NOAA-OAR-WPO-2021-2006592 Observations Competition Project Summary Update

Project Title: Improving Analysis and Communication of Extreme Temperatures Across the New York City Metropolis Using a Dense Network of In Situ Observations
Award Number(s): NA21OAR4590360
PI Name & Affiliation: Dr. Nick Bassill, University at Albany
Co-PI Name & Affiliation: Drs. Jeannette Sutton, Eric Stern, & Chris Thorncroft, University at Albany
Award Period of Performance (08/01/2021 – 07/31/2023)
Reporting Period (08/01/2021 – 01/31/2022)
Date Submitted: August 30th, 2022

Planned Outputs/Products & Outcomes/Benefits:

Outputs/Products: We propose to create a real-time high-resolution analysis and forecast product for New York City built using several observational networks of opportunity and available NWS forecasting products for all stakeholders to use.

Outcomes/Benefits: Primary outcomes include answering key scientific questions regarding the benefits of additional observational data and better understanding predictability of extreme temperature events. Another key benefit will be improved access to easy-to-interpret and more granular weather information for use both by NWS and by key stakeholders such as NYC OEM to make more informed decisions.

Accomplishments (1 of 2)

- Made preliminary website more robust and included more variables based upon NWS feedback
  - See real-time operations use →
- Developed tools to create Wet-bulb Globe Temperature for historical data in NYC for any observing platform
  - Requires a complex series of calculations
- Hired visiting research scientist (aka Post-Doc) and participated in the NERTO program

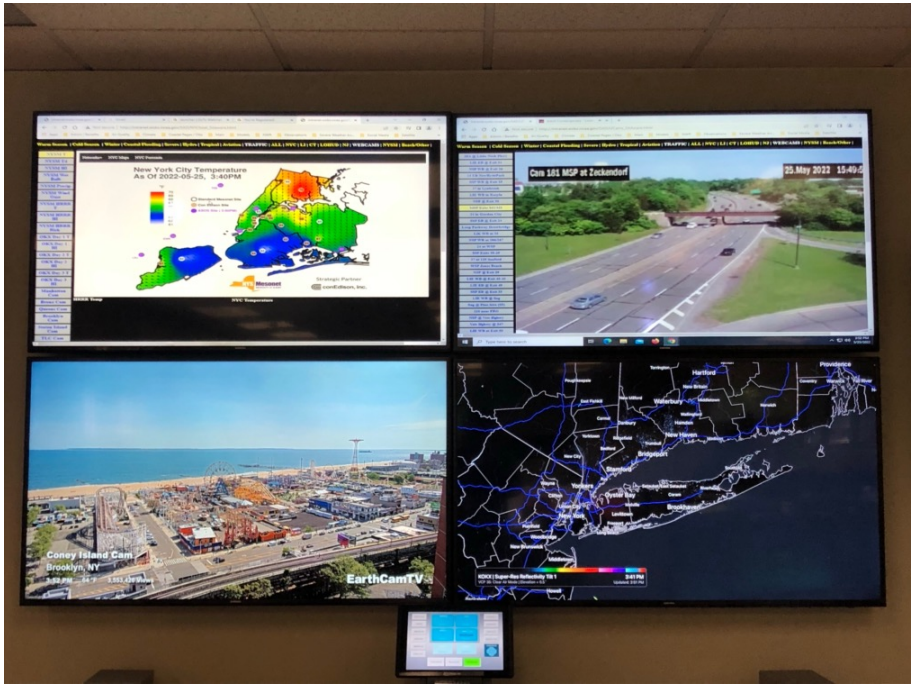
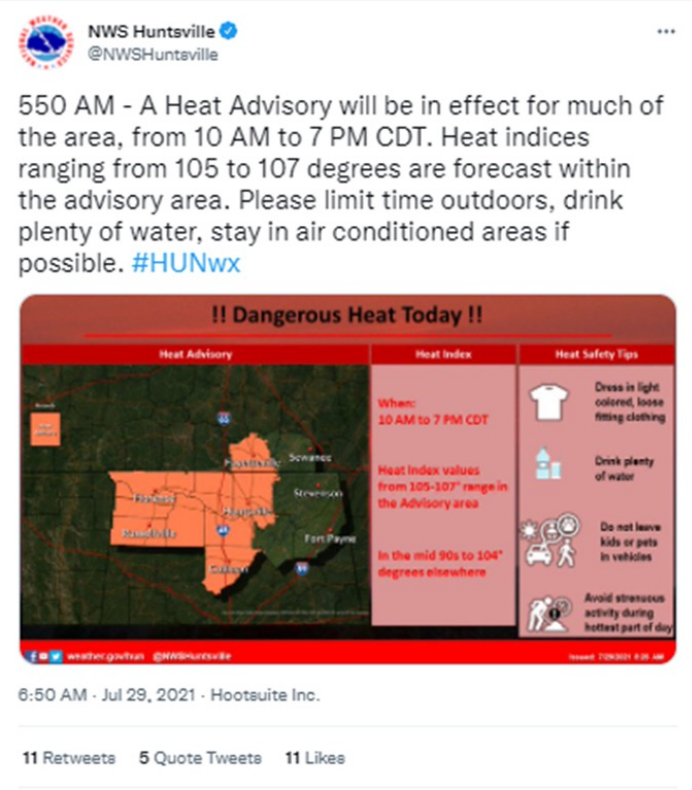


Image provided by OKX SOO Dave Radell

Accomplishments (2 of 2)

Collected 250 tweets posted by 6 WFO Twitter accounts during the first major heatwave in their jurisdictions in 2021:

- 40% of tweets include jargon, with heat advisory being used most frequently and heat index was commonly communicated (38% of the time)
- Heat impacts & consequences were included in 31% of tweets
- Guidance was included in ~58% of tweets
- 36% of tweets including content about vulnerable populations



Milestones Table (1 of 2)

No.	Milestone Description	Date (Planned Completion)	Date (Actual Completion)	Status (% Complete)
1	Literature Review	October 2021	November 2021	95% (pending new literature)
2	IRB Approval	October 2021	August 2021	100%
3	Retrospective Case Analysis	December 2021	Mostly Complete	80%
4	Develop Observational Data Streams	December 2021	Mostly Complete, pending CUNY	90%
5	Gather Forecast Data	January 2022	October 2021	90% (pending NBM)
6	Usability Study/Needs Assessment	February 2022	February 2022	95%(pending new information)
7	Calculate Forecast Errors & Biases	March 2022	Incomplete	40%

Milestones Table (2 of 2)

No.	Milestone Description	Date (Planned Completion)	Date (Actual Completion)	Status (% Complete)
8	Develop Real-Time Analyses	September 2022	April 2022 (most variables)	95% (pending bug fixes)
9/10	Develop & Evaluate Historical Analyses	October 2022	Incomplete	5%
11	“Field” Research	October 2022	Summer 2022	90%

Readiness Levels (RL)

Status	Date (MM/YY)	RL (1-9)	Explanation of Determination & Details https://wpo.noaa.gov/R2O/Transitions/RLevels
At start of Project	09/21	5	This assessment was primarily estimated based on the existing availability of these networks and most forecast products, but the nonexistent research done on these data sources.
Reporting Period 1	02/22	5	At the conclusion of this reporting period, a very basic prototype was in creation
Reporting Period 2	08/22	5	A more robust version of the above prototype has been operating uninterrupted for some time, though more work can be done
Reporting Period 3			
Planned at end of project	09/23	8	Note that the time listed here is the original end time. Given delays in procuring a post-doc, we will almost certainly seek a no-cost extension.

Transition Plan Status

Status	Planned Completion Date (MM/YY)	Actual Completion Date (MM/YY)	Notes
Attend Transition Plan Training	01/22	01/22	
Initial PI POC meeting	03/22		
Opened the Template	01/22	01/22	
25% Draft	03/22	04/22	
50% Draft	04/22	05/22	
75% Draft	05/22	05/22	
100% Draft submitted to WPO for review	06/22	07/22	Note that the discussion regarding the final submitted report did not occur by the end of reporting period 2.

NOAA Testbeds

Will this project use NOAA Testbed resources?	No
If applicable, provide a summary of the status of collaboration with NOAA Testbeds	N/A

Publications

New this Reporting Period? Yes/No	Date of Acceptance or Publication (MM/YY)	Full Reference and digital object identifier (DOI) if available https://apastyle.apa.org/learn/faqs/what-is-doi

Presentations

New this Reporting Period? Yes/No	Date of Presentation (MM/YY)	Title and Forum of Presentation
No	01/22	*Communicating Wetbulb Globe Temperature: Results from a Usability Study*. Presented at the 102nd Annual Meeting of the American Meteorological Society, 10th Symposium on Building a Weather-Ready Nation – Given By Jeannette Sutton
Yes	06/22	*Communicating Extreme Heat to At Risk Publics: A Content Analytic Study of Tweets from 2021*. American Meteorological Society, 6th Conference on Weather Warnings and Communication. June 14-17, 2022. Milwaukee, WI. (Sutton, J., Olson, M, and Waugh, N. 2022.)

Project web sites or data viewers

Description	Link
Preliminary location to post relevant real-time maps and forecast products. Although these are not a finished version of the proposed work, it is useful for ongoing evaluation by us as well as NWS and other partners. Since the last update, this tool has been used operationally by NWS and has been further refined and updated based upon NWS feedback.	https://operations.nysmesonet.org/~nbassill/NOAA/

Finances

Reporting Period	Actual Reporting Date (MM/YY)	$ Planned to be Spent	$ Actual Spent	Comments
6 month	02/22	~75,000	49,930.75	Planned money is a rough estimate assuming a post-doc would have been hired earlier than currently expected
1 year	08/22	299,541	138,855.04	The value here is the literal value in our proposed budget for year 1, which presumes all personnel are/were present at project outset.
18 month				
24 month				

Issues & Risks

	Description	Mitigation
Issue 1	COVID-19 Pandemic (Ideally we would have been shadowing NWS/NYC OEM during a heat wave(s), but this has not been possible due to COVID)	Rather than in-person events with NWS and NYC OEM contacts, we have done virtual events and communicated via email
Issue 2	Post-doc posting produced few obvious choices	Have hired a qualified visiting scientist from India, beginning just after this reporting period ends
Risk 1	Web development skills may be lacking or un-developable by project personnel	Will attempt to employ local web-dev expertise and/or hire other outside student assistance
Risk 2	May not be able to access CUNY weather station data due to COVID/repair issues	Without this data we still have a robust network of 3 sub-networks across NYC.

Future Work

- Operationalize the WBGT variable so that it displays on our prototype website in real-time for all available NYC observing sites
- The new research scientist will begin work focused on understanding heat impacts in NYC on a more granular level
  - Some sites appear to have biases, so part of this work will also try to understand which biases are representative of that neighborhood, and which biases are due to effects of siting
  - We can relate remotely sensed information, knowledge of tree cover or water bodies, etc. to our observations to better understand these differences
  - Although historical data is limited, we can normalize sites by using a percentile approach
- Finalize usability studies/“field” research components and submit a journal article for publication