

Consortium for Climate Risk in the Urban Northeast



YEAR IN REVIEW

KEY ACCOMPLISHMENTS

A main accomplishment of the past year emerged from joint work with the Mid-Atlantic RISA team (MARISA) in multiple communities on building resilience to coastal flooding. Through this project, we have engaged with the Town of Brookhaven, the Shinnecock Tribe on Long Island, and the Pamunkey Tribe in Virginia.

The influence of the tools and the data created within the project were apparent in the workshop that we held with town officials and community members and leaders, and in our interactions with tribal leadership. Our research has increased flexibility by broadening the range of options that are available for reducing flood damages. Community leaders and residents now realize that there are multiple approaches; that effectiveness of approaches differs substantially across conditions, even from house to house; and that many residents can eliminate almost all future flood damages without elevating their homes, which most residents cannot afford to do.

As a result, some residents are planning to wet-floodproof basements instead of elevating homes, achieving the same damage reduction effectiveness at much lower cost. Deliberating the options and the implications of the choices has improved capacity to organize and advanced planning as several community organizations in Mastic Beach have come together to consider community-wide objectives and how to best make progress toward them.

Photo courtesy of Franco Montalto



CCRUN

CONSORTIUM FOR CLIMATE RISK
IN THE URBAN NORTHEAST

A NOAA RISA Team

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ccrun.climate.columbia.edu



COMMUNITY BOARDS IN BRONX AND MANHATTAN, NEW YORK

We have started a new partnership with the communities surrounding Hunter College, Manhattan Community Boards 8 and 13, and Bronx Community Boards 1 and 2. Two workshops focused on capacity building of both communities and Hunter were held. The partnership seeks to harness the knowledge and resources of both groups to address climate impacts and improve the quality of life of Hunter's surrounding neighborhoods.



IDENTIFYING COMMUNITY NEED- BASED ADAPTATION AND RESILIENCE PRIORITIES

In a new NSF-funded project, CCRUN (Co-PI Orton) is working to integrate advanced Earth systems science with community engagement methodologies, focusing on developing practical solutions for living shoreline design, high resolution wave and flooding modeling, machine learning-enabled flood alerts, and policy innovation protocols.

NEW FOCUS AND PARTNERSHIPS

BUILDING LOCAL CAPACITY

The Building Local Capacity team began a new focus area on economic resilience, building on prior expertise and projects on small business resilience. The team has co-authored a chapter on environmental resilience in the Springer *Handbook of Economic Geography*. This focus area on economic resilience enables our team to more fully integrate economic actors, including small businesses, into ongoing analysis of regional resilience. The team has also begun working closely with the Hudson River Foundation's Social Science Research Program through its inaugural Social Science Research grant. Co-PI Leichenko and graduate student Cann have participated in training and information sessions and joined a community of practice with other grantees conducting social and environmental research in the Hudson River Watershed. This partnership has allowed our CCRUN team to form a new network with researchers and community leaders across the region. Participation in the community of practice has resulted in useful feedback on ongoing research projects, enabling us to refine and strengthen our methodologies and form new research contacts.

DARBY-COBBS WATERSHED

CCRUN began work on a National Fish and Wildlife Foundation-supported project in the Darby-Cobbs watershed. This partnership expands CCRUN's engagement in watershed-scale collaboration and data management, bringing together researchers and stakeholders to improve data sharing and support future restoration and resilience planning. Overall, the project seeks to review existing studies, identify knowledge gaps, and initiate development of a centralized watershed database of relevant datasets.

CCRUN also made its NOAA-funded hydrologic and hydraulic (H&H) model of the Darby-Cobbs watershed and online data portal available to support this new work. The CCRUN H&H model is being used to explore stakeholder-derived flood mitigation strategies. The CCRUN data portal is being used to create an online location where stakeholders can access relevant spatial and temporal datasets.



KEY RESEARCH FINDINGS

SIMULATION OF URBAN COMPOUND FLOODING

Flooding in the coastal built environment poses significant risks to communities and infrastructure, with sea level rise (SLR) and increasing storm intensity expected to exacerbate these threats. We published a study that investigates the effects of changes in climate on extreme compound flooding due to SLR and intensified extreme rainfall in Hoboken, New Jersey (Amini et al., 2026). We find that while SLR primarily affects neighborhoods near the shoreline, rainfall intensification generates more widespread flooding throughout the study area. Most significantly, compound flooding scenarios produce substantially different and more severe impacts than the sum of individual drivers. The assessment of critical infrastructure reveals differentiated vulnerability, with some facilities showing greater sensitivity to SLR and others to rainfall intensification, necessitating tailored protection strategies.

SPATIAL SCALES OF EXTREME PRECIPITATION

While many have studied rainfall intensity and frequency at a fixed location, there is relatively less research on the spatial area of daily extreme precipitation (EP) events. We analyze the baseline and trends in the spatial size of daily EP events from 1980 to 2024. We find that, while small-area EP events are far more numerous, the largest-area EP events are nevertheless responsible for most EP (Chatterjee et al., 2026). These events are also more intense on average than small-area events and increasing in their frequency in the eastern United States. Taken together, these results hint at the risk of outsized flood impacts from widespread EP events, and advocate for the inclusion of more nuanced spatial characteristics when communicating about and preparing for flooding and flood damages.



OUTPUTS AND TOOLS

CCRUN's H&H model is being used to explore stakeholder-derived flood mitigation strategies in the Darby-Cobbs watershed. Stakeholders are able to access datasets online through a newly developed data portal.



HIGHLIGHTED PUBLICATIONS

- Amini, E., Marsooli, R., Orton, P., Kasaei, S., & Hajj, M. (2026). [High resolution simulation of urban compound flooding under climate impacts](#). *Urban Climate*, 65, 102771.
- Chatterjee, T., Touma, D., Sobel, A., & Horton, R. M. (2026). [Climatology and Trends in Spatial Scales of Extreme Precipitation Over Land in the Contiguous US](#). *Geophysical Research Letters*, 53(8), e2025GL120662.