

EXAMINING THE IMPACT OF MICROPHYSICS PARAMETERS IN SIMULATIONS OF A JANUARY 2019 VERMONT WINTER STORM

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OBJECTIVES

- Use Weather Research and Forecasting (WRF) to test the impact of different microphysics parameterizations on a winter storm that occurred in VT in late January 2019.
- Examine hourly and total precipitation at various sites for each simulation of the storm
- Compare results to real observations at sea level site (Middlebury) and mountain site (Rochester)
- Better understand the nature of cloud microphysics

THE JANUARY 20-21, 2019 WINTER STORM

- Explain snow totals in VT and northern NY from the storm
- Explain the storm's cold nature / what does that mean for snowfall totals? (10:1 snowfall ratio)
- Discuss the brutal winds
- My personal memory - going to snow bowl to ski – only lasting 30 minutes due to cold and wind

MICROPHYSICS PARAMETIZATIONS

- Explain what cloud microphysics is
- Different schemes in WRF model
- Single moment vs. double moment
- Discuss basics of Thompson, WDM6, Eta (Ferrier), and Morrison 2 moment schemes

METHODS

- WRF – the key method to simulate 48 hours of weather (explain what the model is)
 - Used 4 different microphysics parameterizations with different physics controls
 - 5 km grid spacing, hourly data output, Latitude: 44.0 °, Longitude: -73.03 °
- Data were taken from GFS reanalysis
- Data analysis through NCL and mathematica

RESULTS

- On this slide, I hope to display a data table that shows snowfall totals for each microphysics scheme at the two locations that I will be analyzing data, and I will show actual observations from the storm.

ANALYSIS

- Here I will give a brief discussion of which microphysics scheme best predicts snowfall for the storm, and what that means for selecting MP parameterizations when weather modeling and how this can inform operational forecasting.
- I will also compare my results to similar studies of MP (McMillen and Steenburgh, 2015; Jankov, et al. 2011)

FUTURE DIRECTIONS

- Analyze other microphysics parameterizations not chosen in this project
- Modify other aspects of the WRF physics (Cumulus physics, radiation, land surface physics, etc.)