





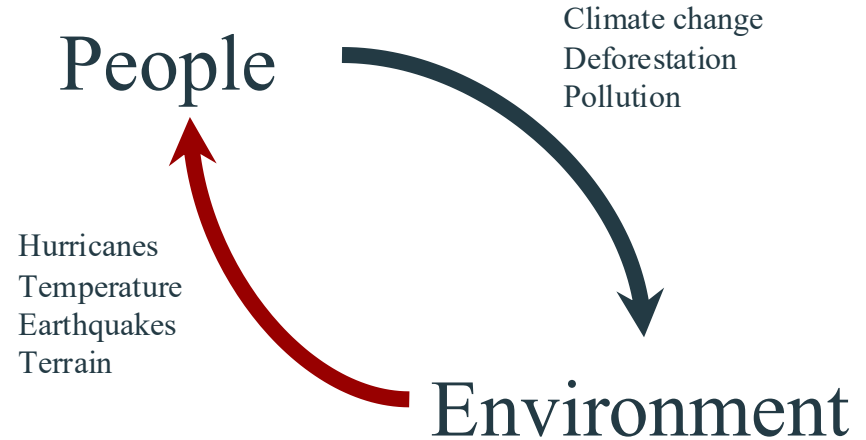
Population Weighted Environmental Variable Database

Etienne Ortega
Wenxin Tang
UCR ORCA Forum
May 9, 2025

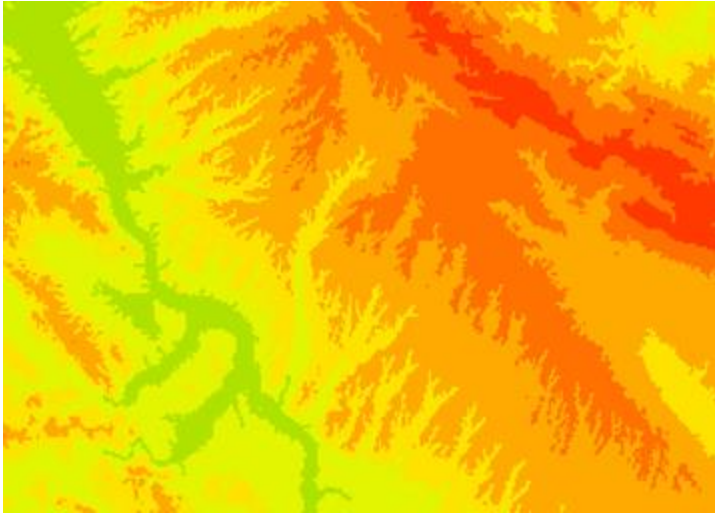


Where this dataset came from...

- Cost of Public Goods
 - Ortega (forthcoming)
 - presented at MPSA 2025
- Bad environment ->
hard to build infrastructure ->
disappointment with regime
- Rugged terrain -> hide rebel groups (Fearon 2003)
- Poor operationalization, not socially weighted



Earth Sciences vs. Comparative Politics



Country	Year	P.W. Elevation
USA	2010	273m
China	2015	254m
Mexico	1975	1028m
Mexico	2020	1018m



Operationalization

Social Weighing

How to weigh

$$\bar{x} = \sum_{i=1}^n w_i x_i$$

What to weigh by

- Population
- Economic Activity
 - Night light
 - Crop Land

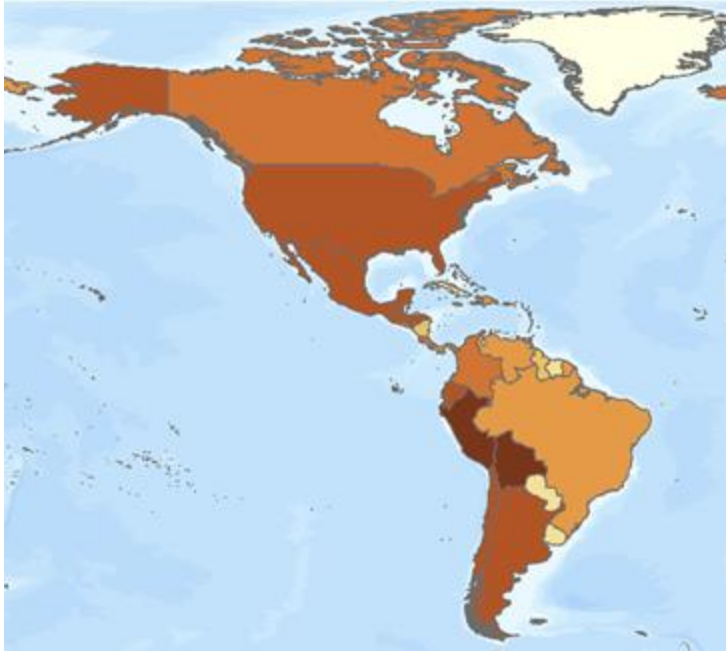
Other socially weighted geographic datasets...

Variables	Paper
Population Density	Edwards et al. (2021)
PM-2.5 Concentration (no per-year data)	ArcGIS Hub (2020)
Heating- and Cooling-Degree-Days (only U.S.)	U.S. E.I.A. (2023)
Heating- and Cooling-Degree-Days	Mistry (2019)
Temperature, Precipitation (weighing by night light, cropland)	Gortan et al. (2024)

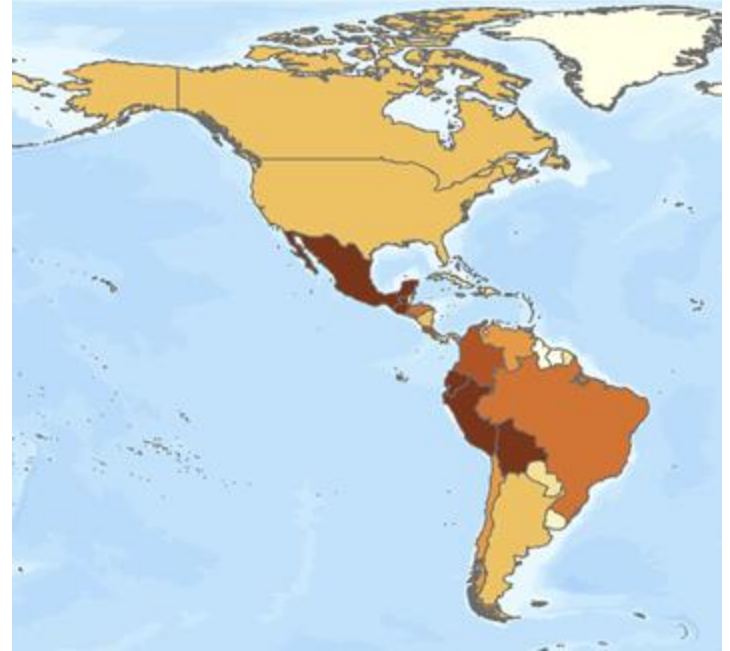


Sneak Peak...

Elevation

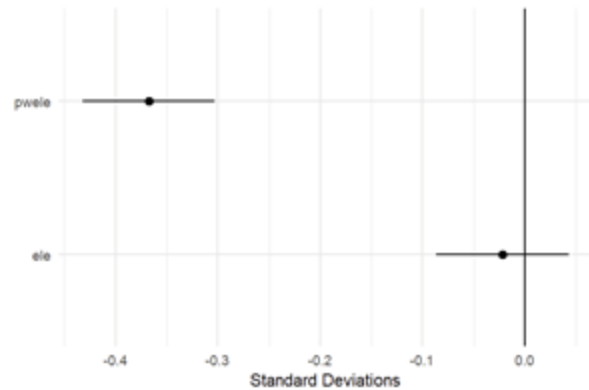


Average Elevation

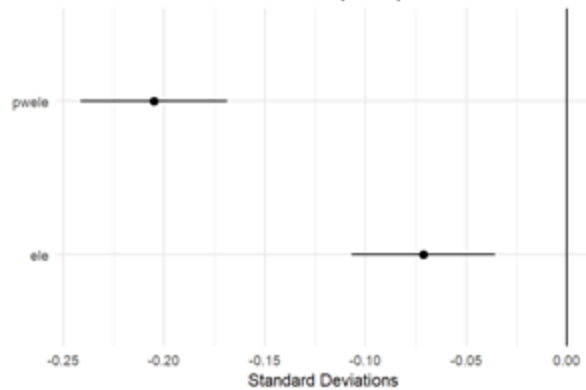


Population- Weighted Elevation
2015

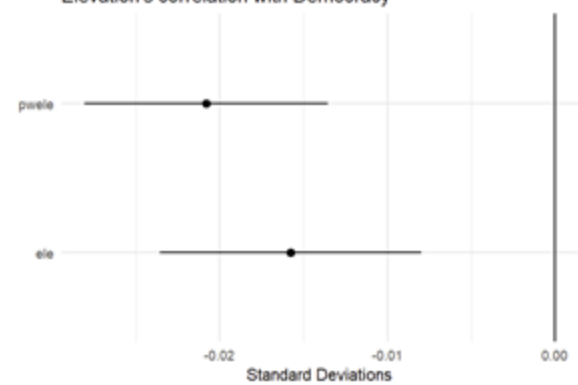
Elevation's correlation with Infrastructure



Elevation's correlation with PPP per capita

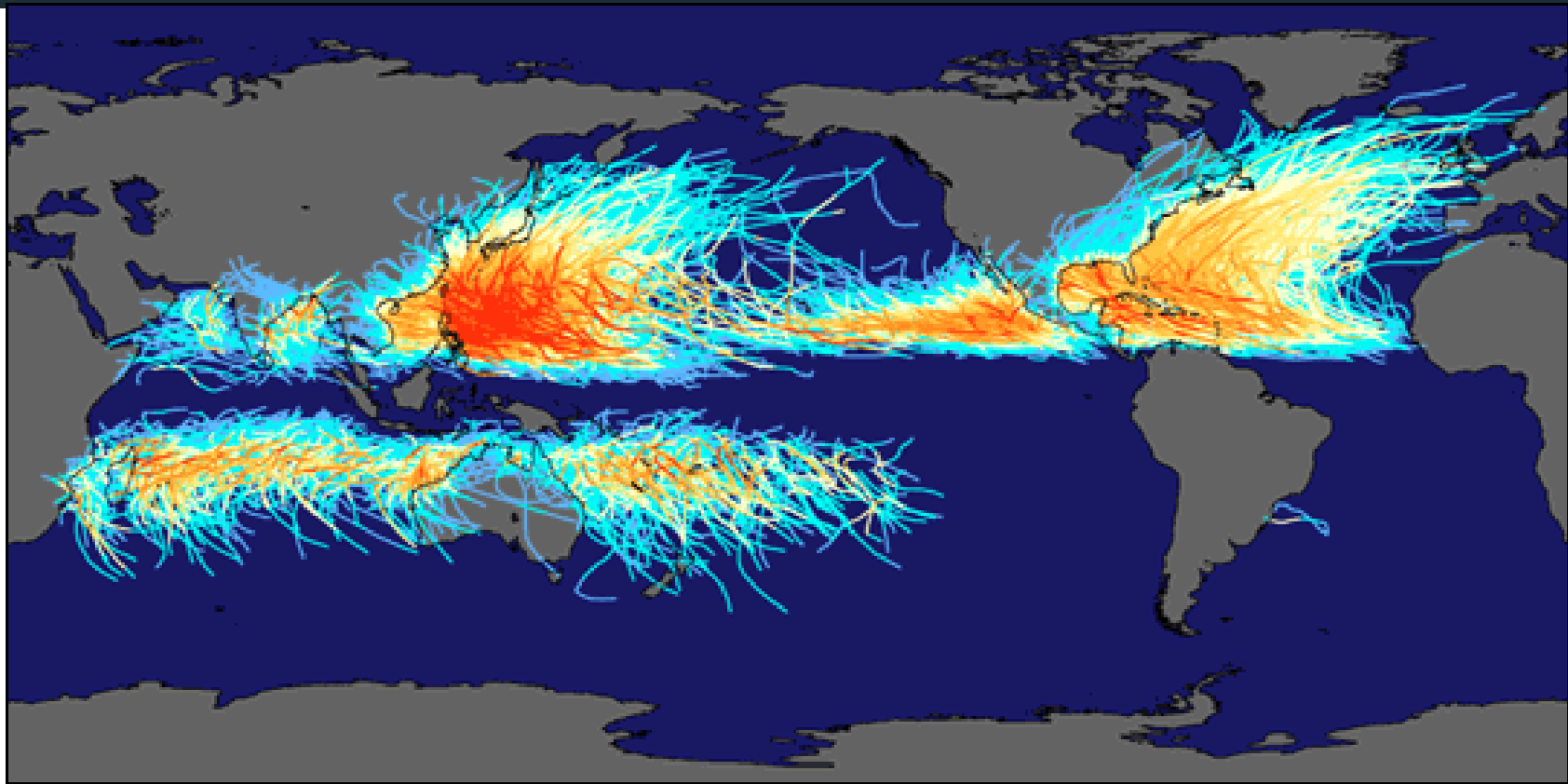


Elevation's correlation with Democracy

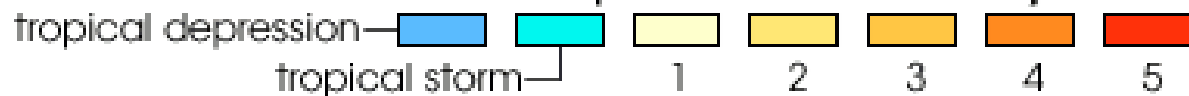




Exogeneity and Endogeneity



Saffir-Simpson Hurricane Intensity Scale



NOAA Earth Observatory (2006)



Potential vs Actual Effects



Actual damages

- Datasets on deaths, economic damages, etc.
- Heavily reporting biased
 - ex: the USA's insurance system shoots up the reported economic damages (Henry Harrison, forthcoming)
 - Brain damage from heatwaves



It's harder with hurricanes...
Hurricanes!



Hurricanes

- **storm surges**
 - hurricane-induced flooding
 - often the most damaging part of a hurricane
 - more so than wind speed, geography impacts storm surge
 - coasts vs inland
- storm **averages** over time or an **anomalously** strong hurricane
 - Miami vs Tampa



Next Step & Data Repository

Data Repository

- *Comparative Political Studies* Journal
- Harvard Dataverse

The screenshot displays the Harvard Dataverse interface for the Comparative Political Studies Dataverse. At the top, the Harvard Dataverse logo is visible, along with navigation links for 'Add Data', 'Search', 'About', 'User Guide', 'Support', 'Sign Up', and 'Log In'. Below the logo, there is a 'CPS' logo and the text 'Comparative Political Studies Dataverse' and 'Journal Homepage' (University of Minnesota). A breadcrumb trail shows 'Harvard Dataverse >'. On the right side, there are 'Contact' and 'Share' icons. The main text describes the journal: 'Comparative Political Studies (CPS) published fourteen times a year, offers scholarly work on comparative politics at both the cross-national and intra-national levels. Dedicated to relevant, in-depth analyses, CPS provides the timeliest methodology, theory, and research in the field of comparative politics. This journal is a member of the Committee on Publication Ethics (COPE)'. Below this, it provides the journal URL: 'https://journals.sagepub.com/home/cps' and contact email: 'cps@umn.edu'. A search bar is present with the text 'Search this dataverse...' and a 'Q' icon, followed by an 'Advanced Search' link and an 'Add Data' button. On the left, there are filters for 'Dataverses (0)', 'Datasets (335)', and 'Files (4,829)'. Below these is a 'Publication Year' filter showing '2025 (20)' and '2024 (84)'. The main content area shows '1 to 10 of 335 Results' and a 'Sort' dropdown. The first result is 'Replication Data for: Expanding the State: Rural Mobilization and Bureaucratic Presence in Peru' by Christopher L. Carter and Madal Urteaga Quispe, dated May 3, 2025. The abstract text is partially visible: 'Governments in the Global South have historically lacked bureaucratic capacity in peripheral areas, making it difficult for central states to n... refer and implement their national policies. This paper address when central governments invest in establishing bureaucratic presence...'. A 'Feedback' button is located at the bottom right of the result card.

Future Variables...

- Earthquake intensity
- Hurricane intensity
- CO2
- Solar Radiance
- Mosquito population

Unified database for these variables!

Variable (Earth Data -> Panel Data)	Potential Damage	Actual Damage	By
Elevation	Done P.W.		Ortega and Tang
Inclination	In progress		Ortega and Tang
Distance to Coast	Done P.W.		Ortega and Tang
Distance to Water Body connected to Ocean	In progress		Ortega and Tang
Air Quality (PM2.5)	Done P.W.	Done Death	Berry (2020) ArcGIS
Temperature, Precipitation	Done P.W. & E.W.		Gortan et al. (2024);
Heating/Cooling Degree Days	Done P.W.		Mistry (2019)
Solar Radiance	In progress		Ortega and Tang
Air Quality (CO2)	In progress		Ortega and Tang
Natural Disasters (Hurricane, Earthquake)	In progress		Ortega and Tang
Natural Disasters (Flood)	NA	Done Death	Floodbase