

Anthony J. Wimmers – Curriculum Vitae

Updated January, 2019

Position: Associate Scientist, Cooperative Institute for Meteorological Satellite Studies (CIMSS), University of Wisconsin – Madison

Contact: wimmers[---]ssec.wisc.edu

Education

B.S. Physics, 1996, University of Dayton, Summa Cum Laude, Honors Program

M.S. Environmental Science, 2000, University of Virginia

Master's Thesis: "Remotely-sensed extratropical specific humidity in the mid- to upper-troposphere"

Ph.D. Environmental Science, 2003, University of Virginia

Dissertation: "Satellite-based location of tropopause folding signatures along air mass boundaries"

Honors & Awards

President's Scholarship, University of Dayton, 1992-1996

Omicron Delta Kappa National Leadership Honor Society, 1996

Sigma Pi Sigma Senior Physics Award, University of Dayton, 1996

President's Fellowship, University of Virginia, 1997-2000

Atmospheric Sciences Graduate Student Award, University of Virginia, 1999

Best Student Poster Award, American Meteorological Society Conference, 1999

DuPont Fellowship, University of Virginia, 1998-2000, 2001-2002

Moore Fellowship, University of Virginia, 2000-2001

Governor's Fellowship, University of Virginia, 2002-2003

Maury Prize (Highest departmental award for graduate students), 2003

NASA Group Achievement Award for Earth Sciences Applications, 2004

NASA Paul F. Holloway Technology Transfer Award, 2007

American Meteorological Society Special Award to the CIMSS Tropical Cyclone Group, 2014

Publications

Moody, J.L., A. J. Wimmers, and J.C. Davenport, Remotely sensed specific humidity: Development of a derived product from the GOES Imager Channel 3, *Geophysical Research Letters*, 26 (1), 59-62, 1999.

Wimmers, A. J., and J.L. Moody, A fixed-layer estimation of upper tropospheric specific humidity from the GOES water vapor channel: Parameterization and validation of the altered brightness temperature product, *Journal of Geophysical Research-Atmospheres*, 106 (D15), 17115-17132, 2001.

- Wang, Y., C. Shim, N. Blake, D. Blake, Y. Choi, B. Ridley, J. Dibb, A. Wimmers, J. Moody, F. Flocke, A. Weinheimer, R. Talbot, and E. Atlas, Intercontinental transport of pollution manifested in the variability and seasonal trend of springtime O₃ at northern mid and high latitudes, *Journal of Geophysical Research – Atmospheres*, 108, art. no. 4683, 2003.
- Snow, J.A., B.G. Heikes, J.T. Merrill, A. Fried, B.P. Wert, A. J. Wimmers, J.L. Moody, B. Ridley, J. Walega, and C. Cantrell, Winter-spring evolution and variability of HO_x reservoir species, hydrogen peroxide, methyl hydroperoxide in the northern mid- to high-latitudes, *Journal of Geophysical Research - Atmospheres*, 108, art. no. 8362, 2003.
- Ridley, B. et al., Ozone depletion events observed in the high latitude surface layer during the TOPSE aircraft program, *Journal of Geophysical Research – Atmospheres*, 108, art. no. 8356, 2003.
- Wimmers, A. J., J.L. Moody, E.V. Browell, J.W. Hair, W.B. Grant, C.F. Butler, M.A. Fenn, C.C. Schmidt, J. Li, and B.A. Ridley, Signatures of tropopause folding in satellite imagery, *Journal of Geophysical Research - Atmospheres*, 109, art. no. 8360, 2003.
- Browell, E.V. et al., Ozone, aerosol, potential vorticity, and trace gas trends observed at high-latitudes over North America from February to May 2000, *Journal of Geophysical Research – Atmospheres*, 108, art. no. 8369, 2003.
- Wimmers, A. J. and J. L. Moody, Tropopause folding at satellite-observed spatial gradients: 1. Verification of an empirical relationship, *Journal of Geophysical Research – Atmospheres*, 109, art. no. D19306, 2004.
- Wimmers, A. J. and J. L. Moody, Tropopause folding at satellite-observed spatial gradients: 2. Development of an empirical model, *Journal of Geophysical Research – Atmospheres*, 109, art. no. D19307, 2004.
- Cooper, O., C. Forster, D. Parrish, E. Dunlea, G. Hubler, F. Fehsenfeld, J. Holloway, S. Oltmans, B. Johnson, A. Wimmers and L. Horowitz, On the life cycle of a stratospheric intrusion and its dispersion into polluted warm conveyor belts, *Journal of Geophysical Research – Atmospheres*, 109, art. no. D23S09, 2004.
- Mecikalski, J.R. W. F. Feltz, J. J. Murray, D. B. Johnson, K. M. Bedka, S. T. Bedka, M. J. Pavolonis, A. J. Wimmers, T. A. Berendes and E. R. Williams, Aviation applications for satellite-based observations of cloud properties, convection initiation, in-flight icing, turbulence, and volcanic ash, *Bulletin of the American Meteorological Society*, 88, 1589-1607, 2007.
- Wimmers, A. J. and C. S. Velden, ‘MIMIC’: A new approach to visualizing satellite microwave imagery of tropical cyclones, *Bulletin of the American Meteorological Society*, 88, 1187-1196, 2007.
- Hoff, R., H. Zhang, N. Jordan, A. Prados, J. Engle-Cox, A. Huff, Amy, S. Weber, E. Zell, S. Kondragunta, J. Szykmna, B. Johns, F. Dimmick, A. Wimmers, J. Al-Saadi and C. Kittaka. Applications of the three-dimensional air quality system to western US air quality: IDEA, Smog Blog, Smog Stories, AirQuest, and the Remote Sensing Information Gateway, *Journal of the Air and Waste Management Association*, 59, 980-989, 2008.

- Wimmers, A. J. and C. S. Velden, Objectively determining the rotational center of tropical cyclones in passive microwave satellite imagery, *J. Appl. Meteor.*, 49, 2013–2034, 2010.
- Felker, S. R., Moody, J.L., Wimmers, A.J., Osterman, G., Bowman, K., A : Multi-sensor Upper Tropospheric Ozone Product (MUTOP) based on TES Ozone and GOES Water Vapor: Derivation, *Atmos. Chem. Phys.* , 11, 6515-6527, 2011.
- Wimmers, A. J. and C. S. Velden, Seamless advective blending of total precipitable water retrievals from polar orbiting satellites, *J. Appl. Meteor.*, 50, 1024-1036, 2011.
- Moody, J. L., S. R. Felker, A. J. Wimmers, G. Osterman, K. Bowman, A. M. Thompson and D. W. Tarasick, A multi-sensor upper tropospheric ozone product (MUTOP) based on TES ozone and GOES water vapor: Validation with ozonesondes, *Atmos. Chem. Phys.*, 11, 6515-6527, 2011.
- Rozoff, C., C. S. Velden, J. Kaplan, J. Kossin, A. Wimmers, Improvements in the probabilistic prediction of tropical cyclone rapid intensification with passive microwave observations, *Wea. Forecast.*, 30, 1016-1038, 2015.
- Wimmers, A. J. and C. S. Velden, Advancements in objective multisatellite tropical cyclone center-fixing, *J. Appl. Meteor.*, 55, 197-212, 2016.
- Wimmers, A. J., S. Griffin, J. Gerth, S. Bachmeier and S. Lindstrom, Observation of gravity waves with high-pass filtering in the new generation of geostationary images and their relation to aircraft turbulence, *Wea. Forecast.*, 30, 1016-1038.
- Mapes, B. E., E. S. Chung, W. M. Hannah, H. Masunaga, A. J. Wimmers, C. S. Velden, 2018: The Meandering margin of the meteorological moist tropics, *Geophys. Res. Lett.*, 45, 1177-1184.
- Knapp, K. R., C. S. Velden, A. J. Wimmers, 2018: A global climatology of tropical cyclone eyes, *Mon. Wea. Rev.*, 146, 20189-2101.
- Wimmers, A. J., C. S. Velden, J. H. Cossuth, 2018: Using deep learning to estimate tropical cyclone intensity from microwave satellite imagery, accepted with revisions to *Monthly Weather Review*.

Invited Presentations

- Enhancing satellite imagery through "morphing" transitions - AMS 13th Conference on Satellite Meteorology and Oceanography, 2004.
- Are hurricanes getting stronger? Predicting hurricane responses to climate change - Mann Chair and Department of Physics lecture at the University of Dayton, 2006.
- Techniques of morphological image interpolation and some possible applications to satellite data assimilation – Canadian Meteorological Centre, Montreal, 2007.
- Analyzing hurricanes and their environments with “morphed” satellite imagery – University of South Carolina, Columbia, 2008.
- Identifying hazardous turbulence within satellite image signatures – Boeing Corporation, Seattle, 2012.
- Morphological compositing of satellite imagery – Invited lecture at Climate Corporation, San Francisco, 2014.
- Advances in morphological compositing of polar-orbiting satellite imagery – Naval Research Laboratory, Monterey, 2016.

Reintroducing the MIMIC-TPW global composite of water vapor from polar-orbiting satellites, NOAA Center for Weather and Climate Prediction, 2017

Selected Conference Presentations

- Wimmers, A. J., and J.L. Moody, Remotely sensed specific humidity: Development of a derived product from the GOES imager channel 3, in Proceedings AMS Third Symposium on Integrated Observing Systems, 1999.
- Wimmers, A. J. and C. S. Velden, Satellite-based center-fixing of tropical cyclones: new automated approaches, AMS 26th Conference on Hurricanes and Tropical Meteorology, 2004.
- Wimmers, A. J., C. Schmidt, W. Feltz, and J. R. Mecikalski, Satellite Applications for Detection of Atmospheric Turbulence Related to Tropopause Folding, AMS 11th Conference on Aviation, Range, and Aerospace, 2004.
- Wimmers, A. J. and W. Feltz, Estimating regions of tropopause folding and clear-air turbulence with the GOES water vapor channel, World Research Symposium on Nowcasting and Very Short Range Forecasting, 2005.
- Wimmers, A. J. and W. Feltz, Observing clear air turbulence indirectly in satellite imagery, AMS 12th Conference on Aviation Range and Aerospace Meteorology, 2006.
- Wimmers, A. J. and C. S. Velden, 'MIMIC' morphed microwave animations: 2005 tropical cyclones and new displays, 60th Interdepartmental Hurricane Conference, 2006.
- Wimmers, A. J. and C. S. Velden, 'MIMIC': Real-time, morphed microwave animations of tropical cyclones, Joint 2007 EUMETSAT Meteorological Satellite Conference and the 15th Satellite Meteorology & Oceanography Conference of the American Meteorological Society, 2007.
- Wimmers A. J., T. Rink, T., S. Ackerman, S. Bachmeier, R. Hoff, J. Engel-Cox, Visualizing a new generation of remotely-sensed aerosol observations in three dimensions, National Air Quality Conferences: Air Quality Forecasting, Mapping, and Monitoring; and Communicating Air Quality and Communities in Motion, 2007.
- Wimmers, A. J. and C. S. Velden, MIMIC-TPW: Real-time, hourly total precipitable water imagery over the oceans from advective blending of polar-orbiting microwave satellite retrievals, World Meteorological Organization Symposium on Nowcasting and Very Short Range Forecasting, 2009.
- Wimmers, A. J. and C. S. Velden, Tropical cyclone center-fixing in microwave and infrared imagery, AMS 29th Conference on Hurricanes and Tropical Meteorology, 2010.
- Wimmers, A. J. and C. S. Velden, MIMIC-TPW: Seamless advective blending of total precipitable water retrievals from polar orbiting satellites, AMS 17th Conference on Satellite Meteorology and Oceanography, 2010.
- Wimmers, A. J. and C. S. Velden, MIMIC-TPW: Hurricane center-fixing with the Automated Rotational Center Hurricane Retrieval (ARCHER) Method, 65th Interdepartmental Hurricane Conference, 2011.

- Wimmers, A. J. and C. S. Velden, Objective, satellite-based tropical cyclone center-fixing, International Workshop on Satellite Analysis of Tropical Cyclones, 2011.
- Wimmers, A. J. and W. Feltz, Identifying hazardous turbulence within satellite mountain wave signatures, EUMETSAT Meteorological Satellite Conference, 2011.
- Wimmers, A. J. and C. S. Velden, Advances in objective tropical cyclone center fixing using multispectral satellite imagery, AMS 31st Conference on Hurricanes and Tropical Meteorology, 2012.
- Wimmers, A. J. and W. Feltz, Satellite identification of gravity waves and the problem of transverse banding, EUMETSAT Meteorological Satellite Conference, 2013.
- Wimmers, A. J. and C. Velden, A quantitative method for validating tropical cyclone model forecasts using satellite microwave observations, AMS 33rd Conference on Hurricanes and Tropical Meteorology, 2014.
- Wimmers, A. J. and A. Heidinger, The morphological composite product of cloud properties for Alaska, American Geophysical Union Annual Meeting, 2014.
- Wimmers, A. J. and C. Velden, Upgrades to the ARCHER TC center-fixing scheme and real-time applications, AMS 35rd Conference on Hurricanes and Tropical Meteorology, 2016.
- Wimmers, A. J., S. Griffin, J. Gerth, S. Bachmeier, S. Lindstrom and W. Feltz, Resolving “hidden gravity waves” with Himawari-8 imagery and its application to aircraft-scale turbulence, EUMETSAT Meteorological Satellite Conference, 2017.

Developed satellite products in transition to operations

- ‘MIMIC’ (Morphed, Integrated Microwave Imagery at CIMSS) – *Visualization of ice scattering and deep convection in tropical cyclones*, <http://goo.gl/qA1Jap>.
- ‘MIMIC-TPW’ (MIMIC – Total Precipitable Water) – *A global depiction of lower-tropospheric water vapor for island and coastal severe weather forecasting*, <http://goo.gl/JVmhfN>.
- ‘IDEA’ (Infusing satellite Data into Environmental Applications) – *Trajectory forecasting of PM_{2.5} aerosol over the United States*, <http://goo.gl/uR0lrX>.
- ‘ARCHER’ (Automated Rotational Center Hurricane Eye Retrieval) – *Statistical retrieval of tropical cyclone center of rotation, to aid hurricane forecasting*, <http://goo.gl/nH9JHH>.
- ‘ARCHER-ERC’ (ARCHER-Eyewall Replacement Cycle) – *Statistical prediction and visualization of hurricane eyewall replacement cycles*, <https://goo.gl/RnGCTX>.
- ‘TFTP’ (Tropopause Folding Turbulence Prediction) – Forecasting aid for aircraft turbulence, viewable at <http://goo.gl/tzGIRz>.
- ‘Pacific high-pass filtering gravity wave visualization’ – Visualization of turbulence-generating gravity waves from the Advanced Himawari Imager, <https://goo.gl/i57v5Z>.

Academic Positions

- Teaching Assistant, Department of Physics, University of Dayton, 1994-1995
- Undergraduate Research Assistant, Department of Physics, University of Dayton, 1994

Undergraduate Research Assistant, NASA Goddard Space Flight Center Summer Institute, 1995
Teaching Assistant, Department of Environmental Science, University of Virginia, 1997-1998
Research Assistant, Department of Environmental Science, University of Virginia, 1998-2003
Postdoctoral Researcher, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 2003-2004
Assistant Researcher, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 2004-2007
Associate Researcher, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 2007-2011
Researcher, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 2011-2014
Assistant Scientist, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 2015-2017
Associate Scientist, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin-Madison, 2017-present

Professional Service

Student mentor, NSF PROPHET research program, 2000 & 2001
Founder and Chair, Matlab Forum, University of Virginia, 2002
Guest lecturer in CIMSS-sponsored high school outreach programs, 2005-2006
Member of the City of Madison Air Quality Committee, 2006
Expert witness in Hurricane Katrina insurance claim cases in Mississippi and Louisiana (reconstructing storm history and damage), 2006-2007
Member of promotion committee at the Joint Center for Earth Systems Technology, University of Maryland – Baltimore County, 2010
Student mentor for UW AOSS Senior year research project, 2015
Member of Expert Advisory Panel to City of Calgary Flood Response Task Force, 2014
Member of Calgary community flood resiliency committee, 2015-2017

Reviewer, Journal of Geophysical Research, 2004
Reviewer, Weather and Forecasting, 2007
Reviewer, Journal of Atmospheric and Oceanic Technology, 2009, 2012, 2014(x3)
Reviewer, Atmospheric Research, 2010
Reviewer, Bulletin of the American Meteorological Society, 2010
Reviewer, IEEE Transactions on Geoscience and Remote Sensing, 2012
Reviewer, National Weather Association Journal of Operational Meteorology, 2013
Reviewer, Quarterly Journal of the Royal Meteorological Society, 2014
Reviewer, Advances in Space Research, 2015
Reviewer, Remote Sensing, 2016
Reviewer, Journal of Applied Meteorology and Climatology, 2002, 2015(x2), 2017

Research Projects

North Atlantic Regional Experiment (NARE), sponsored by NSF, 1997-1999
NOAA-NESDIS Research Grant to develop and apply the GOES Layer-Average Specific Humidity product 1999-2002
Program for Research on Oxidants: Photochemistry, Emissions and Transport (PROPHET), sponsored by NSF, 2000-2001
Tropospheric Ozone Production about the Spring Equinox (TOPSE), sponsored by NSF, 2000-2003
Naval Research Advanced Satellite Applications 2003-present (Co-Investigator from 2010-present)
NOAA Satellite-derived winds research, 2003-2004
Co-Principal Investigator for NOAA GOES-R Risk Reduction, Turbulence products, 2004-2005, 2007-2012
Program Manager for Infusing Data into Environmental Applications (IDEA) sponsored by NASA, NOAA and the EPA, 2004-2006
Program Manager for Three-Dimensional Air Quality System (3D-AQS) to integrate satellite air quality observations and ground-based lidar into a real-time public awareness service, 2006-2007
Co-Investigator for the Graphical Turbulence Guidance project, sponsored by NASA, 2009-2011
Principal Investigator for “Enhanced Downslope Windstorm Prediction with GOES Warning Indicators,” sponsored by NOAA, 2012-2014
Principal Investigator for “Integration of an Objective, Automated TC Center-fixing Algorithm Based on Multispectral Satellite Imagery into NHC/TAFB Operations,” sponsored by the Joint Hurricane Testbed, NOAA, 2013-2015
Principal Investigator for “Cloud Product Updates for NCEP and NWS-Alaska,” sponsored by NOAA, 2013-2015
Principal Investigator for “Improved Eyewall Replacement Cycle Forecasting Using a Modified Microwave-Based Algorithm (ARCHER),” sponsored by the Joint Hurricane Testbed, NOAA, 2015-2017
Principal Investigator for “Strengthening TPW Visualization in the OCONUS Domain with JPSS Data Products”, sponsored by JPSS Risk Reduction Program, 2015-2018
Principal Investigator for “Evaluation of Turbulence-Detection Methods on the ABI and AHI”, sponsored by NOAA GOES-R Risk Reduction, Turbulence Products, 2016-2018
Principal Investigator for “Merged water vapor products for forecasters using advanced visualization methods”, sponsored by JPSS Risk Reduction Program, 2018-2020
Principal Investigator for “Real-time acquisition, processing, analysis, and operational integration of TC-centric polar orbiting data. Part II: Serving forecasters with advanced satellite-based TC center-fixing and intensity estimation”, sponsored by JPSS Risk Reduction Program, 2018-2020

Other Service

Volunteer program auditor for the Society of Mary Women’s Promotion Project in Nairobi, Kenya, 1996

Marianist Volunteer and Administrative Assistant at the East Side Catholic Shelter in
Cleveland, Ohio, 1996-1997