Natalie M Mahowald

Associate Professor

Snee Hall, Room 2140
607/255-5166
Email: nmm63@cornell.edu

Concentration

Atmospheric biogeochemistry and nutrient cycling, Mineral aerosol interactions with climate and biogeochemistry

Departments

- Earth and Atmospheric Sciences

Education

Doctorate, Mass Inst Technology, 1996

Overview

Professor Natalie Mahowald received her Ph.D. in meteorology from Massachusetts Institute of Technology in 1996. She also holds an M.S. in Resource Policy Analysis from the University of Michigan as well as a B.S in Physics and an A.B. in German from Washington University. Mahowald came to Cornell in 2007 from the National Center for Atmospheric Research in Boulder, Colorado. Much of her research has focused on characterizing and understanding global and regional variability of desert dust (mineral aerosols) during the last 20,000 years and human impacts on desert dust. She has also worked on understanding how iron in the desert dust becomes bioavailable to ocean biota and may impact the ocean carbon cycle. In addition, she works on the variability and impact of other "natural " aerosols and how humans may be impacted by these aerosols.

Research Focus

My research group is focused on understanding global and regional scale atmospheric transport of biogeochemically important species such as desert dust. We are interested in how humans are perturbing the natural environment, especially through perturbations to aerosols. We look at these issues through a combination of 3-dimensional global transport and climate models, as well as analysis of satellite and in situ data.

Instruction Focus

Climate Change, Atmospheric Biogeochemistry, Modeling

Honors, Awards and Appointments

- Fellow American Meteorological Society - 2011
- Henry G. Houghton Award from American Meteorological Society - 2006
- Maria Tharp Fellow (Earth Institute, Columbia University) - 2006
- New Investigator Award (NASA) - 2002
- International Fellow Award (NSF) - 1997

Professional Activities

- American Meteorological Society Annual Meeting, New Orleans, LA (invited talk, January 2008). - 2008
- Iron Fertilization Workshop at Woods Hole Oceanographic Institute, October 2007. - 2007
- American Geophysical Union (AGU) Fall 2007 Meeting (invited talk, co-chaired session). - 2007
- American Geophysical Union, Spring 2007 Meeting (2 invited talks). - 2007
- University of Maryland - 2006
- NOAA Geophysical Fluid Dynamics Laboratory - 2006
- Columbia University - 2006
- Lamont-Doherty Laboratory - 2006
- National Aeronautics and Space Sciences Administration, Goddard Institute for Space Studies (NASA/GISS) - 2006
- National Science Foundation Beckman Conference on Scientific Frontiers for Outstanding Young Scientists - 2004
- Iron Fast Track Project of IGBP member, working workshop). - 2004

Selected Publications

- Kloster, S., Natalie M. Mahowald, J. T. Randerson, P. J Lawrence. 2012. "The impacts of climate, land use, and demography on fires during the 21st century simulated by CLM-CN." Biogeosciences 9: 509-525.
- Mahowald, Natalie M., Keith Lindsay, Daniel Rothenberg, Scott D. Doney, J K. Moore, Peter Thornton, James T. Randerson, Chris Jones. 2011. "Desert dust and anthropogenic aerosol interactions in the Community Climate System Model coupled-carbon-climate model." Biogeosciences 8: 387-414.
- Mahowald, Natalie M., Silvia Kloster, Sebastian Engelstadter, J. K. Moore, S. Mukhopadhyay, J. McConnell, S. Albani, S. C. Doney, A. Bhattacharya, M. Curran, M. Flanner, F. Hoffman, D. Lawrence, K. Lindsay, Paul Mayewski, J. Neff, Daniel Rothenberg, E. Thomas, P. Thornton, C. Zender. 2010. "Observed 20th century desert dust variability: impact on climate and biogeochemistry." Atmospheric Chemistry and Physics 10: 10875-10893.
- Mahowald, Natalie M., S. Engelstaedter, C. Luo, A. Sealy, P. Artaxo, C. Benitez-Nelson, S. Bonnet, Y. Chen, P. Y. Chuang, D. D. Cohen, F. Dulac, B. Herut, A. M. Johansen, N.

Kubilay, R. Losno, W. Maenhaut, A. Paytan, J. A. Prospero, L. M. Shank, R. L Siefer. 2009. "Atmospheric Iron Deposition: Global Distribution, Variability, and Human Perturbations." Annual Review of Marine Science 1: 245-278.

- Mahowald, Natalie M., Timothy Jickells, Alex Baker, Paulo Artaxo, Claudia Benitez-Nelson, Giles Bergametti, Tami Bond, Ying Chen, David Cohen, Barak Herut, Nilgun Kubilay, Remi Losno, Chao Luo, Willy Maenhaut, Kenneth McGee, Gregory Okin, Ron Siefert, Seigen Tsukuda. 2008. "Global distribution of atmospheric phosphorus sources, concentrations and deposition rates, and anthropogenic impacts." Global Biogeochemical Cycles 22 (BG4026).
- Thornton, P. E., J. Lamarque, N. A. Rosenbloom, and N. M. Mahowald (2007), Influence of carbon-nitrogen cycle coupling on land model response to CO_2 fertilization and climate variability, Global Biogeochem. Cycles, 21, GB4018, doi:10.1029/2006GB002868.
- H. Planquette, P. Statham, G. Fones, A. Charette, M. Moore, I. Salter, F. Nedelec, S. Taylor, M. French, A. Baker, N. Mahowald, T. Jickells, Dissolved iron in the vicinity of the Crozet Islands, Southern Ocean, Deep Sea Research II, Topical studies in Oceanography, 54 (18-20), 1999-2019, 2007.
- Mahowald, N. M. (2007), Anthropocene changes in desert area: Sensitivity to climate model predictions, Geophys. Res. Lett., 34, L18817, doi:10.1029/2007GL030472. Text and figures.
- N. Mahowald, J.-A. Ballentine, J. Feddema, N. Ramankutty, Global trends in visibility: implications for dust sources, Atmospheric Chemistry and Physics, 7, 3309-3337, 2007.
- Nevison, C. N. Mahowald, R. Weiss, R. Prinn, Interannnual and seasonal variability in atmospheric N2O, Global Biogeochemical Cycles, 21 (3), GB3017, 2007.
- Mahowald, N. M., D. R. Muhs, S. Levis, P. J Rasch, M. Yoshioka, C. S. Zender, and C. Luo (2006), Change in atmospheric mineral aerosols in response to climate: Last glacial period, preindustrial, modern, and doubled carbon dioxide climates, J. Geophys. Res., 111, D10202, doi:10.1029/2005JD006653. AGU copyright. Text +
- Mahowald, N., J.-F. Lamarque, X. Tie, E. Wolff, Sea salt aerosol response to climate change: last glacial maximum, pre-industrial and doubled carbon dioxide climates, JGR-Atmospheres, (111), D05303, doi:10.1029/2005JD006459, 2006. text and color figures. AGU copyright, online supplement
- Mahowald, N., M. Yoshioka, W. Collins, A. Conley, D. Fillmore, D. Coleman, Climate response and radiative forcing from mineral aerosols during the glacial maximum, pre-industrial, current and doubled-carbon dioxide climates, GRL, 33, L20705, doi:10.1029/2006GL026126, 2006. AGU copyright.
- Luo,C., N. Mahowald, N. Meskhidze, Y. Chen, R. Siefert, A. Baker, A. Johansen, Estimation of iron solubility from observations and a global aerosol model, J. Geophys. Res., 110, D23307, doi:10.1029/2005JD006059.
- Mahowald, N.; Artaxo, P.; Baker, A.; Jickells, T.; Okin, G.; Randerson, J.; Townsend, A. Impacts of biomass burning emissions and land use change on Amazonian atmospheric phosphorus cycling and deposition, Global Biogeochem. Cycles, Vol. 19, No. 4, GB4030, 10.1029/2005GB002541, 2005.
- Mahowald, N., R. Bryant, J. del Corral, L. Steinberger, Ephemeral lakes and desert dust sources, GRL, vol 30, no 2,10.1029/2002GL01641, January, 2003.