

# María Val Martín

Research Scientist  
Department of Atmospheric Sciences  
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## Education

2007

**Ph.D. in Engineering-Environmental**, Michigan Technological University.  
Dissertation title: *Nitrogen Oxides in the North Atlantic Lower Free Troposphere: Impacts of Boreal Wildfire and Anthropogenic Emissions*

2002

**M.S. in Environmental Engineering**, Michigan Technological University.  
Thesis title: *Transport of Anthropogenic Nitrogen Oxides and Ozone from North America over the North Atlantic Region*

1999

**B.S./M.S. in Agricultural Engineering**, Universidad Politécnica of Valencia, Spain  
Thesis title: *Phytoremediation of Soils Contaminated with PAHs using Alfalfa (Medicago sativa)*

## Professional Experience

2011-present

**Research Scientist**  
*Department of Atmospheric Sciences, Colorado State University*

2010

**Research Scientist**  
*Earth Sciences Department, Barcelona Supercomputing Center-Centro Nacional de Supercomputacion*

2009

**Adjunct Assistant Professor**  
*Department of Geological/Mining Engineering and Sciences, Michigan Technological University*

2007–2009

**Postdoctoral Research Fellow**  
*Atmospheric Chemistry Modeling Group, Harvard University*

2000–2007

**Graduate Research Assistant**

*Department of Civil and Environmental Engineering, Michigan Technological University*

## Teaching Experience

Air Quality Engineering and Science (CE4508). Fall 2006. Upper-division course covering the formation, control, and regulation of air pollutants, in particular criteria pollutants. Full responsibility of 20% of the course.

Atmospheric Chemistry (CE5515). Spring 2005 and 2007. Graduate course covering fundamentals and applications of atmospheric chemistry. Provided lectures on tropospheric O<sub>3</sub> production and destruction, solar radiation, photolysis rates and greenhouse effect.

## Honors and Awards

2010. Selected participant to the NCAR Biomass Burning Young Faculty Forum.

2010. Beatriz Pinos Postdoctoral Fellowship, Catalunya, Spain (DECLINED).

2009. Selected Atmospheric Chemistry Colloquium for Emerging Senior Scientist (ACCESS) X participant.

2007. Juan de la Cierva Posdoctoral Fellowship, Spain (DECLINED).

2007. Philips Youngs Fellowship at the Civil and Environmental Engineering Department, Michigan Technological University.

2003. Outstanding Presentation Award at the Multi-Disciplinary Sigma Xi Student Research Colloquium, Michigan Technological University.

1999. Outstanding Thesis Award in the environmental field at Universidad Politécnica de Valencia.

## Professional Activities

- Member of the NASA MISR science team.
- **Regular Reviewer:** Journal Geophysical Research-Atmosphere; Atmospheric Chemistry and Physics; NSF Grant Agency
- **Memberships:** American Geophysical Union, European Geosciences Union, Air and Waste Management Association (2003-2004).
- Co-organizer of the Seminar Series at the Civil and Environmental Engineering Department, Michigan Technological University, Fall 2005.

## Manuscripts in Preparation

- M. Val Martín, J. A. Logan, R. Kahn, S. Freitas and C. Ichoku, Vertical transport of fire emissions over North America: Merging satellite observations into a 1-D plume-rise model,

in preparation, *Atmos. Chem. and Phys.*

- R. C. Hudman, D. V. Spracklen, J. A. Logan, L. J. Mickley, M. Val Martín, R. M. Yevich, A. Cantin, M. D. Flannigan, and A. L. Westerling, Effects of climate change on forest fires over North America and impact on U.S. air quality and visibility, to be submitted not later than May 2011, *J. Geophys. Res.*

## Peer-Reviewed Publications

1. M. Val Martín, J. A. Logan R. Kahn, F.-Y. Leung, D. Nelson, and D. Diner, Smoke injection heights from fires in North America: Analysis of 5 years of satellite observations, *Atmos. Chem. and Phys.*, 10, 1491-1510, acp-2009-513, 2010.
2. Dirksen, R. J., K. F. Boersma, J. D. Laats, P. Stammes, G. R. V. D. Werf, M. Val Martín, and H. M. Kelder, An aerosol boomerang: rapid around-the-world transport of smoke from the December 2006 Australian forest fires observed from space, *J. Geophys. Res.*, doi:10.1029/2009JD012360, 2009.
3. M. Val Martín, R. Honrath, R. C. Owen and Q. Li, Seasonal variation of nitrogen oxides in the central North Atlantic lower free troposphere, *J. Geophys. Res.*, 113, D17307, doi:10.1029/2007JD009688, 2008.
4. M. Val Martín, R. Honrath, R. C. Owen and K. Lapina, Large-scale impacts of anthropogenic pollution and boreal wildfires on the nitrogen oxides levels over the central North Atlantic region, *J. Geophys. Res.*, 113, D17307, doi:10.1029/2007JD009689, 2008.
5. K. Lapina, R. E. Honrath, M. Val Martín, E. Hyer and P. Fialho, Late-summer changes in burning conditions in the boreal regions and their implications for NO<sub>x</sub> and CO emissions from boreal fires, *J. Geophys. Res.*, *J. Geophys. Res.*, 113, D11304, doi:10.1029/2007JD009421, 2008.
6. J. Kleissl, R. E. Honrath, M. P. Dziobak, D. Tanner, M. Val Martín, R. C. Owen and D. Helmig, The occurrence of upslope flows at the Pico mountain observatory: a case study of orographic flows on small, volcanic islands, *Journal of Geophysical Research*, 112, doi:10.1029/2006JD007565, 2007.
7. M. Val Martín, R. Honrath, R. C. Owen, G. Pfister, P. Fialho and F. Barata, Significant enhancements of nitrogen oxides, ozone and aerosol black carbon in the North Atlantic lower free troposphere resulting from North American boreal wildfires, *J. Geophys. Res.*, 111, D23S60, doi:10.1029/2006JD007530, 2006.
8. G. Pfister, L. K. Emmons, P. G. Hess, R. Honrath, J.-F. Lamarque, M. Val Martín, R. C. Owen, M. A. Avery, E. V. Browell, J. S. Holloway, P. Nedelec, R. Purvis, R. B. Ryerson, G. W. Sachse, and H. Schlager, Ozone production from the 2004 North American boreal fires, *J. Geophys. Res.*, 111, D24S07, doi:10.1029/2006JD007695, 2006.
9. K. Lapina, R. E. Honrath, R. C. Owen, and M. Val Martín, Evidence of significant large-scale impacts of boreal fires on ozone levels in the midlatitude Northern Hemisphere free troposphere, *Geophys. Res. Lett.*, 33, L18015, doi:10.1029/2006GL025878, 2006.

10. R. Honrath, R. C. Owen, M. Val Martín, J. Reid, K. Lapina, P. Fialho, M. Dziobak, J. Kleissl, and D. Westphal, Regional and hemispheric impacts of anthropogenic and biomass burning emissions on summertime CO and O<sub>3</sub> in the North Atlantic lower free troposphere, *J. Geophys. Res.*, 109, D24310, doi:10.1029/2004JD005147, 2004.

## Non-Peer-Reviewed Publications

- G. Aloisio, C. Basu, A. Caubel, I. Epicoco, O. Jorba, E. Maisonnave, F. Martinez, S. Mocavero, M. Val Martín, S. Valcke, D. Vicente, Report on the Description of the Evaluation Suite and Base-case Results, Project Number GA: 228203, IS-ENES, Infrastructure for the European Network for Earth System Modelling, 2010.
- D. J. Diner, D. L. Nelson, Y. Chen, R. A. Kahn, J. Logan, F.-Y. Leung, and M. Val Martín, Quantitative studies of wildfire smoke injection heights with the Terra Multi-angle Imaging SpectroRadiometer, Proc. SPIE 7089, 708908, doi:10.1117/12.795215, 2008.
- M.C. Peterson, A. Hamlin and M. Val Martín, Transport of anthropogenic pollutants within the marine boundary layer of the central and northwestern North Atlantic. *IGACTivities Newsletter of the International Global Atmospheric Chemistry Project*, 24, pg. 5–6, August 2001.

## Presentations and Published Abstracts

1. M. Val Martín, Fire Smoke Injection Heights in North America: A View from Satellite Observations and Models. Seminar at King's College of London, August 31, 2010. (INVITED TALK)
2. M. Val Martín, Fire smoke plume heights in North America: model validation using MISR and MODIS satellite observations. NCAR Biomass Burning Forum, Boulder, CO, July 13-15, 2010. (INVITED TALK)
3. P. Jimenez-Guerrero, M. Val Martín, J.P. Montavez and J.M. Baldasano, Evaluation of a regional model climatology in Europe using EC-Earth V2.0 data. EC-Earth International Annual Meeting, Barcelona, May 31-June 1, 2010.
4. M. Val Martín, J. A. Logan, R. A. Kahn, S. Freitas, D. L. Nelson, C. Ichoku, D. Diner, F.-Y. Leung and A. Cantin, A parameterization of wildfire emission injection heights in North America: Analysis from satellite observations and models, American Geophysical Union Fall Meeting, San Francisco, CA, December 14-18, 2009; Eos Trans. AGU, 90 (52), Fall Meet. Suppl., Abstract A42D-05. (TALK)
5. J. A. Logan and M. Val Martín, Fire Injection Heights: A View from MISR and Models, Atmospheric Chemistry Gordon Research Conference, WaterVille Valley, NH, August 24-27, 2009 (INVITED TALK)
6. M. Val Martín, J. A. Logan, R. A. Kahn, S. Freitas, D. L. Nelson, C. Ichoku, D. Diner, F.-Y. Leung and A. Cantin, Smoke Injection Heights from Fires in North America: Towards a 1D Plume-rise Model Parameterization, Atmospheric Chemistry Gordon Research Conference, WaterVille Valley, NH, August 24-27, 2009. (POSTER)

7. M. Val Martín, J. Logan, R. Kahn, F.-Y. Leung, D. Nelson and D. Diner, Smoke Injection Heights from Fires in North America, Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS X), Brokehaven National Lab, NY, August 20-22, 2009. (INVITED TALK)
8. M. Val Martín, J. Logan, S. Freitas, D. Nelson, C. Ichoku, R. Kahn, D. Diner, F.-Y. Leung and A. Cantin, Characterization of fire plume heights over North America: Merging MISR and MODIS data into modeling, European Geosciences Union Meeting, Vienna, Austria, April 14-24, 2009. (INVITED TALK)
9. M. Val Martín, Characterization of vertical transport of fire smoke over North America using satellite observations, Remote Sensing Seminar Series at Michigan Technological University, February 9, 2009. (INVITED TALK)
10. M. Val Martín, J. A. Logan, D. L. Nelson, C. Ichoku, R. A. Kahn, D. J. Diner, S. Freitas and F.-Y. Leung, Characterization of Vertical Transport of Fire Emissions over North America: Analysis of MISR Observations with a 1-D plume-resolving Model, American Geophysical Union Fall Meeting, San Francisco, Dec. 14-19, 2008; Eos Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract B41E-02. (TALK)
11. R. Hudman, D.V. Spracklen, J. A. Logan, L. J. Mickley, M. Val Martín, S. Wu, R. Yevich, A. Cantin, M. Flannigan and A.L. Westerling, Effect of climate change on North American wildfire activity and impact on ozone air quality in the United States, American Geophysical Union Fall Meeting, San Francisco, Dec. 14-19, 2008; Eos Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract B42B-06.(TALK)
12. F.-Y. Leung, M. Val Martín, J. A. Logan, D. J. Diner, D. L. Nelson, J. Vaughan, J. Westergreen and R. Kremens, Use and ground validation of MISR satellite data to constrain injection heights of emissions from forest fires in the northwestern United States, American Geophysical Union Fall Meeting, San Francisco, Dec. 14-19, 2008; Eos Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract B31C-0302.(POSTER)
13. M. Val Martín, J. A. Logan, D. L. Nelson, C. Ichoku, R. A. Kahn, D. J. Diner, S. Freitas and F.-Y. Leung, Characterization of Vertical Transport of Fire Emissions over North America: Merging MISR Observations and a 1-D plume-resolving Model, MISR Science Team Meeting, Pasadena, LA, December 11-12, 2008.(TALK)
14. M. Val Martín, Vertical Transport of Fire Smoke Emissions over North America, EPS Graduate Students/Postdoc Seminar Series at Harvard University, November 13, 2008. (INVITED TALK)
15. M. Val Martín, J. A. Logan, F.-Y. Leung, D. L. Nelson, R. A. Kahn, D. J. Diner and S. Freitas, Wildfire Plume Injection Heights Over North America: An Analysis of MISR Observations, International Global Atmospheric Chemistry (IGAC) Conference, Annecy, France, September 7-12. (TALK)
16. D. J. Diner, D. L. Nelson, Y. Chen, R. A. Kahn, J. Logan, F.-Y. Leung, and M. Val Martín, Quantitative studies of wildfire smoke injection heights with the Terra Multi-angle Imaging SpectroRadiometer, SPIE Optics and Photonics, San Diego, CA, 10-14 August 2008. (TALK)

17. M. Val Martín, R.E. Honrath, R. C. Owen, K. Lapina and Q. Li, Seasonal variation of nitrogen oxides in the central North Atlantic lower free troposphere: Influence of boreal wildfires and North American urban pollution, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract A44C-07, 2007.(TALK)
18. K. Lapina, R.E. Honrath, R. C. Owen, M. Val Martín, E. Hyer and P. Fialho, Evidence of a late-summer decrease in NO<sub>x</sub>/CO emission ratios from boreal fires, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract A44C-07, 2007. (POSTER)
19. M. Val Martín, J. A. Logan, R. Yevich and F.-Y. Leung, Overview of the 2002 North American plume injection heights, MISR Science Team Meeting, Pasadena, CA, USA, December 7, 2007. (TALK)
20. F.-Y. Leung, J. Logan, M. Val Martín, D. Nelson, R. Kahn, Y. Chen, D. Mazzone, and D. Diner, The height of lofted biomass burning plumes over Alaska in 2004, MISR Science Team Meeting, Pasadena, CA, USA, December 7, 2007. (TALK)
21. M. Val Martín, Impacts of anthropogenic and boreal wildfires over the central North Atlantic lower free troposphere: Observations at the PICO-NARE observatory, Seminar in the Atmospheric Chemistry Model Group at Harvard University, April 2007. (INVITED TALK)
22. R.E. Honrath, R. C. Owen, M. Val Martín, D. Helmig, D. D. Parrish, Q. B. Li, D. Tanner, and P. Fialho, Photochemical evolution of continental outflow to the N. Atlantic lower free troposphere during spring and summer, American Geophysical Union Fall Meeting, San Francisco, Dec. 11–15, 2006; *Eos Trans. AGU*, 7(52), Fall Meet. Suppl., Abstract A53B-0187. (TALK)
23. R.C. Owen, R. E. Honrath, M. Val Martín, and K. Lapina, A New Method for Transport Analysis: Lagrangian Tracking of Pollution Plumes Using Combined Forward and Backward Model Simulations, American Geophysical Union Fall Meeting, San Francisco, Dec. 11–15, 2006; *Eos Trans. AGU*, 7(52), Fall Meet. Suppl., Abstract A53B-0186. (POSTER)
24. K. Lapina, R. E. Honrath, R. C. Owen, M. Val Martín, E. J. Hyer, P. Fialho and F. Barata, Wildfire Plumes in the Lower Free Troposphere Over the North Atlantic: the Impact of Plume Travel Height and Age on Enhancement Ratios of Ozone, Nitrogen Oxides and Black Carbon, American Geophysical Union Fall Meeting, San Francisco, Dec. 11–15, 2006; *Eos Trans. AGU*, 7(52), Fall Meet. Suppl., Abstract A53B-0186. (POSTER)
25. M. Val Martín, R. E. Honrath, R. C. Owen, P. Fialho, G. Pfister, K. Lapina and F. Barata, Impacts of Anthropogenic and Boreal wildfire Emissions on Nitrogen Oxides, Ozone and Aerosol Black Carbon Levels in the Lower FT over the Central North Atlantic Region, *International Global Atmospheric Chemistry Project (IGAC)/Commission for Atmospheric Chemistry and Global Pollution (CACGP)/World Meteorology Organization (WMO) Joint Conference*, Cape Town, South Africa, September 17–23, 2006.(POSTER)
26. M. Val Martín, R. E. Honrath, R. C. Owen, J. Kleissl, P. Fialho, G. Pfister and K. Lapina, Large Enhancements of Nitrogen Oxides over the Central North Atlantic Lower Free Troposphere Resulting From Boreal Wildfires: Observations at the PICO-NARE Station during Summer 2004, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract A41D-02, 2005. (POSTER)

27. G. Pfister, L. K. Emmons, P. G. Hess, J. Lamarque, D. P. Edwards, A. M. Thompson, D. J. Wuebbles, R. L. Herman, C. R. Owen, R. Honrath, M. Val Martín, G. W. Sachse, M. Avery and J. T. Randerson, Implications of North American Boreal Fires on Air Quality and Composition in Nearby and Remote Regions, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract A21B-0847, 2005. (POSTER)
28. R. E. Honrath, P. Fialho, D. Helmig, M. Val Martín, R. C. Owen, J. Kleissl, J. M. Strane, M. P. Dziobak, D. M. Tanner and F. Barata, A permanent free tropospheric observatory at Pico summit in the Azores Islands? Past measurements (2001-2005) and future plans, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract A51D-0108, 2005. (TALK)
29. K. Lapina, R. Honrath, C. Owen, M. Val Martín and J. Strane, Impact of Large-Scale Boreal Fires on Levels of Tropospheric Ozone in the Northern Hemisphere, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract A51D-0109, 2005.(POSTER)
30. R. E. Honrath, M. Val Martín, J. Kleissl, R. C. Owen, K. Lapina, D. Helmig, and D. Tanner, Large-scale impacts of anthropogenic and boreal forest fire emissions observed in multi-year free tropospheric observations in the Azores, Gordon Research Conference (Atmospheric Chemistry), Big Sky Resort, Big Sky, Montana, Sept. 4–9, 2005. (TALK)
31. M. Val Martín, R. E. Honrath, J. Kleissl, R. C. Owen, K. Lapina, P. Fialho, D. Helmig, and D. Tanner, Impacts of anthropogenic and boreal fire emissions in the central North Atlantic lower free troposphere: Summertime observations at the PICO-NARE observatory, ICARTT 2004 Data Workshop, Durham, New Hampshire, August 9–12, 2005. (POSTER)
32. R. E. Honrath, R. C. Owen, M. Val Martín, K. Lapina, J. P. Kleissl, J. M. Strane, and P. Fialho, Impacts of forest fires and U.S. outflow on lower free troposphere composition over the central North Atlantic: Interannual variability and conditions during the ICARTT study, *Geophysical Research Abstracts*, Vol. 7, 05391, 2005. SRef-ID: 1607-7962/gra/EGU05-A-05391. (TALK)
33. M. Val Martín, R. Honrath, R. C. Owen, J. Kleissl, and K. Lapina, Transport of nitrogen oxides from anthropogenic emissions and boreal forest fires to the central North Atlantic lower free troposphere: Measurements at the PICO-NARE station during the ICARTT study, *Geophysical Research Abstracts*, Vol. 7, 05759, 2005. SRef-ID: 1607-7962/gra/EGU05-A-05759. (POSTER)
34. R. E. Honrath, R. C. Owen, M. Val Martín, J. S. Reid, K. Lapina, J. Kleissl, and P. Fialho, Ozone-CO relationships in plumes carrying North American pollution and boreal biomass burning emissions through the central North Atlantic lower free troposphere, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract A23A-0769, 2004. (TALK)
35. D. Helmig, R. Honrath, D. Tanner, M. Val Martín, and J. Kleissel, North Atlantic long-range transport research at Pico Mountain, Azores, Portugal, *NOAA's Climate Monitoring and Diagnostics Laboratory Annual Meeting*, May 26–27, Boulder, 2004. (POSTER)
36. M. Val Martín, R. Honrath, C. Edlin, R.C. Owen, and P. Fialho, Nitrogen Oxides in the lower free troposphere over the central North Atlantic: Measurements at the PICO-NARE site from summer to early winter, *Geophysical Research Abstracts*, Vol. 5, 07570, 2003. (POSTER)

37. R. E. Honrath, P. Fialho, C. L. Edlin, M. Val Martín, A. D. A. Hansen, and R. C. Owen, PICO-NARE: A multi-year study of the impacts of continental export on O<sub>3</sub>, black carbon, and CO in the MBL and FT over the central North Atlantic Ocean, *International Global Atmospheric Chemistry Project (IGAC)/Commission for Atmospheric Chemistry and Global Pollution (CACGP) Joint Conference*, Heraklion, Greece, September 18–25, 2002. (TALK)
38. M. Val Martín, R. Honrath, D. Parrish, M. Peterson, and S. Bertman, Assessment of the export of O<sub>3</sub> and NO<sub>x</sub> from North America over the North Atlantic Ocean during fall 1997, *Eos Trans. AGU*, 82(47), page F124, Fall Meet. Suppl., 2001. (POSTER)
39. M. Val Martín, R. Honrath, D. Parrish, M. Peterson, and S. Bertman, Ground-based measurements of O<sub>3</sub> and O<sub>3</sub> precursors in the MBL and FT over the North Atlantic Ocean. *Center for International Earth Science Information Network*, Photooxidants, particles, and haze across the arctic and North Atlantic: Transport observations and models, Palisades, New York, July 2001. (POSTER)
40. M. Val Martín, R. Honrath, and M. Peterson, Study of O<sub>3</sub> and O<sub>3</sub> precursors over the North Atlantic based on measurements at Cape Pine, Newfoundland during NARE-97. Sigma Xi Society Student Research Colloquium, Houghton, Michigan, April 2001. (TALK)
41. M. Val Martín, R. Honrath, and M. Peterson, Study of O<sub>3</sub> and O<sub>3</sub> precursors over the North Atlantic based on measurements at Cape Pine, Newfoundland during NARE-97, *23rd Annual Midwest Environmental Chemistry Workshop*, Western Michigan University, Kalamazoo, Michigan, October 2000. (POSTER)