Kristopher M. Bedka

Affiliation: Research Physical Scientist, NASA Langley Research Center (LaRC)
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Education and Employment

08/1996-05/2000 Northern Illinois University, B.S. in Meteorology (Magna Cum Laude)
09/2000-08/2002 University of Wisconsin-Madison, M.S. in Atmospheric Science
09/2002-07/2009 Associate Researcher, University of Wisconsin-Madison, Cooperative Institute for Meteorological Satellite Studies
08/2009-05/2014 Senior Research Scientist, Science Systems and Applications, Inc. (SSAI) at the NASA Langley Research Center
05/2014-PresentResearch Physical Scientist, NASA Langley Research Center

Research and Professional Experience

Mr. Bedka has spent most of his professional career analyzing atmospheric processes and prediction using satellite-, airborne-, and ground-based observations and models. Throughout his career, he has focused on: 1) development, validation, and application of automated satellite-based convective initiation nowcasting, atmospheric motion vector retrieval, ice crystal aircraft icing, overshooting convective cloud top detection, and above anvil plume / enhanced-V signature detection algorithms, 2) development of satellite-based climatologies of hazardous convective storms, 3) cloud microphysical property retrievals using visible light and passive infrared observations, 4) use of airborne lidar wind, aerosol, and water vapor profiling instruments for atmospheric research and satellite instrument calibration and validation, and 5) convectively-induced tropospheric/stratospheric exchange studies. He has authored or co-authored 50+ peer-reviewed publications on these and other topics, and has a Google Scholar h-index of 29 with over 2500 citations of his papers. He has been or is currently the PI for several NASA ROSES projects within the 2015 Severe Weather Research, 2016 NASA Data for Operations and Assessment, 2018 Applied Sciences Disasters, and the 2019 Earth Science Research From Operational Geostationary Satellite Systems programs. He is a Co-I for the NASA Earth Venture-Suborbital Dynamics and Chemistry of the Summer Stratosphere (DCOTSS) mission. He is currently the instrument scientist for the NASA Doppler Aerosol Wind Lidar (DAWN) and was a PI for the April 2019 NASA Aeolus Cal/Val Test Flight Campaign with the DC-8 aircraft. His work has incorporated cloud-resolving numerical weather prediction model output, passive satellite observations from the global constellation of geosynchronous and polar-orbiting passive satellite imagers, CloudSat, CALIPSO, airborne observations from DAWN, High Altitude Lidar Observatory (HALO), dropsondes, and in-situ probes, NOAA National Weather Service WSR-88D Doppler radar data, and 4-dimensional total lightning detection data.

Awards

NASA Group Achievement Awards to the Advanced Satellite Aviation Weather Products (ASAP) Initiative (2006), MACPEX Field Campaign (2012), Aviation Climate Change Research Initiative (2014), the CERES Cloud Property Retrieval Subsystem (2014), the Mount Kelud Volcanic Ash Measurement Mission (2017), NASA HIWC (2019), BATAL project (2019), and NAAMES (2019) teams.

NASA Exceptional Achievement Medal (2018) for satellite-based analysis and detection of hazardous convection, and the H.J.E. Reid Award (2019), given for the most outstanding publication of the year from NASA LaRC.

Selected Peer-Reviewed Publications

Apke, J. M., Mecikalski, J. R., **Bedka, K. M.**, McCaul, E. W., Jr., Homeyer, C. R., & Jewett, C. P., 2018: Relationships between Deep Convection Updraft Characteristics and Satellite-Based Super Rapid Scan Mesoscale Atmospheric Motion Vector–Derived Flow, *Monthly Weather Review*, *146*(10), 3461-3480.

Bedka, K. M., and Mecikalski, J. R., 2005: Application of Satellite-Derived Atmospheric Motion Vectors for Estimating Mesoscale Flows, *Journal of Applied Meteorology*, *44*(11), 1761-1772

Bedka, K. M., Velden, C. S., Petersen, R. A., Feltz, W. F., & Mecikalski, J. R., 2009: Comparisons of Satellite-Derived Atmospheric Motion Vectors, Rawinsondes, and NOAA Wind Profiler Observations, *Journal of Applied Meteorology and Climatology*, *48*(8), 1542-1561

Bedka, K. M., J. Brunner, R. Dworak, W. Feltz, J. Otkin, and T. Greenwald, 2010: Objective satellite-based overshooting top detection using infrared window channel brightness temperature gradients. *J. Appl. Meteor. And Climatol.*, **49**, 181-202.

Bedka, K. M., 2011: Overshooting cloud top detections using MSG SEVIRI infrared brightness temperatures and their relationship to severe weather over Europe. *Atmos. Res.*, **99**, 175-189.

Bedka, K. M., C. Wang, R. Rogers, L. Carey, W. Feltz, and J. Kanak, 2015: Examining deep convective cloud evolution using total lightning, WSR-88D, and GOES-14 super rapid scan datasets**.** *Wea. Forecasting,* **30**, 571-590.

Bedka, K. M., and K. Khlopenkov, 2016: A probabilistic pattern recognition method for detection of overshooting cloud tops using satellite imager data. *J. Appl. Meteor. And Climatol.* **55**, 1983–2005, doi: 10.1175/JAMC-D-15-0249.1

Bedka, K. M., Allen, J. T., Punge, H. J., Kunz, M., & Simanovic, D., 2018: A Long-Term Overshooting Convective Cloud-Top Detection Database over Australia Derived from MTSAT Japanese Advanced Meteorological Imager Observations, *Journal of Applied Meteorology and Climatology*, *57*(4), 937-951

Bedka, K. M., E. M. Murillo, C.R. Homeyer, B. Scarino, and H. Mersiovsky, 2018: The Above-Anvil Cirrus Plume: An Important Severe Weather Indicator in Visible and Infrared Satellite Imagery. *Wea. Forecasting*, 33, 1159–1181, https://doi.org/10.1175/WAF-D-18-0040.1

Bedka, K. M., Yost, C., Nguyen, L., Strapp, J.W. et al., 2019: Analysis and Automated Detection of Ice Crystal Icing Conditions Using Geostationary Satellite Datasets and In Situ Ice Water Content Measurements, *SAE Technical Paper* 2019-01-1953, 2019, doi:10.4271/2019-01-1953

Bedka, K. M., A. Nehrir, M. Kavaya, and co-authors, 2021: Airborne Lidar Observations of Wind, Water Vapor, and Aerosol Profiles During The NASA Aeolus Cal/Val Test Flight Campaign. *Atmospheric Measurement Techniques Discussions*, Aeolus Special Issue, In Review.

Sandmæl, T. N., Homeyer, C. R., **K. M. Bedka,** Apke, J. M., Mecikalski, J. R., & Khlopenkov, K., 2019: Evaluating the Ability of Remote Sensing Observations to Identify Significantly Severe and Potentially Tornadic Storms, *Journal of Applied Meteorology and Climatology*, *58*(12), 2569-2590.

Smith, J. B., D. M. Wilmouth, **K. M. Bedka**, K. P. Bowman, C. R. Homeyer, J. A. Dykema, M. R. Sargent, C. Clapp, S. S. Leroy, D. S. Sayres, J. M. Dean-Day, T. P. Bui, and J. G. Anderson, 2017: A case study of convectively sourced water vapor observed in the overworld stratosphere over the United States, *J. Geophys. Res. Atmos.*, **122**, 9529–9554, doi:10.1002/2017JD026831.

Thiery, W., E. L. Davin, S. I. Seneviratne, **K. M. Bedka**, S. Lhermitte, N. van Leipzig, 2016: Climate change intensifies hazardous storms over Lake Victoria. Nature Communications. doi: 10.1038/ncomms12786