

Gary A. Wick
Physicist
NOAA Earth System Research Laboratory
Physical Science Division
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Boulder, Colorado 80305

Education:

- 1995 Ph.D., University of Colorado at Boulder (Aerospace Engineering Sciences)
- 1990 M.S., University of Colorado at Boulder (Aerospace Engineering Sciences)
- 1988 B.S., with Special Honors, University of Colorado (Aerospace Engineering Sciences)

Employment:

- 2000-date Physicist, NOAA Earth System Research Laboratory / Environmental Technology Laboratory
Boulder, Colorado
- 1997-2000 Research Scientist, Cooperative Institute for Research in Environmental Sciences
University of Colorado, Boulder, Colorado
- 1995-1997 Postdoctoral Research Associate, Applied Physics Laboratory,
University of Washington, Seattle, Washington.
- 1989-1995 Research Assistant, Colorado Center for Astrodynamic Research,
University of Colorado, Boulder, Colorado.
- 1992-1993 Graduate Part Time Instructor, Department of Aerospace Engineering Sciences,
University of Colorado, Boulder, Colorado.

Publications:

- Dole, R. M., et al., Advancing Science and Services during the 2015-16 El Niño: The NOAA El Niño Rapid Response Field Campaign, *Bull. Amer. Meteor. Soc.*, submitted, 2017.
- Ralph, F. M. et al., Dropsonde Observations of total integrated water vapor transport within North Pacific atmospheric rivers, *J. Hydrometeor.*, in press, 2017.
- Maturi, E., A. Harris, J. Mittaz, J. Sapper, G. **Wick**, X. Zhu, P. Dash, and P. Koner, A new high resolution sea surface temperature blended analysis, *Bull. Amer. Meteor. Soc.*, 98, 1015-1026, 2017.
- Castro, S. L., G. A. **Wick**, and M. Steele, Validation of satellite sea surface temperature analyses in the Beaufort sea using UpTempO buoys, *Remote Sens. Environ.*, 187, 458-475, <http://dx.doi.org/10.1016/j.rse.2016.10.035>, 2016.
- Jackson, D. L., M. Hughes, and G. A. **Wick**, Evaluation of landfalling atmospheric rivers along the U.S. West Coast in reanalysis data sets, *J. Geophys. Res.*, 121 (6), 2705-2718, 2016.
- Mahoney, K, D. L. Jackson, P. Neiman, M. Hughes, L. Darby, G. Wick, A. White, E. Sukovich, and R. Cifelli, Understanding the role of atmospheric rivers in heavy precipitation in the Southeast US, *Mon. Wea. Rev.*, 144, 1617-1632, 2016.
- Neiman, P.J., B.J. Moore, A.B. White, G.A. **Wick**, J. Aikins, D.L. Jackson, J.R. Spackman, and F.M. Ralph, An airborne and ground-based study of a long-lived and intense atmospheric river with mesoscale frontal waves impacting California during CalWater2-2014, *Mon. Wea. Rev.*, 144, 1115-1144, 2016.
- Jin, X., L. Yu, D. Jackson, and G. **Wick**, An improved near-surface specific humidity and air temperature climatology for the satellite period, *J. Atm. Oceanic Technol.*, 32, 412-433, 2015.

- Neiman, P. J., G. A. **Wick**, B. J. Moore, F. M. Ralph, J. R. Spackman, and B. Ward, An airborne study of an atmospheric river over the subtropical Pacific during WISPAR: Dropsonde budget-box diagnostics, and precipitation impacts in Hawaii, *Mon. Wea. Rev.*, 142, 3199-3223, 2014.
- Intrieri, J. M. et al., Global Hawk dropsonde observations of the Arctic atmosphere during the Winter Storms and Pacific Atmospheric Rivers (WISPAR) field campaign, *Atmospheric Measurement Techniques*, 7, 3917-3926, 2014.
- Jackson, D. L., and G. A. **Wick**, Propagation of uncertainty analysis of CO₂ transfer velocities derived from the COARE gas transfer model using satellite inputs, *J. Geophys. Res.*, 119, 1828-1842, 2014.
- Ralph, F. M. et al., A vision for future observations for Western U.S. extreme precipitation and flooding, *Journal of Contemporary Water Research and Education*, 153, 16-32, 2014.
- Castro, S. L., G. A. **Wick**, and J. J. H. Buck, Comparison of diurnal warming estimates from unpumped Argo data and SEVIRI satellite observations, *Remote Sensing of Environment*, 140, 789-799, 2014.
- Scanlon, B., G. A. **Wick**, and B. Ward, Near-surface diurnal warming simulations: validation with high resolution profile measurements, *Ocean Science*, 9, 977-986, 2013.
- Wick**, G. A., P. J. Neiman, F. M. Ralph, and T. M. Hamill, Evaluation of forecasts of the water vapor signature of atmospheric rivers in operational numerical weather prediction models, *Weather and Forecasting*, 28, 1337-1352, 2013.
- Wick**, G. A., P. J. Neiman, and F. M. Ralph, Description and validation of an automated objective technique for identification and characterization of atmospheric river events, *IEEE Trans. Geosci. Remote Sensing*, 51, 2166-2176, 2013.
- Bourassa, M. A. et al., High-latitude ocean and sea ice surface fluxes: Challenges for climate research, *Bull. Amer. Meteor. Soc.*, 94, 403-423, 2013.
- Kim, J., D. E. Waliser, P. J. Neiman, B. Guan, J.-M. Ryoo, and G. A. **Wick**, Effects of atmospheric river landfalls on the cold season precipitation in California, *Climate Dynamics*, 40, 465-474, 2013.
- Jackson, D. L., G. A. **Wick**, and J. E. Hare, A comparison of satellite-derived carbon dioxide transfer velocities with GasEx cruise observations using a physically-based model, *J. Geophys. Res.*, 117, C00F13, doi:10.1029/2011JC007329, 2012.
- Castro, S. L., G. A. **Wick**, and W. J. Emery, Evaluation of the relative performance of sea surface temperature measurements from different types of drifting and moored buoys using satellite-derived reference products *J. Geophys. Res.*, 117, C02029, doi:10.1029/2011JC007472, 2012.
- Neiman, P. J., L. J. Schick, F. M. Ralph, M. Hughes, and G. A. **Wick**, Flooding in Western Washington: The connection to atmospheric rivers, *J. Hydrometeorology*, 12, 1337-1358, 2011.
- Ma, Z., Y.-H. Kuo, F. M. Ralph, P. J. Neiman, G. A. **Wick**, E. Sukovich, and B. Wang, Assimilation of GPS radio occultation data for an intense atmospheric river with the NCEP regional GSI system, *Mon. Wea. Rev.*, 139, 2170-2183, 2011.
- Jackson, D. L., and G. A. **Wick**, Improved near-surface temperature retrieval derived from AMSU-A and sea surface temperature observations, *J. Atm. Oceanic Technol.*, 27, 1769-1776, 2010.
- Bourassa, M. A., S. T. Gille, D. L. Jackson, J. B. Roberts, and G. A. **Wick**, Ocean winds and turbulent air-sea fluxes inferred from remote sensing, *Oceanography*, 23, 36-51, 2010.
- Castro, S. L., G. A. **Wick**, P. J. Minnett, A. T. Jessup, and W. J. Emery, The impact of measurement uncertainty and spatial variability on the accuracy of skin and subsurface regression-based sea surface temperature algorithms, *Remote Sensing of Environment*, 114, 2666-2678, doi:10.1016/j.rse.2010.06.003, 2010.
- Godin, O. A., V. G. Irisov, R. R. Leben, B. D. Hamlington, and G. A. **Wick**, Variations in sea surface roughness induced by the 2004 Sumatra-Andaman tsunami, *Nat. Hazards Earth Syst. Sci.*, 9, 1135-1147, 2009.

- Jackson, D. L., G. A. **Wick**, and F. R. Robertson, Improved Multisensor Approach to Satellite-retrieved Near-surface Specific Humidity Observations, *J. Geophys. Res.*, 114, D16303, doi:10.1029/2008JD011341, 2009.
- Wick**, G. A., Y.-H. Kuo, F. M. Ralph, T.-K. Wee, and P. J. Neiman, Intercomparison of integrated water vapor retrievals from SSM/I and COSMIC, *Geophys. Res. Lett.*, 35, L21805, doi:10.1029/2008GL035126, 2008.
- Neiman, P. J. F. M. Ralph, G. A. **Wick**, Y.-H. Kuo, T.-K. Wee, Z. Ma, G. H. Taylor, and M. D. Dettinger, Diagnosis of an intense atmospheric river impacting the Pacific Northwest: Storm summary and offshore vertical structure observed with COSMIC satellite retrievals, *Mon. Wea. Rev.*, 136, 4398-4420, 2008.
- Stankov, B. B., A. J. Gasiewski, D. Cline, B. L. Weber, G. A. **Wick**, and M. Klein, High-resolution airborne polarimetric microwave imaging of snow cover during the NASA Cold Lands Processes Experiment (CLPX), *IEEE Trans. Geosci. Remote Sensing*, 46, 3672-3693, 2008.
- Castro, S. L., G. A. **Wick**, D. L. Jackson, and W. J. Emery, Error characterization of infrared and microwave satellite sea surface temperature products for merging and analysis, *J. Geophys. Res.*, 113, C03010, doi:10.1029/2006JC003829, 2008.
- Neiman, P. J., F. M. Ralph, G. A. **Wick**, J. D. Lundquist, and M. D. Dettinger, Meteorological Characteristics and Overland Precipitation Impacts of Atmospheric Rivers Affecting the West Coast of North America based on Eight Years of SSM/I Satellite Observations, *J. Hydrometeorology*, 9, 22-47, 2008.
- Donlon, C. J. et al., The Global Ocean Data Assimilation Project (GODAE) High Resolution Sea Surface Temperature Pilot Project (GHRSSST-PP), *Bull. Amer. Meteor. Soc.*, 88, 1197-1213, 2007.
- Zuidema, P., B. Mapes, J. Lin, C. Fairall, and G. **Wick**, The interaction of clouds and dry air in the eastern tropical Pacific, *J. Climate*, 19, 4531-4544, 2006.
- Ralph, F. M., P. J. Neiman, G. A. **Wick**, S. I. Gutman, M. D. Dettinger, D. R. Cayan, and A. B. White, Flooding on California's Russian River: The role of atmospheric rivers, *Geophys. Res. Lett.*, 33, L13801, doi:10.1029/2006GL026689, 2006.
- Jackson, D. L., G. A. **Wick**, and J. J. Bates, Near-surface retrieval of air temperature and specific humidity using multi-sensor microwave satellite observations, *J. Geophys. Res.*, D10306, doi:10.1029/2005JD006431, 2006.
- Wick**, G. A., J. C. Ohlmann, C. W. Fairall, and A. T. Jessup, Improved oceanic cool skin corrections using a refined solar penetration model, *J. Phys. Oceanogr.*, 35, 1986-1996, 2005.
- Neiman, P. J., B. E. Martner, A. B. White, G. A. **Wick**, F. M. Ralph, and D. E. Kingsmill, Wintertime nonbrightband rain in California and Oregon during CALJET and PACJET: Geographic, interannual, and synoptic variability, *Monthly Weather Review*, 133, 1199-1223, 2005.
- Smith, D. F., A. J. Gasiewski, D. L. Jackson, and G. A. **Wick**, Spatial scales of tropical precipitation inferred from TRMM Microwave Imager data, *IEEE Trans. Geosci. Remote Sensing*, 43, 1542-1551, 2005
- Ralph, F. M., P. J. Neiman, and G. A. **Wick**, Satellite and CALJET aircraft observations of atmospheric rivers over the eastern north Pacific Ocean during the winter of 1997/98, *Monthly Weather Review*, 132, 1721-1745, 2004.
- Kollias, P. C. W. Fairall, P. Zuidema, J. Tomlinson, and G. A. **Wick**, Observations of Marine Stratocumulus in SE Pacific during the PACS 2003 cruise, *Geophysical Research Letters*, 31, doi:10.1029/2004GL020751, 2004.
- Curry, J. A., et al., SEAFLUX, *Bull. Amer. Meteor. Soc.*, 85, 409-424, 2004.
- Castro, S. L., G. A. **Wick**, and W. J. Emery, Further refinements to models for the bulk-skin sea surface temperature difference, *J. Geophys. Res.*, 108(C12), 3377, doi:10.1029/2002JC001641, 2003.
- Wick**, G. A., J. J. Bates, and D. J. Scott, Satellite and Skin Layer Effects on the Accuracy of Sea Surface Temperature Measurements from the GOES Satellites, *J. Atm. Oceanic Technol.*, 19, 1834-1848, 2002.

- Emery, W. J., S. L. Castro, G. A. **Wick**, P. Schlüssel, C. J. Donlon, Estimating Sea Surface Temperature from Infrared Satellite and In Situ Temperature Data, *Bull. Amer. Meteor. Soc.*, 82, 2773-2785, 2001.
- Wick**, G. A., J. J. Bates, and C. C. Gottschall, Observational evidence of a wind direction signal in SSM/I passive microwave data, *IEEE Trans. Geosci. Remote Sensing*, 38, 823-837, 2000.
- Wick**, G. A., and A. T. Jessup, Simulation of ocean skin temperature modulation by swell waves, *J. Geophys. Res.*, 103, 3149-3161, 1998.
- Suarez, M. J., W. J. Emery, and G. A. **Wick**, The multi-channel infrared sea truth radiometric calibrator (MISTRIC), *J. Atm. Oceanic Technol.*, 14, 243, 1997.
- Wick**, G. A., W. J. Emery, L. H. Kantha, and P. Schlüssel, The behavior of the bulk-skin sea surface temperature difference under varying wind speed and heat flux, *J. Phys. Oceanogr.*, 26, 1969-1988, 1996.
- Fairall, C. W., E. F. Bradley, J. S. Godfrey, G. A. **Wick**, J. B. Edson, and G. S. Young, Cool-skin and warm-layer effects on sea surface temperature, *J. Geophys. Res.*, 101, 1295-1308, 1996.
- Privette, J. L., C. Fowler, G. A. **Wick**, D. Baldwin, and W. J. Emery, Effects of orbital drift on advanced very high resolution radiometer products: Normalized difference vegetation index and sea surface temperature, *Remote Sens. Environ.*, 53, 164-171, 1995.
- Emery, W. J., Y. Yu, G. A. **Wick**, P. Schlüssel, and R. W. Reynolds, Correcting infrared satellite estimates of sea surface temperature for atmospheric water vapor attenuation, *J. Geophys. Res.*, 99, 5219-5236, 1994.
- Wick**, G. A., W. J. Emery, and P. Schlüssel, A comprehensive comparison between satellite-measured skin and multichannel sea surface temperature, *J. Geophys. Res.*, 97, 5569-5595, 1992.

Book Chapters:

- Emery, W. J., G. A. Wick, and P. Schlüssel, Skin and bulk sea surface temperatures: Satellite measurement and corrections, in *Oceanographic Applications of Remote Sensing*, pp. 145-165, CRC Press, 1995.
- Emery, W. J., L. Kantha, G. A. Wick, and P. Schlüssel, The relationship between skin and bulk sea surface temperatures, in *Satellite Remote Sensing of the Oceanic Environment*, pp. 25-40, Seibutsu Kenkyusha, 1993.

Invited Talks:

- The Future of Hurricane Monitoring, National Hurricane Conference, Austin, TX, 2015.
- Satellite-Derived Estimates of the CO₂ Gas Transfer Velocity Between the Ocean and Atmosphere, Florida State University, 2009.
- Evaluation of water vapor retrievals from COSMIC, SSM/I and AMSU, Electrical and Computer Engineering Department, Colorado State University, November 2007.
- Satellite-Derived Heat Flux: Issues with Near-surface Specific Humidity and Air Temperature, University of Colorado Department of Aerospace Engineering Sciences Remote Sensing Seminar, April 2007.
- Application of in situ Observations to Current Satellite-Derived Sea Surface Temperature Products, 1st Joint Global Ocean Surface Underway Data (GOSUD)/Shipboard Automated Meteorological and Oceanographic System (SAMOS) Workshop, Boulder, Colorado, May 2006.
- Near-Surface Retrieval of Air Temperature and Specific Humidity Using Multi-Sensor Observations, SEAFLUX Workshop, Tallahassee, FL, March 2006.
- Infrared and Microwave Remote Sensing of Sea Surface Temperature, University of Colorado Department of Aerospace Engineering Sciences Remote Sensing Seminar, 2002, 2004, 2005.

Summary of Results from the High-Resolution SST Workshop and the GODAE High-Resolution Sea Surface Temperature Pilot Project, Workshop on Advances in the Use of Historical Marine Climate Data, Boulder, CO, 2002.

Modeling the Warm Layer and Cool Skin: Status and Effects on Satellite SST, Kyoto Japan, 1999.

Remote Sensing of Sea Surface Temperature, PAOS, University of Colorado, 1998.

Effects of the bulk-skin temperature difference and diurnal warming on satellite measured sea surface temperature, 1998 Spring AGU Meeting, Boston, MA.

Remote Sensing of Sea Surface Temperature, Los Alamos National Laboratory, 1993.

Professional Activities:

Detail – Project Scientist for NOAA Unmanned Aircraft Systems (UAS) Program, 2013-2017

Member – Group for High-Resolution Sea Surface Temperature (GHRSSST) Science Team

Member and Previous Chair – GHRSSST Diurnal Variability Working Group

Member – NASA Sea Surface Temperature Science Team

Member – US CLIVAR Working Group on High Latitude Surface Fluxes

Voting Member – NOAA Low Earth Orbiting Requirements Working Group

Voting Member – NOAA Geostationary Orbiting Requirements Working Group

Member – NOAA Ocean Color Working Group

Member – American Geophysical Union

Member – American Meteorological Society

Member – IEEE Geoscience and Remote Sensing Society

Member – American Society of Engineering Educators

Co-Lead – NOAA Pacific Testbed for Unmanned Aircraft Systems (UAS), 2007-2010.

Invited Participant – Workshop on Scatterometry and Climate, Washington, DC, August 2009.

Host and Local Organizer – Global Ocean Data Assimilation Experiment (GODAE) High-Resolution Sea Surface Temperature Pilot Project 7th Science Team Meeting, Boulder, CO, March 2006.

Technical Program Committee Co-Chair – 2006 International Geoscience and Remote Sensing Symposium, Denver, CO.

NOAA Rotational Assignment – National Weather Service Office of Hydrologic Development, Silver Spring, MD, September-November 2003.

Invited Participant – Reconciling Vertical Temperature Trends Workshop, Asheville, NC, October 2003.

Reviewer for Journal of Geophysical Research, Journal of Physical Oceanography, Journal of Fluid Mechanics, Remote Sensing of the Environment, Journal of Atmospheric and Oceanic Technology, Geophysical Research Letters, IEEE Transactions on Geoscience and Remote Sensing, NOAA, and NASA

Major Experiments:

Project Scientist: NOAA Sensing Hazards with Operational Unmanned Technology (SHOUT), 2014-2017.

NASA Eastern Pacific Origins and Characteristics of Hurricanes (EPOCH), Co-I, instrument PI for dropsonde system, and project scientist for NOAA collaboration, 2017.

NASA Hurricane and Severe Storm Sentinel (HS3) Experiment, Instrument PI for dropsonde system on NASA Global Hawk unmanned aircraft, Summers 2011-2014.

NASA Marginal Ice Zone Processes Experiment (MIZOPEX), Science Team Member, Summer 2013.

Mission Scientist: NOAA Winter Storms and Pacific Atmospheric Rivers (WISPAR) Experiment. NASA Global Hawk unmanned aircraft, Feb-Mar 2011.

NASA Genesis and Rapid Intensification Processes (GRIP) Experiment, Instrument PI for dropsonde system on NASA Global Hawk unmanned aircraft, Aug-Sep, 2010.

NOAA Unmanned Aircraft Systems Boundary Layer Moisture Flux Demonstration, Vandenberg AFB, Oct-Nov, 2008.

NOAA Hydrometeorological Testbed, Satellite data processing, Winters 2004-2013.

NOAA Atmospheric Rivers Experiment, Satellite data processing and forecasting, March-April 2005.

NOAA Tropical Atmosphere Ocean (TAO) buoy servicing cruise, Measurements of air-sea fluxes, clouds, balloon launches, R/V *Ronald H. Brown*, Puerto Rico–Panama–Chile, October-December, 2004.

Polarimetric Scanning Radiometer Studies of the Sea Surface, Airborne microwave measurements of ocean roughness, Navy P-3, 2004, 2003, 2001, 2000.

AMSR Precipitation Validation, Airborne microwave measurements, NASA P-3, Yakota, Japan, January-February, 2003.

Fluxes, Air-Sea Interaction, and Remote Sensing Experiment (FAIRS), Measurements of the ocean skin layer and gas transfer, R/P *Flip*, Monterey–San Diego, September 2000.

NASA Wallops Flight Facility Wind-Wave Tank, Measurements of gas transfer and skin temperature modulation by waves, November 1998.

NOAA Gas Exchange Experiment (GASEX98), Measurements of ocean skin layer, R/V *Ronald H. Brown*, Miami – Lisbon, May 1998.

Pan American Climate Study (PACS), Satellite data processing, 1997-1998.

Coastal Oceans Probing Experiment (COPE), Measurements of ocean skin layer, surface roughness and wave breaking, R/P *Flip*, Oregon Coast, September 1996.

Central Equatorial Pacific Experiment (CEPEX), Measurements of ocean skin layer, R/V *John V. Vickers*, Solomon Islands – Los Angeles, March-April 1993.

Tropical Oceans Global Atmosphere Coupled Ocean-Atmosphere Response Experiment (TOGA COARE), Satellite data processing and Air-Sea flux group, Nov. 1992 – Feb. 1993.

NOAA Climate and Global Change Cruise, Measurements of ocean skin layer, R/V *Malcolm Baldrige*, American Samoa – New Zealand – Honolulu, March-May 1990.

Honors:

NASA Group Achievement Award, 2015.

NASA Group Achievement Award, 2011.

NOAA Oceanic and Atmospheric Research Outstanding Scientific Paper Award, 2009.

National Ocean Partnership Project Excellence in Partnering Award, 2008

NOAA Oceanic and Atmospheric Research Outstanding Scientific Paper Award, 2007.

Tau Beta Pi Engineering Honor Society

Sigma Gamma Tau Aerospace Honor Society

Golden Key National Honor Society

Century XXI Fellowship, University of Colorado – 1989-1991

Golden Key National Honor Society Scholarship – Fall 1986

Dean's Engineering Scholarship, University of Colorado – 1985-1987

Teaching Experience:

Infrared and Microwave Remote Sensing of Sea Surface Temperature, American Meteorological Society Short Course on Remote Sensing Methods and Applications in Air-Sea Interaction, AMS 83rd Annual Meeting, February 9, 2003.

Co-developer of Matlab-based interactive tutorials on Satellite Measured Sea Surface Temperature and Oceanic Diurnal Warming, 2003.

Thermodynamics, Aerospace Engineering, University of Colorado, Summers 1992-1993.

Guest lectures in Oceanography, Remote Sensing, Radiative Transfer, Data Analysis, and Computer Programming, University of Colorado and University of Washington.

Thesis Committees:

Martin Yapur, Master's Thesis, City College of the City University of New York, 2004.

Sandra Castro, Ph.D. Dissertation, University of Colorado, 2001.

Alan Di Vittorio, Master's Thesis, University of Colorado, 2000.

Roy Schiff, Master's Thesis, University of Washington, 1996.