Matthew R. Igel, PhD

Department of Land, Air and Water Resources University of California, Davis One Shields Ave Davis, California 95616 <u>migel@ucdavis.edu</u> <u>http://www.researcherid.com/rid/A-5727-2013</u> <u>http://orcid.org/0000-0001-8916-544X</u>

Expertise:

Tropical deep convective clouds (models and satellite observations)

Positions:

Since 2016 -- Assistant Adjunct Professor at the University of California, Davis 2014-2016 -- NSF Postdoctoral Fellow hosted by the University of Miami

Education:

- 2014 -- Doctorate of Philosophy in Atmospheric Science from Colorado State University
- 2011 -- Masters of Science in Atmospheric Science from Colorado State University
- 2009 -- Honors Bachelors of Science in Meteorology from North Carolina State University (*magna cum laude*)
 - -- Bachelors of Science in Physics (magna cum laude)
 - -- Minor in Mathematics
 - -- University Honors Program Degree

PhD Dissertation:

2014 -- Tropical Deep Convective Cloud Morphology (Prof. van den Heever) Master's Thesis:

2011 -- A Tropical Radiation and Cloud System Feedback Modulated by Sea Surface Temperature (Prof. Stephens)

Honors:

NSF Atmospheric and Geospace Sciences Postdoctoral Research Fellowship (Fall 2014-Summer 2016)

Herbert Riehl Memorial Award (CSU Atmospheric Science best Masters publication) NASA Earth and Space Science [Graduate] Fellowship (2013-2014)

NASA Earth and Space Science [Graduate] Fellowship (2013-2014

CSU School of Global Environmental Sustainability Fellowship

2015 Gordon Research Seminar co-chair

Sigma Pi Sigma: National Physics Honors Society

AMS Undergraduate Fellowship

AMS Student Travel Grant

Teaching:

2017 -- Atmospheric Dynamics I (4 cr)

Experience:

- 2016 -- NSF Postdoc Professional Development Workshop (UCAR/NCAR)
- 2015 -- Delivered guest lectures at the University of Miami.
- 2014 -- Teaching Assistant (Mesoscale Modeling)

- 2013 -- HS3 Forecaster at NASA Wallops Air Base
 - -- Gordon Research Seminar/Conference on Radiation and Climate
 - -- CSU SoGES Fellowship professional communication workshops (monthly)
- 2012 -- DYNAMO Campaign cruise lead radar operator onboard R/V Revelle
 - -- JPL CCS Summer School: Using Satellite Observations to Advance Climate Models
 - -- Research mentor for CMMAP summer intern (Aryeh Drager, Dartmouth)
 - -- Awarded an NCAR student High-Power Computing Allocation
- 2011 -- Teaching Assistant (Atmospheric Dynamics)

Publications:

- **Igel, M. R.**: Climate Parameter Constraints Imposed by Differing Energy Balance Requirements in Models of Varying Complexity. Submitted to *Journal of Advances in Earth System Modeling*.
- **Igel, M. R.** and A. L. Igel: The Energetics and Magnitude of Hydrometeor Drag in Clouds. Submitted to *Journal of Atmospheric Science*.
- **Igel, M. R.**, S. Herbener, and S. Saleeby: The Tropical Precipitation Pickup Threshold and Clouds in a Radiative Convective Equilibrium Model. Part I: Column Moisture. In Press at *Journal of Geophysical Research*.
- **Igel, M. R.**: The Tropical Precipitation Pickup Threshold and Clouds in a Radiative Convective Equilibrium Model. Part II: Two-Layer Moisture. In Press at *Journal of Geophysical Research*.
- Bourgeois, Q., A.M.L. Ekman, **M. R. Igel**, and R. Krejci: Ubiquity and impact of Thin Mid-Level Clouds in the tropics. *Nature Communications*. 7, doi:10.1038/ncomms12432.
- **Igel, M. R.**, and S. C. van den Heever (2015): Deep-Convective Morphology as Observed from CloudSat. *Atmospheric Chemistry and Physics Discussion*. 15, 15977-16017, doi: 10.5194/acpd-15-15977-2015.
- King, J. M., C. D. Kummerow, S. C. van den Heever, M. R. Igel (2015): Modeled and observed warm rainfall occurrence and its relationships with cloud macrophysical properties. *Journal of Atmospheric Sciences*. 72, 4075-4090.
- Igel, M. R., and S. C. van den Heever (2015): The Relative Influence of Environmental Characteristics on Deep Convective Morphology as Observed by CloudSat. *Journal of Geophysical Research*. 120, doi: 10.1002/2014JD022690.
- Igel, A. L., **M. R. Igel**, and S. C. van den Heever (2015): Make it a Double? Sobering Results from Simulations using Single-Moment Microphysics Schemes. *Journal of Atmospheric Sciences*, 72, 910-925, doi: 10.1175/JAS-D-14-0107.1.
- Igel, M. R., A. J. Drager, and S. C. van den Heever (2014): A CloudSat Cloud-Object Partitioning Technique and Assessment and Integration of Deep Convective Anvil Sensitivities to Sea Surface Temperature. *Journal of Geophysical Research*. 119, 10-515-10,535, doi: 10.1002/2014JD021717.
- Igel, M. R., S. C. van den Heever, G. L. Stephens, and D. J. Posselt (2014): Convective-Scale Responses of a Large-Domain Modeled, Tropical Atmosphere to Surface Warming. *Quarterly Journal of the Royal Meteorological Society*, 140, DOI:10.1002/qj.2230. (Riehl Award)
- Posselt, D. J., S. van den Heever, G. Stephens, and **M. R. Igel** (2012): Changes in the interactions between tropical convection, radiation and the large scale circulation in a warming environment. *Journal of Climate*, 25, doi: 10.1175/2011JCLI4167.1.

Conference Presentations (Oral):

- 2017 -- The Modeled and Observed Dependence of the Precipitation Onset and Cloud Type on Layer-Moisture (William Rossow Symposium)
- 2016 -- Lagrangian and Eulerian Evolutions of the Tropical Column Humidity-Precipitation Relationship (ICCP Meeting)
 - -- Coauthor: The Forgotten Clouds of the Tropical Middle Troposphere (EGU GA)
 - -- The Nature and Magnitude of Hydrometeor Frictional Heating in Convective Clouds (AMOS Meeting)
- 2015 -- The Tropical Convective Cloud Population and the Critical Transition to Heavy Precipitation (CNES Tropical Meeting)
- 2014 -- The Effects of Large-Scale Dynamic Flows on Tropical Deep Convective Morphology (AGU Fall Meeting)
 - -- The Importance of Aerosol to Deep Convective Cloud Morphology (AMS Conference on Cloud Physics)
 - -- 2nd author: Tropical Cold Pool Characteristics (Tropical Workshop)
- 2013 -- Mature Deep Convective Cloud Morphology as Observed by CloudSat (AGU Fall Meeting)
 - -- An analysis of tropical, deep convective anvil-climate interactions using CloudSat (Gordon Research Seminar)
 - -- 2nd author: Tropical Cold Pool Characteristics (AMS Mesoscale Meeting)
- 2012 -- Tropical Precipitation Responses to Surface Warming in a CRM (3ICESM)
 - -- A Scaling Relationship between Tropical Convective Core and Anvil Widths (AGU Fall Meeting)
 - -- Coauthor: Shipboard Operations of the NASA-TOGA Radar in DYNAMO (2012 Tropical Conference)
 - -- Coauthor: Microphysical Contributions to Latent Heating Structures of Midlatitude and Tropical Storms and Feedbacks to Storm Organization (AGU Fall Meeting)
- 2009 -- Effects of Aerosol on Shallow Marine Clouds in the Bay of Bengal (AMS Annual Meeting)

(Poster):

- 2016 -- The Energetics and Consequences of Hydrometeor Frictional Heating in Clouds (AGU Fall Meeting)
- 2015 -- Feedbacks in Tropical Deep Convective Clouds Resulting in the Transition to Strong Precipitation (Gordon Research Seminar/Conference)
 - -- The Role of Depositional Heating in the Transition to Strong Precipitation in Tropical Deep Convection (AMS Mesoscale Conference)
 - -- Organization of the Tropical Convective Cloud Population by Humidity and the Critical Transition to Heavy Precipitation (AGU Fall Meeting)
- 2013 -- Mature Deep Convective Cloud Morphology as Observed by CloudSat (AGU Fall Meeting)
 - -- An Analysis of tropical, deep convective anvil-climate interactions using CloudSat (Gordon Research Seminar/Conference)
- 2012 -- 2nd author to advised summer intern: CloudSat Derived Morphology of Deep Convection over Tropical Oceans (AGU Fall Meeting and AMS Annual Meeting) (OSPA winning poster)
- 2011 -- The Case for Cooler Anvil Temperatures in the Tropics (AGU Fall Meeting)

Media:

2017 – Science Explains "Rough and Chaotic" Cloud Feature. Eos (June)

Professional Organizations:

Since 2003 -- American Meteorological Society

- 2008 -- American Geophysical Union
 - -- American Physical Society
- 2015 -- European Geosciences Union

Review For:

Journals: JGR: Atmosphere; JAS; GRL Proposals: NASA

Labs:

2016-current -- Convective Clouds Group: University of California, Davis 2014-2016 -- Mapes Research Group: University of Miami 2010-14 -- van den Heever Research Group: Colorado State University 2009-10 -- Stephens Research Group: Colorado State University 2006-09 -- Aerosol Climate Interactions Lab: NC State University 2008 -- Space Weather Prediction Center: NOAA Boulder

Miscellaneous

2012 -- Winner of inaugural AGU Fall Meeting Student T-shirt Design Contest