**Randall M. Dole**

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Physical Sciences Division

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**Professional Experience**

2013- Senior Scientist for Climate and Weather, PSD

2005-2013 Deputy Director for Research, PSD

2008-2008 Acting Deputy Director for Research, ESRL

1995-2005 Director*,* NOAA-CIRES Climate Diagnostics Center

1991-1995 Meteorologist,CDC

1989-1991 Associate Professor,Dept. of Earth, Atmospheric and Planetary Sciences, MIT

1983-1988 Assistant Professor,MIT

1982-1983 Research Fellow, Center for Earth and Planetary Physics, Harvard University

1976-1982 Teaching Assistant and Research Assistant, MIT

**Education**

1982 Ph. D., Massachusetts Institute of Technology,Cambridge, MA, Meteorology

1975 B.Sc., Cornell University, Ithaca, NY, Atmospheric Sciences

**Honors**

2013 Council of NOAA Fellows

2012 Department of Commerce Bronze Medal Award “For developing a NOAA Administrative Order on Scientific Integrity Policy and accompanying Handbook on Scientific Misconduct.”

2011 AAAS Electorate Nominating Committee, Atmospheric Sciences Section (elected by AAAS members)

2010 Fellow, American Meteorological Society

2008 NOAA Administrator’s Award “For outstanding leadership in and dedication to developing U.S. Climate Change Science Program Synthesis and Assessment Products integrating climate research for decision support.”

2007 Department of Commerce Bronze Medal Award “For superior federal service for designing and implementing the consolidation of six research organizations in Boulder, Colorado into the new NOAA Earth System Research Laboratory.”

2006 Department of Commerce Bronze Medal Award “For developing an integrated state, local and federal strategy for a National Integrated Drought Information System endorsed by the Western Governors’ Association.”

2002 Department of Commerce Silver Medal Award “For developing the NOAA-CIRES Climate Diagnostics Center into a unique and valuable national resource for climate research.”

1999 Department of Commerce Bronze Medal Award “For extraordinary contributions to the design, development and implementation of the El Niño-Southern Oscillation Rapid Response Project.”

1995 Fellow, University of Colorado, Cooperative Institute for Research in Environmental Sciences.

1995 NOAA Outstanding Performance Award

1993 NOAA Sustained Superior Performance Award

1990 M.I.T. Award for Outstanding Teaching, Department of Earth, Atmospheric and Planetary Sciences

1982 M.I.T. Carl-Gustav Rossby Award for "The most outstanding thesis submitted to the Department of Meteorology and Physical Oceanography in 1982."

1982 Graduate with Honors and Distinction, Cornell University

Honorary Sigma Xi, Phi Kappa Psi, Hoh-nun-de-kah (Cornell honorary society)

Societies

Other honors NCAR Summer Fellow, 1978

Presentations Numerous invited presentations at scientific conferences and universities.

MediaNumerous interviews, national and international media.

*Books*  Invited author, 8 book chapters and article in *Encyclopedia of Climate and Weather*

**Additional Professional Activities**

2015-16 Science lead, NOAA El Niño Rapid Response field campaign

2015-16 Vice-chair, Council of NOAA Fellows

2015- CU Western Water Assessment Advisory Committee

2015 WMO/WWRP Year of Polar Prediction Summit Planning Group

2015 Editor, Council of NOAA Fellows Ideas and Insights essays

2013-14 Co-chair, NOAA Science Challenge Workshop “Predicting Arctic Weather and Climate and Related Impacts: Status and Requirements for Progress”

2013 U.S. Delegation member to WMO Commission for Atmospheric Sciences-16

2013 NOAA drafting team, State of Science Fact Sheet on interpreting how climate change affects extreme events

2012 Steering Committee, Workshop on Attribution of Weather and Climate Extremes (joint US-UK sponsorship, held September 2012 in Oxford UK)

2011- WMO World Weather Research Programme, Scientific Steering Committee

2011-2014 AAAS Electorate Nominating Committee for the Section on Atmospheric and Hydrospheric Sciences

2009-2013 NASA Global Modeling and Assimilation Office, Advisory Board

2008- Cornell University, Department of Earth and Atmospheric Sciences, External Advisory Board

2005- Division Director, Weather and Climate Dynamics Division, Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder

2005- CIRES Executive Committee

2011 USGCRP Strategic Plan Writing Team for “Advance Science” chapter

2011 U.S. Global Change Research Program, Strategic Plan Integration Team

2011 NOAA Ad hoc Committee for NOAA Research Council on how NOAA manages and conducts its science; contributed to new Scientific Integrity Policy

2011 Chair, NOAA Science Challenge Workshop “Toward Understanding and Predicting Regional Climate Variations and Change.” Led drafting of workshop report presented to NOAA Research Council.

2010 Co-Chair, NOAA Science Workshop on “Strengthening NOAA Science”. Co-led drafting of workshop report presented to NOAA senior leadership.

2009-2010 NWS Science and Technology Infusion Program – Climate team

2009 Co-chair, NOAA team to develop a vision for climate services in NOAA

2008 NOAA Climate Service Development Team

2008 NOAA Tiger Team to evaluate options for a National Climate Service

2008-2010 NOAA Climate Goal Capability Lead for “Analysis and Attribution” in Climate Research and Modeling Program

2008 Steering Committee, Pacific Climate Information System (PaCIS)

2008 NCAR Earth and Sun Systems Laboratory Advisory Panel

2007-2010 NOAA Climate Goal capability lead for Climate Analysis and Attribution

2007-2010 NOAA Climate Executive Board

2006-2009 AMS Ad Hoc Committee on Education Planning

2007 U.S. Delegation, for Intergovernmental Panel on Climate Change Working Group I Fourth Assessment Report, “Climate Change 2007: The Physical Science Basis”

2006-2007 Co-organizer and co-chair, 2007 AMS Presidential Forum: “Climate Variations and Change as Manifested by Changes in Weather”

2006 U.S. Government expert reviewer, IPCC WG1 Fourth Assessment Report

2006 NOAA Executive Committee on Drought

2006-2009 ESRL Science and Technology Council

2005-2011 NOAA THORPEX Executive Committee

2005-2008 Chair, Author team lead editor, and Lead agency representative, CCSP Synthesis and Assessment Product 1.3: "Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change".

2005-2006 CENR USGEO Subcommittee "Near-term Opportunity" task force on Drought

2005 NOAA Climate Test Bed Oversight Board

2005 Executive Board, Columbia University Cooperative Institute for Climate Applications and Research (CICAR)

2005 CENR Subcommittee for Disaster Reduction "Grand Challenge" task force on Drought

2003-2005 Core team member for plan to develop a National Integrated Drought Information System (NIDIS)

2003-2004 NOAA Science Team on May 4-10, 2003 Tornado Outbreak

2002-2003 Chair*,* Council of Boulder Laboratory Directors

2002-2003 Chair*,* Tenant Directors Board, David Skaggs Research Center

2002-2003Co-lead author, “Climate Variability and Change” chapter, and contributing author of “Climate Modeling Strategy"chapter of the *U.S. CCSP Strategic Plan*

2001-2011 Co-chair, "Climate Variability and Change” Interagency Working Group of the U.S. Climate Change Science Program (CCSP)

1997-2001 Co-lead, NOAA Strategic Planning Team, “Implement Seasonal to Interannual Climate Forecasts”

1997 Scientific Organizing Committee, WMO WWRP Conference on Dynamical Extended Range Forecasting, Toulouse France

1996-1999 Chair, Advisory Committee*,* NCEP/NCAR Reanalysis, 1997-1999

1996 University of Colorado Center for Chaos & Complexity

1996-1998 CIRES Career Tracks Development Committee

1995-96 CU/CIRES Faculty Search Committee

1995- CIRES Fello*w*

1994-1997 AMS Committee, Atmospheric and Oceanic Waves and Stability.

1994-1996 Editor*, Monthly Weather Review*

1991 Scientific Advisory Panel, NOAA Dynamical Extended Range Forecast (DERF) Project Core Proposal

1986-1993 Associate Editor*,* *Monthly Weather Review*

**Professional Societies**

American Meteorological Society (Fellow), American Geophysical Union,

American Association for the Advancement of Science, Royal Meteorological Society (Fellow)

**Academic teaching and advisory experience**

*Massachusetts Institute of Technology*

*Courses taught -* Introduction to Meteorology I, Introduction to Meteorology II,

Seminar on Weather Prediction, Introductory Synoptic Meteorology, Advanced Synoptic Meteorology, Topics in the Physics of Atmospheres, Seminar on Cyclogenesis

Seminar on Sources for Low-Frequency Variability: Observations and Theories

*Primary Thesis Advisor* for 5 Ph. D., 3 M.Sc.

Ph. D. thesis faculty committee member in meteorology and civil engineering/ hydrology

**Research Interests**

Climate-weather interactions

Attribution of weather and climate extremes

Extreme event predictability

Earth system analysis

**Selected Publications**

Wolter, K., M. Hoerling, J.K. Eischeid, G.J. van Oldenborgh, XW Quan, J.E. Walsh, T.N. Chase, and **R.M. Dole**, 2015: How unusual was the cold winter of 2013/14 in the Upper Midwest? *B. Amer. Met. Soc*., **96**, S10-S14, [10.1175/BAMS-D-15-00126.1](http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-15-00126.1)

Perlwitz, J., M. Hoerling, and **R. Dole**, 2015: Arctic tropospheric warming: Causes and linkages to lower latitudes. *J. Climate*, **28**, 2154–2167, [10.1175/JCLI-D-14-00095.1](http://dx.doi.org/10.1175/JCLI-D-14-00095.1)

Liebmann, B., M. P. Hoerling, C. Funk, Ileana Bladé, **R. M. Dole**, D. Allured, X. Quan, P. Pegion, and J. K. Eischeid, 2014: Understanding recent Eastern Horn of Africa rainfall variability and change. *J. Climate*, **27**, 8630–8645, [10.1175/JCLI-D-13-00714.1](http://dx.doi.org/10.1175/JCLI-D-13-00714.1)

Hoerling, M., K. Wolter, J. Perlwitz, X. Quan, J. Eischeid, H. Wang, S. Schubert, H. Diaz, and **R. Dole**, 2014: [Northeast Colorado extreme rains interpreted in a climate change context](http://www2.ametsoc.org/ams/index.cfm/publications/bulletin-of-the-american-meteorological-society-bams/explaining-extreme-events-of-2013-from-a-climate-perspective/). *Bull. Amer. Meteor. Soc.,* **95**, S15-S18.

**Dole R. M.,** M. P. Hoerling, A. Kumar, J. K. Eischeid, J. Perlwitz, X.-W. Quan, G. N. Kiladis, R. S. Webb, D. Murray, M. Chen, K. Wolter and T. Zhang: The Making of an Extreme Event: Putting the Pieces Together. *Bull. Amer. Meteor. Soc.*, **95** (3), 427-440. [10.1175/AMS-D12-00069.1](http://dx.doi.org/10.1175/BAMS-D-12-00069.1)

Vose, R., S. Applequist, M. A. Bourassa, . . ., **R. M. Dole**, et al.: Monitoring and Understanding Changes in Extremes: Extratropical Storms, Winds, and Waves. *Bull. Amer. Meteor. Soc.*, **95** (3), 377-386. [10.1175/BAMS-D-12-00162.1](http://dx.doi.org/10.1175/BAMS-D-12-00162.1)

Peterson, T. C., … **R.M. Dole,** and Coauthors, 2013: Monitoring and Understanding Changes in Heat Waves, Cold Waves, Floods, and Droughts in the United States: State of Knowledge. *Bull. Amer.Meteor*. Soc., **94**, 821–834, [10.1175/BAMS-D-12-00066.1](http://dx.doi.org/10.1175/BAMS-D-12-00066.1)

Hoerling M. P., A. Kumar, **R. M. Dole**, J. W. Nielsen-Gammon, J. K. Eischeid, J. Perlwitz, X.-W. Quan, T. Zhang, P. Pegion and M. Chen (May 2013): Anatomy of an Extreme Event. *J. Climate*, **26** (9), 2811-2832. [10.1175/JCLI-D-12-00270.1](http://dx.doi.org/10.1175/JCLI-D-12-00270.1)

Stott, P. A., M. Allen, N. Christidis, **R. M. Dole**, M. Hoerling, C. Huntingford, P. Pall, J.

Perlwitz, and D. Stone. 2013. Attribution of weather and climate-related events. In: Climate

Science for Serving Society: Research, Modeling and Prediction Priorities, Eds. G. R.

Asrar, J. W. Hurrell, Springer Science+Business Media, Dordrecht 307-337, [10.1007/978-94-007-6692-1\_12](http://dx.doi.org/10.1007/978-94-007-6692-1_12).

Hoerling, Martin P., Jon K. Eischeid, Xiao-Wei Quan, Henry F. Diaz, Robert S. Webb, **Randall**

**M. Dole**, David R. Easterling, 2012: Is a Transition to Semipermanent Drought Conditions

Imminent in the U.S. Great Plains? *J. Climate*, **25**, 8380–8386,[10.1175/JCLI-D-12-00449.1](http://dx.doi.org/10.1175/JCLI-D-12-00449.1)

Galarneau, T., T. Hamill, **R. Dole,** and J. Perlwitz, 2012: A Multi-Scale Analysis of the Extreme

Weather Events over Western Russian and Northern Pakistan During July 2010. *Mon. Wea.*

*Rev*., **140**, 1639-1664, [10.1175/MWR-D-11-00191.1](http://dx.doi.org/10.1175/MWR-D-11-00191.1).

**Dole, R.,** M. Hoerling, J. Perlwitz, J. Eischeid, P. Pegion, T. Zhang, X.-W. Quan, T. Xu, and D.

Murray, 2011: Was there a basis for anticipating the 2010 Russian heat wave? *Geophys.*

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Legler, D. and **R.M. Dole**, 2011: Evaluation of reanalyses—developing an Integrated Earth System Analysis (IESA) Capability. *EOS Trans. AGU*, **92**, (20) 172, [10.1029/2011EO200006](http://dx.doi.org/10.1029/2011EO200006)

Liebmann, B., **R. M. Dole**, C. Jones, I. Bladé, and D. Allured, 2010: Influence of choice of time

period on global surface temperature trend estimates, *Bull. Amer. Meteor. Soc.,* **91**, 1485-

1491, [10.1175/2010BAMS3030.1](http://dx.doi.org/10.1175/2010BAMS3030.1)

Brunet, G., M. Shapiro, B. Hoskins, M. Moncrieff, **R. Dole**, G. Kiladis, B. Kirtman, A. Lorenc,

B. Mills, R. Morss, S. Polavarapu, D. Rogers, J. Schaake, and J. Shukla, 2010: Collaboration of the weather and climate communities to advance subseasonal-to-seasonal prediction, *Bull. Amer. Meteor Soc*., **91**, 1397-1406, [10.1175/2010BAMS3013.1](http://dx.doi.org/10.1175/2010BAMS3013.1)

Shapiro, M., J. Shukla, G. Brunet, C, Nobre, M. Béland, **R. Dole**, et al., 2010: An Earth-System

Prediction Initiative for the Twenty-first Century. *Bull. Amer. Meteor. Soc*., **91**, 1377–

1388, [10.1175/2010BAMS2944.1](http://dx.doi.org/10.1175/2010BAMS2944.1)

Trenberth, K.E., **R. Dole**, Y. Xue, K. Onogi, R. Dee, M. Balmaseda, M. Bosilovich, S. Schubert,

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*and modeling*. In proceedings: "OceanObs'09: Sustained Ocean Observations and

Information for Society" Conference (Vol. 2), Venice, Italy, 21-25 September 2009, Hall,

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Solomon, S., **R.** **Dole**, R. Feely, I. Held, W. Higgins, J. Payne, E. Shea, U. Varanasi, and M.

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**Dole, R.M.,** 2008: Linking Weather and Climate. In Synoptic-Dynamic Meteorology and Weather Analysis and Forecasting: A Tribute to Fred Sanders.*Meteor. Monogr*., **33**, No. 55, 297-348, [10.1175/0065-9401-33.55.297](http://dx.doi.org/10.1175/0065-9401-33.55.297)

Waliser, D., K. Weickmann, R. Dole, S. Schubert, O. Alves, C. Jones, M. Newman, H.-L. Pan,

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[10.1175/BAMS-87-4-425](http://dx.doi.org/10.1175/BAMS-87-4-425)

Pulwarty, R.S., K.L. Jacobs, and **R.M. Dole,** 2005: The hardest working river: Drought and

critical water problems in the Colorado River Basin. In: Drought and Water Crises: Science, Technology, and Management Issues. D.A. Wilhite, ed., Marcel Dekker, Inc. New

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Hamill, T.M., R.S. Schneider, H.E. Brooks, G.S. Forbes, H.B. Bluestein, M. Steinberg, D.

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Hamill, T.M., R. Schneider, H.E. Brooks, G. Forbes, H. Bluestein, M. Steinberg, D. Melendez,

and **R. Dole**, 2005: Supplement to the May 2003 Extended Tornado Outbreak: Daily Maps.

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**Dole, R. M.,** 2003: “Predicting climate variations in the American West: What are our

prospects?” In: Water and Climate in the Western United States. W.M. Lewis Jr., ed.,

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Chen, P., M.P. Hoerling and **R.M. Dole**, 2001: The origin of the subtropical anticyclones. *J.*

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**Dole, R.M.,** 2000: “Prospects for Drought Forecasts in the United States.” In: Droughts: A

Global Assessment. D. A. Wilhite, ed., Routledge Publishers, London. Volume 1: pp. 83-

99.

Black, R.X., and **R. M. Dole**, 2000: Storm tracks and barotropic deformation in climate models.

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Wolter, K., **R. M. Dole**, and C.A. Smith, 1999: Short-term climate extremes over the continental

United States and ENSO. Part I: Seasonal temperatures. *J. Climate*, **12**, 3255-3272,

[10.1175/1520-0442(1999)012<3255:STCEOT>2.0.CO;2](http://dx.doi.org/10.1175/1520-0442%281999%29012%3C3255%3ASTCEOT%3E2.0.CO;2)

Cai, M., **R.M. Dole**, K.L. Paine, and J.S. Whitaker, 1996: Dynamics of systematic errors in the

NMC Medium Range Forecast Model. *Mon. Wea. Review*, **124**, 265-276, [10.1175/1520-0493(1996)124<0265:DOSEIT>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493%281996%29124%3C0265%3ADOSEIT%3E2.0.CO;2)

**Dole, R.M.,** 1996: “Blocking.” In: Encyclopedia of Climate and Weather. Oxford University

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Lyon, B.F., and **R.M. Dole**, 1995: A diagnostic comparison of the 1980 and 1988 U.S. summer

heat wave-droughts. *J. Climate*, **8**, 1658-1675 [10.1175/15200442(1995)008<1658:ADCOTA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0442%281995%29008%3C1658%3AADCOTA%3E2.0.CO;2)

Whitaker, J.S. and **R.M. Dole**, 1995: Organization of storm tracks in zonally varying flows*. J.*

*Atmos. Sci.,* **52**, 1178-1191 [http://dx.doi.org/10.1175/15200469(1995)052<1178:OOSTIZ>2.0.CO;2](http://dx.doi.org/10.1175/15200469%281995%29052%3C1178%3AOOSTIZ%3E2.0.CO;2)

**Dole, R.M.,** J.S. Whitaker, and K.L. Paine, 1994: Mechanisms for storm track variability. Part I:

Diagnostic studies. In: The Life Cycles of Extratropical Cyclones. S. Gronas and M.A.

Shapiro, Eds. Bergen, Norway, Vol. II, ISBN: 8241901437, pp. 12-17.

Whitaker, J.S., **R.M. Dole**, and K.L. Paine, 1994: Mechanisms for storm track variability. Part II:

Model studies. In: The Life Cycles of Extratropical Cyclones. S. Gronas and M. A. Shapiro,

eds., Bergen, Norway, Vol. II, ISBN: 8241901437, pp. 97-101.

Black, R.X., and **R.M. Dole**, 1993: The dynamics of large-scale cyclogenesis over the North

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Engholm, C.D., E.R. Williams and **R.M. Dole**, 1990: Meteorological and electrical conditions

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[10.1175/1520-0493(1990)118<0470:MAECAW>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493%281990%29118%3C0470%3AMAECAW%3E2.0.CO;2)

**Dole, R.M**., and R.X. Black, 1990: Life cycles of persistent anomalies. Part II: The development

of persistent negative height anomalies over the North Pacific Ocean. *Mon. Wea. Rev*., **118**,

824-846, [http://dx.doi.org/10.1175/1520-0493(1990)118<0824:LCOPAP>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493%281990%29118%3C0824%3ALCOPAP%3E2.0.CO;2).

**Dole, R.M.,** 1989: Life cycles of persistent anomalies. Part I: Evolution of 500-mb height fields.

*Mon. Wea. Rev*., **117**, 177-211, [10.1175/1520-0493(1989)117<0177:LCOPAP>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493%281989%29117%3C0177%3ALCOPAP%3E2.0.CO;2)

**Dole, R.M**., 1987: Persistent large-scale flow anomalies. Part I: Characteristics of developments.

In: The Nature and Prediction of Extratropical Weather Systems. European Centre for Medium Range Weather Forecasts, Reading, England. Volume II. pp. 27-72.

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synoptic-scale eddy activity and cyclogenesis. The Nature and Prediction of Extratropical

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England. Volume II, pp. 73-122.

**Dole, R.M.,** 1986: The life cycles of persistent anomalies and blocking over the North Pacific.

*Advances in Geophysics: Anomalous atmospheric flows and blocking*, Academic Press,

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**Dole, R.M.,** 1986: Persistent anomalies of the extratropical Northern Hemisphere wintertime

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characteristics. *Mon. Wea. Rev*., **111**, 1567-1586,

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circulation. In: Large-Scale Dynamical Processes in the Atmosphere, B.J. Hoskins and R.P.

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**Dole, R.M.,** and N.D. Gordon, 1983: Asymmetries in persistence between positive and negative anomalies in persistent anomaly regions. Predictability of Fluid Motions, G. Holloway and

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**U.S. and Interagency Research Program Reports**

**Dole**, R.M., M. Hoerling and S. Schubert, 2008: [Reanalysis of Historical Climate Data for](http://data.globalchange.gov/report/ccsp-sap-1_3-2008)

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Change Research. National Oceanic and Atmospheric Administration, National Climatic

Data Center, Asheville, NC. 136 pp.

Schubert, S., **R. Dole**, H. van den Dool, M. Suarez, and D. Waliser, 2002: *Prospects for*

*improving forecasts of weather and short-term climate variability on subseasonal (2-week*

*to 2-month) time scales*. NASA/TM-2002-104606, vol. 23, 171 pp.

**NOAA Science Reports**

*Strengthening NOAA Science*. Findings from the NOAA Science Workshop, April 20-22,

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*Toward Advancing Understanding and Predictions of Regional Climate Variations and Change*. Findings for the NOAA Science Challenge Workshop, Sep. 20-22, 2011. Prepared for the NOAA Research Council. **R. Dole**, chair. 32 pp.

*Predicting Arctic Weather and Climate and Related Impacts: Status and Requirements for Progress*. Findings from the NOAA Science Challenge Workshop, May 13-15, 2014. Prepared for the NOAA Research Council. **R. Dole**, F. Horsfall, D. Bromwich and P. Clemente-Colon, co-chairs. 34 pp.

All NOAA Science Reports can be downloaded from [NOAA Research Council Science Reports](http://nrc.noaa.gov/CouncilProducts/WhitePapers.aspx)