

Nicholas Meskhidze

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Educational Background

Ph.D., 2003, Atmospheric Chemistry, Georgia Institute of Technology
M.S., 1996, Environmental Management, Center for the Environmental Management, Tbilisi, Georgia
Diploma, 1993, Physics, Tbilisi State University, Tbilisi, Georgia

Professional Experience

Assistant Professor, North Carolina State University, 2006- present
Visiting Fellow, NASA Goddard Space Flight Center, 2006
Research Scientist II, Georgia Institute of Technology, 2005-2006
Postdoctoral Fellow, Georgia Institute of Technology, 2004

Current Fields of Interest

- Quantification the emissions of biogenic VOCs from marine sources (phytoplankton) and the effects of ocean biological productivity on shallow marine clouds and climate
- Effect of terrestrial and marine organic aerosol on regional air quality and global climate
- Global scale modeling of micronutrient transport (with the emphases on bioavailable iron) to the oceans using GEOS-Chem and the evaluation of the human impact on marine ecosystem productivity and carbon cycle
- Measurements of trace gas emissions from different phytoplankton species
- The sensitivity assessments of shallow cloud forcing in CAM-MAM (Modal Aerosol Model)
- Application of GCM modeling studies in conjunction with remotely sensed data (MODIS, MISR, CALIPSO) for exploring potentially important interactions between nutrient transport, air pollution, and biogeochemistry, and their effects on ocean productivity, clouds and climate

Refereed Publications

- Gantt, B., **N. Meskhidze**, Y. Zhang, and J. Xu, The effect of marine isoprene emissions on secondary organic aerosol and ozone formation in the coastal United States, *in review*
- Gantt, B., **N. Meskhidze**, and D. Kamykowski (2009), A new physically-based quantification of isoprene and primary organic aerosol emissions from the world's oceans, *Atmos. Chem. Phys.*, 9, 4915-4927.
- Meskhidze, N.**, Remer, L. A., Platnick, S., Negrón Juárez, R., Lichtenberger, A. M., and A. R. Aiyer (2009), Exploring the differences in cloud properties observed by the Terra and Aqua MODIS sensors, *Atmos. Chem. Phys.*, 9, 3461-3475.
- Solmon, F., P. Y. Chuang, **N. Meskhidze**, and Y. Chen (2009), Anthropogenic processing of iron in mineral dust over the north Pacific Ocean, *J. Geophys. Res.*, 114, D02305, doi:10.1029/2008JD010417.
- Meskhidze, N.**, R.-E. P., Sotiropoulou, J. Kouatchou, B. Das, L. Oreopoulos, J. M. Rodriguez, and A. Nenes, Aerosol - cloud interactions in the NASA GMI: Model development and indirect forcing assessments, *ACPD*, 7, 14295-14330, 2007.

- Meskhidze, N.**, A. Nenes, W. L. Chameides, C. Luo and N. Mahowald (2007), Southern Ocean Productivity: Fertilization From Above or Below? *Global Biogeochemical Cy.*, 21, GB2006, doi:10.1029/2006GB002711.
- Fountoukis, C., **N. Meskhidze**, W.C. Conant, R. Bahreini, H. Jonsson, A. Sorooshian, V. Varutbangkul, S. Murphy, R.C. Flagan, J.H. Seinfeld, and A. Nenes (2007), Aerosol – Cloud Drop Concentration Closure and Droplet Formation Parameterization Evaluation using in-situ Data from ICARTT, *J. Geophys. Res.*, 112, D10S30, doi:10.1029/2006JD007272.
- Meskhidze, N.**, A. Nenes (2006), Phytoplankton and Cloudiness in the Southern Ocean, *Science*, DOI: 10.1126/science.1131779.
- Luo, C., N. Mahowald, **N. Meskhidze**, Y. Chen, R.L. Siefert, A. R. Baker, A. Johansen (2005), Estimation of Iron Solubility From Observations and A Global Aerosol Model, *J. Geophys. Res.*, 110, D23307, doi:10.1029/2005JD006059.
- Meskhidze N.**, A. Nenes, W. C. Conant, J.H. Seinfeld, Evaluation of a new Cloud Droplet Activation Parameterization with In Situ Data from CRYSTAL-FACE and CSTRIFE (2005), *J. Geophys. Res.*, 110, D16202, doi:10.1029/2004JD005703.
- Meskhidze, N.**, W. L. Chameides, and A. Nenes (2005), Dust and pollution: A recipe for enhanced ocean fertilization?, *J. Geophys. Res.*, 110, D03301, doi:10.1029/2004JD005082.
- Meskhidze, N.**, W.L. Chameides, A. Nenes, and G. Chen (2003), Iron mobilization in mineral dust: Can anthropogenic SO₂ emissions affect ocean productivity?, *Geophys. Res. Lett.*, 30 (21), 2086, doi: 10.1029/2003GL018068.
- Leclerc, M.Y., **N. Meskhidze**, and D. Finn (2003), Comparison between measured tracer fluxes and footprint model predictions over a homogeneous canopy of intermediate roughness, *Agr. Forest Meteorol.*, 117 (3-4), 145, doi:10.1016/S0168-1923(03)00043-1.

Non-Refereed Publications

- Meskhidze, N., A. Nenes and W. L. Chameides, Dust storm surprise: Pollution can convert airborne iron into soluble form (2006), SOLAS (Surface Ocean Lower Atmosphere Study) News, issue 3.

Invited Seminars/Talks

- AGU Fall meeting, San Francisco, CA, December 15-19, 2008.
- RTI-International – Global Climate Change Seminar, April 24, 2008.
- EPA - Research Triangle Park (RTP) Climate Dialogue March 28, 2008
- CEMPD/UNC - Institute for the Environment, Chapel Hill, NC, December 19, 2007
- DUKE/UNC Oceanographic Consortium, Beaufort, North Carolina, November, 16, 2007
- EPA-, Durham, North Carolina, October, 6, 2006.
- AEROCENTER Forum - NASA-Goddard Space Flight Center, Greenbelt, MD, August 29, 2006.
- North Carolina State University, Raleigh, NC, March 16, 2006.
- NASA-Goddard Space Flight Center, Greenbelt, MD, June 25, 2004.

Meetings and Symposia

(Note **only** those presentations in which Meskhidze was the first author or Meskhidze's post-D or student were the first authors are included)

- Johnson, M. **N. Meskhidze**, 2009, Modeling mineral dust and dissolved iron deposition, poster presentation, Goldschmidt2009, Davos, Switzerland, June 21 – 26.
- Meskhidze, N.**, J. Xu, Y. Zhang, B. Gant, S. Ghan, A. Nenes, X.Liu, R. Easter, & R. Zaveri, Effect of marine biogenic organic aerosols on cloud properties: Modeling study, oral presentation, Goldschmidt2009, Davos, Switzerland, June 21 – 26.

- Xu, J., **N. Meskhidze**, Y. Zhang, B. Gantt, S. Ghan, A. Nenes, X. Liu, R. Easter, & R. Zaveri, 2009, *The Effect of Marine Biogenic Organic Aerosols on Stratiform Clouds: A 10-Year Global Simulation with Coupled GCM-Aerosol Model*, AAAR 2009 Annual conference, Hyatt Regency Minneapolis, Minneapolis, MN, October 26 – 30.
- Gantt, B., **N. Meskhidze**, A. M. Carlton, *The Impact of Marine Organic Aerosols on Coastal Air Quality of the Western US*, AAAR 2009 Annual conference, Hyatt Regency Minneapolis, Minneapolis, MN, October 26 – 30.
- Meskhidze, N.**, Y. Zhang, B. Gantt, J. Hemperly, D. Kamykowski, & X.-Y. Wen, 2008, *Effect of Terrestrial and Marine Organic Aerosol on Regional and Global Climate: Work Plan and Some Preliminary Results*, oral presentation at the Department of Energy Atmospheric Science Program FY 2008 Science Team Meeting, Annapolis, MD, 25 - 27 February.
- Gantt, B., **N. Meskhidze**, Y. Zhang, J. Xu, and D. Kamykowski, 2008, *The Effect of Oceanic Isoprene Emissions on Secondary Organic Aerosol Formation in the Coastal United States*, poster presentation at the 7th Annual CMAS Conference, Chapel Hill, NC, 6 - 8 October.
- Hemperly, J., X.-Y Wen, **N. Meskhidze**, and Y. Zhang, 2008, *Application and Evaluation of the Global Weather Research and Forecasting (GWRf) Model*, oral presentation at the 7th Annual CMAS Conference, Chapel Hill, NC, 6 - 8 October.
- Johnson, M., **N. Meskhidze**, F. Solmon, D. Fairlie, S. Gasso, D. Gaiero, 2008, *Modeling Patagonian Dust and Soluble Iron Deposition to the Southern Ocean: Application of GEOS-Chem*, poster presentation at the 7th Annual CMAS Conference, Chapel Hill, NC, 6 - 8 October.
- Gantt, B., **N. Meskhidze**, and D. Kamykowski, 2008, *Oceanic Trace Gases: Quantification and Climate Impact*, poster presentation at AAAR's 27th Annual Conference, Rosen Shingle Creek, FL, 20 - 24 October.
- Meskhidze, N.**, L. A. Remer, S. Platnick, R. Negrón Juárez, A. M. **Lichtenberger** & A. R. Aiyyer, 2008, *Exploring the Differences in Aerosol and Cloud Properties Observed by the MODIS Twin Sensors*, poster presentation at AAAR's 27th Annual Conference, Rosen Shingle Creek, FL, 20 - 24 October.
- Xu, J., **N. Meskhidze**, Y. Zhang, S. Ghan, and A. Nenes, 2009, *Assessment of Aerosol Indirect Forcing Using the Community Atmosphere Model (CAM4)*, AMS 89th Annual Meeting, Phoenix, AZ, 11 - 15 January.
- Johnson, M., **N. Meskhidze**, F. Solmon, D. Fairlie, S. Gasso, D. Gaiero, 2008, *Modeling Patagonian Dust Fluxes and Depositions to the Southern Ocean Using GEOS-Chem*, NC Space Grant presentations, Appalachian State University, Boone, NC, **November 22**.
- Meskhidze, N.**, J. Xu, Y. Zhang, B. Gantt, S. Ghan, A. Nenes, X. Liu, R. Easter & R. Zaveri, 2009, *Effect of Marine Biogenic Organic Aerosols on Clouds*, oral presentation, Annual Science Team Meeting of the Atmospheric Science Program (ASP), Santa Fe, NM, February 25-27.
- Meskhidze, N.**, J. Xu, Y. Zhang, B. Gantt, S. Ghan, A. Nenes, X. Liu, R. Easter & R. Zaveri 2009, *Effect of Marine Biogenic Organic Aerosols on Cloud Properties: Community Atmosphere Model (CAM) Study*, poster presentation, Annual Science Team Meeting of the Atmospheric Science Program (ASP), Santa Fe, NM, February 25-27.
- Gantt, B., J. Xu, D. Kamykowski, **N. Meskhidze**, 2009, *A New Physically-based Quantification of Marine Isoprene and Primary Organic Aerosol Emissions*, poster presentation, Annual Science Team Meeting of the Atmospheric Science Program (ASP), Santa Fe, NM, February 25-27.
- Johnson, M., **N. Meskhidze**, F. Solmon, D. Fairlie, S. Gasso, D. Gaiero, 2009, *Modeling dust and dissolved iron deposition to the Southern Ocean using GEOS-Chem*, oral presentation, 4th GEOS-Chem User's meeting, Harvard University, MA, April 7-10.
- Johnson, M., **N. Meskhidze**, F. Solmon, D. Fairlie, S. Gasso, D. Gaiero, 2009, *Exploring the effects of Patagonian dust on biological activity and carbon uptake in the South Atlantic Ocean using GEOS-Chem*, poster presentation, 4th GEOS-Chem User's meeting, Harvard University, MA, April 7-10.

- Spatial and temporal differences in AOD observed by MODIS twin sensors, International Workshop: Aerosols in the Amazon - Changes and their Consequences from Past and Future Human Activities, Manaus, Amazônia, Brazil, February 18-22, 2008.
- Effects of Aerosol on Shallow Marine Clouds in Bay of Bengal, American Meteorological Society annual meeting, New Orleans, January 11-15, 2008.
- Exploring the differences in aerosol and cloud properties observed by the MODIS twin sensors, American Geophysical Union Fall Meeting, San Francisco, CA, December 10 – 14, 2007.
- Iron Biogeochemistry in the Southern Ocean and the Possible Role of Patagonian Dust in Ocean Fertilization, Multidisciplinary Workshop on Southern South American Dust, Puerto Madrin, Argentina, October 3-5, 2007
- The effect of phytoplankton on clouds in the Southern Ocean: A natural “shiptrack” or “smog chamber”? Gordon Conference on Biogenic Hydrocarbons & the Atmosphere, Ventura, CA, February 25- April 2, 2007.
- Phytoplankton and Cloudiness in the Southern Ocean, American Geophysical Union fall meeting, San Francisco, CA, December 11-15, 2006.
- Aerosol Indirect Forcing from the NASA Global Modeling Initiative: Sensitivity to Meteorology, Emission Scenarios and Aerosol Microphysics, American Association for Aerosol Research (AAAR) International Aerosol Conference 2006, St. Paul, Minnesota, September 10-15, 2006.
- Aerosol Indirect Climatic Effect Assessments using the NASA Global Modeling Initiative, American Geophysical Union Fall Meeting, San Francisco, CA, 2005.
- The Possible Role of Air Pollution in Dust - Fe Mobilization and its Implications to Global C-cycle, ACCESS VIII Colloquium, Yellowstone National Park, Wyoming, September 1-4, 2005 and Gordon Research Conference, Big Sky, Montana, September 4 - 9, 2005.
- Southern Ocean Productivity: Fertilization From Above or Below? Dynamic Planet 2005, Cairns, Australia, August 22 -26, 2005.
- Evaluation of a new Cloud Droplet Activation Parameterization with In Situ Data from NASA CRYSTAL-FACE and CSTRIFE, AAAR Annual Conference, Atlanta, GA, 2004.
- Episodic Dust Passage and Phytoplankton Blooms in North Pacific Ocean, American Geophysical Union, Fall Meeting, San Francisco, CA, 2003.
- Modeling the Influence of Different Processes on Iron Solubilization in Mineral Aerosols: From the Gobi Desert to the North Pacific Ocean, American Geophysical Union Fall Meeting, San Francisco, CA, 2002.
- Tracer Measurements and Modeling of Flux Footprint above a Rough Canopy, 23rd Conference on Agricultural and Forest Meteorology, Albuquerque, New Mexico, 1998.

Honors, Awards, and Recognitions

- 2007 – NCAR ECSA Advanced Study Program participant, Boulder, CO
- 2007 –Early career scientist travel support for Gordon Conference on Biogenic Hydrocarbons & the Atmosphere, Ventura, CA
- 2006- Goddard Visiting Fellowship, NASA Goddard Space Flight Center
- 2006- DISCCRS II Symposium Member, Asilomar Conference Center, Pacific Grove, CA
- 2005 - ACCESS VIII Colloquium Member, Yellowstone National Park, WY
- 2005 - Travel support from NSF for International Conference Dynamic Planet 2005, Cairns, Australia
- 2004 - Best graduate journal publication award, Georgia Institute of Technology
- 2003 - The GRL, 2003 publication was selected as an "AGU Journal Highlight"
- 2000 - Travel support from AMS for 24th conference on Ag. and Forest Meteorology, Davis, California

1996 - Recognition for outstanding achievement and completion of the president's University Student Exchange (1000-1000) program funded by the United States Information Agency (USIA)

1995 - Presidential scholar, The University of Georgia

1995 - The University of Georgia fellowship from United States Information Agency (USIA) 1995-1996

Teaching Experience (2007 -):

| <u>Quarter</u> | <u>Year</u> | <u>Course Number</u> | <u>Course Title</u> | <u>Students</u> |
|----------------|-------------|----------------------|-------------------------------|-----------------|
| Spring | 2009 | MEA 100 | Earth System Science | 100 |
| Spring | 2009 | MEA 412 | Atmospheric Physics | 39 |
| Fall | 2008 | MEA 760 | Biogeochemistry | 7 |
| Spring | 2008 | MEA 412 | Atmospheric Physics | 35 |
| Spring | 2007 | MEA 412 | Atmospheric Physics | 38 |
| Fall | 2007 | MEA 514 | Advanced Physical Meteorology | 10 |

Reviewer

Journal of Geophysical Research (AGU)
 Earth Interactions, American Geophysical Union (AGU)
 Geochemistry, Geophysics, Geosystems (AGU)
 Geobiology, Wiley-Blackwell
 Atmospheric Environment (ELSEVIER)
 Atmospheric Chemistry and Physics (ACP)
 National Science Foundation (NSF)

Membership in Professional and Honor Societies

American Geophysical Union (AGU)
 American Association for Aerosol Research (AAAR)
 American Meteorological Society (AMS)