

# Kyle MacRitchie, PhD

## Atmospheric & Data Scientist

**e-mail:** Kyle@MacRitchie.me // **web:** KyleMacRitchie.com // **github:** github.com/wxscience

I specialize in creating statistical and dynamical/statistical hybrid models that objectively predict weather and climate conditions more than a week in the future. I believe that the future of weather forecasting revolves around statistical forecasts that harness the physical laws of the atmosphere.

### Recent Experience

#### Meteorologist

2018 - present

#### Climate Prediction Center / National Weather Service

- Created neural network models to predict ENSO and weather at weeks 3-4 leads
- Operational forecaster: MJO & tropical hazards, U.S. hazards, weeks 3-4 forecasts
- Python + ArcPy scripting to support ArcMap use in our operational products

#### Atmospheric Scientist

2016 – 2018

#### Innovim, LLC

- Dynamical model calibration for internal tools that support weeks 3-4 forecasting
- Provided guidance and assistance on MJO and tropical hazards product

#### Research Meteorologist

2013 – 2016

#### Riskpulse (formerly EarthRisk)

- Worked to improve predictions using intraseasonal and interannual atmospheric and oceanic variability
- Spearheaded a number of projects to assess model skill and bias under different atmospheric regimes. Created website with this info for clients
- Worked with team to refine ideas and incorporate into other projects as appropriate
- Consultant position

#### Data Support Scientist

2015 – 2016

#### NASA Goddard (GES-DISC) / ADNET Systems, Inc

- Managed transition of metadata for >1,000 products to new database
- Created multiple Python programs to interface with EarthData's RESTful API for myself and others to use

#### Lecturer

2013 – 2015

#### College at Oneonta

- Full-time lecturer, temporary position in which I created and taught Introduction to Meteorology, Tropical Meteorology, Physical Meteorology (Thermodynamics), Environmental Issues, and Senior Seminar

### Skills

#### Software

Office; Linux, macOS, and Windows; I'm most at home with a zsh terminal, ArcMap

#### Web & Related

RESTful APIs, Google Maps API, HTML, CSS, PHP, JavaScript, XML, virtual machines

#### Data Tools

Python (incl. Anaconda, NumPy, Keras, Pandas, scikit-learn, ArcPy, etc), MATLAB, NCL

#### Statistics/ML

neural networks, regression, PC/EOF analysis, CCA, cluster analysis, significance testing, time-series analysis, Fourier transforms, etc.

#### Datasets

netCDF, HDF, GRIB, binary, GrADS, csv, txt, etc.

#### Gridded Data

ECMWF, JMA, GFS, CFS (forecasts, hindcasts, and reanalyses), TRMM, GPM + many more

### Education

#### Ph.D. in Atmospheric Science

Advisor: Paul Roundy

#### University at Albany/SUNY in Albany, NY (2014)

- Large-scale tropical variability, tropical/midlatitude interactions, statistical analysis and forecasting

#### B.S. in Mathematics and Atmospheric Science

#### University at Albany/SUNY in Albany, NY (2009)

## Website – [www.KyleMacRitchie.com](http://www.KyleMacRitchie.com)

- I created the website and I run the cloud server: Linux, Apache, and Plesk
- Developed unique hovmöller diagrams and latitude-longitude maps to display equatorial waves
- Site has hundreds of regular users from the academic, government, energy, agriculture, and enthusiast sectors
- Site incorporates data from NOAA's CFS reanalysis and forecast datasets
- Most maps are updated daily in near real-time

## Professional Development

- Peer Reviewer – ongoing
- NCAR ASP Summer Colloquium: Weather-Climate Intersection (Boulder, CO 2012)
  - Selected to participate in a 3-week summer colloquium where leading scientists discussed challenges associated with understanding the weather-climate intersection
- Invited speaker: 18<sup>th</sup> Annual Maxar Energy Conference, October, 2019
- Conference planning: 44<sup>th</sup> Climate Diagnostics and Prediction Workshop, October, 2019

## Peer-Reviewed Publications and Presentations

- MacRitchie, K., and P.E. Roundy. 2016: The two-way relationship between the Madden Julian oscillation and anticyclonic wave breaking. *Quart. J. Royal Meteor. Soc.*, **142**, 2159-2167.
- Roundy, P.E., N. Sakaeda, K. MacRitchie, L. Gloeckler, 2017: Weather-climate interactions and MJO influences. *Climate Extremes: Patterns and Mechanisms*, S.-Y.S. Wang et al., Eds., Amer. Geophys. Union, 139-163,
- MacRitchie, K., and P. E. Roundy, 2012: Potential vorticity accumulation following atmospheric Kelvin waves in the active convective region of the MJO. *J. Atmos. Sci.*, **69**, 908-914.
- Roundy, P. E., K. MacRitchie, J. Asuma, T. Melino, 2010: Modulation of the global atmospheric circulation by combined activity in the Madden-Julian oscillation and the El Niño-Southern oscillation during boreal winter. *J. Climate*, **23**, 4045-4059.
- I have given > 10 presentations at conferences including talks at the AMS and AGU annual meetings.