

Nicholas Pedatella
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EDUCATION

University of Colorado, Boulder CO 2007 - 2011
Ph.D. in Aerospace Engineering Sciences
The Pennsylvania State University, University Park, PA 2003 - 2007
Bachelor of Science with Honors in Aerospace Engineering

PROFESSIONAL EXPERIENCE

Scientist VI*, 2024 – present
High Altitude Observatory, National Center for Atmospheric Research
Scientist II, 2019 – 2024
High Altitude Observatory, National Center for Atmospheric Research
Scientist I, 2016 – 2019
High Altitude Observatory, National Center for Atmospheric Research
Project Scientist I, September 2013 – 2016
COSMIC Program Office, University Corporation for Atmospheric Research
Advanced Study Program Postdoctoral Fellow, September 2011 – September 2013
High Altitude Observatory, National Center for Atmospheric Research
Postdoctoral Researcher, June 2011 – August 2011
University of Colorado at Boulder, Dept. of Aerospace Engineering Sciences
Graduate Research Assistant, June 2007 – May 2011
University of Colorado at Boulder, Dept. of Aerospace Engineering Sciences

SUMMARY OF RESEARCH EXPERIENCE

Atmosphere Vertical Coupling: Led scientific investigations into the physical processes of vertical coupling in the atmosphere-ionosphere system, including the roles of gravity waves, planetary waves, and tides in driving ionosphere variability. This research is performed using numerical model simulations and observational data analysis. Made important research contributions on the role of the stratosphere polar vortex on ionosphere-thermosphere variability as well as the interaction between terrestrial and space weather.

Whole Atmosphere Data Assimilation: Led the development of the data assimilation capability in WACCM and WACCM-X using the Data Assimilation Research Testbed (DART) ensemble Kalman filter. Implemented and tested observation forward operators for the assimilation of middle and upper atmosphere observations. Performed Observing System Experiments and Observing System Simulation Experiments to assess the impact of assimilating new observations on analysis and short-term forecasts.

Space-based GNSS Observations: Developed, implemented, and tested new techniques for space-based GPS and GLONASS absolute TEC observations. Techniques are currently used in the operational data processing for the FORMOSAT-7/COSMIC-2 observations.

*Formerly Scientist III; changed to Scientist VI due to organizational scientific appointment restructuring in 2025

HONORS AND AWARDS

Outstanding Reviewer for AGU Space Weather journal, 2023
UCAR Award for Scientific and Technical Advancement, 2020
UCAR Award for Scientific and Technical Advancement, 2016
Distinguished Young Scientist Award, Scientific Committee on Solar-Terrestrial Physics, 2016

SELECTED PUBLICATIONS

- Pedatella, N. M. (2022), Scientific motivations and future directions of whole atmosphere modeling, *Front. Astron. Space Sci.*, doi:10.3389/fspas.2022.957007.
- Pedatella, N. M., and V. L. Harvey (2022), Impact of Strong and Weak Stratospheric Polar Vortices on the Mesosphere and Lower Thermosphere, *Geophys. Res. Lett.*, 49, e2022GL098877, doi:10.1029/2022GL098877.
- Goncharenko, L. P., V. L. Harvey, H. Liu, and N. M. Pedatella (2021), Sudden Stratospheric Warming Impacts on the Ionosphere-Thermosphere System, in *Ionosphere Dynamics and Applications* (eds. C. Huang, G. Lu, Y. Zhang and L.J. Paxton), doi:10.1002/9781119815617.ch16.
- Pedatella N. M., H.-L. Liu, D. R. Marsh, K. Raeder, J. L. Anderson, J. L. Chau, L. P. Goncharenko, and T. Siddiqui (2018), Analysis and Hindcast Experiments of the 2009 Sudden Stratospheric Warming in WACCMX+DART, *J. Geophys. Res.*, 123, doi:10.1002/2017JA025107.
- Pedatella, N. M., J. L. Chau, H. Schmidt, L. P. Goncharenko, C. Stolle, K. Hocke, V. L. Harvey, B. Funke, and T. A. Siddiqui (2018), How Sudden Stratospheric Warming Affects the Whole Atmosphere, *EOS*, 99, doi:10.1029/2018EO092441.
- Pedatella, N. M. (2016), Impact of the lower atmosphere on the ionosphere response to a geomagnetic superstorm, *Geophys. Res. Lett.*, 43, doi:10.1002/2016GL070592.
- Pedatella, N. M., A. D. Richmond, A. Maute, and H.-L. Liu (2016), Impact of semidiurnal tidal variability during SSWs on the mean state of the ionosphere and thermosphere, *J. Geophys. Res. Space Physics*, 121, 8077-8088, doi:10.1002/2016JA022910.
- Pedatella, N. M., T. Fuller-Rowell, H. Wang, H. Jin, Y. Miyoshi, H. Fujiwara, H. Shinagawa, H.-L. Liu, F. Sassi, H. Schmidt, and L. Goncharenko (2014), The neutral dynamics during the 2009 sudden stratosphere warming simulated by different whole atmosphere models, *J. Geophys. Res.*, 119, 1306-1324, doi:10.1002/2013JA019421.
- Pedatella, N. M., H.-L. Liu, F. Sassi, J. Lei, J. L. Chau, and X. Zhang (2014), Ionosphere variability during the 2009 SSW: Influence of the lunar semidiurnal tide and mechanisms producing electron density variability, *J. Geophys. Res.*, 119, 3828-3843, doi:10.1022/2014JA019849. (EOS Research Spotlight on June 17, 2014)
- Pedatella, N. M., K. Raeder, J. L. Anderson, and H.-L. Liu (2014), Ensemble Data Assimilation in the Whole Atmosphere Community Climate Model, *J. Geophys. Res.*, 119, 9793-9809, doi:10.1002/2014JD021776.
- Pedatella, N. M., and H.-L. Liu (2013), The influence of atmospheric tide and planetary wave variability during sudden stratosphere warnings on the low latitude ionosphere, *J. Geophys. Res.*, 118, doi:10.1002/jgra.50492.

PROFESSIONAL SOCIETY MEMBERSHIPS

Member, American Geophysical Union, 2008-present.