-CRREL, Ft. Wainwright, AK, United States, **Stefanie Arndt**, Alfred Wegener Institute Helmholtz-Center for Polar and Marine Research Bremerhaven, Bremerhaven, Germany, **Martin Schneebeli**, WSL Inst. Snow & Avalanche Research SLF, Davos Dorf, Switzerland and **David Clemens-Sewall**, Dartmouth College, Hanover, NH, United States*

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Antarctic

Ongoing evolution of the climate-ice-ocean system on the Amundsen Sea - West Antarctic coast
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Understanding Ice-Shelf Processes
***Martin Wearing**, University of Edinburgh, Edinburgh, EH9, United Kingdom, **Sammie Claire Buzzard**, Georgia Institute of Technology Main Campus, Atlanta, United States, **Reinhard Drews**, University of*

*Bremen, Bremen, Germany and **Alison F Banwell**, University of Colorado Boulder, CIRES, Boulder, United States*

Satellite Study of Cryosphere-Climate Interactions Through The Correlation of Ocean-atmosphere-cryosphere interactions with Climate Variability, Sea-level Variability Mechanism , Sub-mesoscale Dynamics To Develop Cryosphere Climate Predicting Models (CCPM).
***Virendra KUMAR Goswami**, Indian Institute of Technology Delhi, New Delhi, India and **Tristan L'Ecuyer**, University of Wisconsin Madison, Madison, WI, United States*

Data-based modeling and uncertainty quantification for space weather
***Bharat Kunduri**, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States, **Mervyn P Freeman**, British Antarctic Survey, Cambridge, United Kingdom and **Steven Morley**, Los Alamos National Laboratory, Los Alamos, NM, United States*

Dynamics of Particles, Precipitation, and Waves in the Near-Earth Space Environment
***Jean-Francois Ripoll**, CEA Commissariat à l'Energie Atomique DAM, Arpajon Cedex, France, **Jay Albert**, Air Force Research Lab, Albuquerque, NM, United States, **Richard Bertram Horne**, British Antarctic Survey, Cambridge, United Kingdom and **Gregory Cunningham**, Los Alamos National Laboratory, Los Alamos, NM, United States*

Forecast and Prediction

Innovations in Risk Transfer Solutions using Earth Observations, Weather Data, Physical Models, and Short to Long Term Forecasts
***Julio Enrique Herrera-Estrada**, Descartes Labs, Inc., Los Alamos, NM, United States, **Colby K Fisher**, Princeton Climate Analytics, Princeton, NJ, United States and **Elinor Benami**, University of California Davis, Davis, CA, United States*

Space Weather Research and Forecasting: End-User Requirements and Future Modelling Capabilities.
***Mario Mark Bisi**, United Kingdom Research and Innovation – Science & Technology Facilities Council - Rutherford Appleton Laboratory, RAL Space, Harwell Campus, Oxfordshire, United Kingdom, **Antti A Pulkkinen**, NASA/GSFC, Greenbelt, MD, United States, **Michele D Cash**, NOAA-Space Weather Prediction Center, Boulder, CO, United States and **Suzy Bingham**, Met Office, Exeter, United Kingdom*

From Ideas to Action: using evidence from the past to improve forecasts
***Ann Raiho**, Colorado State University, Fort Collins, CO, United States, **Andria Dawson**, Mount Royal University, Calgary, Canada, **Jason S McLachlan**, University of Notre Dame, Notre Dame, IN, United States and **Andrew Fox**, Joint Center for Satellite Data Assimilation, Boulder, CO, United States*

Towards A Generation of Forecast Informed Reservoir Operations--Applicability and Limitations
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Extreme Weather Events: Forecast skill, Uncertainty Quantification and Impact Modeling
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Ground-Based Atmospheric Monitoring Networks
***Katrine Gorham**[1], **Dominique E Young**[1], **Jenny L Hand**[2] and **Nicole P Hyslop**[3], (1)University of California Davis, Davis, CA, United States(2)Colorado State Univ, Fort Collins, CO, United States(3)University of California, Davis, CA, United States*

Advances in Earth system prediction across timescales
***Jadwiga Richter**, National Center for Atmospheric Research, Climate and Global Dynamics Laboratory, Boulder, CO, United States, **Stephen G Yeager**, NCAR, Oceanography, Boulder, CO, United States and **Kathleen Pegion**, George Mason University, Fairfax, VA, United States*

Data Assimilation, Reanalysis, and Observing System Simulation Experiments
***Isaac Moradi**, NASA Goddard Space Flight Center, Global Modeling and Assimilation Office (GMAO), Greenbelt, MD, United States*

Advancing netCDF-CF for the Earth System Science Community
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Atmospheric Convection: Processes, Dynamics, and Links to Weather and Climate
***Giuseppe Torri**, University of Hawai'i at Mānoa, Department of Atmospheric Sciences, Honolulu, HI, United States, **Rachel L Storer**, NASA Jet Propulsion Laboratory, Pasadena, CA, United States, **Hanii Takahashi**, Jet Propulsion Lab, Pasadena, CA, United States and **Yang Tian**, Lawrence Livermore National Laboratory, Livermore, United States*

Calibration and Validation of Satellite Earth Observation Systems
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Application of weather, water & climate products to track the spread and/or impacts of the COVID-19 pandemic
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Subseasonal to Seasonal Climate Prediction, Processes, and Services

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Cloud-Associated Observations, Properties, Processes, and Parameterizations

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Unmanned Systems in Atmospheric Research

***Fan Mei**[1], **Gijs de Boer**[2], **Greg M McFarquhar**[3] and **Beat Schmid**[1], (1)Pacific Northwest National Laboratory, Richland, WA, United States(2)University of Colorado at Boulder; IASC Atmosphere WG Member, Boulder, CO, United States(3)Cooperative Institute for Mesoscale Meteorological Studies, University of Oklahoma, Norman, OK, United States*

Diagnostics, Sensitivity, and Uncertainty Analysis of Earth and Environmental Models

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Scientific and Philosophical Interpretations of Uncertainty in Climate Models and Climate Change

***Donald D Lucas**, Lawrence Livermore National Laboratory, Livermore, CA, United States and **Elisabeth A Lloyd**, Indiana University Bloomington, History and Philosophy of Science and Medicine, Bloomington, IN, United States*

Modeling of the Cryosphere: Seasonal Snow

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Machine Learning for Weather and Climate Modeling

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Extreme Weather Events: Forecast skill, Uncertainty Quantification and Impact Modeling

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Utilizing Precipitation Datasets and Quantifying Associated Uncertainties in Hydrometeorological and Climate Impact Applications
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Near Real-Time/Low Latency Data for Earth Science and Space Weather Applications
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High-Latitude Earth Systems - Their Local Responses to and Impacts on Global Climate Change
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Atmosphere

Large-scale atmosphere-ocean dynamics of climate variability and climate change
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Advances in Data Assimilation, Predictability and Uncertainty Quantification
***Steven J Fletcher**, Colorado State University, Cooperative Institute for Research in the Atmosphere, Fort Collins, CO, United States, **Brian C Ancell**, Texas Tech Univ-Geosciences, Lubbock, TX, United States, **Derek J Posselt**, Jet Propulsion Laboratory, Pasadena, CA, United States and **Matthias Morzfeld**, University of Arizona, Department of Mathematics, Tucson, AZ, United States*

Progress in Reanalysis: Development, Evaluation, and Application
***Jan Dominik Keller**, Deutscher Wetterdienst, Offenbach, Germany, **Michael G Bosilovich**, Earth Sciences Division, Greenbelt, MD, United States, **Masatomo Fujiwara**, Hokkaido University, Faculty of Environmental Earth Science, Sapporo, Japan and **Rixen Michel**, World Meteorological Organization, World Climate Research Programme, Geneva, Switzerland*

Advances in Atmospheric Remote Sensing Techniques and Theories
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Surface-Atmosphere Interactions: From Single Flux Measurements to Integrated Synthesis
***Gilberto Pastorello**, Lawrence Berkeley National Laboratory, Berkeley, CA, United States, **David Durden**, National Ecological Observatory Network, Battelle, Boulder, CO, United States, **Housen Chu**, Lawrence Berkeley National Laboratory, Berkeley, United States and **Dario Papale**, University of Tuscia, Department for Innovation in Biological, Agro-food and Forest systems (DIBAF), Viterbo, Italy*

Neutral-dynamical, Electrodynamical, and Chemical Processes in the Vertical and Horizontal Coupling within the Earth's Atmosphere and Space
***Xinzhao Chu**, University of Colorado Boulder, Boulder, CO, United States, **Xian Lu**, Clemson University, Physics and Astronomy, Clemson, SC, United States and **Zhonghua Xu**, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States*

Air quality during the COVID-19 pandemic: Responses to emissions reductions and the role of in-situ data.
***Jessica Gilman**[1], **Steven S Brown**[1], **Armin Wisthaler**[2] and **Bin Yuan**[3], (1)NOAA Earth System Research Laboratory, Chemical Sciences Division, Boulder, CO, United States(2)University of Oslo, Department of Chemistry, Oslo, Norway(3)Jinan University, Guangzhou, China*

Bridging systems modeling advances across socio-ecological domains
***Amanda Giang**, University of British Columbia, Vancouver, BC, Canada, **Sarah Fletcher**, Stanford University, Novato, CA, United States, **Megan Lickley**, Massachusetts Institute of Technology, Cambridge, MA, United States and **Morgan Edwards**, University of Wisconsin Madison, Madison, WI, United States*

Polar

Altimetry of the Polar Regions: CryoSat-2, Operation IceBridge, ICESat-2, and Beyond
***Helen Amanda Fricker**, Scripps Institution of Oceanography, La Jolla, CA, United States, **Louise Sandberg Sorensen**, National Space Institute, Copenhagen Oe, Denmark, **Rachel Tilling**, NASA Goddard Space Flight Center, Greenbelt, MD, United States and **Isobel Lawrence**, University of Leeds, Leeds, United Kingdom*

Extratropical and High-latitude Storms, Teleconnections, Extreme Events, and the Rapidly Changing Polar Climate
Xiangdong Zhang, University of Alaska Fairbanks, Fairbanks, AK, United States, Kent Moore, Univ Toronto, Toronto, ON, Canada and James E Overland, NOAA Seattle, Seattle, WA, United States

Ongoing evolution of the climate-ice-ocean system on the Amundsen Sea - West Antarctic coast
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Atmospheric Satellite Measurements and COVID-19 Impacts
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Coupled-system Processes of the Central Arctic Atmosphere-Sea Ice-Ocean System: Harnessing Field Observations and Advancing Models

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Altimetry of the Polar Regions: CryoSat-2, Operation IceBridge, ICESat-2, and Beyond

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Subseasonal to Seasonal Climate Prediction, Processes, and Services

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Satellite Study of Cryosphere-Climate Interactions Through The Correlation of Ocean-atmosphere-cryosphere interactions with Climate Variability, Sea-level Variability Mechanism , Sub-mesoscale Dynamics To Develop Cryosphere Climate Predicting Models (CCPM).

***Virendra KUMAR Goswami**, Indian Institute of Technology Delhi, New Delhi, India and **Tristan L'Ecuyer**, University of Wisconsin Madison, Madison, WI, United States*

Microphysical and Macrophysical Properties and Processes of Ice and Mixed-Phase Clouds: Linking in Situ, Remote Sensing Observations and Multiscale Models

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Advancing predictive understanding of climate variability and change associated with air-sea interactions and interbasin connections

***Shoshiro Minobe**, Hokkaido University, Sapporo, Japan, **Aixue Hu**, NCAR, Boulder, CO, United States, **Alexey Karpechko**, Finnish Meteorological Institute, Helsinki, Finland and **Rhys Parfitt**, Florida State University, Tallahassee, United States*

Model Physics and Process-based Testing and Evaluation of Weather and Climate Models

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Insights into Aerosol-Cloud Interactions in Low Clouds through COVID-19 Impacts, Natural Experiments, and Deliberate Aerosol Perturbations

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A Path Towards Climate Resiliency: Preparing a Future Climate Workforce From Within the Indigenous Community

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Advances in Observation and Modeling of Forest Snow Processes

***Tobias Jonas**, WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland, **Lundquist Jessica**, University of Washington, Seattle, United States and **Adrian Adam Harpold**, University of Nevada Reno, Natural Resources and Environmental Science, Reno, NV, United States*

Hazards from a Changing Cryosphere

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The Air, Land, and Sea Unmanned Platforms of Tomorrow: Automated Systems and Data Analysis

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Digital Transformation of Earth Science Cloud: Data-Oriented and Self-Optimizing Architectures and Workflows

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Dynamics of oceanic mesoscale eddies from regional to global scales under a changing climate

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Addressing the Need for Earth-Observation Capacity Development at the Local, National, Regional, and Global Scales

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Lagrangian and Climatological Transitions of Warm Boundary Layer Clouds

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Innovation and exploration in observed and model oceanographic data using interpretable machine learning

Maike Sonnewald[1,2], ***V. Balaji***[1], ***Julien Brajard***[3] *and* ***Redouane Lguensat***[4], *(1)Princeton University, Princeton, NJ, United States(2)University of Washington, School of Oceanography, Seattle, MA, United States(3)Sorbonne Université, Sorbonne, France(4)Institut des Géosciences de l'Environnement, CNRS/Univ. Grenoble Alpes/G-INP/IRD, Grenoble, France*

Emerging technology and communications for Earth and Space science sensing

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Satellite-based air quality and atmospheric composition impacts of COVID-19

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Extreme Precipitation in Past, Present, and Future Climates

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Diversity and Inclusion in Polar Science

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Recent Advancements in Earth Science Data Discovery and Metadata Stewardship Practices

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Communication of Science - Practice, Research and Reflection

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Sub-millimeter Technology and Science for Remote Sensing: Cloud, Precipitation and Beyond

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