

CURRICULUM VITAE

Ralph F. Milliff

Cooperative Institute for Research in Environmental Science
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Education:

B.A.; 1978; University of California, Santa Barbara, Geography

M.A.; 1980; University of California, Santa Barbara, Geography

Ph.D.; 1989; University of California, Santa Barbara, Interdisciplinary-Physical Oceanography
dissertation written at Harvard University; Professor Allan R. Robinson, thesis advisor

Research Positions:

2013-present – Senior Research Associate, Cooperative Institute for Research in Environmental Science (CIRES), University of Colorado, Boulder, Colorado

2012 – Visiting Fellow, Cooperative Institute for Research in Environmental Science, University of Colorado, Boulder, Colorado

2003-present – Adjunct Faculty, Atmospheric and Oceanic Sciences (ATOC) Department, University of Colorado, Boulder, Colorado

2000-2012 – Senior Research Scientist, Colorado Research Associates (CoRA), Boulder, Colorado, a division of Northwest Research Associates (NWRA), Redmond, Washington (milliff@cora.nwra.com)

2000- 2003 – FSWXOutlook Author/Editorial Team, Foresight Weather Inc., Boulder, Colorado (FSWXOutlook founder and coordinator, 2000-2001)

1992- 2001 – Scientist, Climate and Global Dynamics Division, National Center for Atmospheric Research, Boulder, Colorado

1989-1991–UCAR Postdoctoral Fellow in Ocean Modeling at National Center for Atmospheric Research, Boulder, Colorado (J.C. McWilliams, advisor)

1989 – Postdoctoral Fellow, Division of Applied Sciences, Harvard University, Cambridge, Massachusetts (A.R. Robinson, advisor)

1985 - 1989 – Visiting Fellow, Division of Applied Sciences, Harvard University, Cambridge, Massachusetts

1981 - 1985 – Research Assistant, Computer Systems Laboratory and Geography Remote Sensing Unit, University of California, Santa Barbara, California

Professional Service, Societies and Awards:

University of California Community Service Award at graduation, 1978

University of California, Santa Barbara Interdisciplinary Doctoral Program, 1983

University of California Regents Fellowship, 1984

Harvard University, Visiting Fellow/Special Student Program, 1985 -1988

UCAR Postdoctoral Fellowship in Ocean Modeling, 1989 -1991

UCAR Council on Family and Work, 1993 - 1997

NCAR Geophysical Turbulence Program member, 1994 - present

NASA Group Achievement Award, 1998

National Academy of Sciences:

- Committee on Earth Studies, 1999 - 2002;
- Ensuring the Climate Data Record from NPOESS, 2007;
- Uncertainty Management in Remote Sensing of Climate Data, 2008.

Member, NASA International Ocean Vector Winds Science Team, 1991 - present

Member, American Geophysical Union

Member, American Meteorological Society

Member, The Oceanography Society

CoRA Overhead Oversight Committee, 2001 - 2006

CoRA Management Council 2009-2010

Refereed Publications:

Milliff, R.F., J. Fiechter, W.B. Leeds, R. Herbei, C.K. Wikle, M.B. Hooten, A.M. Moore, T.M. Powell and J.L. Brown, 2013: Uncertainty management in coupled physical-biological lower-trophic level ocean ecosystem models., *Oceanography*, in preparation for GLOBEC Special Issue.

Wikle, C.K., R.F. Milliff, R. Herbei and W.B. Leeds, 2013: Modern Statistical Methods in Oceanography: A Hierarchical Perspective., *Statistical Science*, invited paper, in press.

Fiechter, J., R. Herbei, W. Leeds, J. Brown, R. Milliff, C. Wikle, A. Moore and T.M. Powell, 2013: A Bayesian parameter estimation method applied to a marine ecosystem model for the coastal Gulf of Alaska., *Ecological Modelling*, **258**, 122-133.

Leeds, W.B., C.K. Wikle, J. Fiechter, J. Brown and R.F. Milliff, 2012: Modeling 3D spatio-temporal biogeochemical processes with a forest of 1D statistical emulators. *Environmetrics*, **24**(1), 1-12, doi:10.1002/env.2187.

van Loon, H., J.L. Brown and R.F. Milliff, 2012: Trends in sunspots and North Atlantic sea-level pressure. *J. Geophysical Research, Atmospheres*, **117**, D07106, doi:10.1029/2012JD017502.

- Milliff, R.F., A. Bonazzi, C.K. Wikle, N. Pinardi and L.M. Berliner, 2011: Ocean Ensemble Forecasting, Part 1: Ensemble Mediterranean Winds from a Bayesian Hierarchical Model. *Quarterly Journal of the Royal Meteorological Society*, **137**, Part B, 858-878, doi: 10.1002/qj.767.
- Pinardi, N., A. Bonazzi, S. Dobricic, R.F. Milliff, C.K. Wikle and L.M. Berliner, 2011: Ocean Ensemble Forecasting, Part 2: Mediterranean Forecast System Response. *Quarterly Journal of the Royal Meteorological Society*, **137**, Part B, 879-893, doi: 10.1002/qj.816.
- Matthews, D., B. Powell and R.F. Milliff, 2011: "Dominant spatial variability scales from observations around the Hawaiian Islands", *Deep Sea Res*, Part I., **58**, 979-987, 10.1016/j.dsr.2011.07.004
- Chhak, K., A.M. Moore and R.F. Milliff, 2009: Stochastic forcing of ocean variability by the North Atlantic Oscillation. *J. Physical Oceanogr.*, **39**, 162-184.
- Mapes, B.E., R.F. Milliff and J. Morzel, 2009: "Composite life cycle of maritime tropical mesoscale convective systems in scatterometer and microwave satellite observations", *J. Atmos. Sci.*, **66**, 199-208.
- Long, D.G., R.F. Milliff, E. Rodriguez, 2009: "The TropSat Mission: An Observatory for Mesoscale Convective System Processes in the Global Tropics", *Proceedings of the 2009 IEEE Radar Conference*, Pasadena, CA, 6pgs.
- Wikle, C.K. and R.F. Milliff, 2009: "Comment on 'A Spatio-Temporal Model for Mean, Anomaly and Trend Fields of North Atlantic Sea Surface Temperature'", *J. Amer. Stat. Assoc.*, **104**(485), 2223.
- Milliff, R.F. and P.A. Stamus, 2008: "QuikSCAT Impacts on Coastal Forecasts and Warnings: Operational Utility of Satellite Ocean Surface Vector Wind Data", *Weather and Forecasting*, **23**, 878-890.
- Powell, B.S., A.M. Moore, H.G. Arango, E. Di Lorenzo, R.F. Milliff and R.R. Leben, 2009: Near real-time assimilation and prediction in the Intra-Americas Sea with the Regional Ocean Modeling System. *Dyn. Atmos. Oceans*, **48**, 46-68.
- Powell, B.S., H.G. Arango, A.M. Moore, E. Di Lorenzo, R.F. Milliff and D. Foley, 2008: 4DVAR data assimilation in the Intra-Americas Sea with the Regional Ocean Modeling System. *Ocean Modelling*, **23**, 130-145.
- Chhak, K., A.M. Moore, R.F. Milliff, G. Branstator, W.R. Holland and M. Fisher, 2006: "Stochastic Forcing of the Wind-Driven North Atlantic Ocean Circulation. Part I: A Diagnostic Analysis of the Ocean Response to Stochastic Forcing", *J. Physical Oceanogr.*, **36**, 300-315.
- Chhak, K., A.M. Moore, R.F. Milliff, G. Branstator, W.R. Holland and M. Fisher, 2006: "Stochastic Forcing of the Wind-Driven North Atlantic Ocean Circulation. Part II: An Analysis of the Dynamical Ocean Response using Generalized Stability Theory", *J. Physical Oceanogr.*, **36**, 316-334.
- Julien, K., E. Knobloch, R.F. Milliff and J.A. Werne, 2006: "Generalized quasi-geostrophy for spatially anisotropic rotationally constrained flows", *J. Fluid. Mech.*, **555**, 233-274.
- Bengtsson, T., R.F. Milliff, R. Jones, D. Nychka and P.P. Niiler, 2005: "A state-space model for ocean drifter motions dominated by inertial oscillations", *J. Geophys. Res. Oceans*, **110**, C10015, doi:10.1029/2004JC002850.

- Milliff, R.F., J. Morzel, D.B. Chelton, M.H. Freilich, 2004: "Wind stress curl and wind stress divergence biases from rain effects on QSCAT surface wind retrievals", *J. Atmos. Ocean. Tech.*, **21**, 1216-1231.
- Stockwell, R.G., W.G. Large, R.F. Milliff, 2004: "Resonant inertial oscillations in moored buoy ocean surface winds", *Tellus*, **56**, 536-547.
- Chelton, D.B., M.G. Schlax, M.H. Freilich and R.F. Milliff, 2004: "Satellite measurements reveal persistent small-scale features in ocean winds", *Science*, **303**, 978-983.
- Milliff, R.F., P.P. Niiler, J. Morzel, A.E. Sybrandy, D. Nychka and W.G. Large, 2003: "Mesoscale correlation length scales from NSCAT and Minimet surface wind retrievals in the Labrador Sea", *J. Atmos. and Ocean. Tech.*, **20**(4), 513-533.
- Hoar, T.J., R.F. Milliff, D. Nychka, C.K. Wikle, and L.M. Berliner, 2003: "Winds from a Bayesian Hierarchical Model: Computation for Atmosphere-Ocean Research", *J. Computational and Graphical Stats.*, **12**, 781-807.
- Berliner, L.M., R.F. Milliff, and C.K. Wikle, 2003: "Bayesian hierarchical modelling of air-sea interaction", *J. Geophysical Res.*, **108**(C4), 3104, doi:10.1029/2002JC001413.
- Pickart, R.S., M.A. Spall, M.H. Ribergaard, G.W.K. Moore, and R.F. Milliff, 2003: "Deep convection in the Irminger Sea forced by Greenland tip jet", *Nature*, **424**, 152-156.
- van Loon, H., G.A. Meehl, and R.F. Milliff, 2003: "The Southern Oscillation in the early 1990s", *Geophys. Res. Lett.*, **30**(9), 1478, doi:10.1029/2002GL016307.
- Wikle, C.K., L.M. Berliner, and R.F. Milliff, 2003: "Hierarchical Bayesian approach to boundary value problems with stochastic boundary conditions", *Mon. Wea. Rev.*, **131**(6), 1051-1062.
- Milliff, R.F. and J. Morzel, 2001: "The global distribution of the time-average wind-stress curl from NSCAT", *J. Atmos. Sci.*, **58**(2), 109-131.
- Wikle, C.K., R.F. Milliff, D. Nychka, and L.M. Berliner, 2001: "Spatiotemporal hierarchical Bayesian modeling: Tropical ocean surface winds", *J. Amer. Stat. Assoc.*, **96**(454), 382-397.
- Milliff, R.F., M.H. Freilich, W.T. Liu, R. Atlas, W.G. Large, 2001: "Global ocean surface vector wind observations from space", in *Observing the Oceans in the 21st Century*, C.J. Koblinsky and N.R. Smith (Eds.) GODAE Project Office, Bureau of Meteorology, Melbourne. 102-119.
- Milliff, R.F., W.G. Large, J. Morzel, G. Danabasoglu, and T.M. Chin, 1999: "Ocean general circulation model sensitivity to forcing from scatterometer winds", *J. Geophys. Res.*, **104**(C5), 11337-11358.
- Milliff, R.F., T.J. Hoar, H. van Loon, and M. Raphael, 1999: "Quasi-stationary wave variability in NSCAT winds", *J. Geophys. Res.*, **104**(C5), 11425-11436.
- Berliner, L.M., C.K. Wikle and R.F. Milliff, 1999: "Multiresolution wavelet analyses in hierarchical Bayesian turbulence models", in *Bayesian inference in wavelet-based models*, P. Muller and B. Vidakovic (Eds.), Springer-Verlag, *Lecture Notes in Statistics*, **141**, 341-359.
- Madden, R.A., T.J. Hoar, and R.F. Milliff, 1999: "Scatterometer winds composited according to the phase of tropical intraseasonal oscillations", *Tellus*, **51A**, 263-272.

- Wikle, C.K., R.F. Milliff and W.G. Large, 1999: "Surface wind variability on spatial scales from 1 to 1000 km observed during TOGA COARE", *J. Atmos. Sci.*, **56**, 2222-2231.
- Milliff, R.F., T.J. Hoar, and R.A. Madden, 1998: "Fast, eastward moving disturbances in the surface winds of the equatorial Pacific", *Tellus*, **50A**, 26-41.
- Berliner, L.M, J.A. Royle, C.K. Wikle, and R.F. Milliff, 1998: "Bayesian methods in the Atmospheric Sciences", *Bayesian Statistics*, **6**, 83-100.
- Royle, J.A., L.M. Berliner, C.K. Wikle and R.F. Milliff, 1998: "A hierarchical spatial model for constructing wind fields from scatterometer data in the Labrador Sea." in *Case Studies in Bayesian Statistics IV*, C. Gatsonis, R.E. Kass, B. Carlin, A. Cariquiry, A. Gelman, I. Verdinelli, and M. West (Eds.), Springer-Verlag, 367-381.
- Chin, T.M., R.F. Milliff and W.G. Large, 1998: "Basin-scale, high-wavenumber sea surface wind fields from multiresolution analysis of scatterometer data", *J. Atmos. and Ocean. Tech.*, **15**, 741-763.
- Charbonneau, P., J. Herring, and R.F. Milliff (Guest Eds.), 1997: "Foreward; Papers from a Workshop on Stratified Rotating Turbulence", *Theoretical and Computational Fluid Dynamics*, **11**(3,4).
- Milliff, R.F., W.G. Large, W.R. Holland, and J.C. McWilliams, 1996: "The general circulation responses of high-resolution North Atlantic ocean models to synthetic scatterometer winds", *J. Phys. Oceanogr.*, **26**, 1747-1768.
- Milliff, R.F., and R.A. Madden, 1996: "The existence and vertical structure of fast, eastward-moving disturbances in the equatorial troposphere", *J. Atmos. Sci.*, **53**, 586-597.
- Milliff, R.F. and J.C. McWilliams, 1994: "The evolution of boundary pressure in ocean basins", *J. Physical Oceanogr.*, **24**(6), 1317-1338.
- Milliff, R.F. and A.R. Robinson, 1992: "Structure and dynamics of the Rhodes Gyre system and dynamical interpolation for estimates of mesoscale variability", *J. Physical Oceanogr.*, **22**(4), 317-337.
- Milliff, R.F., 1990: "A modified capacitance matrix method to implement coastal boundaries in the Harvard open ocean model", *Mathematics and Computers in Simulation*, **31**, 541-564.
- Pinardi, N. and R.F. Milliff, 1989: "A note on consistent quasi-geostrophic boundary conditions in partially open, simply and multiply connected domains.", *Dynamics of Atmospheres and Oceans*, **14**, 65-76.
- Goodchild, M.F., R.F. Milliff, and S. Davis, 1981: "The significance of potential-density regressions", *The Professional Geographer*, **33**, 341-349.

Doctoral and Postdoctoral Supervision:

Dr. Toshio M. Chin, postdoc 1995-1997 (NCAR/ASP, now at NASA/JPL)

Prof. Christopher K. Wikle, postdoc 1997-1999 (NCAR/GSP, now at U. Missouri)

Dr. Enrique Curchitser, doctoral committee 1999 (Rutgers, now at Rutgers)

Dr. Javier Zavala-Garay, doctoral committee 2002 (CU/PAOS, now at Rutgers)

Dr. Neil Burrell, doctoral committee 2003 (CU/Applied Math, now at U. North Carolina)

Dr. Ketyah Chhak, doctoral committee 2003 (CU/PAOS, now at Georgia Tech.)

Dr. Alessandro Bonazzi, doctoral committee 2005-2008 (U. Bologna)

Dr. Benet Duncan, doctoral committee 2007-2011 (CU/ATOC, now at USGS San Francisco)

Recent and Longterm Collaborators:

L.M. Berliner, Ohio State; J.L. Brown, CoRA; D.B. Chelton, OSU; J. Fiechter, UC Santa Cruz,
B. Fox-Kemper, Brown Univ.; M.H. Freilich, NASA/OSU; R. Herbei, Ohio State; K. Julien, CU;
W.G Large, NCAR; W.B. Leeds, U. Chicago; D.G. Long, BYU; R.A. Madden, NCAR;
B. Mapes, U. Miami; A. Moore, UC Santa Cruz; P.P. Niiler, UCSD/SIO; D. Nychka, NCAR;
N. Pinardi, U. Bologna; B. Powell, U. Hawaii, T.M. Powell, UC Berkeley; E. Rodriguez, NASA/JPL;
H. van Loon, CoRA; C.K. Wikle, U. Missouri.