



Analyzing Climate Services that Assess Equity and Vulnerability



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Abstract

Climate services, or the applications that provide and organize climate data for easier data finding and comprehension, have seen a recent rise in popularity as a tool to combat the effects of climate change. As the effects of climate change increase in both frequency and intensity, many politicians, policy-makers and planners (i.e., decision-makers) have come to rely on climate services to provide and organize information about the current and future impacts of climate change. Part of this reliance on climate services is a result of a lack of regulation or guidance about how decision-makers should respond to climate change. This project aims to identify the effectiveness of these climate services and how they can improve. This project is currently focused on providing this service to the Gulf Coast region of the United States. First, we identified climate services that considered equity or vulnerability that that were usable across the United States (U.S.) Gulf Coast Region, then created an analytical framework to evaluate the usability of each climate service. Our analysis yielded themes that were common across many of these climate services, with key takeaways being climate services often lack opportunities for data comparison within the program, have significant learning curves and the vast majority lacked any analysis of action options and outcomes.

Introduction

Decision-makers currently have little guidance for how to incorporate climate change, and other coupled current and future stressors, into their existing frameworks, plans, and decisions. The goal of climate services is to provide information to support decision-making in the context of climate change, with the hope that developing a better understanding of the way climate change interacts with other current and future pressures will help us to make better, more informed decisions about reacting to and dealing with the conditions we are currently experiencing and will be experiencing with more frequency and intensity in the future. Thus far, climate services have only been able to provide information to support decision-making and have done little to inform specific policy choices, analyze the outcomes of potential choices, or calculate the cost of continuing to operate as we usually do. This study analyzes where climate services are and where they can go to be more relevant to decision-makers but also makes the case that we must collectively understand that any decision made about the future will have an inherent level of uncertainty, and that waiting until we have enough of the right type of information may be costly, may push us past tipping points that we cannot return from, and may exacerbate inequities and vulnerabilities far beyond our current state.

Methods

Tool Selection

- Search climate services databases:
 - Climate Adaptation Knowledge Exchange
 - Georgetown Climate Center Adaptation Clearinghouse
 - U.S. Climate Resilience Toolkit
 - Gulfree
- Refine climate services to those that consider:
 - Energy Equity
 - Community Vulnerability
 - Social Vulnerability
 - Community Resilience
- Review climate services collectively to determine their inclusion in the analysis
- A total of 28 climate services were selected

Tool Analysis

- Analyzed climate services based on the adjusted KnoPE (Knowledge Product Evaluation) framework focusing on scalability, accessibility, comprehension, data input, dynamism and integration
- Conducted analyst reliability tests on three climate services to refine methods
- Two analysts evaluated each tool
- Evaluations were compared and contrasted across analysts to produce findings that persisted within, among, and across climate services

Primary components of the adjusted KnoPE Framework are detailed in the visualization below.



Results

Our analysis yielded common themes that persist across climate services that consider equity and vulnerability.

- 4 of the 28 climate services use data from the CDC Social Vulnerability Index (CDC SVI) to incorporate vulnerability into the climate service. In these climate services social vulnerability was a part but not the focus of the climate service. Notably, the CDC SVI provides data refined to the census tract geographic scale.
- 2 of the 28 Climate services spread their data across separate webpages, significantly slowing the process of data extraction as users must load different pages to view all of the data. These separate webpages made simultaneous comparisons of data on two separate pages impossible
- Many climate services include dynamic inputs or the ability for users to control data visualization, however often these inputs cannot be viewed at the same time, which limits opportunities for comparison of data layers.
- Complexity without sufficient explanation leaves some climate services with learning curves and a sort of barrier to entry. An example of a tool that approaches complexity successfully is the FEMA Resilience Analysis and Planning Tool (RAPT) tool which includes both a user guide and resource center which explains in-depth the functions of the tool.
- Complexity can cause more harm than good to a tool if it gets in the way of ease of understanding, regular updates or scale of analysis. The Social Vulnerability Index (SoVI) is a good example of this as it includes an extensive list of indicators in its index but hasn't been updated since 2019 and its visual element hasn't been updated since 2014 limiting its usefulness in future decision making
- Climate services are often tailored to specific geographical areas. For example, the Coastal Resilience Mapping Portal focuses on specific states, but also the Gulf Coast region as a whole
- Only 2 of the 28 climate services provided an analysis of potential decisions or outcomes with these climate services being the Louisiana Flood Risk and Resilience Viewer and the ESIST: Energy Savings and Impacts Scenario Tool

Conclusion

Climate services currently aim to provide information to support decision-making in the context of climate change coupled with other current and future stressors. This study analyzed the effectiveness of climate services and identified specific areas where they could improve. Our analysis found that climate services that consider equity and vulnerability in the context of the U.S. were mostly effective in providing and organizing data. However, 26 out of 28 of these climate services lacked any form of action options and outcomes. Specifically, climate services should improve their options for data comparison, improve their overall usability, and should more often incorporate action options and outcomes. Action options should clearly spell out the consequences of each option, including the cost of the action and the consequences if no action is taken. These changes would help climate services provide information in decision-making processes that can be compared, can be easily understood, and may help decision-makers consider and compare potential options which could help to provide clarity about potential actions.

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