

**Dr. Andrew Martin**

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850-228-6436, [anmarti2@pdx.edu](mailto:anmarti2@pdx.edu)<http://web.pdx.edu/~anmarti2/index.html>AT A GLANCE

- Hydrometeorologist, with PhD in Meteorology from Florida State University
- Community-recognized expert in Atmospheric Rivers
- 17 Peer-reviewed publications in Atmospheric Rivers, Atmospheric Dynamics, and Aerosol and Cloud Microphysics
- \$716,200 federal and state research funding awarded in 2+ years as P.I.
- Established a real-time WRF forecast system for Atmospheric Rivers, with associated analysis and decision-support products published to the web.
- Teaches concepts of weather and forecasting in *Severe Weather* at Portland State University

PROFESSIONAL PREPARATION

Postdoctoral	<b>Scripps Institution of Oceanography</b> Kimberly Prather and F. Martin Ralph, Advisor(s) Fields: <i>Numerical Weather Prediction, Hydrometeorology, Clouds and Aerosols</i>	2015
PhD	<b>Florida State University</b> <i>Meteorology</i> <u>The Impact of Anomalous Aerosol Heating on the Onset of the Asian Summer Monsoon</u> , T. N. Krishnamurti (chair), Paul Ruscher, Robert Hart, Guosheng Liu, James Tull	2012
	<b>NASA Goddard Space Flight Center</b> NASA Graduate Student Researchers Program, 3 yr, 10 wk / yr William K. Lau, Advisor Fields: <i>Numerical Weather Prediction, Tropical Meteorology</i>	
BS	<b>Iowa State University</b> <i>Physics</i>	2006

PROFESSIONAL APPOINTMENTS

Research Assistant	<b>Portland State University</b>	2019 – pres.
Professor	Department of Geography Martin Lafrenz, Chair	
Assistant Project Scientist	<b>Scripps Institution of Oceanography</b> CASPO Division F. Martin Ralph, Supervisor	2015 - 2019

## SCHOLARLY AND TECHNICAL EXPERTISE

- Community-recognized expert in the physical and dynamic meteorology of atmospheric rivers
  - 10 peer-reviewed articles in leading journals
  - Chapter editor for *Atmospheric Rivers*, Springer Press
  - Executive committee member and co-founder of the *International Atmospheric Rivers Conference*, first conference solely dedicated to atmospheric river science and applications
  - Faculty Instructor for the *Atmospheric Rivers Colloquium Summer School*
  - Contributed to *American Meteorology Society Glossary* entry for “Atmospheric River”
  - Local media (*KOIN, KGW* – Portland, OR) interviews appearing as atmospheric rivers expert
- Expert in weather forecasting applications to water management
  - Principal Investigator for “Forecast Informed Reservoir Operations” (FIRO), using predicted conditions to enable enhanced water supply and environmental co-benefits without raising flood risk
  - 7 Invited lectures discussing FIRO and associated water management topics
- Managed ~\$1M quasi-operational *West-WRF* numerical weather prediction project at Scripps Institution of Oceanography
  - Supervised 10 graduate students, postdoctoral scholars and junior scientists.
  - Delivered daily forecasts seasonally 2014 - 2018, including output data, web-displayed products (<https://cw3e.ucsd.edu/west-wrf/>), and AWIPS ingest for NOAA-NWS
  - Included operational deterministic, experimental data assimilation, coupled hydrology, and ensemble modes
  - Enhanced forecast products and discussions were used by CA Flood Operations Center to respond to the Lake Oroville Dam Crisis in Feb 2017 and CalWater field experiment in 2015.
- Expert in cloud and aerosol microphysics
  - 8 peer-reviewed publications in leading journals
  - 2 PhD dissertation chapters
- Technical expert on regional climate downscaling
  - 2 extramurally funded projects contributing to methods in CA Climate Change Assessment
  - Expert consultant for private industry study on performance of energy efficient building designs in future climates
- Led mobile laboratory as co-investigator for NSF-funded (*AGS-145147*) intensive field study investigating clouds and aerosols in coastal environments and atmospheric rivers
  - Study generated 12 peer-reviewed publications
  - Trained 14 students (grad and undergrad) from 4 universities in field methods, instrumentation, and the publication process
- Graduate Student Participant, NASA Genesis and Rapid Intensification Processes (GRIP, 2010)

- Multi-institution, multi-platform field experiment to study rapid intensification in Atlantic tropical cyclones, with locations in US and Caribbean.
- Produced daily forecasts of tropical disturbance and TC activity and led forecast discussions during daily flight planning meeting.

### TEACHING AND MENTORSHIP

- Instructor, GEOG 314U, *Severe Weather*, Portland State University, 2019 – 2020
- Instructor, *Atmospheric Rivers Colloquium Summer School*, 2019
  - Two-week intensive course oriented toward graduate student education and training in theory and applications of atmospheric rivers.
  - 30 students and 16 instructors drawn from universities and institutions across the U.S., Europe, South America, Africa and Asia.
- Graduate Teaching Assistant, MET 5403, *Meteorological Instrumentation and Observation*, Florida State University, 2008
- Thesis Committee Member, 7 students at Masters and PhD levels, including 4 complete degrees.
- Faculty mentor, PSU *Center for Climate and Aerosol Research*, NSF-REU site.
- Lectures, assignments and labs in hydrometeorology, cloud physics, synoptic meteorology, tropical meteorology, weather forecasting, weather instrumentation and water resource management.

### UNIVERSITY AND PROFESSIONAL SERVICE

- Justice, Equity, Diversity and Inclusion committee, Department of Geography, Portland State University (Curr.)
- Year of Water committee, College of Liberal Arts and Sciences, Portland State University
- GIS Co-op committee, Department of Geography, Portland State University
- Promotion and Tenure ad-hoc reviewer, Scripps Institution of Oceanography
- Climate science program chair and executive committee member for the 2019 *Northwest Climate Conference*
- Convener for sessions in hydrology and atmospheric sciences, *Fall Meeting of the American Geophysical Union*
- Program committee chairman for the 2016 *International Atmospheric Rivers Conference*
- Faculty Fellow, *Institute for Sustainable Solutions* and *PSU-USGS University Partnership Program*
- Reviewer, *Journal of Geophysical Research*, *Journal of Climate*, *Journal of the Atmospheric Sciences*, *Geophysical Research Letters*, *Nature Scientific Reports*, *Environmental Science & Technology*

### PROFESSIONAL TRAINING AND SKILLSET

- “Remote @ PSU”, A two-week intensive course in online course design. Office of Academic Innovation, Portland State University.

- “Planning and Writing Successful Grant Proposals”, A one-day workshop covering successful grant writing strategies. Research and Graduate Studies, Portland State University.
- “Watershed Modeling with GSSHA”, 3-day intensive course in distributed hydrology model setup, operation and study design using the USACE GSSHA model. Coastal and Hydraulics Laboratory, US Army Corps of Engineers.
- *Weather Research and Forecast* model expert, including prognostic and diagnostic code development.
- High-performance computing with MVAPICH, OpenMPI, Fortran, C, Python, NCL, Matlab, Matplotlib, Linux, git.
- Field siting and calibration of instruments including rain gauges, trace gas analyzers, automated precipitation and stream sampling, aerosol sizing and condensation nuclei analyzers, remote helium-balloon GPS-sondes.

### HONORS AND AWARDS

- NOAA Postdocs Applying Climate Expertise Fellowship (2012-2013)
- NASA Graduate Student Researchers Program Fellowship (2009-2011)
- Chi Epsilon Pi, honor society for outstanding graduate students in meteorology/atmospheric sciences (2008)
- NASA Graduate Student Summer Program Internship (2007)

### GRANTS

US Army Corps of Engineers	<i>Forecast Informed Reservoir Operations</i>	\$403,200 / 4 yr.
NOAA	<i>Enhancing Observations of Melting Level to Support Forecasts of Rain-Snow Partitioning in the Sierra Nevada</i>	\$86,400 / 2 yr.
CA Energy Commission	<i>Advanced Statistical-Dynamical Methods and Products for California Electrical</i>	\$99,999 / 2 yr.
CA Energy Commission	<i>Development and Evaluation of a 2-km hourly historical climate dataset for California</i>	\$106,600 / 2 yr.
NASA	<i>An Observationally-Driven Earth System Model Evaluation of Precipitation Extremes and their Associated Meteorological Mechanisms</i>	\$252,952 / 4 yr. *recommended

### PEER-REVIEWED PUBLICATIONS

Cornwell, G. C. Sultana, C. M., Petters, M. D., Al-Mashat, H., Rothfuss, N. E., Taylor, H., DeMott, P. J., **Martin, A. C.**, and K. A. Prather (Submitted) Improved

discrimination between dust and bioaerosol by aerosol time-of-flight mass spectrometry. *Aerosol Science and Technology*.

**Martin, A. C.**, Kristensen, L. J., Campbell, L., Cornwell, G. C., Ralph, F. M., Prather, K., and L. R. Leung (In-revision) Impacts of Marine Cloud Nuclei on a Landfalling Atmospheric River: Secondary Ice, Latent Heating, and a Downslope Windstorm. *J. Atmos. Sci.*

DeHaan, L., **Martin, A. C.**, Weihs, R., Delle Monache, L. and F. M. Ralph (In-revision) Object-based Verification of Atmospheric River Predictions in the Northeast Pacific. *Weather and Forecasting*.

Michaelis, A., **Martin, A. C.**, Fish, M. A., Hecht, C., and F. M. Ralph (In-revision) Modulation of Atmospheric Rivers by Mesoscale Frontal Waves and Latent Heating: Comparison of Two U.S. West Coast Events. *Mon. Wea. Rev.*

Slinsky, E. A., Loikith, P. C., Waliser, D. E., Guan, B., and **A. Martin** (2020) A Climatology of Atmospheric Rivers and Associated Precipitation for the Seven US National Climate Assessment Regions. *Journal of Hydrometeorology*, **21**, 11, 2439 – 2456, 10.1175/JHM-D-20-0039.1.

Ryoo, J.M., Chiao, S., Spackman, J.R., Iraci, L.T., Ralph, F.M., **Martin, A.**, Dole, R.M., Marrero, J.E., Yates, E.L., Bui, T.P. and Dean-Day, J.M. (2020) Terrain Trapped Airflows and Precipitation Variability during an Atmospheric River Event. *Journal of Hydrometeorology*, **21**, 2, 355-375, doi:10.1175/JHM-D-19-0040.1.

Demirdjian, R., Norris, J.R., **Martin, A.** and F.M. Ralph (2020) Dropsonde Observations of the Ageostrophy within the Pre-Cold-Frontal Low-Level Jet Associated with Atmospheric Rivers. *Monthly Weather Review*, **148**, 4, 1389-1406, 10.1175/MWR-D-19-0248.1.

Henn, B., Weihs, R., **Martin, A.C.**, Ralph, F.M. and T. Osborne (2020) Skill of rain-snow level forecasts for landfalling atmospheric rivers: A multi-model model assessment using California's network of vertically profiling radars. *J. Hydrometeorology*, EOR, doi:10.1175/JHM-D-18-0212.1.

**Martin, A. C.**, Ralph, F. M., Wilson, A., DeHaan, L., and B. Kawzenuk, (2019) Rapid Cyclogenesis from a Mesoscale Frontal Wave on an Atmospheric River: Impacts on Forecast Skill and Predictability During Atmospheric River Landfall. *J. Hydrometeorology*, **20**, 9, 1779-1794, doi:10.1175/JHM-D-18-0239.1.

Atwood, S. A., Kreidenweis, S. M., DeMott, P. J., Petters, M. D., Cornwell, G. C., **Martin, A. C.**, and K. A. Moore, (2019): Classification of aerosol population type and cloud condensation nuclei properties in a coastal California littoral environment using an unsupervised cluster model, *Atmos. Chem. Phys.*, **19**, 6931 – 6947. doi:10.5194/acp-19-6931-2019.

**Martin, A. C.** et al. (2019), Contrasting Local and Long-Range Transported Warm Ice-Nucleating Particles During an Atmospheric River in Coastal California, USA, *Atmos. Chem. Phys.* **19**, 7, 4193 – 4210, doi:10.5194/acp-19-4193-2019.

- Mix, H. T., Reilly, S., **Martin, A. C.**, Cornwell, G. (2019), Evaluating the roles of rainout and post-condensation processes in a landfalling atmospheric river with stable isotopes in precipitation and water vapor, *Atmosphere*, **10**, 2, 86, doi:10.3390/atmos10020086.
- Martin, A.**, F. M. Ralph, R. Demirdjian, L. DeHaan, R. Weihs, J. Helly, D. Reynolds, and S. Iacobellis (2018), Evaluation of Atmospheric River Predictions by the WRF Model Using Aircraft and Regional Mesonet Observations of Orographic Precipitation and its Forcing, *J. Hydrometeorology*, **19**, 7, 1097 - 1113. doi:10.1175/JHM-D-17-0098.1.
- Martin, A. C.** and Cornwell, G. C., S. A. Atwood, K. A. Moore, N. Rothfuss, H. Taylor, P. J. DeMott, S. M. Kreidenweiss, M. D. Petters, and K. A. Prather (2017), Transport of Pollution to a Remote Coastal Site during Gap Flow from California's Interior: Impacts on Aerosol Composition, Clouds and Radiative Balance, *Atmos. Chem. Phys.*, **17**, 2, 1491 – 1509. doi:10.5194/acp-17-1491-2017.
- Cordeira, J. M., Ralph, F. M., **Martin, A.**, Gaggini, N., Spackman, R., Neiman, P., Rutz, J., and Pierce, R. (2017), Forecasting Atmospheric Rivers During CalWater 2015, *Bulletin of the American Meteorological Society*, **98**, 3, 449 – 459. doi:10.1175/BAMS-D-15-00245.1.
- Ralph, F. M. **et al.** (2017), Atmospheric Rivers Emerge as a Global Science and Applications Focus, *Bulletin of the American Meteorological Society*, **98**, 9, 1969 – 1973. doi:10.1175/BAMS-D-16-0262.1.
- Ralph, F. M. **et al.** (2016), CalWater Field Studies Designed to Quantify the Roles of Atmospheric Rivers and Aerosols in Modulating US West Coast Precipitation in a Changing Climate, *Bulletin of the American Meteorological Society*, **97**, 7, 1209 – 1228, doi:10.1175/BAMS-D-14-00043.1.
- Martin, A.**, Krishnamurti, T. N., and W. K. Lau (2013) Absorbing Aerosol Induced Change in the Early Monsoon Arabian Sea Low Level Jet: Modeled Transfer from Anomalous Heating to Non-divergent Kinetic Energy, *J. Geophys. Res.*, **118**, 12,566 – 12,576, doi:10.1002/2013JD019808.
- Krishnamurti, T.N., **Martin, A.**, Krishnamurti, R., Simon, A., Thomas, A. and Kumar, V., (2013) Impacts of enhanced CCN on the organization of convection and recent reduced counts of monsoon depressions. *Climate Dynamics*, **41**, 1, pp.117-134, doi:10.1007/s00382-012-1638-z.
- Martin, A.** and T.N. Krishnamurti (2011), The role of storm-relative advection of absolute angular momentum in strengthening of Atlantic tropical cyclones. *Geophys. Res. Lett.*, **38**, L19801, doi:10.1029/2011GL048910.
- Krishnamurti, T. N., Chakraborty, A., **Martin, A.**, Lau, W. K., Kim, K.-M., Sud, Y., Walker, G. (2009) Impact of Arabian Sea pollution on the Bay of Bengal winter monsoon rains, *J. Geophys. Res.*, **114**, D06213, doi:10.1029/2008JD010679.

#### OTHER PUBLICATIONS AND REPORTS

- Cayan, D., Pierce, D., DeHaan, L., Guzman-Morales, J., Gershunov, A., Clemesha, R., **Martin, A.**, Ullrich, P., Shu, L., Ajami, H., Schreiner- McGraw, A. (2020) Downscaling Using Dynamical and Statistical Methods. *Technical Report for the California Energy Commission under contract EPC-16-063: Advanced Statistical-Dynamical Downscaling Methods and Products for California Electricity System Climate Planning*, 35pp.
- Forecast Informed Reservoir Operations Steering Committee (2017) *Preliminary viability assessment of Lake Mendocino*, 76 pp, <http://escholarship.org/uc/item/66m803p2>.
- Martin, A.**, Prather, K., Suski, K., Leung, L. R., Fan, J., Cayan, D. (2014) Simulated intra-storm variability in aerosol driven precipitation enhancement during west coast winter storms. *Technical Report for the California Energy Commission under contract 500-12-001: CalWater modeling and analysis*, 40pp.
- Slinsky, E. A., P. C. Loikith, D. E. Waliser, B. Guan, and **A. Martin** (2020). Papers of Note: Climatology of Atmospheric Rivers for the Seven National Climate Assessment Regions, *Bulletin of the American Meteorological Society*, **101**(11), 960-961, <https://journals.ametsoc.org/view/journals/bams/101/11/bams.101.issue-11.xml>.