NOAA Urban Heat Island Virtual Reality Experience

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Background

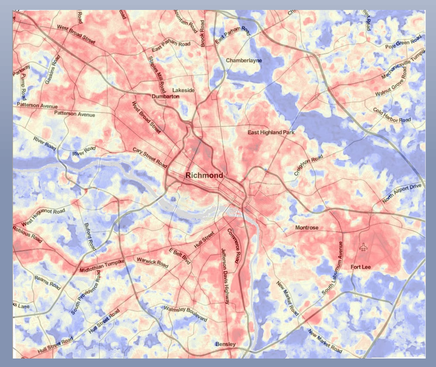
Urban Heat Islands mapping

Jeremy Hoffman from the Science Museum of Virginia, and Vivek Shandas from the Portland State University/CAPA Strategies, in collaboration with Richmond, VA community members and supported by a grant from NOAA's Environmental Literacy Program developed a methodology to collect temperature measurements obtained by community members, analyzed them alongside satellite data using Machine Learning to develop heat maps of a city.

Morgan Zabow (NOAA) and a volunteer set up a sensor on a car. *NOAA CPO*

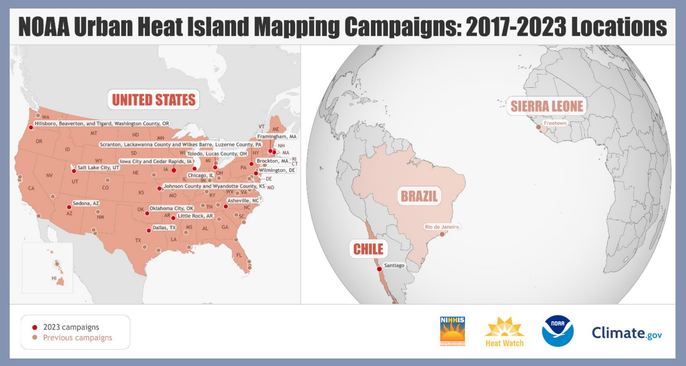
Land surface temperature. *NOAA View*

Machine Learning



Growing mapping campaigns

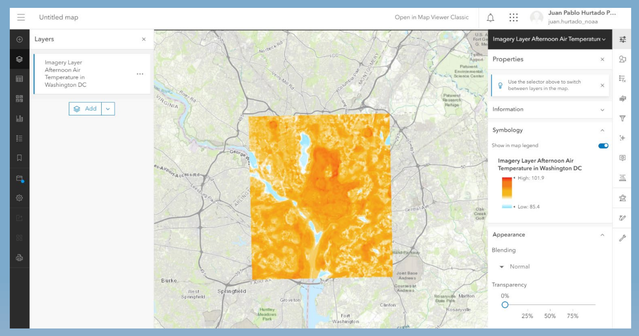
With further support from NOAA's Climate Program Office the mapping campaigns have been increasing in number of cities mapped every rear, including international cities.

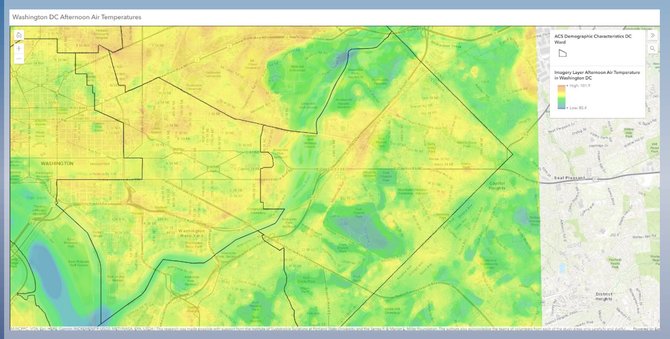


Enhancing and Disseminating the Data

Processing GIS Layers

The data collected from the Urban Heat Island campaigns is shared by the NOAA Environmental Visualization Lab at NESDIS as geospatial services. The data is processed on a city-by-city basis, changing color pallets, and publishing using NESDIS ArcGIS Servers on heat.gov and the NOAA Geoplatform for public access.



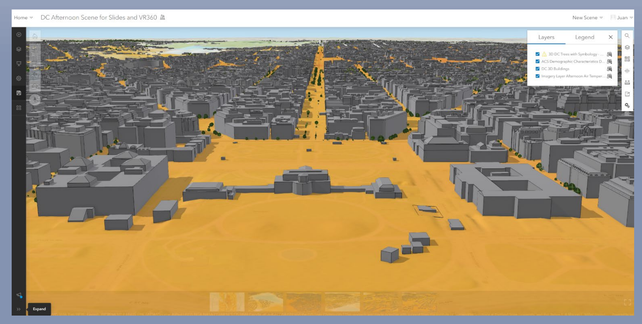


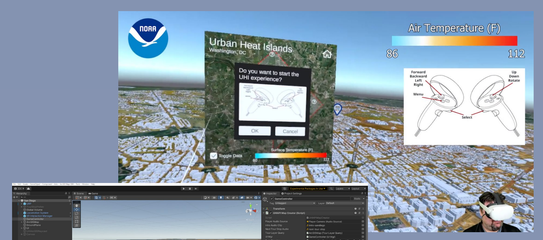
Outreach and UHI

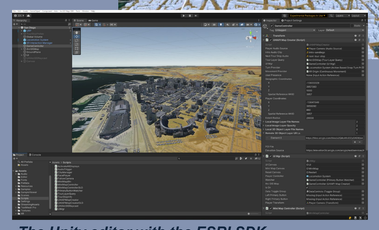
The Faunteroy Center, a NOAA grantee, works on climate resilience for the community of DC's Ward 7th. As part of their Juneteenth celebration, an online app showing the UHI effect in Washington DC was created and there was a great response from the audience

3D Visualization

3D visualization was explored to enhance the user experience and understanding of the data. Other layers, such as buildings and trees, were included to add more realism to the data. By immersing the public in the science behind climate issues, this innovative project promotes awareness, understanding, and action toward building more sustainable and resilient cities.







The Unity editor with the ESRI SDK

ESRI SDK, Unity, and Virtual Reality

While working on this project ESRI released v 1.0 of their new SDK for Unity and this project was used as a test for that new technology with excellent results.
In the Urban Heat Island of Washington DC Virtual Reality (VR) Experience you will discover a new perspective of Washington D.C. like you never have seen before. The VR experience allows users to fly around Washington DC using a headset. The city is populated with detailed 3D buildings that are laid over the urban heat island afternoon temperature readings.

The Impact

Dr. Rick Spinrad, NOAA Administrator tries out the UHI VR Experience at COP 27 in Egypt

2023 Innovation Champion Award from ACT-IAC

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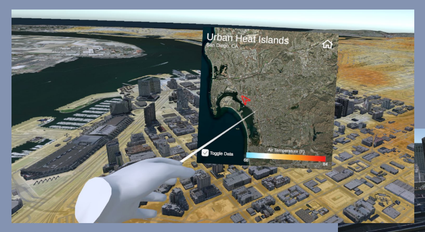
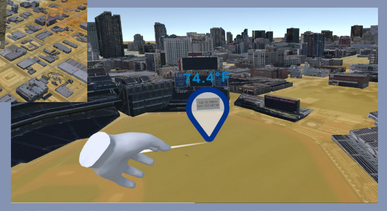
The Future



Additional cities such as San Diego, CA, with more self exploration and ways to probe the data, but without long narrations at waypoints.



Additional options by "gamifying" the experience and analysis tools such as point probing for surface temperature

Digital Twins

A digital twin is a virtual replica of a physical system or process that can be used to simulate and predict its behavior in real-time. Adding more data, additional analysis tools, and creating a multi-user experience could one day form the foundation of a digital twin.

Magic Leap in collaboration with the California Department of Forestry and Fire Protection (CAL FIRE)