

From Global Models to Local Impacts

Interactive "Explor-anatory" Visualization of CMIP Data for Museumgoers

Alex Gurvich, Ph.D.

NASA Scientific Visualization Studio

AGU2024 - Merging Worlds: Integrating Data Visualization with GIS for Science and Application

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Disclaimer:
The views and opinions expressed in this presentation are **my own** and do not necessarily reflect the official policy or position of **NASA**.

Hometown Dashboard is an interactive visualization application deployed at the Smithsonian National Museum of Natural History.



Earth Information Center (EIC)
Smithsonian National Museum of Natural History
National Mall, Washington DC
Opened: October 8th 2024



The EIC is a NASA-led effort with six other Federal agencies to make actionable Earth data available to the public.

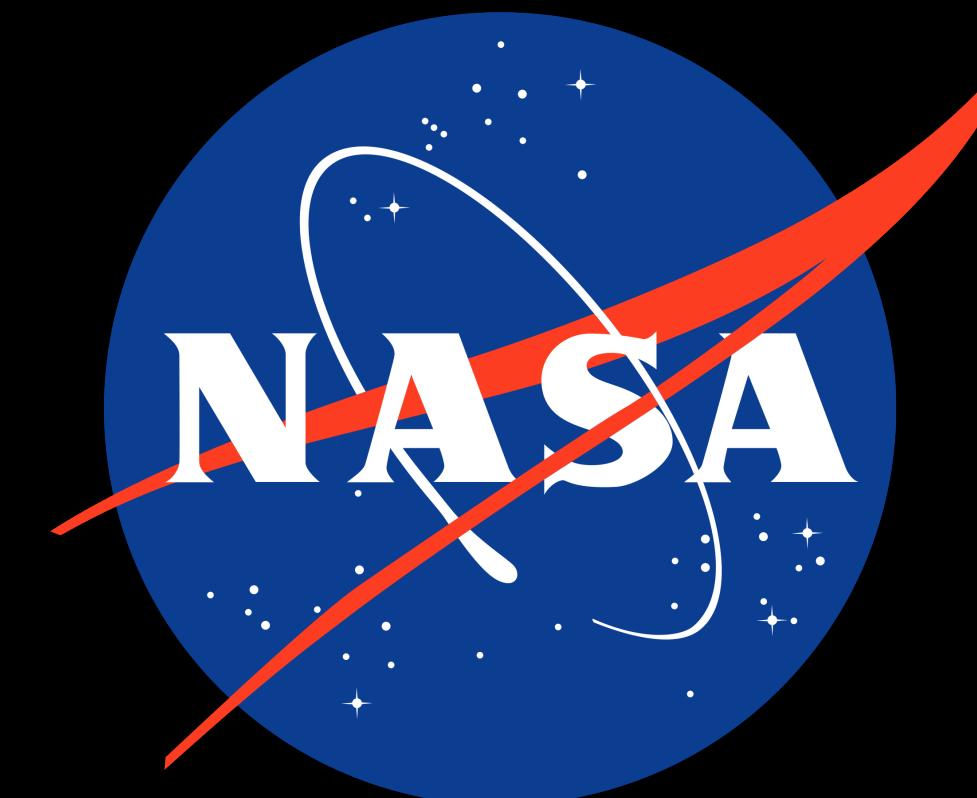
Earth Information Center



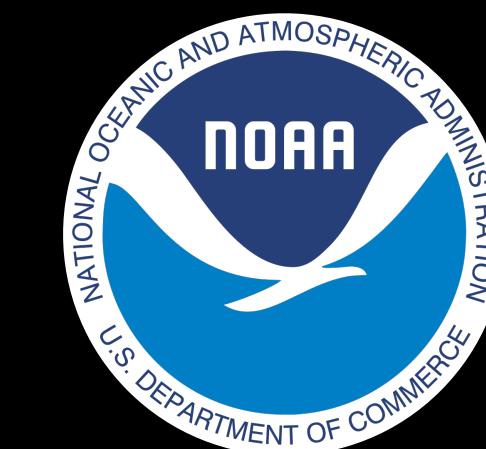
FEMA

USDA

EPA



USAID
FROM THE AMERICAN PEOPLE

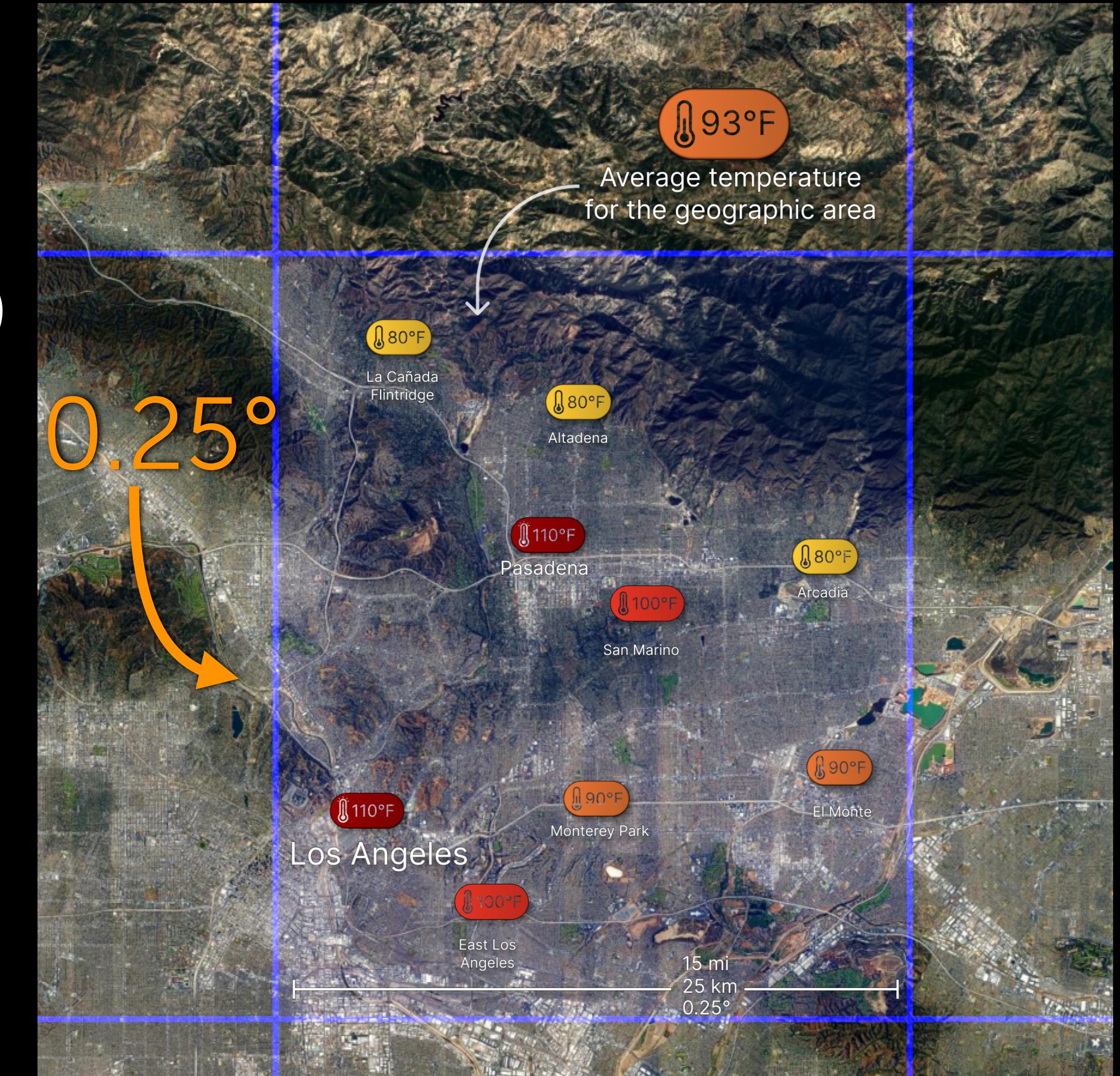


USGS
science for a changing world

Hometown Dashboard uses state-of-the-art climate model data.

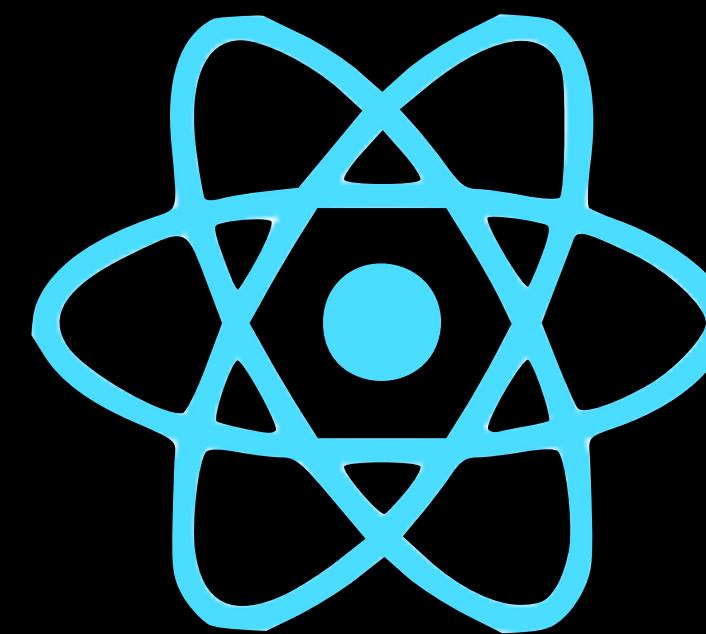
- ensemble median of 35 global climate models
- NASA Earth Exchange (**NEX**)
Global Daily Downscaled Projections (**GDDP**)
Coupled Model Intercomparison Project Phase 6 (**CMIP6**)

150 year time series @
monthly cadence on a
0.25° x 0.25° grid
- two variables
maximum daily temperature &
total precipitation
- four tier 1 emissions scenarios
low, intermediate, high, very high



Hometown Dashboard uses a modern web technology stack with a **serverless** architecture.

interface with



React

mapping with



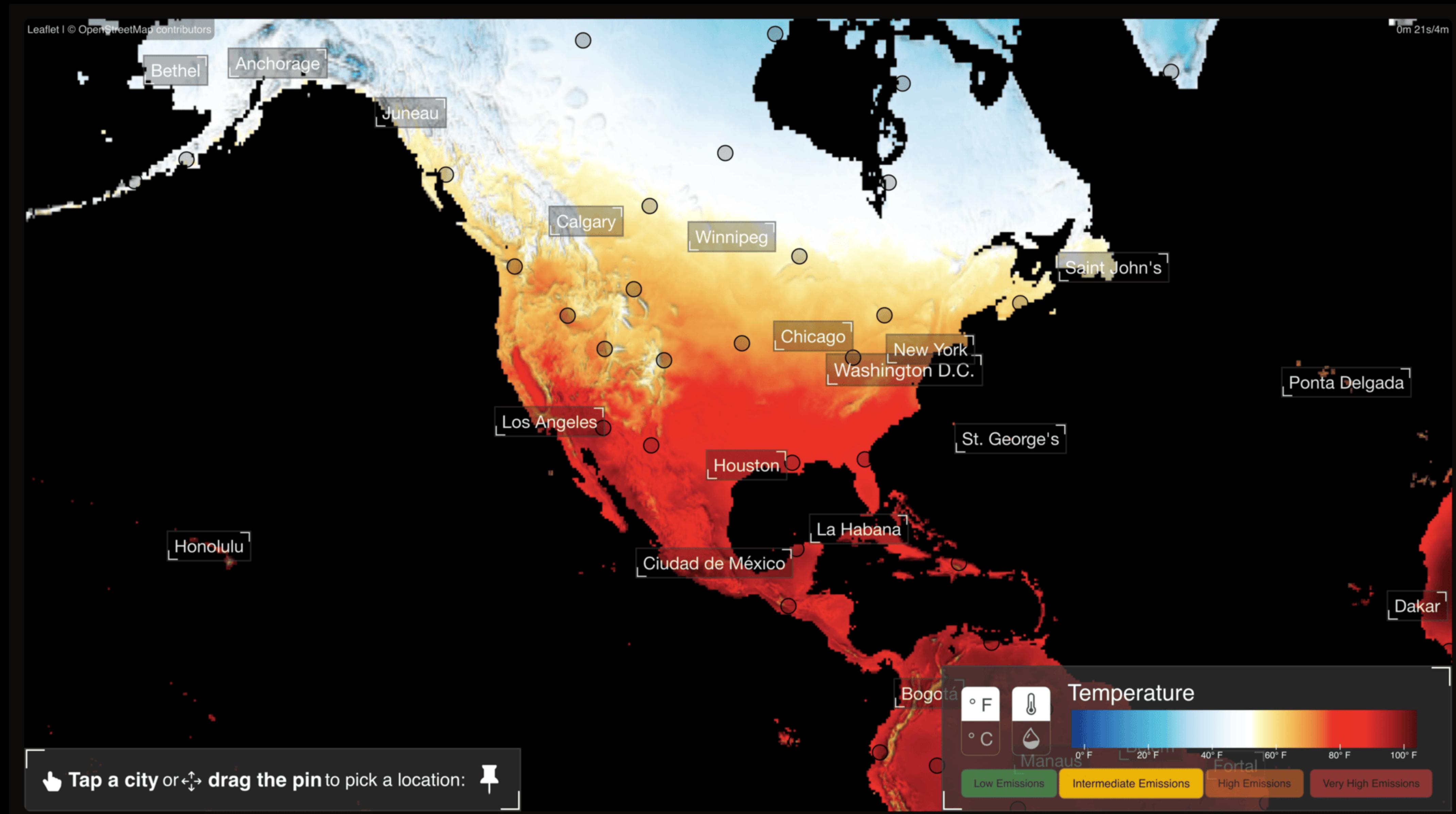
interactive data visualization with



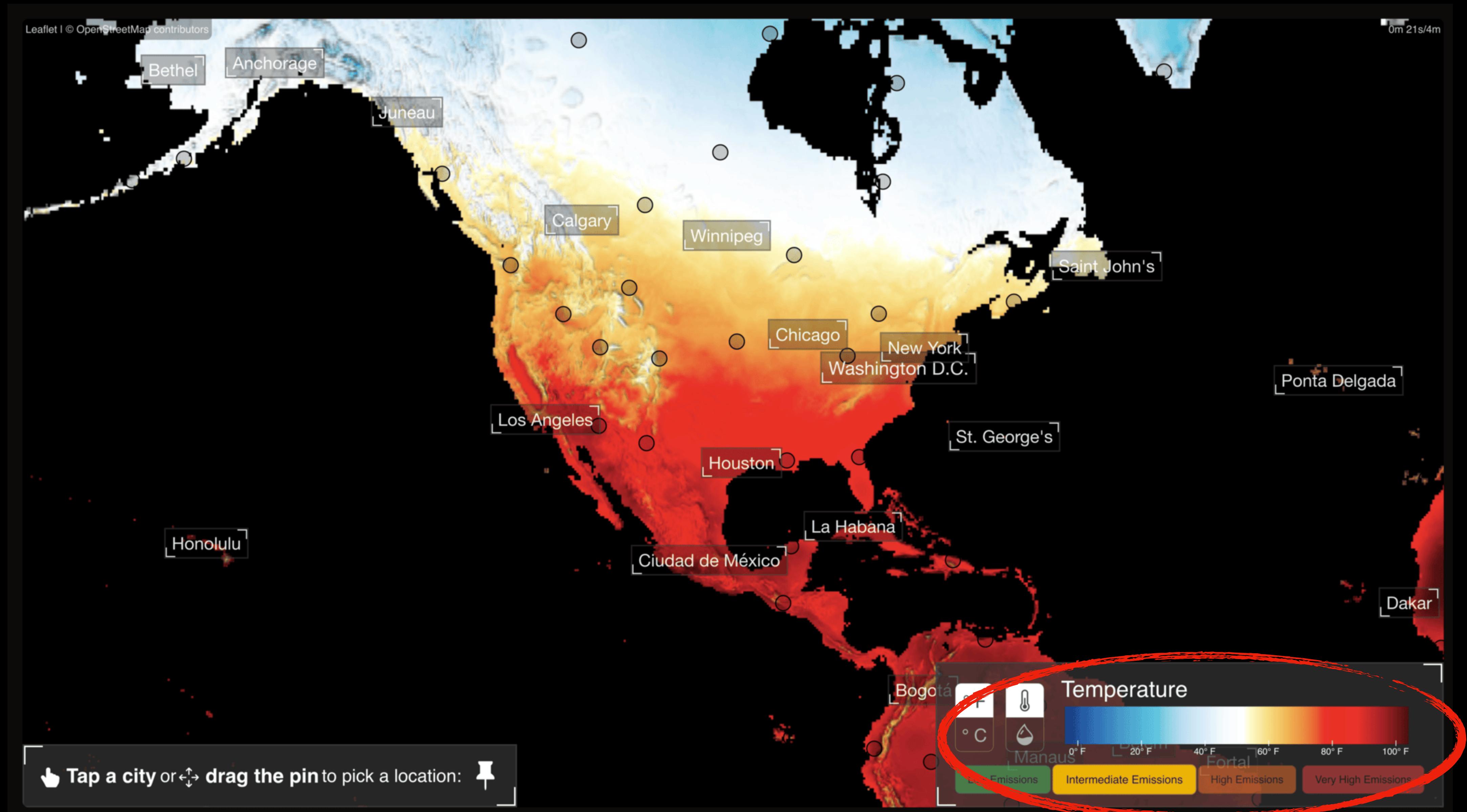
deployment with



The application opens in the map-view with a **passive attractor screen** that pans across the globe.



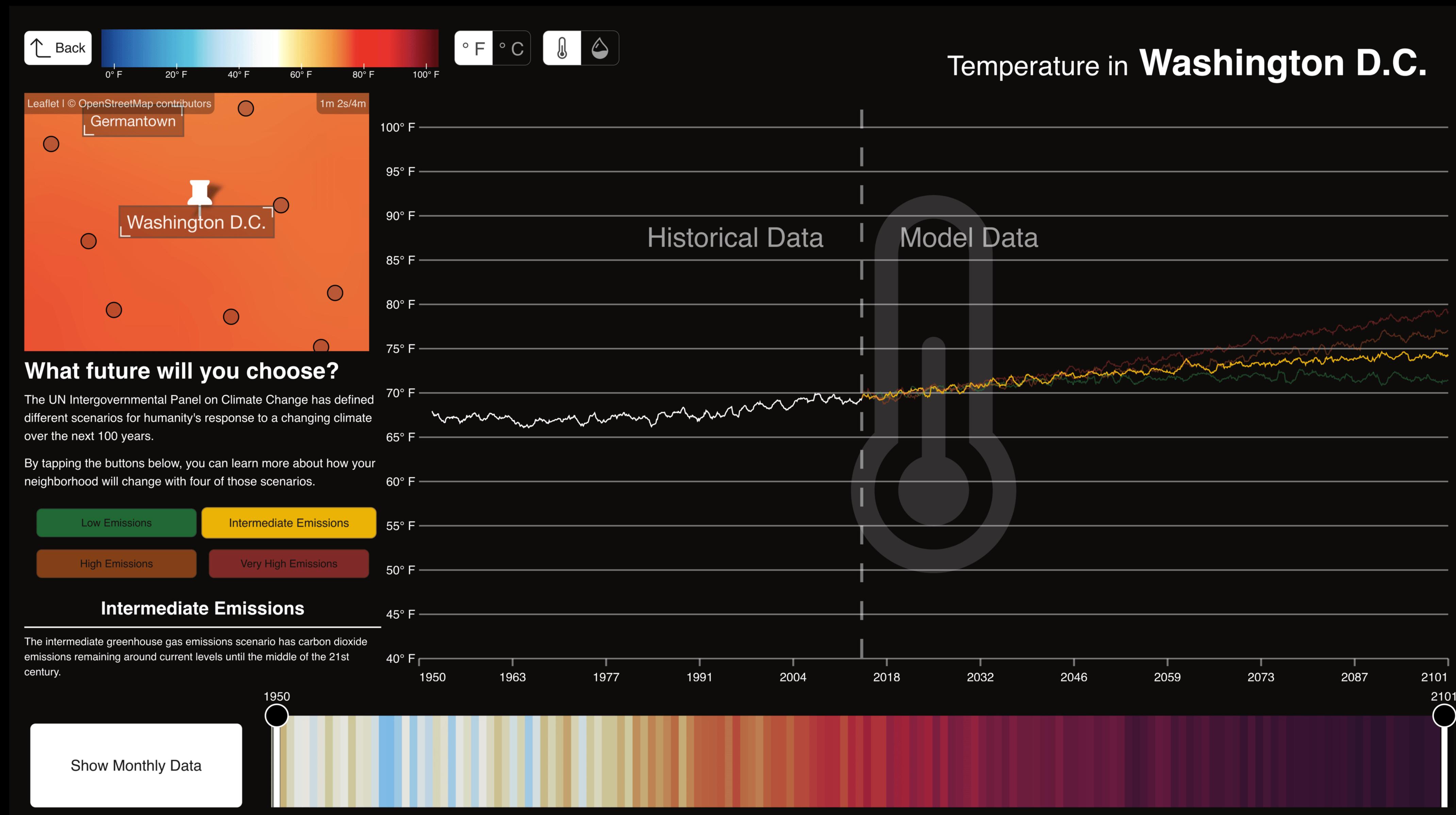
Interface **buttons** allow users to interactively switch between **units**, **variables**, and **scenarios**.



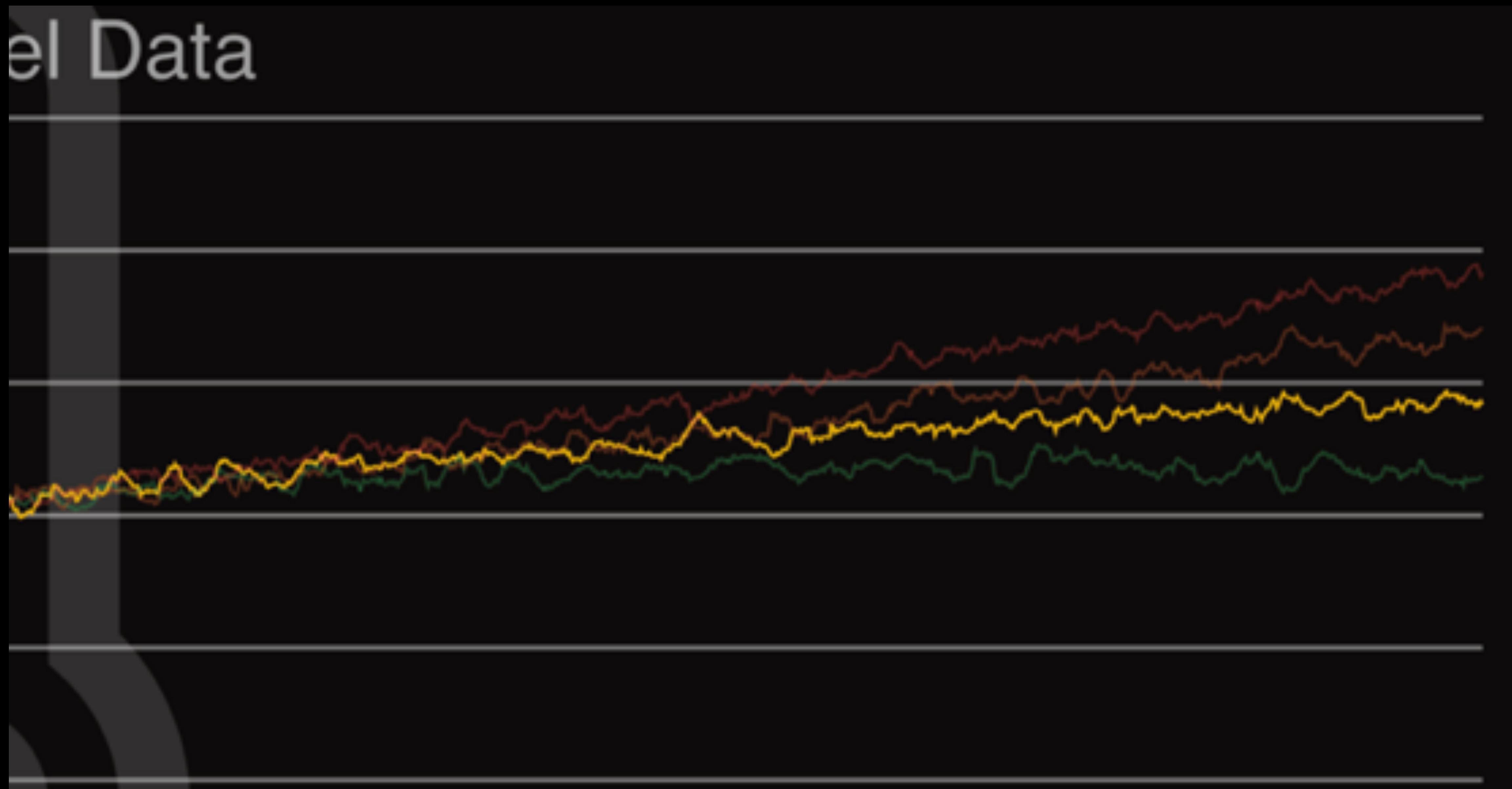
Zooming in reveals additional city labels using Open Street Maps data, which provides labels for 40k cities.



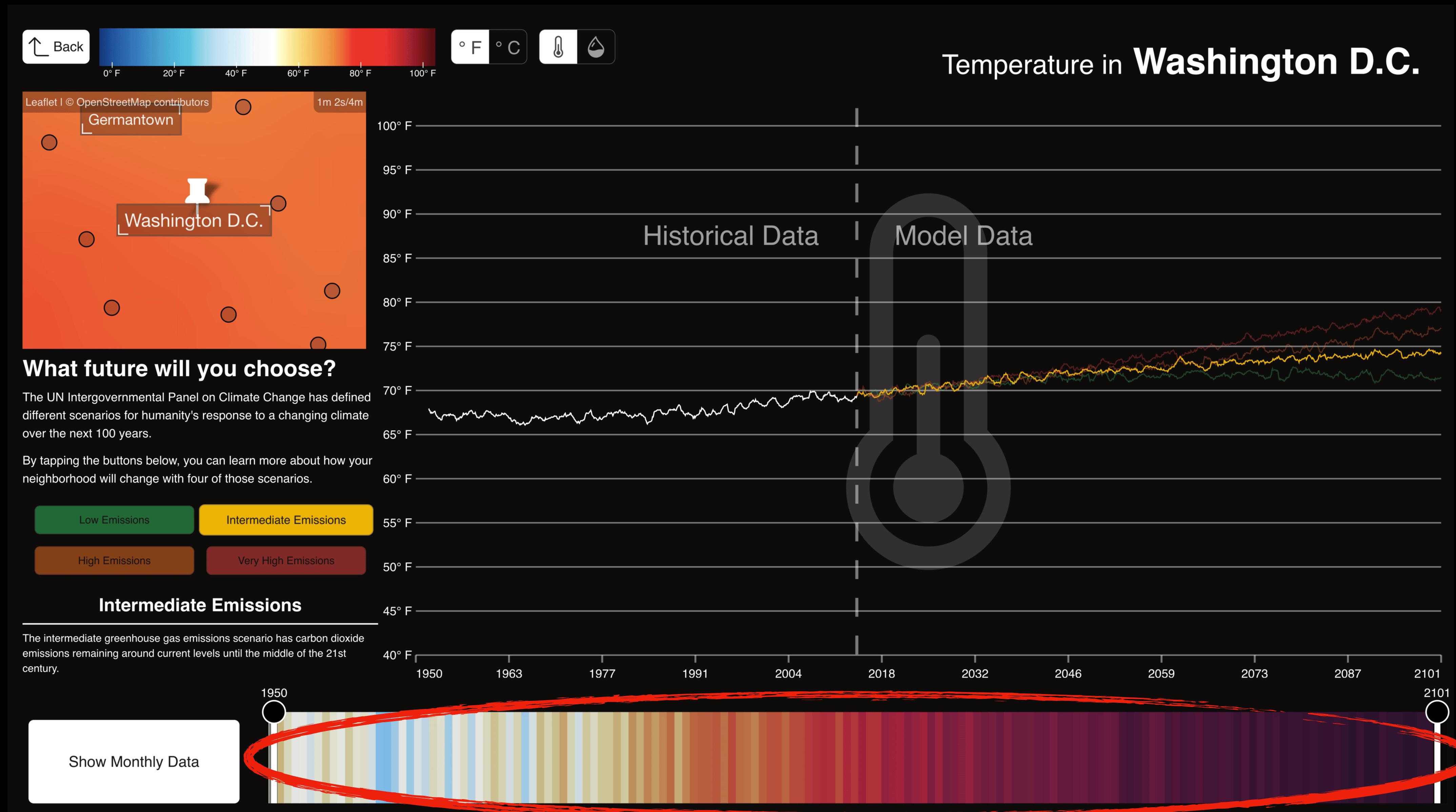
Tapping a label opens the **interactive dashboard view**, allowing users to explore their hometown's data.



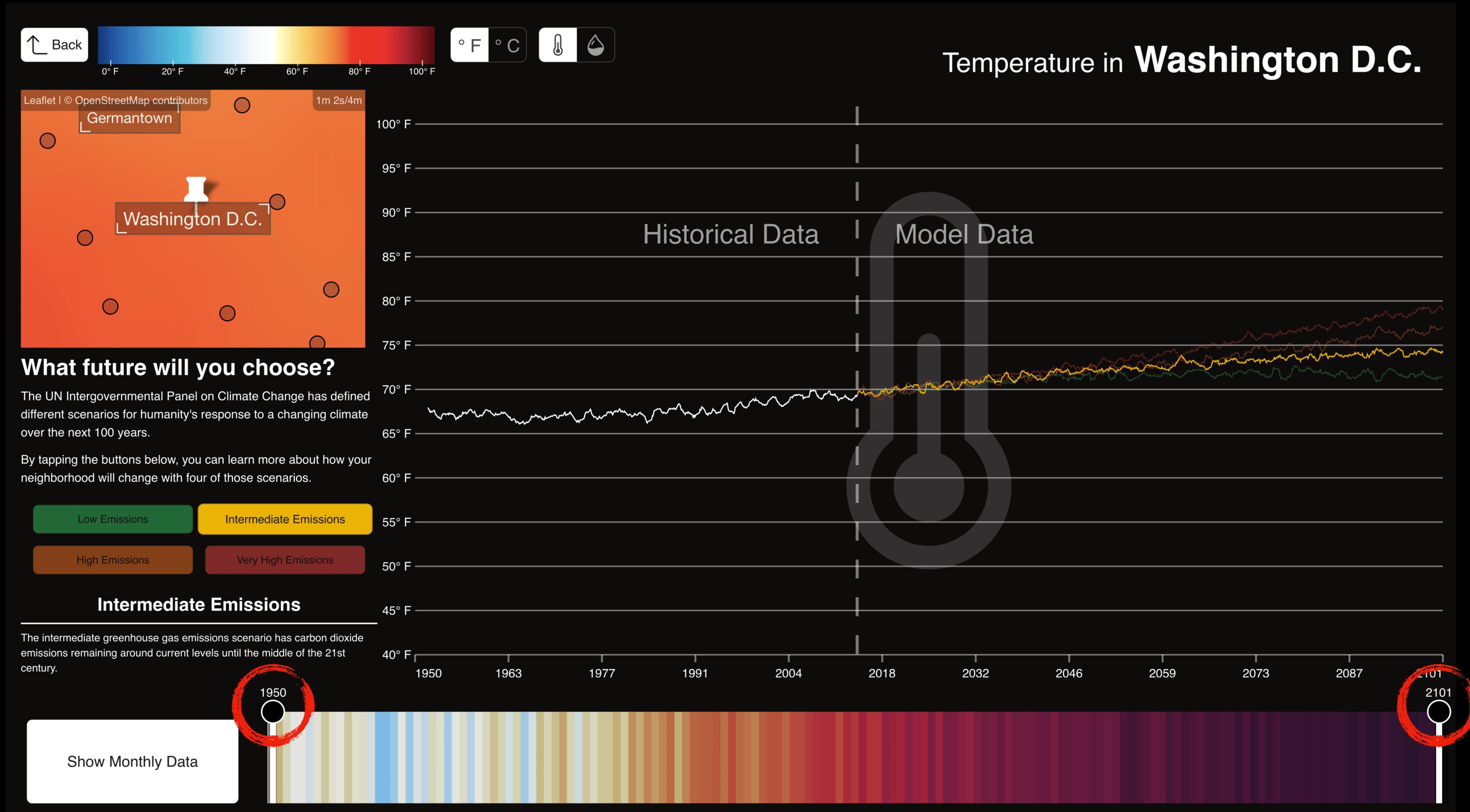
Inactive scenarios are overlayed with low opacity for easy comparison.



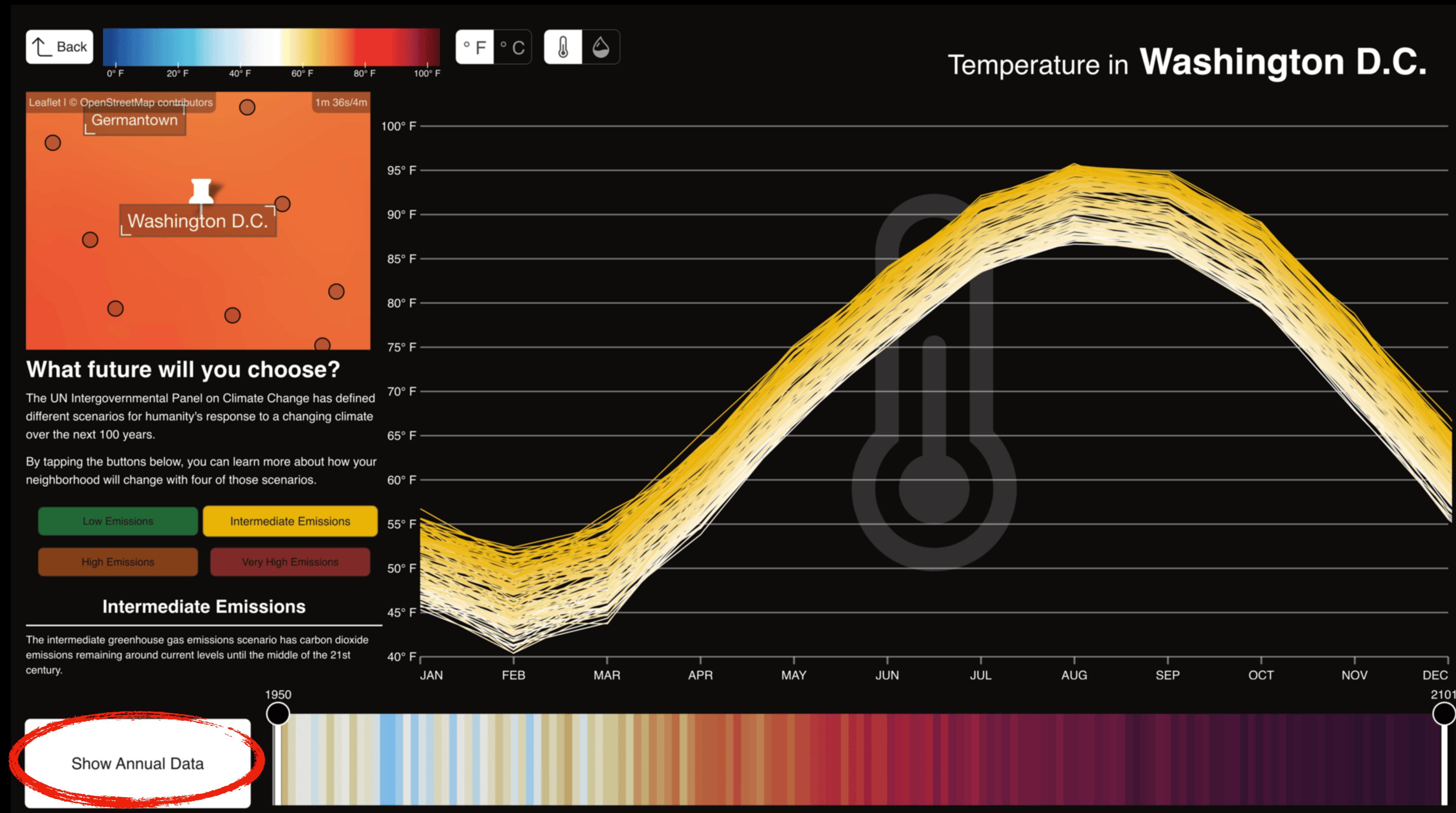
The timeline **double encodes** the data as **Climate Stripes**; this is the **first time** Climate Stripes have been produced on a **global grid**.



Slider handles allow users to interactively focus the time interval on specific periods of time.



The monthly view groups the data by year to show seasonal variation.



Learn more about how to integrate **explanatory** elements into **exploratory** visualizations from the Data Visualization Society's **Nightingale** magazine.

1. Provide a Space for Exploration

- Create open-ended experiences that allow users to explore data in multiple ways rather than following a fixed narrative.
- Enable users to bring their own questions, knowledge, and meaning to the visualization.

2. Use Familiar Objects, Actions, or Representations

- Incorporate familiar visual elements and interactions to reduce cognitive overload.
- Use familiar entry points to make complex data more approachable for a broader audience.

3. Structure the Interaction

- Guide users through the data with clear instructions, limited functionality, and salient controls.
- Avoid overwhelming users by prioritizing key interactions and organizing the visualization for focus and ease of use.

4. Foster Social Interaction

- Design the visualization to encourage collaborative exploration and shared learning experiences.
- Provide multiple interaction points or tools that allow groups to engage simultaneously without interfering with each other.

5. Leverage the Power of Words

- Use embedded text, annotations, or tooltips to guide interpretation and explain the data.
- Ensure the text is contextually integrated within the visualization to support exploration directly.

<https://nightingaledvs.com/beyond-storytelling-with-data-guidelines/>

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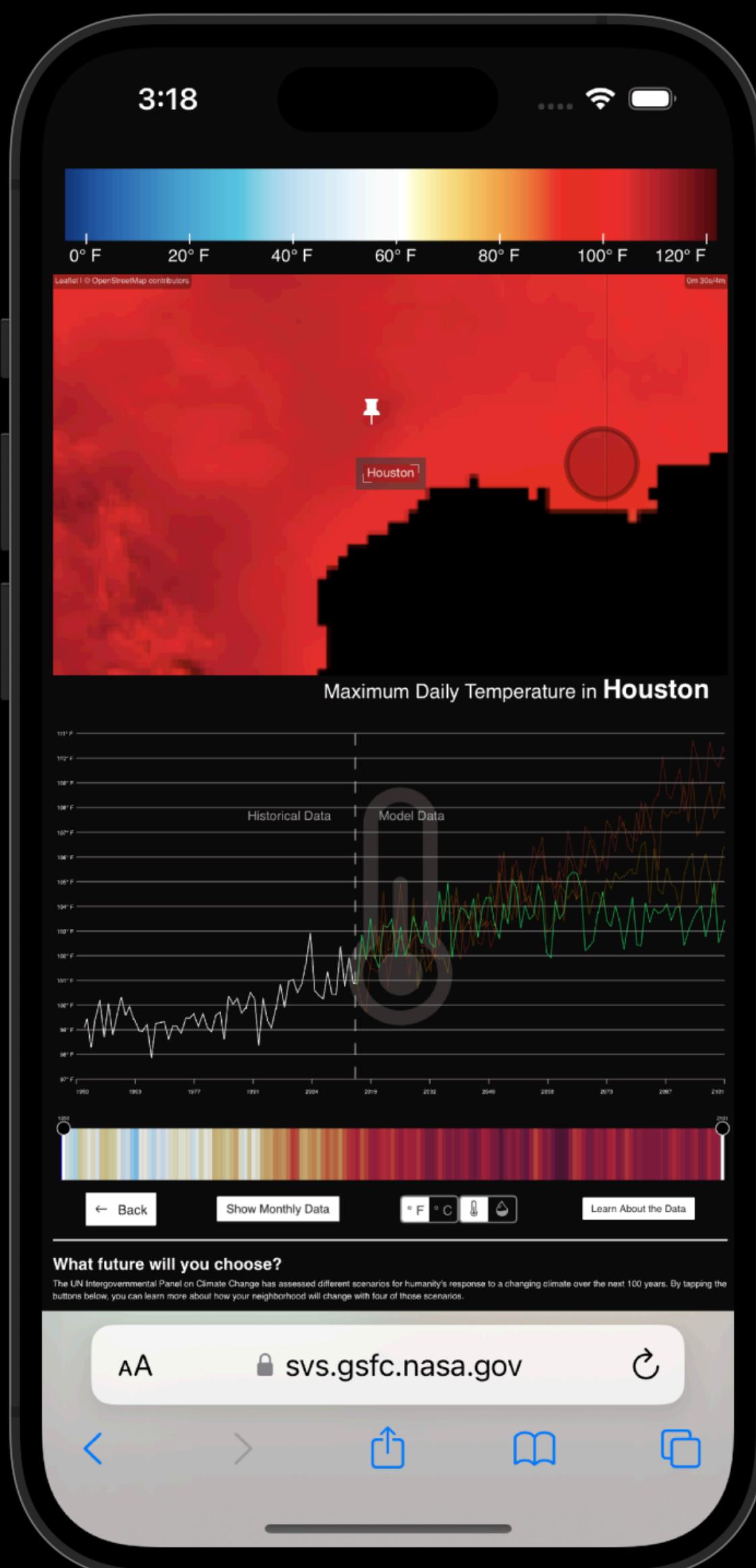
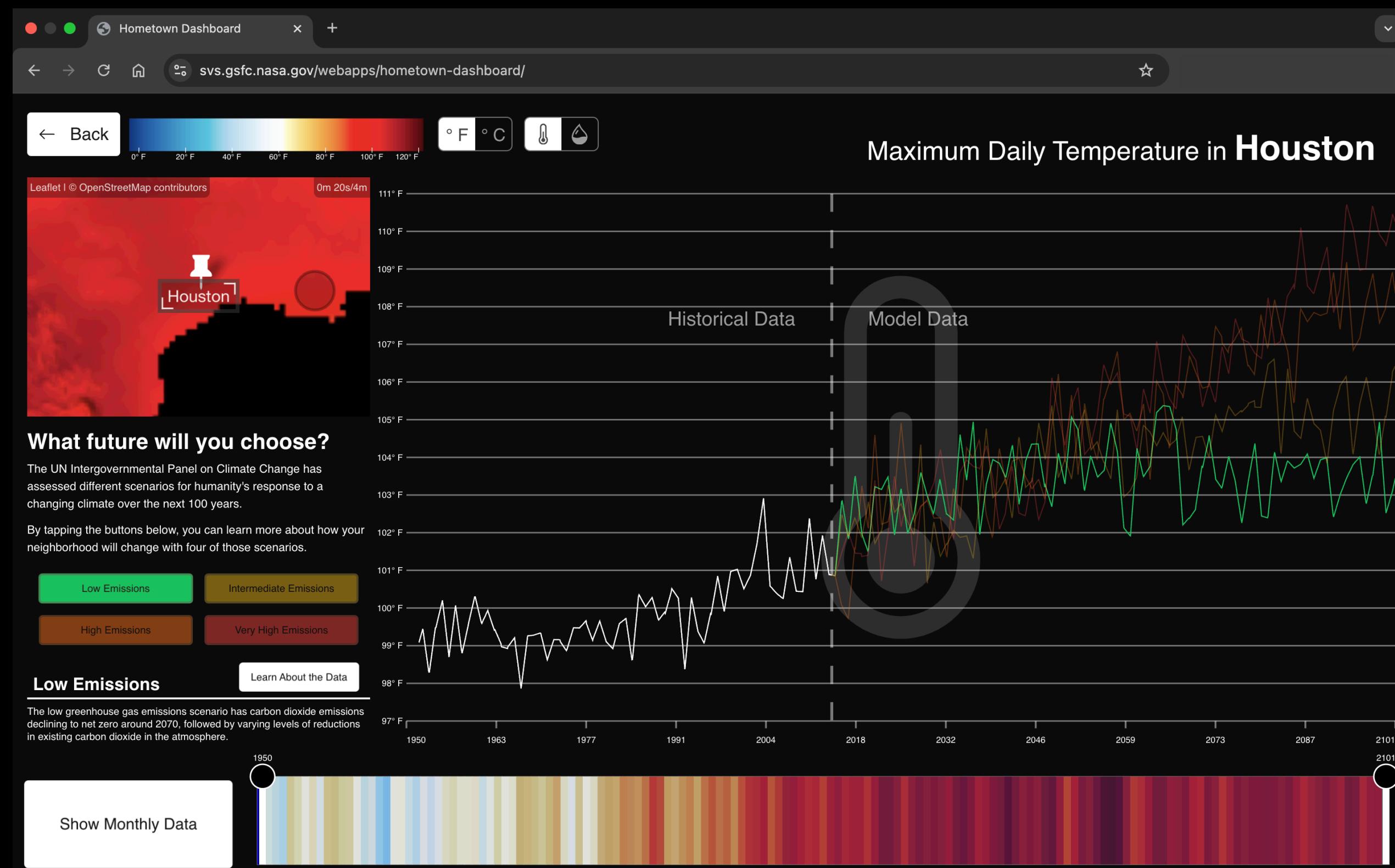
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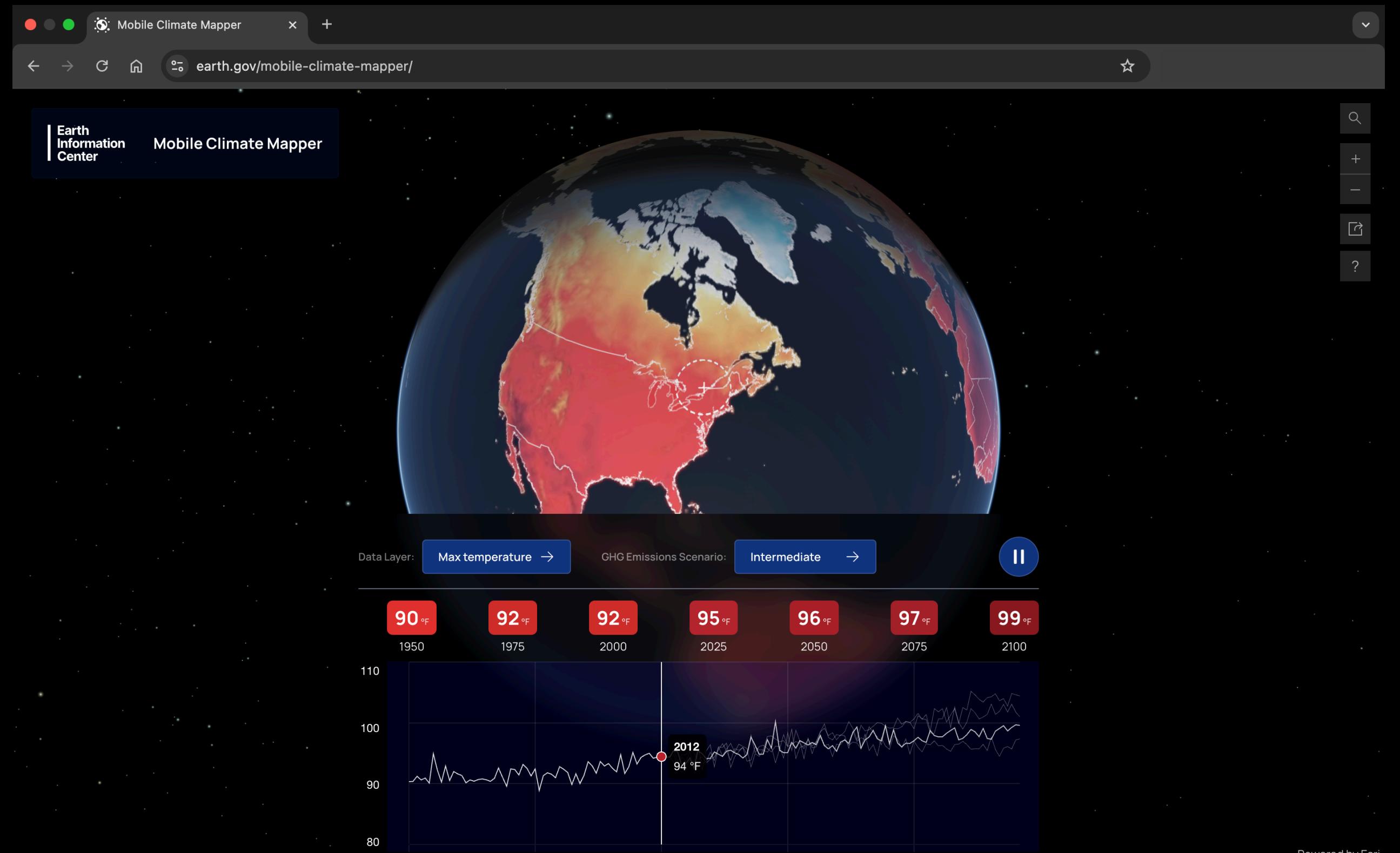
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Try out Hometown Dashboard for yourself in the exhibition hall or online.

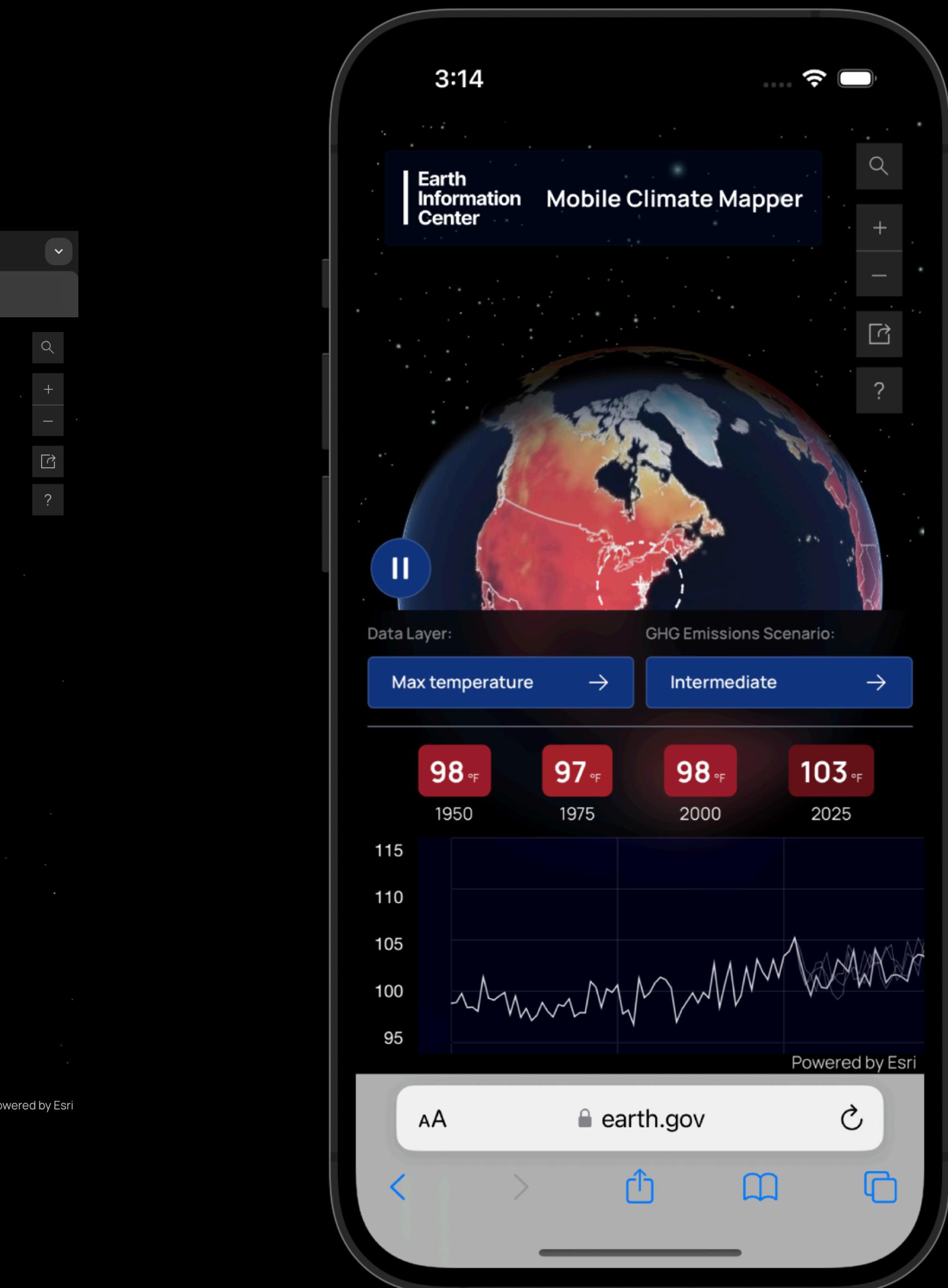


<https://svs.gsfc.nasa.gov/webapps/hometown-dashboard>

Or try out the EIC's **Mobile Climate Mapper**,
Hometown Dashboard's mobile-first companion app.



<https://earth.gov/mobile-climate-mapper>



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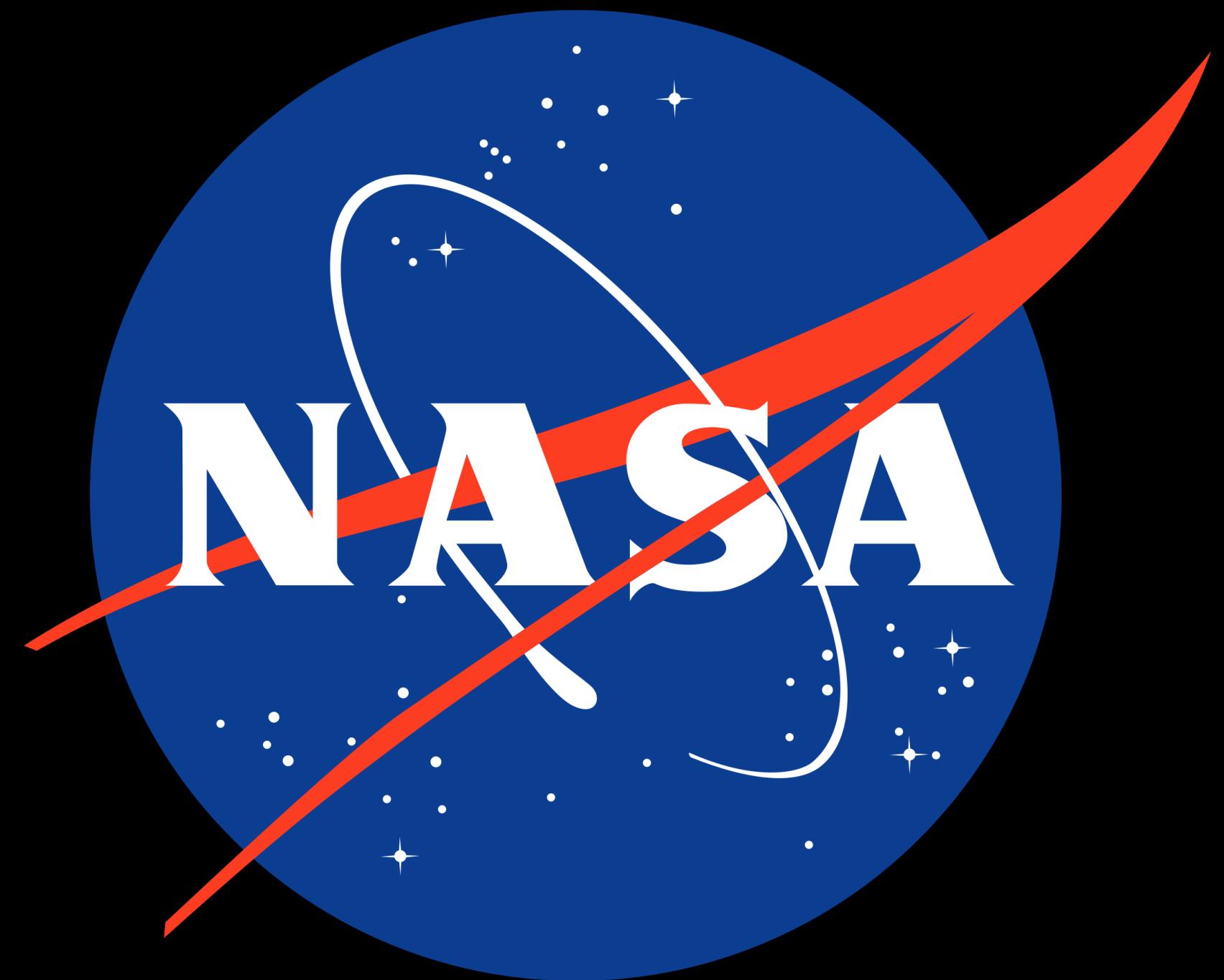
development **SEED**

<https://earth.gov/mobile-climate-mapper>



Thanks for listening!

Earth
Information
Center



a copy of these slides is available at:
<https://www.alexbgurvi.ch>