



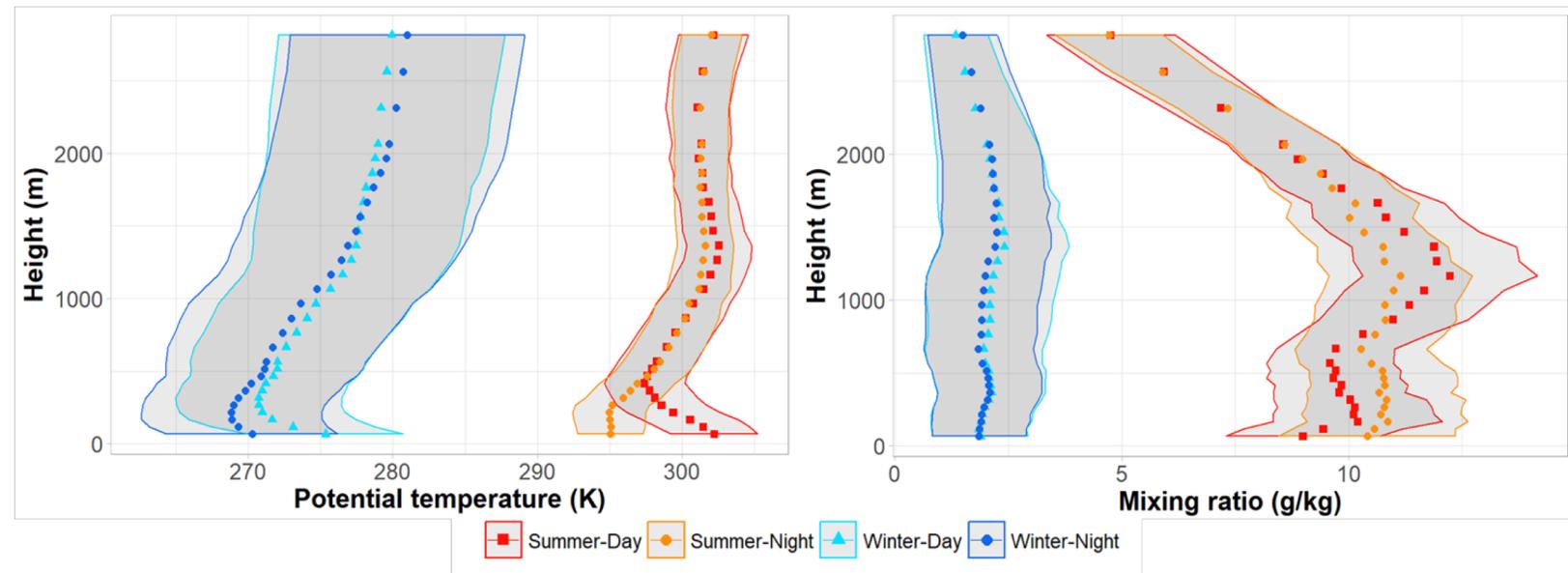
# David Melecio-Vazquez

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# Research Area

- Rising population in cities → **urban boundary-layer studies** in the last 30 years have focused on problems ranging from air pollution (Molina and Molina 2004) to the threat of terrorism (Batchvarova and Gryning 2006).
- These studies have led to **major improvements** in numerical weather prediction (Salamanca and Martilli 2010) and air pollution models (Batchvarova and Gryning 2006; Franzese and Huq 2011).
- However, these studies may have **limited applicability** to cities like New York due to the inherent complexities of:
  1. **Coastal-urban environments**
  2. Evaluating boundary-layer characteristics from models, developed from a **limited amount of observations** (Barlow 2014).

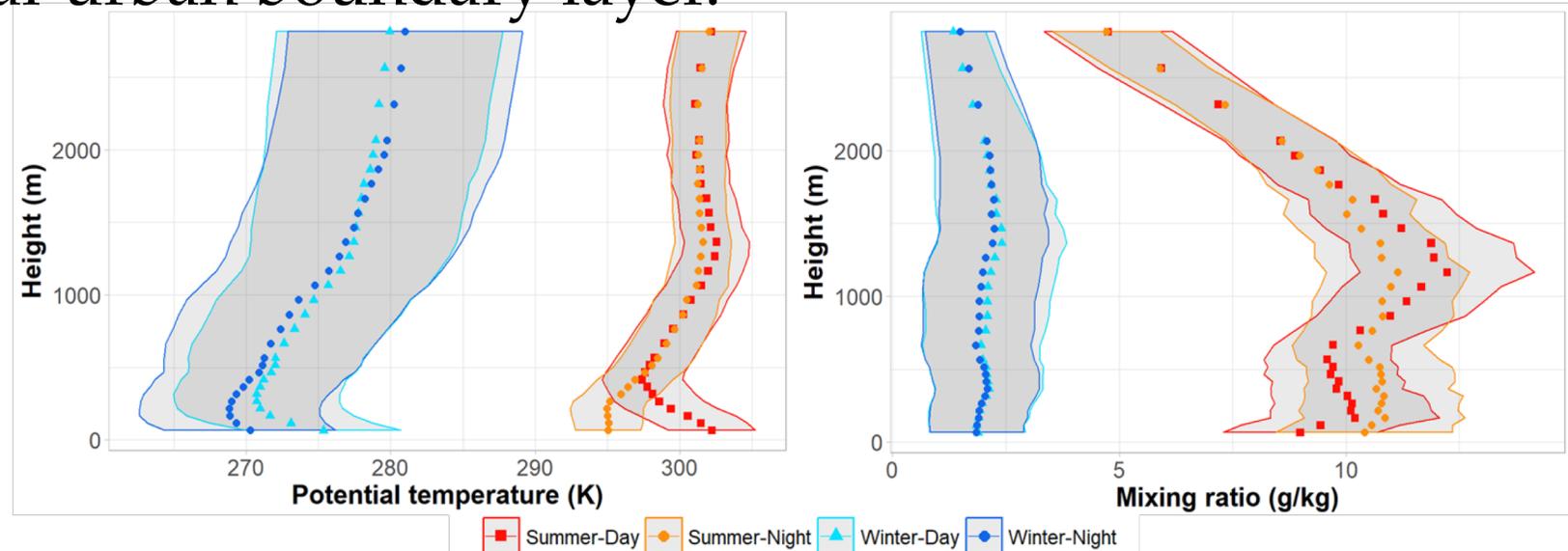
## Radiometrics MP-3000A



# Research Area: Recent Publication

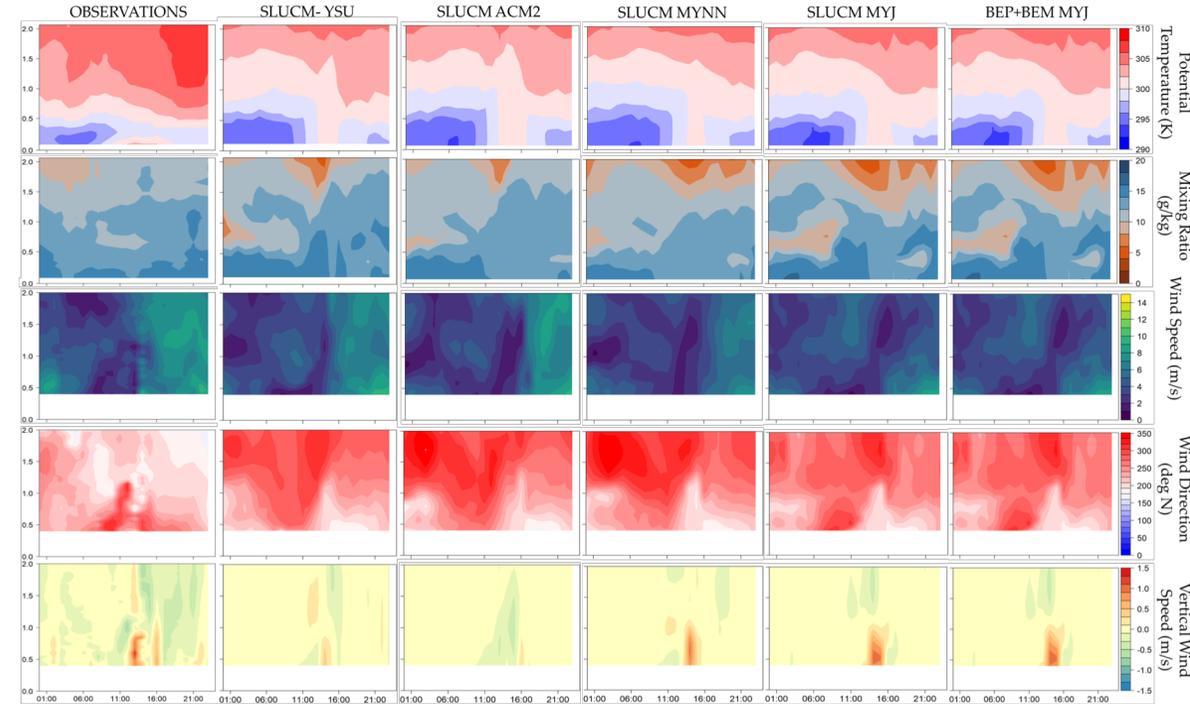
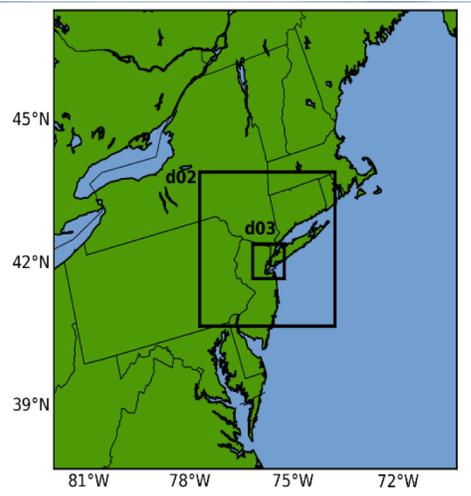
- This paper highlights the finding of an analysis done on boundary-layer measurements of temperature and humidity.
- The features found in this paper may be a direct impact of the coastal-urban interface that is present over New York City.
- Since most, if not all, boundary-layer parameterizations were developed over homogenous terrain with vegetation, these models may not be well-suited to capture features of a coastal-urban boundary layer.

## Radiometrics MP-3000A

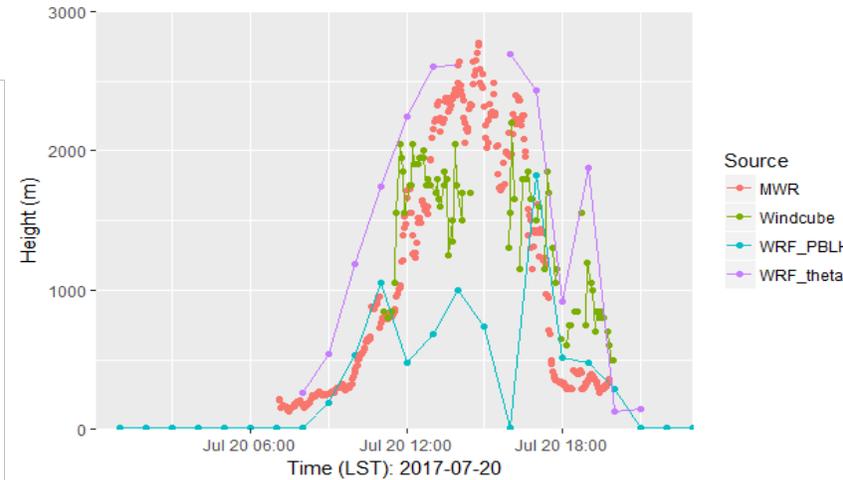
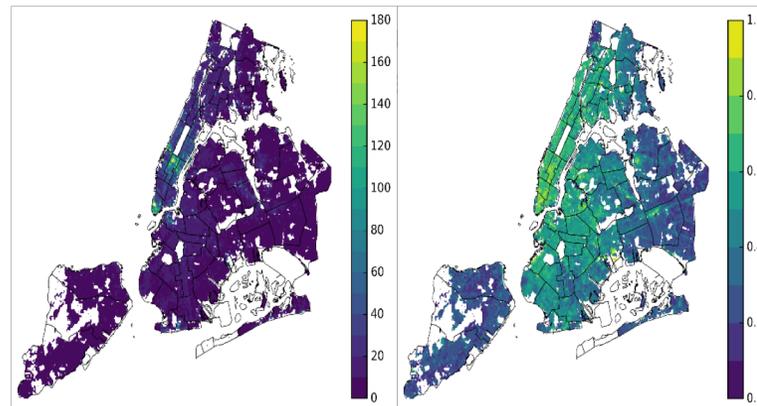


Melecio-Vázquez D, Ramamurthy P, Arend M, González-Cruz JE (2018) Thermal Structure of a Coastal-Urban Boundary Layer. Bound-Layer Meteorol. doi: 10.1007/s10546-018-0361-7

# Modeling & Validation Tools: A Snapshot



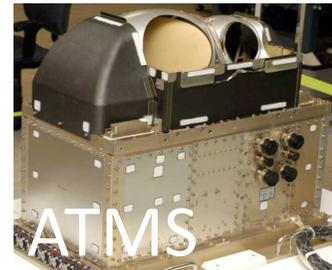
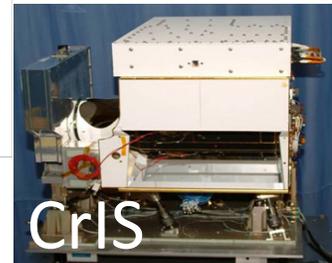
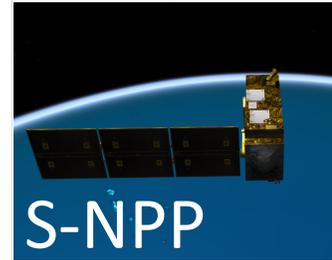
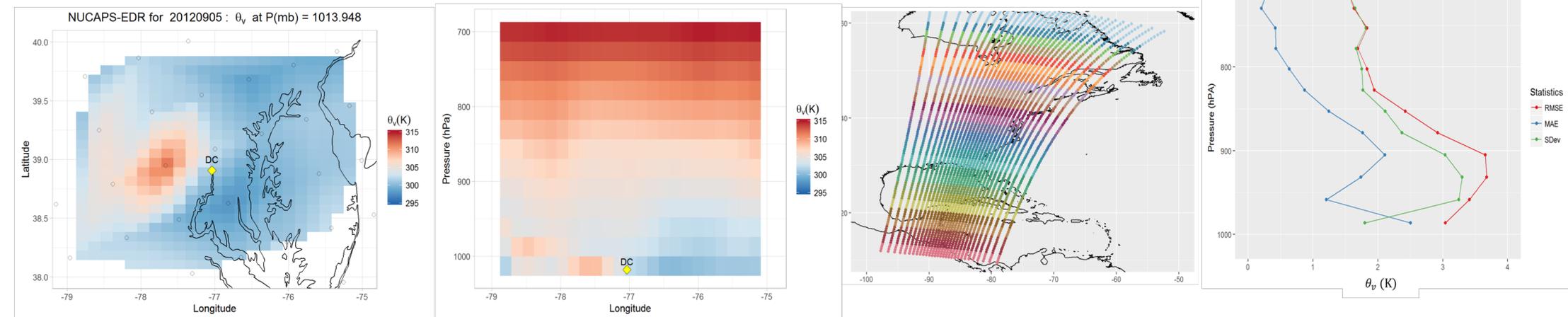
**PLUTO (Property Land Use Tax-Lot Output) for NYC at 1km Resolution**



# NOAA-CREST Past Activities



- JPSS-SPARKS (Student Professional and Academic Readiness with Knowledge in Satellites)
  - **Suomi-NPP: NOAA Unique Combined Atmospheric Profiling System (NUCAPS)**
    - Using the Suomi NPP, CrIS (Infrared) and ATMS (microwave) Processing System the profiles of the ABL can be observed for a large spatial array.



- Mentoring Activities:

- Research Experience for Undergraduates (REU) 2018
- HIRES (2017 and 2018).

# NERTO PLANS



- **Still in Planning Phase!**
- Met Stanley Benjamin at the AGU 2017 conference and since then I've been in communication with Jaymes Kenyon and Joseph Olson.
- Current work has been on comparing the boundary-layer results of the HRRR model vs the uWRF model (run at CCNY).
- Future work may focus on seeking a way to combine the multi-layer urban physics used in uWRF to work with the planetary boundary-layer scheme used in HRRR.