Matthew R. Igel, PhD
Department of Land, Air and Water Resources
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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)
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: 10.1002/2014JDO22690.

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