

## BIOGRAPHICAL SKETCH

### Michael Steele

Senior Oceanographer  
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### Education

1987 PhD: Geophysical Fluid Dynamics, Princeton University, Princeton, NJ  
1981 BA (Phi Beta Kappa): Physics, Reed College, Portland, OR

### Experience

1997-present Senior oceanographer, Polar Science Center, Seattle, WA  
1996-1999 Chairman, Polar Science Center  
1989-1997 Oceanographer, Polar Science Center  
1987-1988 Postdoctoral Research Associate, Polar Science Center  
1982-1987 Assistant in Research, Geophysical Fluid Dynamics Lab, Princeton, NJ  
1980 Research Assistant, Goddard Institute for Space Studies, New York, NY

### Community Service

2005-ongoing Member, SEARCH Observing Change panel (NSF)  
2004-ongoing Member, ARCUS Advisory Board  
2002-ongoing Member, Polar Advisory Group, PoDAG (NASA)  
2002-ongoing Member, ARCSS Hydrology Science Steering Comm., CHAMP (NSF)  
1999-ongoing Developer of the ocean database PHC (last major update winter, 2005):  
(<http://psc.apl.washington.edu/Climatology.html>)  
ongoing Reviewer for JGR, GRL, Polar Research, DSR, ARCUS student research  
award, NSF, NASA and other agencies.  
ongoing Lectures and demonstrations in local K-12 & schools & colleges.  
2004 Co-chair, Freshwater in the Arctic session (AGU mtg., S.F., CA)  
2000-2004 Member, ARCSS OAI Science Steering Committee (NSF)  
1999-2000 Member, Committee on NASA's Polar Geophysical Data Sets (NRC)  
2002 Co-chair, Arctic model-data comparison workshop (ACSYS/IARC)  
2002 Co-chair, High latitude ocean processes Chapman conference (AGU)

### Observational Program Experience

2003 *ongoing*: Freshwater Switchyard Project  
2000 *ongoing*: North Pole Environmental Observatory (NPEO)  
1995 Scientific Ice Expeditions (SCICEX'95)  
1991 Lead Experiment (LEADEX) Pilot Study  
1988 Coordinated Eastern Arctic Experiment (CEAREX)

## Students

### *Undergraduate research assistantships:*

2004: W. Williams, Physics/Astronomy  
1998-99: R. Morley, Physics  
1998: S. Norman, Chemistry  
1997-98: T. Saunders, Physics  
1996-97: J. Annis, Oceanography  
1997: N. Huang, Computer Science

### *Masters degree student:*

2003-05: W. Ermold, Appl. Physics

## Peer-Reviewed Publications

Falkner, K., M. Steele, R. Woodgate, J. Swift, K. Aagaard, and J. Morison, Dissolved oxygen extrema in the Arctic Ocean halocline from the North Pole to the Lincoln Sea, *Deep-Sea Res.*, in press, **2005**.

Steele, M. and W. Ermold, Salinity trends on the Siberian shelves, *Geophys. Res. Lett.*, *31*, L24308, 10.1029/2004GL021302, **2004**.

Zhang, J., M. Steele, D. A. Rothrock, and R. Lindsay, Increasing exchanges at Greenland-Scotland ridge and their links with the North Atlantic Oscillation and arctic sea ice, *Geophys. Res. Lett.*, *31*, L09307, 10.1029/2003GL019304, **2004**.

Steele, M., J. Morison, W. Ermold, I. Rigor, M. Ortmeyer, and K. Shimada, Circulation of summer Pacific halocline water in the Arctic Ocean, *J. Geophys. Res.*, *109*(C2), C02027, 10.1029/2003JC002009, **2004**.

Steiner, N., G. Holloway, R. Gerdes, S. Häkkinen, D. Holland, M. Karcher, F. Kauker, W. Maslowski, A. Proshutinsky, M. Steele, J. Zhang, Comparing modeled streamfunction, heat and freshwater content in the Arctic Ocean, *Ocean Modelling*, *6*, 265-284 **2004**.

Morison, J. H., K. Aagaard, K. K. Falkner, K. Hatakeyama, R. Moritz, J. E. Overland, D. Perovich, K. Shimada, M. Steele, T. Takizawa, R. Woodgate, Early results from the North Pole Environmental Observatory, *EOS Trans.*, *83*(33), pp. 357, 360-361, **2002**.

Boyd, T. J., M. Steele, R. D. Muench, and J. T. Gunn, Partial recovery of the Arctic Ocean halocline, *Geophys. Res. Lett.*, *29*, 10.1029/2001GL014047, **2002**.

Björk, G., S. Söderkvist, P. Winsor, A. Nikolopoulos, and M. Steele, Partial return of the cold halocline layer to the Amundsen Basin of the Arctic Ocean: Implications for the sea ice mass balance, *Geophys. Res. Lett.*, *29*, 10.1029/2001GL014157, **2002**.

Proshutinsky, A., M. Steele., J. Zhang, G. Holloway, N. Steiner, S. Häkkinen, D. Holland, R. Gerdes, C. Koeberle, M. Karcher, M. Johnson, W. Maslowski, Y. Zhang, W. Hibler, and J. Wang, Multinational effort studies differences among Arctic Ocean models, *EOS Trans.*, *82* (51), 637, 643-644, **2001**.

Walsh, J. E., J. Curry, M. Fahnestock, M. C. Kennicutt II, A. D. Mcguire, W. B. Rossow, M. Steele, C. J. Vorosmarty, and R. Wharton, Enhancing NASA's contributions to polar science: A review of polar geophysical data sets, National Academy Press, Washington, D.C., 124 pp., **2001**.

Steele, M., W. Ermold, S. Häkkinen, D. Holland, G. Holloway, M. Karcher, F. Kauker, W. Maslowski, N. Steiner, and J. Zhang, Adrift in the Beaufort Gyre: A model intercomparison, *Geophys. Res. Lett.*, *28*, 2935-2938, **2001**.

Steele, M., R. Morley, and W. Ermold, PHC: A global ocean hydrography with a high quality Arctic Ocean, *J. Climate*, *14*, 2079-2087, **2001**.

Martinson, D. G., and M. Steele, Future of the arctic sea ice cover: Implications of an antarctic analog, *Geophys. Res. Lett.*, *28*, 307-310, **2001**.

- Forman, S. L., W. Maslowski, J. T. Andrews, D. Lubinski, M. Steele, J. Zhang, R. Lammers, and B. Peterson, Researchers explore arctic freshwater's role in ocean circulation, *EOS Trans.*, *81*, 169, **2000**.
- Morison, J.H., K. Aagaard, and M. Steele, Recent environmental changes in the Arctic: A review, *Arctic*, *53*, 359-371, **2000**.
- Steele, M. and G. Flato, Sea ice growth, melt, and modeling: A survey, in: *The Freshwater Budget of the Arctic Ocean*, pp 549-587, Kluwer, The Netherlands, **2000**.
- Zhang, J., D. Rothrock, and M. Steele, Recent changes in Arctic sea ice: The interplay between ice dynamics and thermodynamics, *J. Climate*, *13*, 3099-3114, **2000**.
- Steele, M. and T. Boyd, Retreat of the cold halocline layer in the Arctic Ocean, *J. Geophys. Res.*, *103*, 10,419-10,435, **1998**.
- Zhang, J., D. Rothrock, and M. Steele, Warming of the Arctic Ocean by a strengthened Atlantic inflow: Model results, *Geophys. Res. Lett.*, *25*, 1745-1748, **1998**.
- Morison, J.H., M. Steele, and R. Andersen, Hydrography of the upper Arctic Ocean measured from the nuclear submarine USS Pargo, *Deep Sea Res. I*, *45*, 15-38, **1998**.
- Zhang, J., W. Hibler, M. Steele, and D. Rothrock, Arctic ice-ocean modeling with and without climate restoring, *J. Phys. Oceanogr.*, *28*, 191-217, **1998**.
- Steele, M., J. Zhang, D. Rothrock and H. Stern, The force balance of sea ice in a numerical model of the Arctic Ocean, *J. Geophys. Res.*, *102*, 21,061-21,079, **1997**.
- Steele, M., D. Thomas, D. Rothrock, and S. Martin, A simple model study of the Arctic Ocean freshwater balance, 1979-1985, *J. Geophys. Res.*, *101*, 20,833-20,848, **1996**.
- Thomas, D., D. Rothrock, S. Martin, and M. Steele, Assimilating satellite concentration data into an Arctic sea ice mass balance model, 1979-1985, *J. Geophys. Res.*, *101*, 20,849-20,868, **1996**.
- Steele, M., J.H. Morison, and T. Turtin, Halocline water formation in the Barents Sea, *J. Geophys. Res.*, *100*, 881-894, **1995**.
- Steele, M. and J. Morison, Hydrography and vertical fluxes of heat and salt northeast of Svalbard in autumn, *J. Geophys. Res.*, *98*, 10,013-10,024, **1993**.
- Steele, M., Sea ice melting and floe geometry in a simple ice-ocean model, *J. Geophys. Res.*, *97*, 17729-17738, **1992**.
- Steele, M. and J. H. Morison, Obtaining smooth hydrographic profiles from a buoy deployed in sea ice, *J. Atmos. and Ocean. Technol.*, *9*, 812-826, **1992**.
- Steele, M., G. L. Mellor, and M. G. McPhee, Role of the molecular sublayer in the melting or freezing of sea ice, *J. Phys. Oceanogr.*, *19*, 139-147, **1989**.
- Steele, M., J. H. Morison, and N. Untersteiner, The partition of air-ice-ocean momentum exchange as a function of ice concentration, floe size, and draft, *J. Geophys. Res.*, *94*, 12,739-12,750, **1989**.
- Steele, M., Numerical models of sea ice - ocean interaction in the Marginal Ice Zone, Ph.D. thesis, Princeton University, 203 pp., **1987**.
- Mellor, G. L., M. G. McPhee, and M. Steele, Ice-seawater turbulent boundary layer interaction with melting or freezing, *J. Phys. Oceanogr.*, *16*, 1829-1846, **1986**.

### **Non-Reviewed Publications**

- Steele, M., The cold halocline, in: *The Encyclopedia of the Arctic*, 1<sup>st</sup> edition, Routledge, 2304 pp., M. Nutall editor, Independence, KY, **2004**.
- Morison, J., K. Aagaard, and M. Steele, Report on: The study of the Arctic Change workshop, University of Washington, Seattle, Washington, Report #8, **1998**.
- McPhee, M.G., and M. Steele, Comparison of SACM and turbulence cluster measurements, *Proc. IEEE 4th Working Conf. on Current Measurement*, Clinton, MD, **1990**.

**Advisors**

BA (physics) senior project: Dr. D. Griffiths, Reed College

PhD advisor: Dr. G. Mellor, Princeton University

Postdoctoral advisor: Dr. J. Morison, Polar Science Center