

Curriculum Vitae, Randall V. Martin

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Address

Department of Physics and Atmospheric Science
Dalhousie University
Halifax, NS, B3H 3J5, Canada
Tel: 902-494-3915; Fax: 902-494-5191
randall.martin@dal.ca

Academic Appointments

2011-present: Professor, Dalhousie University
2010-present: Killam Professor, Dalhousie University
2003-present: Research Associate, Harvard-Smithsonian Center for Astrophysics
2007-2011: Associate Professor, Dalhousie University
2003-2007: Assistant Professor, Dalhousie University
2002-2003: Postdoctoral Research Fellow, Harvard-Smithsonian Center for Astrophysics

Education

Ph.D. (Engineering Sciences), Harvard University, 2002
M.S. (Engineering Sciences), Harvard University, 2001
M.Sc. (Environmental Science), Oxford University, 1998
B.S. (Engineering), Cornell University, 1996

Honors

E.W.R. Steacie Memorial Fellowship for outstanding and highly promising scientists and engineers, NSERC, 2012-2014
Killam Professor, 2010-2015
NSERC Discovery Accelerator Supplement, 2010-2012
Killam Prize for young scientist with exceptional research ability, 2010
NASA Group Achievement Award for INTEX-B (2008)
Editors Citations for Excellence in Refereeing: Geophys. Res. Lett. (2007), J. Geophys. Res. (2008)
Dr. G. Forbes Langstroth Memorial Teaching Award, 2006
Petro-Canada Young Innovator Award, 2006
Invited presentation at Gordon Research Conference in Atmos. Chem., 2005
Atmospheric Chemistry Colloquium for Emerging Senior Scientists, 2003
National Defense Science and Engineering Graduate Fellowship, 2000-2002
AGU Journal Highlight, Martin et al., Geophys. Res. Lett., 2000
National Science Foundation Graduate Fellowship, 1997-2000
Tau Beta Pi, 1995
Phi Kappa Phi, 1995

Current & Recent External Activities

Co-Model Scientist for the International GEOS-Chem model 2009-
Associate Editor, Journal of Geophysical Research Atmospheres, 2009-
Associate Editor, Atmospheric Measurement Techniques, 2009-
Scientific Advisory Group Member for GEMS (Korean Geostationary) 2009-
Co-chair Scientific Program Committee IGAC/CACGP Conference, 2009-2010
Space and Atmospheric Environment Advisory Committee to the Canadian
Space Agency, 2008-2010
Science Team Member for the Ozone Monitoring Instrument (OMI) aboard the
Aura satellite, 2006-
Lead Scientist for Canadian Contribution to INTEX-B, 2006-2008
Member of International Global Atmospheric Chemistry Scientific Steering
Committee 2005-2007

Journal Publications

2012

- Anderson, H. R., B. Butland, A. van Donkelaar, M. Brauer, D. P. Strachan, T. Clayton, R. van Dingenen, M. Amann, B. Brunekreef, A. Cohen, F. Dentener, C. Lai, L. N. Lamsal, R. V. Martin, and the ISAAC Phase One and Phase Three study groups, Satellite-based estimates of ambient air pollution and global variation in childhood asthma prevalence, *Environ. Health Perspec.*, doi:10.1289/ehp.1104724, 2012. [\[Link\]](#)
- Cooper, M., R.V. Martin, A. van Donkelaar, L. Lamsal, M. Brauer, and J. Brook, A satellite-based multi-pollutant index of global air quality, *Env. Sci. and Tech.*, 46, 8523-8524. [\[Link\]](#)
- Croft, B., J. R. Pierce, R. V. Martin, C. Hoose, and U. Lohmann, Strong sensitivity of aerosol concentrations to convective wet scavenging parameterizations in a global model, *Atm. Chem. Phys. Discuss.*, submitted, [\[Full Text \(pdf\)\]](#)
- Crouse, D.L., P. A. Peters, A. van Donkelaar, M. S. Goldberg, P. J. Villeneuve, O. Brion, S. Khan, D. O. Atari, M. Jerrett, C. A. Pope III, M. Brauer, J. R. Brook, R. V. Martin, D. Stieb, R. T. Burnett, Risk of Non-accidental and Cardiovascular Mortality in Relation to Long-term Exposure to Low Concentrations of Fine Particulate Matter: A Canadian National-level Cohort Study *Env. Health Persp.*, <http://dx.doi.org/10.1289/ehp.1104049>. [\[Link\]](#)
- Evans, J., A. van Donkelaar, R. V. Martin, R. Burnett, D. G. Rainham, N. J. Birkett, D. Krewski, Estimates of global mortality attributable to particulate air pollution using satellite imagery, *Environ. Res.*, <http://dx.doi.org/10.1016/j.envres.2012.08.005>, 10pp, 2012, [\[Link\]](#)
- Hudman, R.C., N. E. Moore, R. V. Martin, A. R. Russell, A. K. Mebust, L. C. Valin, and R. C. Cohen, A mechanistic model of global soil nitric oxide emissions: implementation and space based-constraints, *Atm. Chem. Phys.*, **12**, 7779-7795, doi:10.5194/acp-12-7779-2012, [\[Link\]](#)

- Hystad, P.W., P.A. Demers, K.C. Johnson, J.R. Brook, A. van Donkelaar, L. Lamsal, R.V. Martin, and M. Brauer, Spatiotemporal air pollution exposure assessment for a Canadian population-based lung cancer case-control study, *Environ. Health*, **11**, 22 doi:10.1186/1476-069X-11-22, 2012, [[Full Text \(PDF\)](#)].
- McLinden, C., A.E. Bourassa, S. Brohede, M. Cooper, D.A. Degenstein, W.J.F. Evans, R.L. Gattinger, C.S. Haley, E.J. Llewellyn, N.D. Lloyd, P. Loewen, R.V. Martin, J.C. McConnell, I.C. McDade, D. Murtagh, C. von Savigny, P.E. Sheese, C.E. Sioris, B. Solheim and K. Strong, OSIRIS: A decade of scattered light, *BAMS*, in press.
- Mitovski, R., I. Folkins, R.V. Martin, and M. Cooper, Testing convective transport on short timescales: Comparisons with mass divergence and ozone anomaly patterns about high rain events, *J. Geophys. Res.*, **117** D02109, doi:10.1029/2011JD016321 [[Full Text \(pdf\)](#)]
- Turner, A., D. K. Henze, R. V. Martin, and A. Hakami, The spatial extent of source influences on modeled column concentrations of short-lived species, *Geophys. Res. Lett.*, **39**, L12806, doi:10.1029/2012GL051832, [[Full Text \(pdf\)](#)].
- van Donkelaar, A., R.V. Martin, A.N. Pasch, J.J. Szykman, L. Zhang, Y. X. Wang, and D. Chen, Improving the accuracy of daily satellite-derived ground-level fine aerosol concentration estimates for North America, *Environ. Sci. & Tech.*, in press.
- Wang, S. W., Zhang, Q., Streets, D. G., He, K. B., Martin, R. V., Lamsal, L. N., Chen, D., Lei, Y., and Lu, Z.: Growth in NO_x emissions from power plants in China: bottom-up estimates and satellite observations, *Atmos. Chem. Phys.*, **12**, 4429-4447, doi:10.5194/acp-12-4429-2012, 2012. [[Full Text \(pdf\)](#)]
- Wiensz, J. T., A.E. Bourassa, N.D. Lloyd, A. Wiacek, R. V. Martin, D. A. Degenstein, Photon conservation in scattering by large ice crystals with the SASKTRAN radiative transfer model, *J. Quant. Spectro. Rad. Trans.*, in press. [[Full text \(pdf\)](#)]
- Zhang, Y. L. Jaegle, A. van Donkelaar, R. V. Martin, C. D. Holmes, H. M. Amos, Q. Wang, R. Talbot, R. Artz, S. Brooks, W. Luke, T. M. Holsen, D. Felton, E. K. Miller, K. D. Perry, D. Schmeltz, A. Steffen, R. Tordon, P. Weiss-Penzias, and R. Zsolway, Nested-grid simulation of mercury over North America, *Atm. Chem. Phys.*, **12**, 6095-6011, doi:10.5194/acp-12-6095-2012, [[Link](#)]

2011

- Brauer, M., M. Amann, R. Burnett, A. Cohen, F. Dentener, M. Ezzati, S. B. Henderson, M. Krzyzanowski, R. Martin, R. Van Dingenen, A. van Donkelaar, and G. D. Thurston, Exposure assessment for estimation of the global burden of disease attributable to outdoor air pollution, *Environ. Sci. Technol.*, doi:10.1021/es2025752 [[webpage link](#)]
- Cooper, M.J., R.V. Martin, B. Sauvage, C.D. Boone, K.A. Walker, P.F. Bernath, C.A. McLinden, D.A. Degenstein, A. Volz-Thomas, and C. Wespes, Evaluation of ACE-FTS and OSIRIS satellite retrievals of ozone and nitric acid in the upper troposphere: Application to ozone production efficiency, *J. Geophys. Res.*, **116**, D12306, doi:10.1029/2010JD015056, 2011. [[Full Text \(pdf\)](#)]

- Hystad, P., E. Setton, A. Cervantes, K. Poplawski, S. Deschenes, M. Brauer, A. van Donkelaar, L. Lamsal, R.V. Martin, M. Jerrett, and P. Demers, Creating National Air Pollution Models for Population Exposure Assessment in Canada, *Environ. Health Perspec.*, **119**, 1123-1129. [[Full Text \(pdf\)](#)]
- Lamsal, L.N., R.V. Martin, A. Padmanabhan, A. van Donkelaar, Q. Zhang, C.E. Sioris, K. Chance, T.P. Kurosu, and M.J. Newchurch, Application of satellite observations for timely updates to global anthropogenic NO_x emission inventories, *Geophys. Res. Lett.*, **38**, L05810, doi:10.1029/2010GL046476. [[Full Text \(pdf\)](#)]
- Lee, C.J., J.R. Brook, G.J. Evans, R.V. Martin, and C. Mihele, Novel application of satellite and in-situ measurements to map surface-level NO₂ in the Great Lakes region, *Atmos. Chem. Phys.*, **11**, 11761-11775, doi:10.5194/acp-11-11761-2011. [[Full Text \(pdf\)](#)]
- Lee, C., R.V. Martin, A. van Donkelaar, H. Lee, R.R. Dickerson, J.C.Hains, N. Krotkov, A. Richter, K. Vinnikov, and J.J. Schwab, SO₂ emissions and lifetimes: Estimates from inverse modeling using in situ and global, space-based (SCIAMACHY and OMI) observations, *J. Geophys. Res.*, **116**, D06304, doi:10.1029/2010JD014758, 2011. [[Full Text \(pdf\)](#)]
- Nowlan, C., X. Liu, K. Chance, Z. Cai, T. Kurosu, C. Lee, and R.V. Martin, Retrievals of sulfur dioxide from the Global Ozone Monitoring Experiment 2 (GOME-2) using an optimal estimation approach: Algorithm and initial validation, *J. Geophys. Res.*, **116**, D18301, doi:10.1029/2011JD015808 [[Full Text \(pdf\)](#)]
- van Donkelaar, A., R. V. Martin, R. C. Levy, A. M. da Silva, M. Krzyzanowski, N. E. Chubarova, E. Semutnikova and A. J. Cohen, Satellite-based estimates of ground-level fine particulate matter during extreme events: A case study of the Moscow fires in 2010, *Atmospheric Environment*, **45** 6225-6232, doi:10.1016/j.atmosenv.2011.07.068, 2011. [[Full Text \(pdf\)](#)]
- Villeneuve, P.J., M.S.G. Goldberg, R.T. Burnett, A. van Donkelaar, H. Chen, and R.V. Martin, Associations between sociodemographic characteristics, cigarette smoking, obesity, and remote sensing derived estimates of ambient PM_{2.5}: results from a Canadian population-based survey, *Occupational and Environmental Medicine*, doi:10.1136/oem.2010.062521, 2011. [[Full Text \(pdf\)](#)]

2010

- Croft, B., U. Lohmann, R.V. Martin, P. Stier, S. Wurzler, J. Feichter, C. Hoose, U. Heikkilä, A. van Donkelaar, and S. Ferrachat, Influences of in-cloud aerosol scavenging parameterizations on aerosol concentrations and wet deposition in ECHAM5-HAM, *Atmos. Chem. Phys.*, **10**, 1511-1543, 2010. [[Full Text \(pdf\)](#)]
- Duncan, B., Y. Yoshida, J. Olson, S. Sillman, C. Retscher, R. V. Martin, L. Lamsal, Y. Hu, K. Pickering, C. Retscher, D. Allen, and J. Crawford, Application of OMI observations to a space-based indicator of NO_x and VOC controls on surface ozone formation, *Atmos. Environ.*, **44**, 2213-2223, 2010. [[Full Text \(pdf\)](#)]
- Lamsal, L. N., R. V. Martin, A. van Donkelaar, E. A. Celarier, E. J. Bucsela, K. F. Boersma, R. Dirksen, C. Luo, and Y. Wang, Indirect validation of tropospheric nitrogen dioxide retrieved from the OMI satellite instrument: insight into the

seasonal variation of nitrogen oxides at northern midlatitudes, *J. Geophys. Res.*, **115**, D05302, doi:10.1029/2009JD013351, 2010. [\[Full Text \(pdf\)\]](#)

- O'Byrne, G., R.V. Martin, A. van Donkelaar, J. Joiner, and E.A. Celarier, Surface reflectivity from OMI using MODIS to eliminate clouds: effects of snow on UV-Vis trace gas retrievals, *J. Geophys. Res.*, **115**, D17305, doi:10.1029/2009JD013079, 2010. [\[Full Text \(pdf\)\]](#)
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- Walker, T.W., R.V. Martin, A. van Donkelaar, W.R. Leaitch, A.M. Macdonald, K. Anlauf, R.C. Cohen, L.G. Huey, M.A. Avery, A.J. Weinheimer, F.M. Flocke, D.W. Tarasick, A.M. Thompson, D.G. Streets, and X. Liu, Trans-Pacific transport of reactive nitrogen and ozone to Canada during spring, *Atmos. Chem. Phys.*, **10**, 8353-8372, 2010. [\[Full Text \(pdf\)\]](#)
- van Donkelaar, A., R. V. Martin, M. Brauer, R. Kahn, R. Levy, C. Verduzco, and P. J. Villeneuve, Global estimates of ambient fine particulate matter concentrations from satellite-based aerosol optical depth: Development and application, *Environ. Health Perspec.*, doi:10.1289/ehp.0901623, 2010. [\[Full Text \(pdf\)\]](#)

2009

- Croft, B., U. Lohmann, R. V. Martin, P. Stier, S. Wurzler, J. Feichter, R. Posselt, and S. Ferrachat, Aerosol Size-Dependent Below-Cloud Scavenging by Rain and Snow in the ECHAM5-HAM, *Atmos. Chem. Phys.*, **9**, 4653-4675, 2009. [\[Full Text \(pdf\)\]](#)
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- Leaitch, W. R., Macdonald, A. M., Anlauf, K. G., Liu, P. S. K., Toom-Sauntry, D., Li, S.-M., Liggio, J., Hayden, K., Wasey, M. A., Russell, L. M., Takahama, S., Liu, S., van Donkelaar, A., Duck, T., Martin, R. V., Zhang, Q., Sun, Y., McKendry, I., Shantz, N. C., and Cubison, M.: Evidence for Asian dust effects from aerosol plume measurements during INTEX-B 2006 near Whistler, BC, *Atmos. Chem. Phys.*, **9**, 3523-3546, 2009. [\[Full Text \(pdf\)\]](#)

- Lee, C., R.V. Martin, A. van Donkelaar, G. O'Byrne, N. Krotkov, A. Richter, G. Huey, and J.S. Holloway, Retrieval of vertical columns of sulfur dioxide from SCIAMACHY and OMI: Air mass factor algorithm development and validation, *J. Geophys. Res.*, **114**, D22303, doi:10.1029/2009JD012123. [\[Full Text \(pdf\)\]](#)
- Sun, Y., Zhang, Q., MacDonald, A. M., Hayden, K., Li, S. M., Liggio, J., Liu, P. S. K., Anlauf, K. G., Leitch, W. R., Cubison, M., Worsnop, D., van Donkelaar, A., and Martin, R. V.: Size-resolved aerosol chemistry on Whistler Mountain, Canada with a High-Resolution Aerosol Mass Spectrometer during INTEX-B, *Atmos. Chem. Phys.*, **9**, 3095-3111, 2009. [\[Full Text \(pdf\)\]](#)
- Wespes, C., D. Hurtmans, C. Clerbaux, M.L. Santee, R.V. Martin, and P.F. Coheur, Global distributions of nitric acid from IASI/MetOP measurements, *Atmos. Chem. Phys.*, **9**, 7949-7962, 2009. [\[Full Text \(pdf\)\]](#).

2008

- Barkley, M. P., P. I. Palmer, U. Kuhn, J. Kesselmeier, K. Chance, T. P. Kurosu, R. V. Martin, D. Helmig, and A. Guenther, Net ecosystem fluxes of isoprene over tropical South America inferred from GOME observations of HCHO columns, *J. Geophys. Res.*, **113**, D20304, doi:10.1029/2008JD009863, 2008. [\[Full Text \(pdf\)\]](#)
- Choi, Y., Y. Wang, T. Zeng, D. Cunnold, E.-S. Yang, R. Martin, K. Chance, V. Thouret, and E. Edgerton, Springtime transitions of NO₂, CO, and O₃ over North America: Model evaluation and analysis, *J. Geophys. Res.*, **113**, D20311, doi:10.1029/2007JD009632, 2008. [\[Full Text \(pdf\)\]](#)
- Fishman, J., K.W. Bowman, J.P. Burrows, A. Richter, K.V. Chance, D.P. Edwards, R.V. Martin, G.A. Morris, R.B. Pierce, J.R. Ziemke, J.A. Al-Saadi, T.K. Schaack, and A.M. Thompson, Remote sensing of tropospheric pollution from space, *Bull. Am. Meteorol. Soc.*, **89**(6), 805-821, 2008. [\[Full Text \(pdf\)\]](#) [\[Cover Image\]](#)
- Kaynak, B., Y. Hu, R.V. Martin, A.G. Russell, Y. Choi, and Y. Wang, The effect of lightning NO_x production on surface ozone in the continental United States, *Atmos. Chem. Phys.*, **8**, 5151-5159, 2008. [\[Full Text \(pdf\)\]](#)
- Kim, J. H., S. Na, R. V. Martin, K. H. Seo, M. J. Newchurch, Singular value decomposition analysis of tropical tropospheric ozone columns determined from TOMS, *Geophys. Res. Lett.*, **35**, L15816, doi:10.1029/2008GL033690, 2008. [\[Full Text \(pdf\)\]](#)
- Lamsal, L.N., R.V. Martin, A. van Donkelaar, M. Steinbacher, E.A. Celarier, E. Bucsela, E.J. Dunlea, and J. Pinto, Ground-level nitrogen dioxide concentrations inferred from the satellite-borne Ozone Monitoring Instrument, *J. Geophys. Res.*, **113**, D16308, doi:10.1029/2007JD009235, 2008. [\[Full Text \(pdf\)\]](#)
- Martin, R.V., Satellite remote sensing of surface air quality, *Atmos. Environ.*, **42**, 7823-7843, 2008. [\[Full Text \(pdf\)\]](#)
- McKendry, I.G., A.M. Macdonald, W.R. Leitch, A. van Donkelaar, Q. Zhang, T.J. Duck, and R.V. Martin, Trans-Pacific dust events observed at Whistler, British Columbia during INTEX-B, *Atmos. Chem. Phys.*, **8**, 6297-6307, 2008. [\[Full Text \(pdf\)\]](#)

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- van Donkelaar, A., R.V. Martin, W.R. Leitch, A.M. Macdonald, T.W. Walker, D.G. Streets, Q. Zhang, E. Dunlea, J.L. Jiminez, J.E. Dibb, G. Huey, R. Weber, and M.O. Andreae, Analysis of aircraft and satellite measurements from the Intercontinental Chemical Transport Experiment (INTEX-B) to quantify long-range transport of East Asian sulfur to Canada, *Atmos. Chem. Phys.*, **8**, 2999-3014, 2008. [[Full Text \(pdf\)](#)]

2007

- Hu, R.-M., R.V. Martin, and T.D. Fairlie, Global retrieval of columnar aerosol single scattering albedo from space-based observations, *J. Geophys. Res.*, **112**, D02204, 10.1029/2005JD006832, 2007. [[Full Text \(pdf\)](#)]
- Martin, R.V., B. Sauvage, I. Folkins, C.E. Sioris, C. Boone, P. Bernath, and J.R. Ziemke, Space-based constraints on the production of nitric oxide by lightning, *J. Geophys. Res.*, **112**, D09309, doi:10.1029/2006JD007831, 2007. [[Full Text \(pdf\)](#)]
- Pierce, R.B., T.K. Schaack, J. Al-Saadi, T.D. Fairlie, C. Kittaka, G. Lingenfelter, M. Natarajan, J. Olson, A. Soja, T.H. Zapotocny, A. Lenzen, J. Stobie, D.R. Johnson, M. Avery, G. Sachse, A. Thompson, R. Cohen, J. Dibb, J. Crawford, D. Rault, R.V. Martin, J. Szykman, and J. Fishman, Chemical data assimilation estimates of continental US ozone and nitrogen budgets during INTEX-A, *J. Geophys. Res.*, **112**, D12S21, doi:10.1029/2006JD007722, 2007. [[Full Text \(pdf\)](#)]
- Sauvage, B., R.V. Martin, A. van Donkelaar, X. Liu, K. Chance, L. Jaegle, P.I. Palmer, S. Wu, and T.-M. Fu, Remote sensed and in situ constraints on processes affecting tropical tropospheric ozone, *ACP*, **7**, 815-838, 2007. [[Full Text \(pdf\)](#)]
- Sauvage, B., R.V. Martin, A. van Donkelaar, and J.R. Ziemke, Quantification of the factors controlling tropical tropospheric ozone and the South Atlantic maximum, *J. Geophys. Res.*, **112**, D09309, doi:10.1029/2006JD007831, 2007. [[Full Text \(pdf\)](#)].
- Sioris, C. E., C. A. McLinden, R. V. Martin, B. Sauvage, C. S. Haley, N. D. Lloyd, E. J. Llewellyn, P. F. Bernath, C. D. Boone, S. Brohede, and C. T. McElroy, Vertical profiles of lightning-produced NO₂ enhancements in the upper troposphere observed by OSIRIS, *Atmos. Chem. Phys.*, **7**, 4281-4294, 2007. [[Full Text \(pdf\)](#)].
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observations: Implications for combustion and microbial sources, *J. Geophys. Res.*, **112**, D06301, doi:10.1029/2006JD007538. [[Full Text \(pdf\)](#)]

2006

- Folkins, I., P. Bernath, C. Boone, A. Eldering, G. Lesins, R.V. Martin, B.-M. Sinnhuber, and K. Walker, Testing convective parameterizations with tropical measurements of HNO₃, CO, H₂O, and O₃: implications for the water vapor budget, *J. Geophys. Res.*, **111**, D23304, doi:10.1029/2006JD007325. [[Full Text \(pdf\)](#)]
- Guerova, G., I. Bey, J.-L. Attie, R.V. Martin, J. Cui, and M. Sprenger, Impact of transatlantic transport episodes on summertime ozone in Europe, *ACP*, **6**, 2057-2072, 2006. [[Full Text \(pdf\)](#)]
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2005

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