The Global Climate Security Atlas

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Climate change is a significant threat to humanity and requires global and local cooperation to be tackled in a transformative, systemic, and holistic way.

The Perry World House Global Climate Security Atlas aims to address challenges in communication for climate decision-making and multi-disciplinary climate teaching and research by curating more than 200 datasets ranging from demographics to climate projections; bridging the gap between climate scientists, educators, and decision-makers. To achieve this, the Atlas fills an underexplored niche in Climate Research with four major characteristics:

I. Synthesizing Scientific Findings on Climate Impacts and Vulnerability - Our project provides a comprehensive digital compilation of independent papers studying climate impacts and vulnerability on food, water, biodiversity, and health.

II. Multidisciplinary Approach to Global Crises Beyond Climate - The Atlas aims to provide global maps across multiple disciplines intersecting with climate change, such as biodiversity loss, planetary boundaries, pollution, social and political crises.

III. Global Environmental Perspective - The database helps us understand global and transboundary climate patterns, inequality in environmental impacts and vulnerabilities across regions, and intersections with geopolitics.

IV. Long-Term Focus - Our aim is to focus on mid-term to long-term climate and societal impacts and catalyze thoughtful discussions on transformational solutions and climate adaptation

Want to use this Atlas in your teaching, classes or in your research and need help and ideas? Want to work with us? Contact us at imarinov@upenn.edu

Access the Perry World House Climate Security Atlas!

https://global.upenn.edu/perryworldhouse/global-climate-security-atlas

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An interactive way to navigate through transdisciplinary geospatial datasets, effectively engaging scientists and policy-makers alike.

Visualize IPCC (Intergovernmental Panel For Climate Change) maps and hundreds more datasets in seconds!

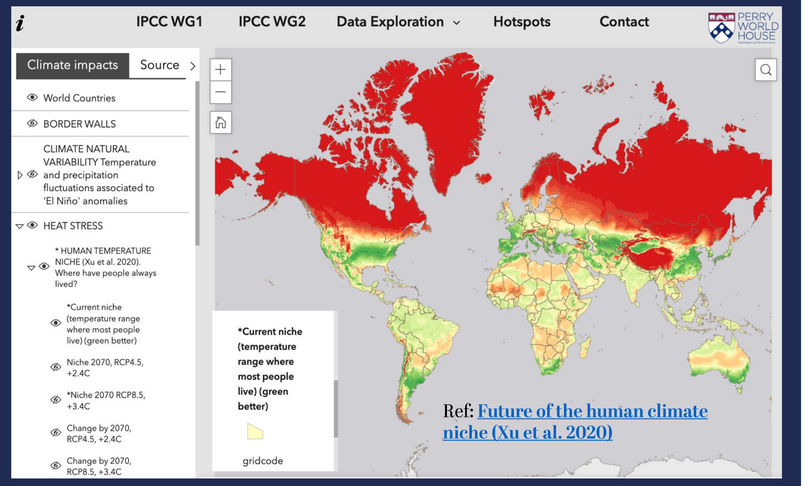
IPCC

- Climate Science
- Impacts, Adaptation, and Vulnerability to Climate and other stressors

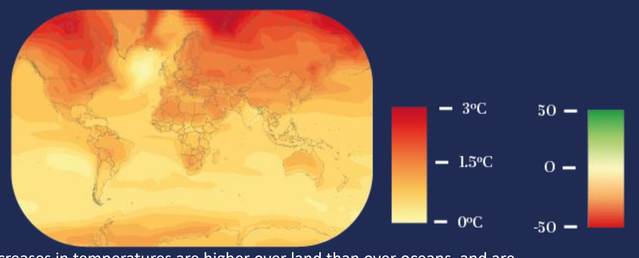
Datasets and Indices in our Database displayed as global maps:

- Climate Projections (e.g. Temp & Precipitation)
- Climate Projections (Heat, droughts, floods & health)
- Food and water security
- Biodiversity
- Land-based Environmental indices
- Social and political indices
- Environmental Risk and footprint indices
- Geography-Infrastructure-Population. Country contours.

Sample Output
Access the vast sources of data and science literature we used to build the Atlas! Examples below:

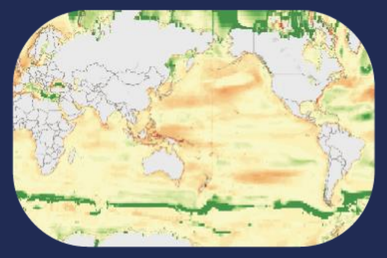


Mean near-surface air temperature CHANGE at +1.5C.



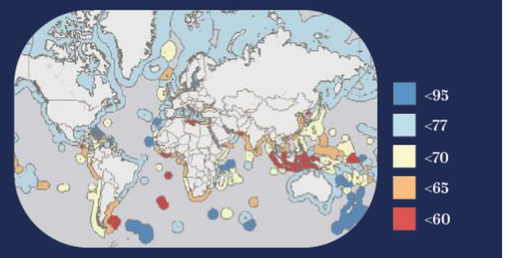
Increases in temperatures are higher over land than over oceans, and are higher in the Northern Hemisphere compared to the Southern Hemisphere. Atlas. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change . Gutierrez et al. 2021

Percent change in marine animal biomass between 1990–1999 and 2090–2999 for CMIP6 RCP2.6 +1.8C



Note expected decreases in marine biomass projected over most of the ocean
Ref: Next-generation ensemble projections reveal higher climate risks for marine ecosystems, Tittensor et al. 2021

Historical Global Ocean Health Index Scores (2012 - 2021)



Note low ocean health index especially in low latitude oceans.
An index to assess the health and benefits of the global ocean. Halpern, B., Longo, C., Hardy, D. et al. 2012.

Proposed Future Work: We plan to incorporate a user-defined "hotspot finder," which will combine datasets to visually emphasize geographical areas that face multiple climate impacts and other crises → create user defined vulnerability to climate change indices as a function of time, socio-economic scenarios, and warming level

Thank you for support to: **Penn Perry World House**
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Penn Data Science for Social Good
https://web.sas.upenn.edu/data-science/data-science-for-good/