John R. Mecikalski
Professor & Department Chair
Atmospheric and Earth Science Department
University of Alabama in Huntsville

Professional Preparation

University of Wisconsin-Milwaukee, Milwaukee, WI	Atmos. Science/Botany	B.S. 1988
University of Wisconsin-Milwaukee, Milwaukee, WI	Atmos. Science/Math	M.S. 1991
University of Wisconsin-Madison, Madison, WI	Atmos. Science/CompSci	Ph.D.1999

Appointments/Positions

May 2018-May 2023	Interim Chair & Department Chair, University of Alabama in Huntsville
August 2016-Present	Full Professor, University of Alabama in Huntsville
August 2009-August 2016	Associate Professor, University of Alabama in Huntsville
January 2004-August 2009	Assistant Professor, University of Alabama in Huntsville
July 2002-December 2003	Assistant Scientist, UW–Cooperative Institute for Meteorological Satellite Studies
July 1997-June 2002	Associate Researcher, UW–Cooperative Institute for Meteorological Satellite Studies
January 1995-June 1997	Assistant Researcher, UW–Cooperative Institute for Meteorological Satellite Studies
May 1992-January 1995	McIDAS software and system tester. UW–Space Science and Engineering Center
May 1990-July 1991	Meteorologist Intern National Weather Service in Green Bay, Wisconsin

Career Interests and Summary

As a Professor at the University of Alabama in Huntsville, Dr. Mecikalski has successfully managed over $25 M in research grants and contracts since 2002. Dr. Mecikalski was the Chair of the Atmospheric and Earth Science Department from May 2018 to May 2023. John has been involved in a number of NASA, NOAA, USGS, NSF, DoD and DoE projects. John has a wide breadth of knowledge in Earth systems datasets, satellite-based algorithm development (with an emphasis on short-term prediction of clouds, precipitation and sever weather, radar and satellite data assimilation), machine learning, and high-resolution/cloud-resolving numerical weather prediction modeling. Dr. Mecikalski's research has been heavily focused on uses of visible and thermal infrared observations, with an emphasis on the use of high temporal resolution (1-5 min) geostationary satellite datasets for cloud process studies. Dr. Mecikalski has also been involved in use of scatterometer wind assimilation, machine learning approaches for predictive modeling, solar insolation modeling for evaporation estimates, boundary layer profile development using passive microwave observations, and in studies relate to tropical meteorology, lightning prediction, and soil moisture estimation/assimilation. To date, he has published 120 peer-reviewed papers, as well as several technical reports and book chapters (see summary below).

Current Projects

- Observed convective cloud-numerical weather prediction model comparisons for improved convective parameterizations, as related to the North Alabama AMF3 DoE ARM facility
- Combined ground- and satellite-based analysis of convective clouds, specifically related to changes in cloud cover, type and growth.
- Machine learning to improve global planetary boundary layer and deep tropospheric thermodynamic profile retrievals
- Machine learning to improve 3D cloud field predictions
- Studies related to the 0-4 hour nowcasting of convective storms
- GOES satellite solar insolation estimation for evapotranspiration modeling
- Estimation of convective cloud and storm updraft magnitudes using GOES-16/-19 observations using satellite derived products and lightning data
- Convective nowcasting methods related to the use of 1- and 2.5-min resolution multi-spectral GOES-16/-19 and Meteosat Third Generation imagery

Recent Publications

Haliczer, D. T., **J. R. Mecikalski**, and P. Kollias, 2025: Use of satellite, surface observations and numerical weather prediction model data to improve cloud base height and cloud base vertical velocity estimation. *J. Geophys. Res–Atmospheres*, **130**, e2024JD041853.

Tracy, C., and **J. R. Mecikalski**, 2024: Mesoscale influences of land use, topography, antecedent rainfall, and atmospheric conditions on summertime convective storm initiation under weak synoptic-scale forcing. *Wea. Forecasting*, **39**, 55–74.

Anderson, M. C., W. Kustas, J. Norman, G. Diak, C. Hain, F. Gao, Y. Yang, K. Knipper, J. Xue, Y. Yang, W. Crow, T. Holmes, H. Nieto, R. Guzinski, J. Otkin, **J. Mecikalski**, C. Cammalleri, A. Torres-Rual, X. Zhan, L. Fang, P. Colaizzi, and N. Agam, 2024: A brief history of the thermal IR-based Two-Source Energy Balance (TSEB) model–diagnosing evapotranspiration from plant to global scales. *Ag. Forest Meteorology*, **350**.

Murphy, K. M., **J. R. Mecikalski**, K. M. Bedka, J. W. Cooney, and C. R. Homeyer, 2024: Characterization of reflectance signatures within above anvil cirrus plumes in GOES‐16 infrared and visible imagery. Journal of Geophysical Research: Atmospheres, 129, e2024JD041076.

Jones, T.A., and J. R. **Mecikalski**, 2023: Convective Initiation Forecasting Using Synthetic Satellite Imagery from the Warn-on-Forecast System. *J. Operational Meteor*., **11**, 132-139.

Thompson, K. B., J. R. **Mecikalski**, and M. G. Bateman, 2023: Signatures of oceanic wind events in convective resolving WRF model simulations. *Wea. Forecasting*, **38**, 2189–2215.

Henderson, D. S., J. A. Otkin, and **J. R. Mecikalski**, 2022: Examining the role of the land surface on convection using high-resolution model forecasts over the Southeastern U.S., J. *Geophys. Res.–Atmos*., **127**.

Leinonen, J., U. Hamann, R. Germann, and **J. R. Mecikalski**, 2022: Nowcasting thunderstorm hazards using machine learning: the impact of data sources on performance. *Nat. Hazards Earth Syst. Sci*., **22**, 577–597.

Mecikalski, J. R., T. N. Sandmæl, E. M. Murillo, C. R. Homeyer, K. M. Bedka, J. M. Apke, and C. P. Jewett, 2021: A random forest model to assess predictor importance and nowcast severe storms using high-resolution radar-GOES satellite-lightning observations. *Mon. Wea. Rev*., **149**, 1725–1746.

Apke, J. M., and J. R. **Mecikalski**, 2021: On the origin of rotation derived from super rapid scan satellite imagery of cloud tops of severe deep convection. *Mon. Wea. Rev*., **149**, 1827–1851.

Henderson, D. S., J. A. Otkin, and J. R. **Mecikalski**, 2021: Evaluating convective initiation in high-resolution numerical weather prediction models using GOES-16 infrared brightness temperatures. *Mon. Wea. Rev*., **149**, 1153–1172.

Publication Summary (as of July 2025)

Total Peer Reviewed Publication: **120**
Technical Reports: **13**
Total Book Chapters: **6**

Google Scholar Citation Indices	All	Since 2020
Citations	8789	3382
h-index	39	26
i10-index	79	61

Courses Taught (since January 2004)

- Capstone Student Mentoring (AES–Undergraduate level)
- Satellite Meteorology (AES 472/AES 572–Graduate & Undergraduate levels)
- Forecasting Mesoscale Processes (AES 454/AES 554–Graduate & Undergraduate levels)
- Advanced Synoptic Meteorology (AES 652–Graduate level)
- Atmospheric Data Assimilation (AES 675–Graduate level)
- Tropical Meteorology (AES 656–Graduate level)
- Cloud Processes (AES 740–Graduate level)
- Nowcasting–Theory, Methods & Applications (AES 657–Graduate level)
- Student Seminar (AES 780/AES 781– Graduate level)
- Fluid Dynamics-I (AES 451/AES 551–Graduate & Undergraduate levels)