

CURRICULUM VITAE

ALEXANDER GERSHUNOV

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RESEARCH INTERESTS

Weather and climate extremes; global and regional weather and climate variability on hourly to multi-century time scales; water cycle, hydro-meteorology and hydro-climate; coupled ocean-land-atmosphere dynamics; teleconnections; long-range seasonal predictability and prediction of daily weather statistics; meteorological and climate model validation, downscaling and statistical correction; applications of climate forecasts; extreme precipitation, atmospheric rivers and drought; climate and wildfire; fire weather; coastal low clouds; heat waves and cold snaps; climate impacts on public health, water resources, energy and agriculture; climatic history and future change; climate-society interactions

EDUCATION

Ph.D. (1996) University of California, Santa Barbara (UCSB), Geography Department (Climatology)

M. S. (1989) UCSB, Statistics and Applied Probability Department

B. S. (1986) University of California, Irvine, Math Department

RESEARCH EXPERIENCE

Research Meteorologist. 2013 – Present. CASPO, Scripps Institution of Oceanography (SIO)

Associate Research Meteorologist. 2007 – 2013. CASPO, SIO.

Associate Project Scientist. 2006 – 2007. Climate Research Division, SIO.

Assistant Project Scientist. 2000 – 2006. Climate Research Division, SIO.

Visiting Researcher. June - August 2004. Centre National de Recherches Météorologiques (CNRM), Meteo-France.

Visiting Researcher. October 2002 – January 2003 and December 2001 – March 2002. Laboratoire de Météorologie Dynamique (LMD) du SNRS, Paliseau, France.

Postgraduate Research Meteorologist. 1996 – 2000. Climate Research Division, SIO.

NASA Global Change Research Fellow. 1992 – 1995. Geography Department, UCSB.

TEACHING EXPERIENCE

Lecturer (Senior) in Climate Sciences.

- 2011 (2013) – Present. SIO/UCSD. Directing graduate and undergraduate research
- Winters 2015, 2016. Subject: *The Atmosphere (SIO20)*. Undergraduate meteorology course

Visiting Professor. March – June 2006. Departamento de Física, Universidad de Alcalá de Henares, Spain. Subject: *Climate variability, change and prediction*. Graduate and undergraduate course

Rotary Foundation University Teacher at the Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE). Spring 2004. Subject: *Climatic variability and predictability*. Graduate seminar

Lecturer in the Geography Department, UCSB:

- Fall 1995. Subject: *Climatic Change*. Upper division undergraduate course
- Spring 1996. Subject: *Tropical Meteorology*. Upper division undergraduate course

PARTICIPATION IN CURRENT ACTIONABLE RESEARCH PROGRAMS

- California Nevada Climate Applications Program (<https://scripps.ucsd.edu/programs/cnap/>), NOAA, Co-I
- Southwest Climate Adaptation Science Center (<http://www.doi.gov/csc/southwest>), DOI, Co-PI
- Climate Education Partners (<http://www.sandiego.edu/climate/>), NSF, Co-PI

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

- American Meteorological Society • American Geophysical Union • International Association of Hydrological Sciences
- U.S. CLIVAR Executive Committee • VAMOS Working Group On Extremes

AWARDS

- NASA Global Change Research Fellow, 1992–1995
- Rotary Foundation International Teaching Grant, 2004
- UCSD's John Muir Environmental Fellow, 2017

ART AND SCIENCE NEXUS

Co-organized art exhibition *Weather on Steroids: the Art of Climate Change Science*
<http://www.kpbs.org/news/2017/jun/08/exhibit-features-art-climate-change-science/>

TOOLS

Gershunov test (G-test) for spurious low frequency modulations (https://rdr.io/cran/treeclim/man/g_test.html,
<https://cran.r-project.org/web/packages/treeclim/treeclim.pdf>) as proposed by Gershunov et al. (2001)

MEDIA OUTREACH

- Numerous interviews to the media on unfolding weather and climate extremes in the news
- American Association for the Advancement of Science (AAAS) SciLine expert on meteorology and climate science
- American Geophysical Union (AGU) Press Office media contact science expert on heat waves

LANGUAGES

- English (fluent) • Russian (native) • French (fluent) • Spanish (workable)

PUBLICATIONS, SEMINARS AND PRESENTATIONS AT PROFESSIONAL MEETINGS

Complete list of publications contains over 90 papers. Over 400 presentations, lectures and invited seminars.

REFEREED PUBLICATIONS

- Abatzoglou, J.T., B.J. Hatchett, P. Fox-Hughes, A.Gershunov, and N.J. Nauslar, 2020: Global climatology of downslope winds. *International Journal of Climatology*. In press.
- Schwartz L. B.J. Malig, J. Guzman Morales, K. Guirguis, A. Gershunov, R. Basu and T. Benmarhnia, 2020: The health burden of fall, winter and spring heat waves in Southern California and contribution of Santa Ana Winds. *Environmental Research Letters*. In press.
- McElroy, S., L. Schwartz, H. Green, I. Corcos, K. Guirguis, A. Gershunov and T. Benmarhnia, 2020: Defining heat waves using sub-regional meteorological data to maximize benefits of early warning systems to population health. *Science of the Total Environment*. In press.
- Ilango, S.D., M. Weaver, P. Sheridan, L. Schwarz, T. Bruckner, R. Basu, A. Gershunov and T. Benmarhnia, 2020: Extreme heat episodes and risk of preterm delivery in California, 2005-2013. *Environment International*, in press.
- Leibel S., M. Nguyen, W. Brick, J. Parker, S. Ilango, R. Aguilera, A. Gershunov, T. Benmarhnia, 2019: Increase in Pediatric Respiratory Visits Associated With Santa Ana Wind-driven Wildfire and PM 2.5 levels in San Diego County. *Annals of the American Thoracic Society*, in press.
- Aguilera, R., A. Gershunov, S.D. Ilango, J. Guzman Morales and T. Benmarhnia, 2019: Santa Ana winds of Southern California impact coastal air quality with and without smoke from wildfires. *GeoHealth*, in press.
- Goddard, L. and A. Gershunov, 2019: Impact of ENSO on weather and climate extremes. Chapter 16 in *El Niño Southern Oscillation in a changing climate*. AGU Books. McPhaden, Santoso and Cai eds. In press.
- Rutz J.J., B. Guan, D. Bozkurt, I. Gorodetskaya, A. Gershunov, D.A. Lavers, K.M. Mahoney, B.J. Moore, W.Neff, P.J. Neiman, F.M. Ralph, A.M. Ramos, H.C. Steen-Larsen, M. Tsukernik, R. Valenzuela, M. Viale, 2019: Global and Regional Perspectives. Chapter 4 in *Atmospheric Rivers*. Springer, In press.
- Barlow, M., W.J. Gutowski Jr., J.R. Gyakum, R.W. Katz, Y.-K. Lim, R.S. Schumacher, M.F. Wehner, M. Bosilovich, A. Gershunov, R. Grotjahn, R. Leung, S. Milrad, L. Agel, 2019: North American extreme precipitation events and related large scale meteorological patterns: a review of statistical methods, dynamics, modeling, and trends. *Climate Dynamics*, in press.
- Corringham, T.W., F.M. Ralph, A. Gershunov, D.R. Cayan and C.A. Talbot, 2019: Atmospheric rivers drive flood damages in the western United States. *Science Advances*, in press.
- Malig, B.J., X.M. Wu, K.Guirguis, A. Gershunov and R. Basu, 2019: Associations between ambient temperature and hepatobiliary and renal hospitalizations in California 1999 to 2009. *Environmental Health Perspectives*, in press.
- Williams A.P., J.T. Abatzoglou, A. Gershunov, J. Guzman Morales, D.A. Bishop and D.P. Lettenmaier, 2019: The link between anthropogenic climate change and wildfire in California. *Future Earth*, 7. <https://doi.org/10.1029/2019EF001211>. <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2019EF001210>
- Gershunov, A., T.M. Shulgina, R.E.S. Clemesha, K. Guirguis, D.W. Pierce, M.D. Dettinger, D.A. Lavers, D.R. Cayan, S.D. Polade, J. Kalansky and F.M. Ralph, 2019: Precipitation regime change in Western North America: The role of Atmospheric Rivers. *Nature Scientific Reports*, 9:9944, DOI: 10.1038/s41598-019-46169-w. <https://rdcu.be/bJPK0>

- Aguilera, R., A. Gershunov and T. Benmarhnia, 2019: Atmospheric rivers impact California's coastal water quality via extreme precipitation. *Science of the Total Environment*, 671, 488–494.
- Guzman Morales, J. and A. Gershunov, 2019: Climate change suppresses Santa Ana Winds of Southern California and sharpens their seasonality. *GRL*, doi: 10.1029/2018GL080261.
- Guirguis, K., A. Gershunov, T. Shulgina, A. Subramanian, R.E.S. Clemesha, F.M. Ralph, 2018: Circulation drivers of Atmospheric Rivers along the North American West Coast. *GRL*, 45. <https://doi.org/10.1029/2018GL079249>
- Ralph, F.M., A.M. Wilson, T. Shulgina, B. Kawzenuk, S. Sellars, J.J. Rutz, M. Asgari-Lamjiri, E.A. Barnes, A. Gershunov, B. Guan, K. Nardi, T. Osborne, and G.A. Wick, 2018: Comparison of Atmospheric River Detection Tools: How Many Atmospheric Rivers Hit Northern California's Russian River Watershed? *Climate Dynamics*. <https://doi.org/10.1007/s00382-018-4427-5>.
- Basu, R., X. Wu, A. Gershunov, K. Guirguis, T. Benmarhnia, 2018: Heat waves and health impacts in California. California's Fourth Climate Change Assessment. California Energy Commission. Publication number EXT-CCC4A-2018-XXXX, in press.
- Dias, D.F., D.R. Cayan and A. Gershunov, 2018: Statistical prediction of minimum and maximum air temperature in California and Western North America. California's Fourth Climate Change Assessment. California Energy Commission. Publication number EXT-CCC4A-2018-XXXX, in press.
- Syphard, A.D., A. Gershunov, D.M. Lawson, H. Rivera Huerta, J. Guzman-Morales, and M.K. Jennings. 2018: San Diego Wildfires: Drivers of Change and Future Outlook. Pages 49 - 69 in: Jennings, M.K., D. Cayan, J. Kalansky, A.D. Pairis et al. *San Diego County ecosystems: ecological impacts of climate change on a biodiversity hotspot*. California's Fourth Climate Change Assessment, California Energy Commission. Publication number: EXT-CCC4A- 2018-010
- Lawson, D.M., R.E.S. Clemesha, S. Vanderplank, A. Gershunov, and D. Cayan. 2018. Impacts and Influences of Coastal Low Clouds and Fog on Biodiversity in San Diego. Pages 69-89 in: Jennings, M.K., D. Cayan, J. Kalansky, A.D. Pairis et al. *San Diego County Ecosystems: Ecological Impacts Of Climate Change On A Biodiversity Hotspot*. California's Fourth Climate Change Assessment, California Energy Commission. Publication number: EXT-CCC4A- 2018-010
- Guirguis, K., A. Gershunov, T.M. Shulgina, R.E.S. Clemesha, F.M. Ralph, 2018: Atmospheric Rivers impacting Northern California and their modulation by a variable climate. *Climate Dynamics*. <https://doi.org/10.1007/s00382-018-4532-5>
- Vashishtha, D., W. Sieber, B. Hailey, K. Guirguis, A. Gershunov, W. Al-Delaimy, 2018: Outpatient Clinic Visits During Heat Waves: Findings From a Large Family Medicine Clinical Database. *Family Practice*, cmy013, <https://doi.org/10.1093/fampra/cmy013>.
- Guirguis, K., R. Basu, W. Al-Delaimy, T. Benmarhnia, R.E.S. Clemesha, I. Corcos, J. Guzman-Morales, B. Hailey, I. Small, A. Tardy, D. Vashishtha, J.G. Zivin, and A. Gershunov, 2018: Heat, disparities, and health outcomes in San Diego County's diverse climate zones. *GeoHealth*, 2, <https://doi.org/10.1029/2017GH000127>.
- Shields, C. A., J. J. Rutz, L.-Y. Leung, F. M. Ralph, M. Wehner, B. Kawzenuk, J.M. Lora, E. McClenny, T. Osborne, A. E. Payne, P. Ullrich, A. Gershunov, N. Goldenson, B. Guan, Y. Qian, A.M. Ramos, C. Sarangi, S. Sellars, I. Gorodetskaya, K. Kashinath, V. Kurlin, K. Mahoney, G. Muszynski, R. Pierce, A. C. Subramanian, R. Tome, D. Waliser, D. Walton, G. Wick, A. Wilson, D. Lavers, Prabhat, A. Collow, H. Krishnan, G. Magnusdottir, and P. Nguyen, 2018: Atmospheric River Tracking Method Intercomparison Project (ARTMIP): project goals and experimental design, *Geoscientific Model Development*, 11, 2455-2474, <https://doi.org/10.5194/gmd-11-2455-2018>.
- Sherbakov, T., B.J. Malig, K. Guirguis, A. Gershunov, R. Basu, 2017: Ambient Temperature and Added Heat Wave Effects on Hospitalizations in California from 1999-2009. *Environmental Research*, 160, 83-90.
- Clemesha, R.E.S., K. Guirguis, A. Gershunov, I. Small and A.Tardy, 2017: California heat waves: their spatial evolution, variation and coastal modulation by low clouds. *Climate Dynamics*, DOI 10.1007/s00382-017-3875-7.
- Guirguis, K., A. Gershunov, D.R. Cayan and D. Pierce, 2017: Heat wave probability in the changing climate of the Southwest US. *Climate Dynamics*, DOI: 10.1007/s00382-017-3850-3.
- Polade, S.D., A. Gershunov, D.R. Cayan, M.D. Dettinger and D.W. Pierce, 2017: Precipitation in a warming world: Assessing projected hydro-climate of California and other Mediterranean climate regions. *Nature Scientific Reports*, 7: 10783, DOI:10.1038/s41598-017-11285-y.
- Gershunov A., T.M. Shulgina, F.M. Ralph, D. Lavers and J.J. Rutz, 2017: Assessing climate-scale variability of Atmospheric Rivers affecting western North America. *Geophysical Research Letters*, 44, doi:10.1002/2017GL074175.
- Clemesha, R.E.S., A.Gershunov, S.F. Iacobellis and D.R. Cayan, 2017: Daily Variability of California Coastal Low Cloudiness: A Balancing Act between Stability and Subsidence. *Geophysical Research Letters*, 44, 3330–3338, doi:10.1002/2017GL073075.
- Guzman Morales, J., A. Gershunov, J. Theiss, H. Li and D.R. Cayan, 2016: Santa Ana Winds of southern California: Their climatology, extremes, and behavior spanning six and a half decades. *Geophysical Research Letters*, 43, doi:10.1002/2016GL067887.
- Clemesha, R.E.S., A. Gershunov, S.F. Iacobellis, D.R. Cayan and A.P. Williams, 2016: The Northward March of Summer Low Cloudiness along the California Coast. *Geophysical Research Letters*, 43, doi:10.1002/2015GL067081.
- Grotjahn R., R. Black, R. Leung, M.F. Wehner, M. Barlow, M. Bosilovich, A. Gershunov, W.J. Gutowski Jr., J.R. Gyakum, R.W. Katz, Y.-Y. Lee, Y.-K. Lim, Prabhat, 2016: North American Extreme Temperature Events and Related Large Scale Meteorological Patterns: A Review of Statistical Methods, Dynamics, Modeling, and Trends. *Climate Dynamics*, 46, 1151-1184, doi: 10.1007/s00382-015-2638-6.

- Guirguis, K., A. Gershunov and D.R. Cayan, 2015: Interannual variability in associations between seasonal climate, weather and extremes: wintertime temperature over the Southwestern United States. *Environmental Research Letters*, 10, 124023, doi:10.1088/1748-9326/10/12/124023.
- Lavers, D.A., F.M. Ralph, D.E. Waliser, A. Gershunov and M.D. Dettinger, 2015: Climate change intensification of horizontal water vapor transport in CMIP5. *Geophysical Research Letters*, 42, 5617-5625, doi:10.1002/2015GL064672.
- Cavanaugh, N.R., A. Gershunov, 2015: Probabilistic Tail Dependence of Intense Precipitation on Spatiotemporal Scale in Observations, Reanalyses, and GCMs. *Climate Dynamics*, 45, 2965-2975, DOI:10.1007/s00382-015-2517-1.
- Cavanaugh, N.R., A. Gershunov, A.K. Panorska, and T.J. Kozubowski, 2015: The Probability Distribution of Intense Daily Precipitation. *Geophysical Research Letters*, 42, 1560–1567. doi: 10.1002/2015GL063238.
- Schwartz, R.E., A. Gershunov, S.F. Iacobellis and D.R. Cayan, 2014: North American West Coast Summer Low Cloudiness: Broad Scale Variability Associated with Sea Surface Temperature. *Geophysical Research Letters*. 41, 3307–3314, DOI: 10.1002/2014GL059825.
- Polade, S.D., D.W. Pierce, D.R. Cayan, A. Gershunov and M.D. Dettinger, 2014: The key role of dry days in changing regional climate and precipitation regimes. *Nature Scientific Reports* 4, 4364; DOI:10.1038/srep04364.
- Guirguis, K., A. Gershunov, A. Tardy and R. Basu, 2014: The Impact of Recent Heat Waves on Human Health in California. *Journal of Applied Meteorology and Climatology*, 53, 3-19.
- Brown, H. E., A. C. Comrie, D. M. Drechsler, C. M. Barker, R. Basu, T. Brown, A. Gershunov, A. M. Kilpatrick, W. K. Reisen, and D. M. Ruddell. 2013. "Human Health." Chapter 15 in *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment*, edited by G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 312–339. A report by the Southwest Climate Alliance. NCA Regional Input Reports. Washington, DC: Island Press. ISBN 9781610914468
- Gershunov, A., B. Rajagopalan, J. Overpeck, K. Guirguis, D. Cayan, M. Hughes, M. Dettinger, C. Castro, R. E. Schwartz, M. Anderson, A. J. Ray, J. Barsugli, T. Cavazos, and M. Alexander. 2013. "Future Climate: Projected Extremes." Chapter 7 in *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment*, edited by G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 126–147. A report by the Southwest Climate Alliance. NCA Regional Input Reports. Washington, DC: Island Press. ISBN 9781610914468
- Cayan, D., M. Tyree, K. E. Kunkel, C. Castro, A. Gershunov, J. Barsugli, A. J. Ray, J. Overpeck, M. Anderson, J. Russell, B. Rajagopalan, I. Rangwala, and P. Duffy. 2013. "Future Climate: Projected Average." Chapter 6 in *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment*, edited by G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 101–125. A report by the Southwest Climate Alliance. NCA Regional Input Reports. Washington, DC: Island Press. ISBN 9781610914468
- Polade, S.D., A. Gershunov, D.R. Cayan, M.D. Dettinger and D.W. Pierce, 2013: Natural climate variability and teleconnections to precipitation over the Pacific-North American region in CMIP3 and CMIP5 models. *Geophysical Research Letters*, 40, doi:10.1002/grl.50491.
- Rodó X., M. Pascual, F.J. Doblas-Reyes, A. Gershunov, D.A. Stone, F. Giorgi, P.J. Hudson, J. Kinter, M.-À. Rodríguez-Arias, N.Ch. Stenseth, D. Alonso, J. Garcia-Serrano, A.P. Dobson, 2013: Climate Change and Infectious Diseases: Can we meet the needs for better prediction? *Climatic Change*, 118, 625-640.
- Gershunov A. and K. Guirguis, 2012: California heat waves in the present and future. *Geophysical Research Letters*, 39, L18710, doi:10.1029/2012GL052979.
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- Guirguis, K., A. Gershunov, R. Schwartz and S. Bennett, 2011: Recent warm and cold daily winter temperature extremes in the Northern Hemisphere, *Geophysical Research Letters*, 38, L17701, doi:10.1029/2011GL048762.
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- Gershunov A., D. Cayan and B. Retournaz, 2010: California Heat Waves with Impacts on Wine Grapes. In E.G. Pavia, J. Sheinbaum and J. Candela (Eds), *The Ocean, the Wine, and the Valley: The Lives of Antoine Badan*, Lulu Press, 205-223, ISBN 978-0-557-94026-4.
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- Ben Ari, T., A. Gershunov, T. Rouyer, B. Cazelles, K.L. Gage, N.Ch. Stenseth, 2010: Interannual variability of human plague occurrence in the western U.S. explained by tropical and North Pacific Ocean climate variability. *American Journal of Tropical Medicine & Hygiene*, 83, 624-632.
- Gershunov, A., D. Cayan and S. Iacobellis, 2009: The great 2006 heat wave over California and Nevada: Signal of an increasing trend. *Journal of Climate*, 22, 6181–6203.
- Favre, A. and A. Gershunov, 2009: North Pacific cyclonic and anticyclonic transients in a global warming context: possible consequences for Western North American daily precipitation and temperature extremes. *Climate Dynamics*, 32, 969-987.

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- Gershunov, A. and R. Roca, 2004: Coupling of latent heat flux and the greenhouse effect by large-scale tropical/subtropical dynamics diagnosed in a set of observations and model simulations. *Climate Dynamics*, 22, 205-222.
- Gershunov, A. and D. Cayan, 2003: Heavy daily precipitation frequency over the contiguous United States: Sources of climatic variability and seasonal predictability. *Journal of Climate*, 16, 2752-2765.
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- Gershunov, A. and T. Barnett, 1998: Inter-decadal modulation of ENSO teleconnections. *Bulletin of the American Meteorological Society*, 79, 2715-2725.
- Gershunov, A., 1998: ENSO influence on intraseasonal extreme rainfall and temperature frequencies in the contiguous US: Implications for long-range predictability. *Journal of Climate*, 11, 3192-3203.
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