

Weekly Report

RAMMB / CIRA
Cooperative Research Program Division (CoRP)
STAR/NESDIS
National Oceanic and Atmospheric Administration (NOAA)

Submitted by: Austin Boone
Prepared by: RAMMB/CIRA contributors
Date of Submission: 27 May 2022

Products and Applications

A. Schumacher has designed a new tool for automatically collecting Automated Surface/Weather Observing Systems (ASOS) 1-minute wind data from NCEI for tropical cyclone studies. This tool, written in FORTRAN, uses information from tropical cyclone Best Track files to determine a spatial swath of interest for the entire storm lifetime and then download all available 1-minute surface wind data for all ASOS stations within that swath at the time of the storm. This automation will significantly streamline post-season collection of TC surface wind data for products such as the WTCM tropical cyclone surface wind estimates. WTCM is a vortex model that creates a gridded wind field that is fit to the routine Tropical Cyclone forecast advisory Message (TCM). (A. Schumacher, L. Lu, M. DeMaria, K. Musgrave, CIRA, andrea.schumacher@colostate.edu, Funding: JTTI)

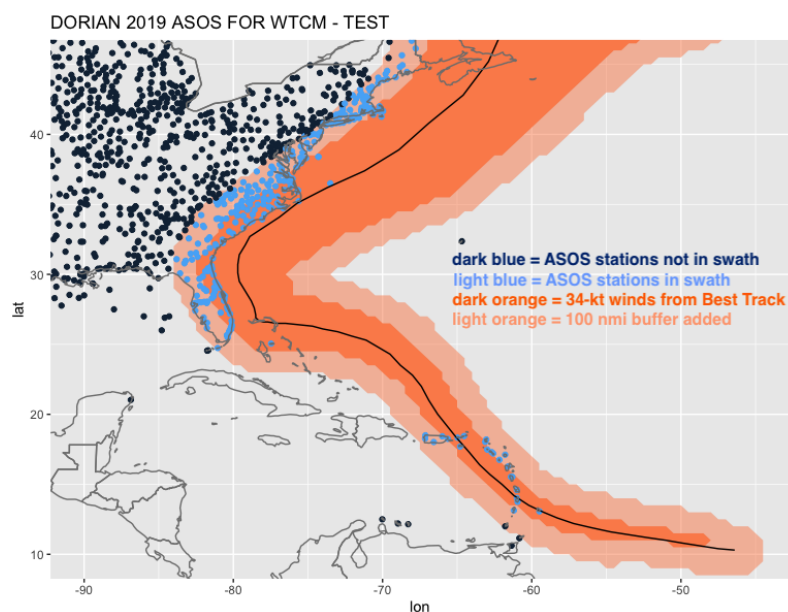


Figure: ASOS stations within 100 nmi of radii of 34-kt winds (light blue dots) of Hurricane Dorian 2019.

Awards and Recognition

Publications (Citation: followed by a short Summary: (Why & so what), & detailed summary):

Citation: Anderson, G.B., Schumacher, A., Done, J.M. et al. Projecting the Impacts of a Changing Climate: Tropical Cyclones and Flooding. *Curr Envir Health Rpt* 9, 244–262 (2022). <https://doi.org/10.1007/s40572-022-00340-0>. **Summary:** Developments in climate epidemiology and climate science are opening new possibilities in projecting the health impacts of floods and tropical cyclones under a changing climate. In this study, we highlight ways in which epidemiological studies characterizing health impacts of floods and tropical cyclones can be combined with quantitative climatological projections to produce quantitative climate health impact projections.

Detailed Summary: There is clear evidence that the earth's climate is changing, largely from anthropogenic causes. Flooding and tropical cyclones have clear impacts on human health in the United States at present, and projections of their health impacts in the future will help inform climate policy, yet to date there have been few quantitative climate health impact projections.

Despite there being a wealth of studies characterizing health impacts of floods and tropical cyclones, many of these studies are better suited for qualitative, rather than quantitative, projections of climate change health impacts. However, a growing number have features that will facilitate their use in quantitative projections, features we highlight here. Further, while it can be difficult to project how exposures to flood and tropical cyclone hazards will change in the future, climate science continues to advance in its capabilities to capture changes in these exposures, including capturing regional variation.

(POC: A. Schumacher, CIRA, andrea.schumacher@colostate.edu, Funding: CIRA Societal Impacts)

Media Interactions and Requests

Blog Posts and Social Media

Travel, Workshops, Conferences, and Meeting Reports

Tropical Cyclone Ocean Observing and Forecasts Exemplar: Pre-Meeting: J. Knaff provided a short presentation at a pre-meeting for the Global Ocean Observing System Ocean Observing Co-Design workshop to be held 7-9 June. He covered topics related to what observations are currently used and gaps in those capabilities. The meeting was organized by Cheyenne Stienbarger, NOAA/Global Ocean Monitoring and Observing Program and Gustavo Goni, AOML. (POC: John Knaff, STAR, john.knaff@noaa.gov, Funding: PRDA)

NWS Leadership visits CIRA: Acting NWS Deputy Director A. J. Reiss, NWS Acting Director Central Region Ken Harding, and several NWS union representatives, visited CIRA on May 26 to find out what a Cooperative Institute (CI) was like. After brief introductions, CIRA Director Steve Miller

gave a quick overview of the NOAA/CIRA-CSU relationship, its personnel makeup, and funding support, and the discussions then moved on to research topics. The topics included training, artificial intelligence/machine learning, data assimilation, satellite products, and the research to operations links. This was an impromptu morning meeting, and serendipitous opportunity as these folks were traveling from Boulder to visit the Cheyenne WFO in the afternoon. (POC: J. Knaff, B. Line, STAR, B. Connell, D. Bikos, S. Miller, and many other CIRA, CSU, John.Knaff@noaa.gov, (970) 279-1611, Bernie.Connell@colostate.edu, Funding: PRDA)

Visiting Scientist: Prof. Tom Beucler from the Université Lausanne (Lausanne, Switzerland) will be visiting CIRA as visiting scientist Jan 1-3, 2022. Dr. Beucler is an expert in the area of building physics-guided machine learning algorithms for weather and climate applications. He will give a CIRA seminar, entitled *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*, on June 1, 2022, 1-2pm MDT, Director's conference room or Google meet meet.google.com/eot-tivq-nrs. Tom is visiting CIRA to build a collaboration with the Tropical Cyclone and Machine Learning groups at CIRA. Tom will be hosted by Marie McGraw, Kate Musgrave and Imme Ebert-Uphoff. Marie McGraw is planning to spend two months in Prof. Beucler's lab in 2023 to further strengthen this collaboration. (POC: Marie McGraw, Kate Musgrave, Imme Ebert-Uphoff, CIRA, marie.mcgraw@colostate.edu, Funding: CIRA).

Training and Education activities

Week 1 of 2022 Hazardous Weather Testbed (HWT) Satellite Proving Ground: This week marked the first of three installments of the 2022 Hazardous Weather Testbed Satellite Proving Ground. The Proving Ground provides NWS forecasters the opportunity to evaluate experimental products in real-time, yet mock forecast situations using AWIPS in the cloud. J. Dostalek participated as a developer, demonstrating an algorithm that adjusts the near-surface levels of NUCAPS retrievals according to GOES and Real-Time Mesoscale Analysis (RTMA) data, as satellite retrievals typically struggle near the ground. The figures below give an example from southwestern Missouri. This week's forecasters were from the NWS offices in Raleigh, NC; Glasgow, MT; Phoenix, AZ; Anchorage, AK; Binghamton, NY and Wilmington, NC. (POC: J. Dostalek, CIRA, Jack.Dostalek@colostate.edu , Funding: JPSS)

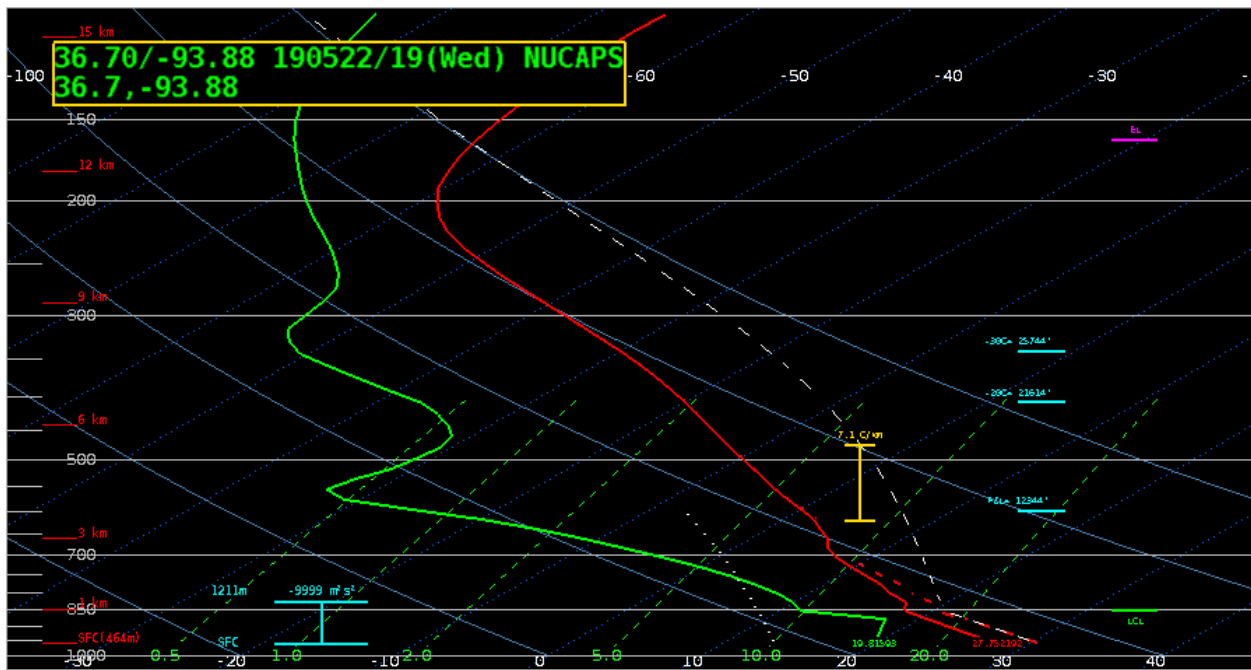
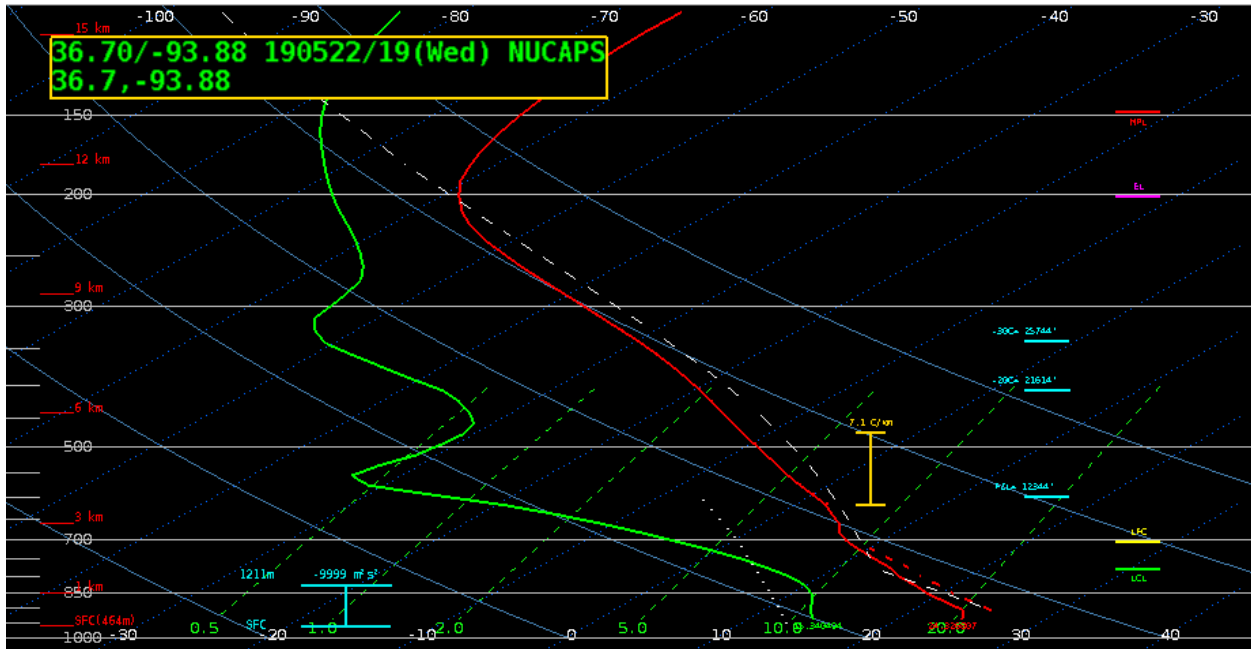


Figure. Original NUCAPS temperature and moisture profile (top), and after the application of the low-level modification (bottom).

Future Meetings and Events (dates, meeting/event, location, staff involved)

Other

Review: J. Knaff provided a review of a manuscript submitted to Weather and Forecasting. (POC: John Knaff, STAR, john.knaff@noaa.gov, Funding: PRDA).

Review: B. Line provided a review of a manuscript submitted to the *Journal of Operational Meteorology*. (POC: Bill Line, STAR, bill.line@noaa.gov, Funding: PRDA).