ALEX HALL

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BACKGROUND

Dr. Hall studies the climate system from both regional and global perspectives. He has experience in multi-model analysis of climate simulations, and comparing output from these experiments to *in situ* and remote sensing data. At the global scale, he studies processes determining the climate system's response to increases in greenhouse gases. At the regional scale, he has been active in the development and integration of regional climate models. He uses these simulations to examine mesoscale climate dynamics and interactions among earth-system components that are crucial for simulating and understanding regional climate but are largely unrepresented in current global climate models. This research also has applications in the areas of climate impacts, water resources, renewable energy, and conservation. At UCLA, Dr. Hall teaches climate-related courses at the undergraduate and graduate levels. He is a recipient of the NSF Graduate Fellowship (1993–1996), the NASA Earth System Science Fellowship (1996–1998), the Lamont Fellowship (1999–2001), and the NSF CAREER award (2002–2007).

SYNERGISTIC ACTIVITIES

Dr. Hall was a Contributing Author to the 2007 IPCC 4th scientific assessment of climate change Working Group I report, where his work on climate sensitivity is featured. He is also a Lead Author for Chapter 14 of the Working Group I component of the IPCC 5th Assessment Report, entitled "Climate Phenomena and their Relevance for Future Regional Climate Change," and a Contributing Author of Chapter 9, "Evaluation of Climate Models." He was co-chair of US CLIVAR Climate Prediction and Applications Interface Panel, charged with making research and funding recommendations to US agencies regarding climate prediction and climate applications and was also a member of the overarching US CLIVAR committee (2002–2009). He is a member of the executive committee of the UCLA–JPL Joint Institute for Regional Earth System Science and Engineering, and the faculty director of the UCLA Center for Climate Change Solutions and the UCLA Earth Systems Institute. Finally, he is a member of the technical advisory board for the Los Angeles Collaborative for Climate Action and Sustainability, a consortium of local governments, NGOs and businesses, and is the lead scientist for the Collaborative's "Climate Change in the Los Angeles Region Project."

PROFESSIONAL PREPARATION

Pomona College, Claremont, CA
B.A., 1993, *summa cum laude*, double concentration in Physics and History

Princeton University, Princeton, NJ
Ph.D., Atmospheric and Oceanic Sciences, 1998. Thesis advisor: Suki Manabe

Lamont-Doherty Earth Observatory, Lamont postdoctoral fellow. October 1998-November 2000.

APPOINTMENTS

University of California—Los Angeles, Professor, *Department of Atmospheric and Oceanic Sciences*, July 2012–present. Professor, *Institute of the Environment and Sustainability*, 2012–present. Associate Professor, June 2008–June 2012 (AOS), 2009–2012 (IoES). Assistant Professor (AOS), November 2000–June 2008.

Collaborators
Edvin Aldrian, BMKG, Indonesia; Richard Ambrose, UCLA; Soon-Il An, Yonsei U, Korea; Julien Boé, CNRS/CERFACS; Sandrine Bony, Laboratoire de Meteorologie Dynamique; Peter Caldwell, LLNL; Scott Capps, Vertum Partners; Christophe Cassou, CERFACS, France; Iracema Cavalcanti, NISR, Brazil; Dan Cayan, UCSD; Yong Chen, UCLA; Jens Christensen, DRI, Denmark; Francois Colas, IRD; Matthew Collins, U of Exeter, UK; Sebastien Conil, Meteo France; Frank Davis, UCSB; Manuel de Castro, U Castilla-La Mancha, Spain; Tom Delworth, NOAA; John Dingman, UC Berkeley; Charles Dong, UCLA; Wenjie Dong, Beijing Normal U; Nicolas Faivre, UCI; Richard Fernandez, CCRS; Eric J. Fetzer, JPL; Alan Flint, USGS; Lorrie Flint, USGS; Rob Fovell, UCLA; Janet Franklin, ASU; Alessandra Giannini, Columbia U; Neil Gordon, LLNL; Prashant Goswami, CSIR, India; Michael Goulden, UCI; Simon Hook, JPL; Hsin-Yuan Huang, UCLA; Shao-Chin Huang, UCLA; Mimi Hughes, NOAA; Yufang Jin, UCI; Krishna Kumar Kanikacharla, QMD, Qatar; Joseph Kanyanga, Zambia Meteorological Dept; Sarah Kapnick, GFDL; Jinwon Kim, UCLA; Akio Kitoh, U Tsukuba, Japan; Steve Klein, LLNL; James Kossin, NOAA; Meg Krawchuk, UC Berkeley; Jaison Kurian, UCLA; Paul Kushner, U Toronto; Baird Langenbrunner, UCLA; Ngar-Cheung Lau, NOAA; Wei-Liang Lee, Academia Sinica; Ruby Leung, PNNL; Qinbin Li, UCLA; Kuo-Nan Liou, UCLA; Glen MacDonald, UCLA; Ian McCullough, UCSB; Jim McWilliams, UCLA; Carlos Roberto Mechoso, UCLA; Joyce Meyerson, UCLA; Tadashi Moody, UC Berkeley; Max Moritz, UC Berkeley; David Neelin, UCLA; Malcolm North, UC Davis; Wendy Parker, U of Ohio, Tamlin Pavelsky, UNC; Xin Qu, UCLA; James Randerson, UCI; Kelly Redmond, DRI; Helen May Regan, UCR; James Renwick, Victoria U of Wellington, New Zealand; Josep Serra-Diaz, ASU; Rebecca Shaw, EDF; Victoria Sork, UCLA; David Stephenson, U of Exeter, UK; Fengpeng Sun, UCLA; Lynn Sweet, UCSB; Alexandra Syphard, San Diego State U; Karl Taylor, LLNL; Joao Teixeira, JPL; Bridget Thrasher, UCSC; Thomas Toniazzo, JPL; Sander Veraverbeke, JPL; Masahiro Watanabe, U of Tokyo; Shang-Ping Xie, UCSD; Mark Zelinka, LLNL; Yunyan Zhang, LLNL; Tianjun Zhou, Chinese Academy of Sciences.

Graduate and Postdoctoral Advisors
Graduate Advisor: Suki Manabe, currently Professor Emeritus of Princeton University. No fixed postdoctoral advisor.

Thesis Advisor and Postgraduate-Scholar Sponsor
Currently advising Neil Berg, Alex Jousse, Marla Schwartz, and Daniel Walton, graduate students in the UCLA Atmospheric and Oceanic Sciences Department. Advised Dr. Xin Qu (Ph.D., 2007), Dr. Mimi Hughes (Ph.D. 2008), and Dr. Sarah Kapnick, (Ph.D. 2011), as well as 3 other students. Total students advised: 10. Postdoctoral-Scholar sponsor for Drs. Xin Qu, Julien Boé, Fengpeng Sun, Tamlin Pavelsky, Jerry Huang, Scott Capps, Florent Brient, and Anthony DeAngelis.

REFEREED PUBLICATIONS

Berg N, A Hall, F Sun, SC Capps, D Walton, D Neelin, and B Langenbrunner, 2014: Mid 21st-century precipitation changes over the Los Angeles region. *Journal of Climate,* submitted.

Walton D, F Sun, A Hall, and SC Capps, 2014: A hybrid dynamical–statistical downscaling technique, part I: Development and validation of the technique. *Journal of Climate,* submitted.

Sun F, D Walton, and A Hall, 2014: A hybrid dynamical–statistical downscaling technique, part II: End-of-century warming projections predict a new climate state in the Los Angeles region. *Journal of Climate,* submitted.

Qu X, A Hall, SA Klein, and PM Caldwell, 2014: The strength of the tropical inversion and its response to climate change in 18 CMIP5 models. *Climate Dynamics,* submitted.

Veraverbeke, S, SC Capps, SJ Hook, JT Randerson, Y Jin, and A Hall, 2014: Controls on biomass burning during Santa Ana events in southern California.*Agricultural and Forest Meteorology,* submitted.

Jin Y, JT Randerson, N Faivre, SC Capps, A Hall, and ML Goulden, 2014: Contrasting controls on wildland fires in Southern California during periods with and without Santa Ana winds. *Journal of Geophysical Research,* accepted. DOI: 10.1002/2013JG002541

Qu X, A Hall, SA Klein, and PM Caldwell, 2014: On the spread of changes in marine low cloud cover in climate model simulations of the 21st century. *Climate Dynamics,* 42(9–10), 2602–2606. DOI: 10.1007/s00382-013-1945-z

Huang, H-Y, S Capps, S-C Huang, and A Hall, 2014: Downscaling near-surface wind over complex terrain using a physically-based statistical modeling approach. *Climate Dynamics,* accepted.

Qu X and A Hall, 2014: On the persistent spread of snow-albedo feedback. *Climate Dynamics,* 42(1–2), 69–81. DOI: 10.1007/s00382-013-1945-z

Capps SB, A Hall, and M Hughes, 2014: Sensitivity of Southern California wind energy to turbine characteristics. *Wind Energy,* 17(1), 141–159. DOI: 10.1002/we.1570

Christensen JH, et al., 2013: Climate phenomena and their relevance for future regional climate change. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Flato G, et al., 2013: Evaluation of Climate Models. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Neelin, JD, B Langenbrunner, JE Meyerson, A Hall, and N Berg, 2013: California winter precipitation change under global warming in the Coupled Model Intercomparison Project 5 ensemble. *Journal of Climate,* 26, 6238–6256. DOI: 10.1175/JCLI-D-12-00514.1

Huang, HY, A Hall. and J Teixeira, 2013: Evaluation of the WRF PBL parameterizations for marine boundary layer clouds: Cumulus and stratocumulus. *Monthly Weather Review,* 141, 2265–2271.

Boé J, A Hall, and X Qu, 2013: Reply to "Comments on 'Current GCMs' Unrealistic Negative Feedback in the Arctic.'" *Journal of Climate,* 26(19), 7789–7792. DOI: 10.1175/JCLI-D-12-00723.1

Toniazzo T, F Sun F, CR Mechoso, and A Hall, 2013: A regional modeling study of the diurnal cycle in the lower troposphere in the south-eastern tropical Pacific. *Climate Dynamics,* 41(7–8), 1899–1922.

Berg N, A Hall, SB Capps, and M Hughes, 2013: El Niño–Southern Oscillation impacts on winter winds over Southern California. *Climate Dynamics,* 40(1–2), 109–121. DOI: 10.1007/s00382-012-1461-6.

Kapnick S, and A Hall, 2012: Causes of recent changes in western North American snowpack. *Climate Dynamics,* 38(9–10), 1885–1899. DOI: 10.1007/s00382-011-1089-y

Waliser D, J Kim, Y Xue, Y Chao, A Eldering, R Fovell, A Hall, Q Li, KN Liou, J McWilliams, F De Sale, and Y Yu: 2011: Simulating cold season snowpack: Impacts of snow albedo and multi-layer snow physics. *Climatic Change,* 109(S1), 95–117. DOI: 10.1007/s10584-011-0312-5

Hughes M, A Hall, and J Kim, 2011: Human-induced changes in wind, temperature and relative humidity during Santa Ana events. *Climatic Change,* 109(S1), 119–132. DOI: 10.1007/s10584-011-0200-9

Sun F, A Hall, and X Qu, 2011: On the relationship between low cloud variability and lower tropospheric stability in the Southeast Pacific. *Atmospheric Chemistry and Physics*, 11, 9053–9065. DOI: 10.5194/acp-11-9053-2011

Pavelsky T, S Kapnick, and A Hall, 2011: Accumulation and melt dynamics of snowpack from a multiresolution regional climate model in the central Sierra Nevada, California. *Journal of Geophysical Research: Atmospheres,* 116, D16115. DOI: 10.1029/2010JD015479

Dong, C, JC McWilliams, A Hall, and M Hughes, 2011: Numerical simulation of a synoptic event in the Southern California Bight. *Journal of Geophysical Research: Oceans,* 116, C05018. DOI: 10.1029/2010JC006578

Lee WL, KN Liou, and A Hall, 2011: Parameterization of solar fluxes over mountain surfaces for application to climate models. *Journal of Geophysical Research: Atmospheres,* 116, D01101. DOI: 10.1029/2010JD014722

Pavelsky T, J Boé, A Hall, and E Fetzer, 2011: Atmospheric inversion strength over polar oceans in winter regulated by sea ice. *Climate Dynamics*, 36, 945–955. DOI: 10.1007/s00382-010-0756-8

Qu X, A Hall, and J Boé, 2010: Why does the Antarctic Peninsula warm in climate simulations? *Climate Dynamics,* 38(5–6), 913–927. DOI: 10.1007/s00382-011-1092-3

Boé J, A Hall, F Colas, JC McWilliams, X Qu, J Kurian, and SB Kapnick, 2010: What shapes mesoscale wind anomalies in coastal upwelling zones? *Climate Dynamics* 36, 2037–2049. DOI: 10.1007/s00382-011-1058-5

Boé J, A Hall, and X Qu, 2010: Sources of spread in simulations of Arctic sea ice loss over the twenty-first century. *Climatic Change*, 99, 637–645. DOI: 10.1007/S10584-010-9809-6

Kapnick S and A Hall, 2010: Observed climate–snowpack relationships in California and their implications for the future. *Journal of Climate,* 23, 3446–3456. DOI: 10.1175/2010JCLI203.1

Moritz M, T Moody, M Krawchuk, M Hughes, and A Hall, 2010: Spatial variation in extreme winds predicts large wildfire locations in chaparral ecosystems. *Geophysical Research Letters,* 37, L04801. DOI: 10.1029/2009GL041735.

Hughes M and A Hall, 2010: Local and synoptic mechanisms causing Southern California's Santa Ana winds. *Climate Dynamics,* 34(6), 847–857. DOI: 10.1007/s00382-009-0650-4

Fernandes R, H Zhao, X Wang, J Key, X Qu, and A Hall, 2009: Controls on northern hemisphere snow albedo feedback quantified using satelllite Earth observations. *Geophysical Research Letters,* 36, L21702. DOI: 10.1029/2009GL040057

Boé J, A Hall, and X Qu, 2009a: Deep ocean heat uptake as a major source of spread in transient climate change simulations. *Geophysical Research Letters*, 36, L22701. DOI: 10.1029/2009GL040845

Boé J, A Hall, and X Qu, 2009b: September sea-ice cover in the Arctic Ocean projected to vanish by 2100. *Nature Geoscience,* 2, 341–343. DOI: 10.1038/NGE0467

Derevianko G, C Deutsch, and A Hall, 2009: On the relationship between DMS and solar radiation. *Geophysical Research Letters,* 36, L17606. DOI: 10.1029/2009GL039412

Fletcher C, P Kushner, A Hall, and X Qu, 2009: Circulation responses to snow albedo feedback in climate change. *Geophysical Research Letters,* 36, L09702. DOI: 10.1029/2009GL038011

Boé J, A Hall, and X Qu, 2009: Current GCMs' unrealistic negative feedback in the Arctic. *Journal of Climate,* 22, 4682–4695. DOI: 10.1175/2009JCLI2885.1

Kapnick S and A Hall, 2009: Observed changes in the Sierra Nevada snowpack: Potential causes and concerns. *California Environmental Protection Agency and California Energy Commission Report CEC-500-2009-016-F.*

Kim J, R Fovell, A Hall, S Kapnick, Q Li, KN Liou, JC McWilliams, X Qu, Y Xue, Y Chao, A Eldering, R Friedl, and D Waliser, 2009: A projection of the cold season hydroclimate in California in mid-twenty-first century under the SRES-A1B emission scenario. *California Environmental Protection Agency and California Energy Commission Report CEC-500-2009-029-F.*

Hughes M, A Hall, and J Kim, 2009: Anthropogenic reduction of Santa Ana winds. *California Environmental Protection Agency and California Energy Commission Report CEC-500-2009-030-F.*

Hughes M, A Hall, and RG Fovell, 2009: Blocking in areas of complex topography, and its influence on rainfall distribution. *Journal of the Atmospheric Sciences,* 66, 508–518. DOI: 10.1175/2008JAS2689.1

Hall A, X Qu, and JD Neelin, 2008: Improving predictions of summer climate change in the United States. *Geophysical Research Letters,* 35, L01702. DOI: 10.1029/2007GL032012

Liou KN, WL Lee, and A Hall, 2007: Radiative transfer in mountains: Application to the Tibetan Plateau, *Geophysical Research Letters,* 34, L23809. DOI: 10.1029/2007GL031762

Randall, D.A., et al., 2007: Climate models and their evaluation. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the 4th Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, USA.

Hughes M, A Hall, and RG Fovell, 2007: Dynamical controls on the diurnal cycle of temperature in complex topography. *Climate Dynamics,* 29, 277–292. DOI: 10.1007/s00382-007-0239-8

Qu X, and A Hall, 2007: What controls the strength of snow albedo feedback? *Journal of Climate,* 20, 3971–3981. DOI: 10.1175/JCLI4186.1

Qu X, and A Hall, 2006: Assessing snow albedo feedback in simulated climate change. *Journal of Climate,* 19, 2617–2630. DOI: 10.1175/JCLI3750.1

Bony S, R Colman, V Kattsov, RP Allan, CS Bretherton, J-L Dufresne, A Hall, S Hallegatte, MM Holland, W Ingram, DA Randall, BJ Soden, G Tselioudis, and MJ Webb, 2006: How well do we understand climate change feedback processes? *Journal of Climate,* 19, 3445–3482. DOI: 10.1175/JCLI3819.1

Conil S and A Hall, 2006: Local regimes of atmospheric variability: A case study of Southern California. *Journal of Climate,* 19, 4308–4325. DOI: 10.1175/JCLI3837.1

Chen Y, A Hall, KN Liou, 2006: Application of three-dimensional solar radiative transfer to mountains, *Journal of Geophysical Research—Atmospheres*, 111, D21111. DOI: 10.1029/2006JD007163.

Hall A, and X Qu, 2006: Using the current seasonal cycle to constrain snow albedo feedback in future climate change. *Geophysical Research Letters*, 33, L03502. DOI: 10.1029/2005GL025127

Medeiros B, A Hall, and B Stevens, 2005: What controls the mean depth of the PBL? *Journal of Climate,* 18, 3157–3172. DOI: 10.1175/JCLI3417.1

Qu X, and A Hall, 2005: Surface contribution to planetary albedo variability in cryosphere regions. *Journal of Climate,* 18, 5239–5252. DOI: 10.1175/JCLI3555.1

Hall A, A Clement, DWJ Thompson, A Broccoli, and C Jackson, 2005: The importance of atmospheric dynamics in the northern hemisphere wintertime climate response to changes in earth's orbit. *Journal of Climate,* 18, 1315–1325. DOI: 10.1175/JCLI3327.1

Clement A, A Hall, and A Broccoli, 2004: The importance of precessional signals in the tropical climate. *Climate Dynamics,* 22, 327–341. DOI: 10.1007/s00382-003-0375-8

Hall A, 2004: The role of surface albedo feedback in climate. *Journal of Climate,* 17, 1550–1568. DOI: 10.1175/1520-0442(2004)017<1550:TROSAF>2.0.CO;2

Visbeck M, and A Hall, 2004: Reply: Interannual southern hemisphere atmospheric variability in the NCEP reanalysis between 1980 and 2002. *Journal of Climate*, 17, 2255–2258. DOI: 10.1175/1520-0442(2004)017<2255:R>2.0.CO;2

Hall A, 2003: Mathematical models of human-induced climate change. In *Mathematical Models*, edited by Jerzy Filar, in Encyclopedia of Life Support Systems (EOLSS). Developed under the auspices of the UNESCO, EOLSS Publishers, Oxford, UK.

Hall A, and M Visbeck, 2002: Synchronous variability in the southern hemisphere atmosphere, sea ice, and ocean resulting from the annular mode. *Journal of Climate,* 15, 3043–3057. DOI: 10.1175/1520-0442(2002)015<3043:SVITSH>2.0.CO;2

Hall A, and RJ Stouffer, 2001: An abrupt climate event in a coupled ocean-atmosphere simulation without external forcing. *Nature*, 409, 171–174. DOI: 10.1038/35051544

Hall A, and S Manabe, 2000: The effect of water vapor feedback on internal and anthropogenic variations of the global hydrologic cycle. *Journal of Geophysical Research,* 105(D5), 6935–6944.

Hall A, and S Manabe, 2000: ENSO suppression in a coupled model without water vapor feedback. *Climate Dynamics,* 16, 393–403. DOI: 10.1007/s003820050336

Hall A, and S Manabe, 1999: The role of water vapor feedback in unperturbed climate variability and global warming. *Journal of Climate,* 12, 2327–2346. DOI: 10.1175/1520-0442(1999)012<2327:TROWVF>2.0.CO;2

Hall A, and S Manabe, 1997: Can local, linear stochastic theory explain sea surface temperature and salinity variability? *Climate Dynamics,* 13, 167–180. DOI: 10.1007/s003820050158