Michael A. Spall
Physical Oceanographer
Senior Scientist
Department of Physical Oceanography
Woods Hole Oceanographic Institution

Birth: January 15, 1959

Education:

B.S., Clarkson College of Technology, 1980 (mechanical engineering)
M.S., Clarkson College of Technology, 1982 (mechanical engineering)
S.M., Harvard University, 1984 (applied mathematics)
Ph.D., Harvard University, 1988 (applied mathematics)

Research Interests:

Dynamics of mid-latitude subtropical and subpolar gyres, frontal dynamics and mesoscale variability, eddy-mean flow interaction, marginal seas.

Positions and experience:

Staff Engineer, TRW, Redondo Beach, California, 1982–83
Research Assistant, Harvard University, 1984–88
Visiting Scientist, National Center for Atmospheric Research, Boulder, Colorado, 1988–89
Visiting Scientist, Institut für Meerskunde, Kiel, Germany, 1992
Assistant Scientist, 1990–93; Associate Scientist, 1993–2002; tenure awarded, 1997; Senior Scientist, 2002–present Woods Hole Oceanographic Institution

Educational Activity:

Teaching - M.I.T./W.H.O.I. Joint Program Courses: 12.801, "Steady Circulation of the Ocean and Atmosphere", (with L. Pratt), spring 1994, 1995, 1996; 12.758, "Classic Papers in Physical Oceanography", spring 2008, 2009.

Advising - Primary advisor for M.I.T./W.H.O.I. Joint Program student Hristina Hristova. Member of thesis committees for M.I.T./W.H.O.I. Joint Program Students: Hua-Min Zhang, Keith Alverson, Paul Robbins, Christopher Edwards, Brian Arbic, William Williams, Mikhail Solovev, Richard Wardle, Albert Fischer, Juan Botella, Markus Jochum, Juli Atherton, Alison Walker, Baylor

Fox-Kemper, Beatriz Pena Molino, Kjetil Vage, Jinbo Wang. External committee member for Victoria Coles (Univ. of Miami). Advisor to Summer Student Fellows Anne-Francoise Weyns, Amanda O'Rourke. Postdoctoral advisor for Caroline Katsman, Raffaele Ferrari (with J. Pedlosky), Mahadi Ben-Jeloul (with R. X. Huang), T. Durland (with J. Pedlosky), J. DeShays (with F. Straneo).

Other Activities:

W.H.O.I. - Physical Oceanography Department recruitment committee 1992-1993, 1996-2006 (Chair 2003-2006). Scientific Staff Executive Committee (2004-2007, Chair 2006-2007). Scientific Advisory Committee on Computing, 1994-1996. Information Systems Council 1995-1996. UCAR Members Representative 1994-2002.

Non-W.H.O.I. - member Americal Geophysical Union, Americal Meteorological Society; Organizing Committee for OPW93 Workshop; WOCE Working Group on Numerical Modeling 1992-1996; Cooperative Institute for Marine and Atmospheric Studies Visiting Scientist, Univ. of Miami, March 1995; National Science Foundation Physical Oceanography Ocean Sciences Panel, May 1997, Nov. 2003, National Science Foundation Office of Polar Programs Panel, May 2004; Co-Chair of the Ocean Modeling Working Group of the NCAR Community Climate System Model, 1996-2000. Organising Committee for Ocean Sciences Meeting 2000; Ocean Research Priorities Plan Implementation Team for the AMOC 2007; Editor *Journal of Geophysical Research - Oceans* 1999-2000; Associate Editor *Journal of Geophysical Research - Oceans* 2000-2002; Editorial Board Member *Dynamics of Atmospheres and Oceans* 1998-2007; Editor *Journal of Physical Oceanography* 2002-2008; Chief Editor*Journal of Physical Oceanography* 2009-present.

Refereed Publications

1. Robinson, Allan R., Michael A. Spall and Nadia Pinardi, 1988. Gulf Stream simulation and the dynamics of ring and meander processes. *Journal of Physical Oceanography*, **18**(12), 1811–1853.

2. Robinson, Allan R., Michael A. Spall, Leonard J. Walstad and Wayne G. Leslie, 1989. Data assimilation and dynamical interpolation in GULFCASTING experiments. *Dynamics of Atmospheres and Oceans*, **13**, 301–316.

3. Spall, Michael A., 1989. Regional primitive equation modeling and analysis of the POLYMODE data set. *Dynamics of Atmospheres and Oceans*, **14**(1–2), 125–174.

4. Spall, Michael A., and Allan R. Robinson, 1989. A new hybrid coordinate open ocean primitive equation model. *Mathematics and Computers in Simulation*, **31**, 241–269.

5. Spall, Michael A., 1990. Circulation in the Canary Basin: a model/data analysis *Journal of Geophysical Research*, **95**(C6), 9611–9628.

6. Spall, Michael A., and Allan R. Robinson, 1990. Regional primitive equation studies of the Gulf Stream meander and ring formation region. *Journal of Physical Oceanography*, **20**(7), 985–1016.

7. Spall, Michael A., 1991. A diagnostic study of the wind and buoyancy driven North Atlantic Circulation. *Journal of Geophysical Research*, **96**(C10), 18,509–18,518.

8. Spall, Michael A., and William R. Holland, 1991. A nested primitive equation model for oceanic applications. *Journal of Physical Oceanography*, **21**(2), 205–220.

9. Spall, Michael A., 1992a. Cooling spirals and recirculation in the subtropical gyre. *Journal of Physical Oceanography*, **22**(5), 564–571.

10. Spall, Michael A., 1992b. Rossby wave radiation in the Cape Verde Frontal Zone. *Journal of Physical Oceanography*, **22**(7), 796–807.

11. Spall, Michael A., and James C. McWilliams, 1992. Rotational and gravitational influences on the degree of balance in the shallow water equations. *Geophysical and Astrophysical Fluid Dynamics*, **64**, 1–29.

12. Spall, Michael A., 1993. Variability of sea surface salinity in stochastically forced systems. *Climate Dynamics*, **8**, 151–160.

13. Spall, Michael A., Philip L. Richardson and James Price, 1993. Advection and eddy mixing in the Mediterranean salt tongue. *Journal of Marine Research*, **51**(4), 797–818.

14. Spall, Michael A., 1994. A mechanism for low frequency variability and salt flux in the Mediterranean salt tongue. *Journal of Geophysical Research*, **99**(C5), 10,121–10,129.

15. Polvani, L. M., J. C. McWilliams, M. A. Spall, and R. Ford, 1994. The coherent structures of shallow-water turbulence: deformation-radius effects, symmetry breaking and gravity-wave generation. *Chaos*, **4**(2), 177–186.

16. Spall, Michael A., 1994. Wave-induced abyssal recirculations. *Journal of Marine Research*, **52**, 1051-1080.

17. Spall, Michael A., 1995. Frontogensis, subduction, and cross-front exchange at upper ocean fronts. *Journal of Geophysical Research*, **100**(C2), 2543–2557.

18. Williams, Richard G., Michael A. Spall and John C. Marshall, 1995. Does Stommel's mixed-layer 'demon' work? *Journal of Physical Oceanography*, **25**(12), 3089–3102.

19. Spall, Michael A., 1996. Dynamics of the Gulf Stream/Deep Western Boundary Current Crossover. Part I: Entrainment and recirculation. *Journal of Physical Oceanography*, **26**(10), 2152–2168.

20. Spall, Michael A., 1996. Dynamics of the Gulf Stream/Deep Western Boundary Current Crossover. Part II: Low-frequency internal oscillations. *Journal of Physical Oceanography*, **26**, 2169–2182.

21. Pedlosky, Joseph, Lawrence J. Pratt, Michael A. Spall, and Karl R. Helfrich, 1997. Circulation around islands and ridges. *Journal of Marine Research*, **55**(6), 1199–1251.

22. Pickart, Robert S., and Michael A. Spall, and J. R. N. Lazier, 1997. Mid-depth ventilation in the western boundary current system of the subpolar gyre. *Deep-Sea Research I*, **44**(6), 1025–1054.

23. Visbeck, Martin, John Marshall, Tom Haine, and Mike Spall, 1997. Specification of eddy transfer coefficients in coarse-resolution ocean circulation models. *Journal of Physical Oceanography*, **27**(3), 381–402.

24. Spall, M. A., 1997. Baroclinic jets in confluent flow. *Journal of Physical Oceanography*, **27**(6), 1054–1071.

25. Spall, Michael A., and James F. Price, 1998. Mesoscale variability in Denmark Strait: The PV outflow hypothesis. *Journal of Physical Oceanography*, **28**(8), 1598–1623.

26. Spall, Michael A., and David C. Chapman, 1998. On the efficiency of baroclinic eddy heat transport across narrow fronts. *Journal of Physical Oceanography*, **28**(11), 2275–2287.

27. Spall, Michael A., 1999. A simple model of the large scale circulation of Mediterranean water and Labrador Sea water. *Deep-Sea Research II*, **46**, 181–204.

28. Pedlosky, Joseph, and Michael Spall, 1999. Rossby normal modes in basins with barriers. *Journal of Physical Oceanography*, **29**(9), 2332–2349.

29. Spall, Michael A., 2000. Generation of strong mesoscale eddies by weak ocean gyres. *Journal of Marine Research*, **58**(1), 97–116.

30. Joyce, Terrence M., Clara Deser, and Michael A. Spall, 2000. On the relation between decadal variability of Subtropical Mode Water and the North Atlantic Oscillation. *Journal of Climate*, **13**, 2550–2569.

31. Spall, Michael A., Robert A. Weller, and Peter W. Furey, 2000. Modeling the three-dimensional upper ocean heat budget and subduction rate during the Subduction Experiment. *Journal of Geophysical Research*, **105**(C11), 26,151–26,166.

32. Spall, Michael A., 2000. Buoyancy-forced circulations around islands and ridges. *Journal of Marine Research*, **58**(6), 957–982.

33. Spall, Michael A., and Robert S. Pickart, 2001. Where does dense water sink? A subpolar gyre example. *Journal of Physical Oceanography*, **31**(3), 810–826.

34. Spall, Michael A., 2001. Large-scale circulations forced by localized mixing over a sloping bottom. *Journal of Physical Oceanography*, **31**(8), Part 2, 2369–2384.

35. Blackmon, M., and 25 co-authors including M. Spall, 2001. The Community Climate System Model. *Bulletin of the American Meteorological Society*, **82**(11), 2357-2376.

36. Spall, Michael A., 2002. Wind- and buoyancy-forced upper ocean circulation in two-strait marginal seas with application to the Japan / East Sea. *Journal of Geophysical Research*, **107(C1),** 6.1-6.12.

37. Spall, Michael A., 2003. On the thermohaline circulation in flat bottom marginal seas. *J. Marine Res.*, 61, 1-25.

38. Pickart, R. S., M. A. Spall, M. H. Ribergaard, G. W. K. Moore, and R. F. Milliff, 2003. Convection east of Greenland: Atmospheric forcing and oceanic response. *Nature*, **424,** 152-156.

39. Spall, Michael A., and Robert S. Pickart, 2003. Wind-driven recirculation and exchange in the Labrador and Irminger Seas. *Journal of Physical Oceanography*, **33,** 1829-1845.

40. Pratt, L. J., and M. A. Spall, 2003. A Porous Medium Theory for Geostrophic Flow Through Ridges and Archipelagos *J. Phys. Oceanogr.*, 33, 2702-2718.

41. Spall, Michael A., 2003. Islands in Zonal Flow. *Journal of Physical Oceanography*, **33,** 2689-2701.

42. Weller, R. A., P. W. Furey, M. A. Spall, and R. E. Davis, 2003. The large-Scale Context for Oceanic Subduction in the Northeast Atlantic *Deep-Sea Res.*, 51, 665-699.

43. Spall, M.A., 2004. Boundary currents and water mass transformation in marginal seas. *J. Phys. Oceanogr.*, 34, 1197-1213.

44. Katsman, C. A., M. A. Spall, R. S. Pickart, 2004. Boundary current eddies and their role in the restratification of the Labrador Sea. *J. Phys. Oceanogr.*, 34, 1967-1983

45. Spall, M. A., J. Pedlosky, 2005. Reflection and Transmission of Equatorial Rossby Waves. *J. Phys. Oceanogr.*, 35, 363-373.

46. Spall, M.A., 2005. Buoyancy-forced circulations in shallow marginal seas. *J. Mar. Res.* 63, 729-752.

47. Pedlosky, J. and M. A. Spall, 2005. Boundary intensification of vertical velocity in a beta-plane basin. *J. Phys. Oceanogr.*, **35,** 2487-2500.

48. Pickart, R. S. and M. A. Spall, 2007. Impact of Labrador Sea convection on the North Atlantic meridional overturning circulation. *J. Phys. Oceanogr.* **37,** 2207-2227.

49. Spall, M. A. 2007. Mid-latitude wind stress / sea surface temperature coupling in the vicinity of oceanic fronts. in press: *J. Climate*

50. Spall, M. A. 2007. Effect of sea surface temperature / wind stress coupling on baroclinic instability in the ocean. *J. Phys. Oceanogr.*, **37,** 1092-1097.

51. Spall, M. A. 2007. Circulation and water mass transformation in a model of the Chukchi Sea. *J. Geophys. Res.*, **112,** C05025,doi:10.1029/2005JC002264

52. Small, R. J., S. deSzoeke, S. P. Xie, L. O'Neill, H. Seo, Q. Song, P. Cornillon, M. Spall, S. Minobe, 2008: Air-sea interaction over ocean fronts and eddies. in press: *Dynamics of Atmospheres and Oceans.*

53. Spall, M. A., R. S. Pickart, P. S. Fratantoni, A. J. Plueddemann, 2008: Western Arctic Shelfbreak Eddies: Formation and Transport. *J. Phys. Oceanogr.*, **38,** 1644-1668

54. Spall, M. A., and J. Pedlosky, 2008: Lateral coupling in baroclinically unstable flows. *J. Phys. Oceanogr.,* **37,** 1267-1277.

55. Iovino, D., F. Straneo, M. A. Spall, 2008: On the effect of a sill on dense water formation in a marginal sea. *J. Mar. Res.*, 66, 325-345.

56. Pratt, L. J., and M. A. Spall, 2008: Circulation and exchange in choked marginal seas. *J. Phys. Oceanogr.*, 38, 2639-2661.

57. Hristova, H., J. Pedlosky, M. A. Spall, 2008: Radiating instability of a meridional boundary current. *J. Phys. Oceanogr.*, 38, 2294-2307.

58. Spall, M. A., 2008: Buoyancy-forced downwelling in boundary currents. *J. Phys. Oceanogr.*, 38, 2704-2721.

59. Spall, M. A., 2008: Low-frequency interaction between horizonal and overturning gyres in the ocean. *Geophys. Res. Lett.*, **35,** L18614, doi:10.1029/2008GL035206

60. Durland, T. S., J. Pedlosky, M. A. Spall, 2009: Response to a steady poleward outflow, part I: the linear quasigeostrophic problem, *J. Phys. Oceanogr.*, 39, 1541-1550.

61. Durland, T. S., M. A. Spall, J. Pedlosky, 2009: Response to a steady poleward outflow, part II: oscillations and eddies, *J. Phys. Oceanogr.*, 39, 1551-1573.

62. Deshayes, J. F. Straneo, M. A. Spall, 2009: Mechanisms of variability in a convective basin. *J. Mar. Res.,* 31, 273-303.

63. Spall, M. A., 2010: Non-local topographic influences on deep convection: An idealized model for the Nordic Seas. *Ocean Modeling*, 32, 72-85.

64. Spall, M. A., 2010: Dynamics of downwelling in an eddy-resolving convective basin. *J. Phys. Oceanogr.,* 40, 2341-2347.

65. Hristova, H., H. Dijkstra, M. A. Spall, 2010: Onset of time-dependence in a double-gyre circulation: Barotropic basin modes versus classical baroclinic modes. *J. Mar. Res.,* 68, 215-236.

66. Pickart, R. S., M. A. Spall, G. W. K. Moore, T. J. Weingartner, R. A. Woodgate, K. Aagaard, K. Shimada, 2010: Upwelling in the Alaskan Beaufort Sea: Atmospheric forcing and local versus non-local response. *Prog. Oceanogr.,* in press.