TCSJ
TECHNICAL COMMUNICATION
& SOCIAL JUSTICE

# Accessibility and Contribution Limitations of Authoritative Climate Information: Evaluating The Usability and Inclusivity of IPCC's Website

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*Technical Communication & Social Justice*, Vol. 1, No. 1 (2023), pp. 24-40

**Abstract:** Translation has assumed an important place in technical communication (Batova, 2010; Gonzales & Bloom-Pojar, 2018; Gonzales & Zantjer, 2015; Walton & Mugengana, 2015). Despite this, little scholarship has paid attention to the intersection between translation, user experience, inclusive access, and climate justice in the field of technical communication. Although there are many sources of climate information, this article will focus on the accessibility, authority, and impact of the Intergovernmental Panel on Climate Change (IPCC) website. Through a user analysis and usability test, this study finds issues with the degree of localization and accessibility of https://www.ipcc.ch/. This article concludes with the roles TPC may contribute towards climate communication.

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**Keywords:** IPCC, usability, accessibility, translation, climate

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**IRB Permission Number:** 1942450-1

**Declaration of Interests:** The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## 1. Introduction

Technical and professional communication (TPC) is in a unique position to contribute towards climate communication, as there are calls for social sciences' advice on procedural aspects such as decision-making with multiple stakeholders and communicating disagreements, as well as requests for equitable/just social and cultural changes (Lidskog et al., 2022). Further, it is an exigent matter that is communicated by the IPCC's assessment of the climate crisis labeled as a "code red for humanity" in 2021 (IPCC), and the recent passing of the Inflation Reduction Act of 2022 in the U.S. This bill is the largest climate investment act to have passed in U.S. history with an estimate of $370-430 billion (Nilsen, 2022; Breuninger, 2022) from the U.S. government and over $8 billion of private sector investment by 2030 (The United States Government, 2022).

With such high stakes, it is crucial to have an authoritative, universal source for climate information and policy. Theoretically, the IPCC website is well-situated for this role, though in actuality it is inaccessible for nearly half of internet users around the world, and mostly inaccessible for all non-native English language users. My positionality as a multilingual technical communication and climate communication scholar with over a decade of living experience in various countries outside the U.S. affords me insight into communication practices in international audience facing websites such as the IPCC.

In addition to awareness of contribution and access, this paper will attempt to address a practical issue in the form of actionable recommendations for improving the usability of the IPCC website, since "simply putting social science findings 'out there' and assuming they will find their way into practice, is as ineffective in communication science as it is in climate science" (Moser, 2016, p. 357).

This paper addresses the following research questions:

- How can TPC include and consider different sources of climate information/global environmental assessments (GEAs) to assess climate conversations?
- What can TPC scholars contribute towards climate information accessibility?
- What role does translation play in the work being done by organizations fighting for social justice? Specifically, how does TPC research on climate influence the conversations and voices included?

First, I will establish the relevance of the IPCC to the field of TPC as an authoritative source of climate information and provide background information about GEAs and the IPCC organization. Next, I examine the accessibility of https://www.ipcc.ch/ in two parts, first by adding findings from a usability test of the website conducted using the think-aloud protocol, second through an audience analysis approach using a traffic analysis tool and an accessibility checker. Finally, I discuss my findings within TPC and social justice conversations.

## 1.1 Authority and Relevance of Climate Information Organizations

Climate communication is an interdisciplinary field made from social science, humanities, earth systems science, physical sciences, engineering, and many more. GEAs consolidate these disparate sources and assume responsibility for hosting, accumulating, creating, and sharing knowledge. Although there are many GEAs, the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) are the largest and most well-known given their cross-national and cross-governmental positionality. This invited comparisons between IPCC (established in 1988) and IPBES (established in 2012), in recent climate communication publications (Lidskog et al., 2022; Borie et al., 2021; Kause et al., 2022; Maas et al., 2021). The IPCC has been labeled a 'top–down' GEA which starts with science and ends with communication whereas IPBES is considered 'bottom-up' by aggregating input from many diverse knowledge sources (Borie et al, 2021; Brooks, 2014). While IPBES is lesser known given the more recent formation of the organization, TPC scholars researching climate have only cited the IPCC as a source of authoritative climate information (Cagle & Tillery, 2015; Reeves & Ross, 2021; Shirley, 2021). Upon conducting a preliminary search of articles in TPC journals (JTWC, JBTC, IEEE, TC, and TCQ) that published on climate as a topic within the past 5 years, all articles (n=5) referenced and cited the IPCC but not IPBES. Given this selection in TPC publications, this paper will focus on IPCC as a site of evaluation. This next section will describe what the IPCC is, what they do, and their current position regarding climate.

## 1.2 The IPCC Profile & Position

The IPCC is the United Nations (UN) body for assessing the science on climate change. The IPCC report is a summation of the Conference of Parties (COP) meetings in which 195 nations agree to new environmental pacts. At these meetings, scientists, politicians, and world leaders gather to make their case for agendas, policies, and treaties. Since the announcement of a "code red for humanity" (internationally-agreed threshold of 1.5 degrees Celsius above pre-industrial levels of global heating) by the IPCC, climate issues and conversations have not only been amplified but revised altogether (IPCC Report: 'Code Red' for Human Driven Global Heating, Warns UN Chief, 2021).

The IPCC's role is to communicate assessments of climate to the public and policy makers. Creating this assessment includes assigning confidence levels and likelihood terms to statements and claims (e.g. very likely, likely, high confidence, medium confidence, etc.). These confidence levels and likelihood selections are a formal system that is stated in the working group reports and summary reports (as well as on the IPCC website) that aid in reporting findings for the general public and the decision-making process of policymakers. The IPCC guidance note is a document (available on the IPCC website) to help authors of the IPCC reports assign levels of agreement to statements consistently and provide transparency in the procedure to the general public as well as policymakers (IPCC). A recent study by Kause et al. (2022) found that experts from different scientific disciplines had different interpretations of the IPCC guidance note, which created confusion on how to integrate evidence and agreement into confidence levels (Kause et al., 2022). The study reported inconsistent confidence levels across IPCC working

groups, citing differing traditions and comprehension of "confidence levels" and "likelihood terms" as interchangeable.

### 1.3 Access & Knowledge Making for IPCC

One of the most common and available forms of access to the IPCC reports is through their website. People have turned to websites and online platforms as their first resource in search for specific information because websites have vast amounts of up-to-date information that is readily available. This is a key factor in enabling businesses or organizations to create "a suitable online presence in order to be portrayed optimally and meet the information needs of relevant stakeholder groups" (de Jong & Wu, 2018). However, it should be noted that access alone is not enough for policymakers and the public. Visitors of the IPCC website have a variety of not only linguistic backgrounds but educational, environmental, and national backgrounds as well. Access to websites such as the IPCC provides transparency for both experts and non-experts to the state of climate reported by contributing scientists and policymakers.

Often assumed to be a global lingua franca, English language competency is expected in many international contexts, particularly those with Western participants. A side effect of this is that individuals who are less able to speak it, due to learning it as a second or third language, are often seen as inferior in U.S. academic and professional settings (Gonzales & Zantjer, 2015). TPC scholars have acknowledged this inherent bias and seek to recognize the potential these multilingual scholars and professionals have for adapting knowledge for a diverse cultural context (Reeves & Ross, 2021; Agboka, 2013; Gonzales & Bloom-Pojar, 2018; Gonzales & Zantjer, 2015). This is exemplified by diversity and inclusivity issues within the IPCC AR4 and AR5 meetings. Authors of the reports and government representatives from developing countries and those who speak limited or no English were unable to participate in the conversation at full capacity (Reeves & Ross, 2021). As TPC scholars, it is important to note the source and context of the conversations that occur in fields that are outside of the TPC realm. Reeves & Ross's study explores and addresses the positionality, power, and influence that participants of the IPCC reports have. Their findings report that the "...dominance of Western perspectives and Western ways of knowing on author panels led to additional challenges in the deliberative process" (Reeves & Ross, 2021). They explain that non-Western participants were sometimes uncomfortable with the aggressive or hard-hitting deliberative processes that Western authors engaged in as a form of discourse. Moreover, both Western and non-Western participants paid more attention to those who were most experienced at speaking up in group sessions and most comfortable using English.

Another point to consider regarding climate communication is the familiarity and level of comfort of representatives who are newer to spaces like IPCC. Qualitative feedback from the Reeves & Ross (2021) study revealed that the representatives from recently developed countries such as Brazil or Mexico had difficulty participating, as they "had not had a chance to think through the issues about how to get the best out of the international process" (Reeves & Ross, 2021). This points not only to (un)awareness of power relations and institutional structures that move beyond the quality of knowledge and knowledge-making process but also to the extent and forms that the knowledge takes (Lidskog et al., 2022). It follows that the power relations between IPCC participants of different English language proficiency levels affect the content and quality

of the reports. This issue is compounded when one considers how the citizens of these underrepresented countries in the IPCC are often more vulnerable to climate change.

## 2. Methodology

### *2.1. Method 1 - Usability Test*

To shed light on how TPC may address some issues regarding the usability and accessibility of IPCC's climate information, I conducted a usability test (IRB: 1942450-1) for https://www.ipcc.ch/ in February 2022. Usability testing is deeply rooted in TPC–both in theory and practice (Meloncon & St. Amant, 2019). The purpose of usability testing the IPCC website was to collect feedback on how users use the website, such as the problems they encountered using it, findability/searchability of information, and navigation of the website interface (UI). The usability test establishes a baseline of the IPCC website for proficient English users with a high education background and familiarity with general website navigation. Users who do not fit this background will likely have a harder time using the IPCC website.

The usability test provided quantitative and qualitative data to measure the following:

- **The general feeling/layout of the site**
  - Does the layout suggest the route (first-time) users will take to find documents?
- **The procedure for locating reports**
  - Basic search: Is it easy to use?
  - Advanced search: Can users accomplish their goals on the advanced search screen?
- **Language**
  - Can users easily switch language settings on the website?
  - Are there any issues navigating the website with a non-default language setting?
- **Navigation & Accessibility**
  - Can users navigate efficiently when locating documents and reports?
- **Satisfaction**
  - What aspects do users like and which aspects do they dislike?

These points of focus were situated through Barnum's definition of usability: "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified use" (Barnum, 2010). This usability test employed the think-aloud protocol in order to obtain verbal qualitative data. The usability test consisted of scenario-tasks and questionnaires that were task-oriented and directed towards how the user responds to the issues encountered with the IPCC website.

#### *2.1.1. Participants*

Five participants were selected to usability test the IPCC website. The participants were selected with the following parameters:

- Speak, read, and write in proficient English (Participants without proficiency in English may have experienced additional difficulty in the usability test as the delivery of the usability test itself was in English)
- Age range must be 22-60 years
- Hold a bachelor's degree in any field of study
- Must actively use the internet at least 10 hours per week (proficient digital literacy)
- No prior experience navigating the IPCC website and no subject area expertise in climate communication (non-expert user)

Following Barnum's best practices for website usability testing using the think-aloud protocol, these parameters were based on an initial heuristic evaluation of the website conducted by the author prior to the creation of the 5 scenario tasks (Barnum, 2010). All but one of the participants were from the U.S., and all but one participant had heard of the IPCC as a main source of climate information.

### *2.1.2 Testing Process*

The participants completed a pre-test questionnaire before testing the website. Then participants completed five scenario tasks using the think-aloud protocol. Each scenario task was concluded with a few post-task questions. Once they completed all five scenario tasks, each participant completed the post-test questionnaire that focused on reflecting on their experience using the IPCC website.

### *2.1.3. Scenario Design*

This usability test was initially conducted to test the navigation and functions of the website from the perspective of participants described with the goal of assessing the ease or difficulty of accessing existing content. This usability test did not focus on the user experience of the IPCC site of any particular marginalized groups. The scenarios reflect the issues found from an initial heuristic evaluation of the IPCC website conducted by the author.

Scenario 1: Observing the home page
Scenario 2: Locating a specific report section
Scenario 3: Finding specific information
Scenario 4: Locating technical papers (archive materials)
Scenario 5: Changing the language settings

Although scenarios 1 through 4 do not rely on any background knowledge of reading another language, scenario 5 requires participants to recognize the Spanish language setting option labeled: Español. While there are four other language options to choose from in the drop down, many U.S-based websites and services offer Spanish as an alternative language, so it is reasonable to expect participants to recognize the word.

### *2.1.4. Usability Test Results*

While every participant was able to complete most of the scenario tasks, there were still some recurring points of friction. Several of the participants commented on the ambiguity between the two different types of reports and the unnecessary repetition with the home page, links, and node pages. Some participants were confused by the organizational hierarchy; they were unsure whether they were downloading a chapter or the entire report. The abundance of unfamiliar acronyms and terminology caused participants to acknowledge that they were not expert users. Overall, the test results indicated that the selected participants, who were proficient in English, college educated, and familiar with navigating website content, could mostly access the IPCC website but still had some difficulty on occasion.

| | P1 | P2 | P3 | P4 | P5 |
|---|---|---|---|---|---|
| **Scenario 1** | | | | | |
| **Scenario 2** | | | | | |
| **Scenario 3** | | | | | |
| **Scenario 4** | | | | | |
| **Scenario 5** | | | | | |

**Table 1**

Scenario task completion by participant (blue=successfully completed task, yellow=unsuccessful at completing task)

### *2.1.5. Availability of Translated Reports*

An additional assessment of https://www.ipcc.ch/ language settings found that while the IPCC website includes language options for Arabic, Chinese, French, Russian, and Spanish, it does not include as many reports or summaries in languages other than English. At the time of this usability test, there were several reports in all language settings that had not been translated and offered "only English". Although the initial scope of this usability test was not focused on determining usability of the IPCC website for non-native English users, a follow-up study that focuses on non-native English speakers proficient in the languages offered in the IPCC website (Arabic, Chinese, French, Russian, and Spanish) would be useful.

### *2.2. Method 2 - User Analysis*

To gather further insight into IPCC site users, an analysis of the website was conducted using freely available tools (an accessibility checker: accessibilitychecker.org, and a site traffic analysis tool: similarweb.com). The purpose of using these tools was to gather insight into the geography, language, accessibility, and retention of real-user information.

The purpose of these tools is to address that while a usability test may provide context for a specific situation in which a user/persona may navigate through the site, it cannot cover real-time users and site visitors of https://www.ipcc.ch/. To address the context of the IPCC site use, the following were used to address who is included/excluded in the design of the website and identify real-user data:

### *2.2.3. An accessibility checker (accessibilitychecker.org)*

An accessibility checker helps to find any initial issues that are not ADA compliant and identify critical accessibility issues. Using an accessibility checker can also highlight issues that may go unnoticed even with a usability test.

### *2.2.4. Traffic analysis tool (similarweb.com)*

SimilarWeb is a traffic analysis site intended for business stakeholders to gain insights about their websites and the websites of their competitors. It provides information on the traffic volume to a particular website, its performance, the sites which link to it, and even the demographics of its users. The findings will include a traffic analysis report of https://www.ipcc.ch/ from April – June 2022 of the Geography section of the Audience tab as well as a screenshot of the incoming traffic section of the Referrals tab.

### *2.2.5. User Analysis Results*

### *2.2.6. Accessibility of the IPCC website using accessibilitychecker.org*

A scan of https://www.ipcc.ch/ found that the website was not ADA compliant and provided a report of 7 critical issues. These issues are:

1. Buttons do not have an accessible name.
2. Background and foreground colors do not have a sufficient contrast ratio.
3. Heading elements are not in a sequentially-descending order
4. <html> element does not have a [lang] attribute
5. Image elements do not have [alt] attributes
6. Form elements do not have associated labels
7. Links do not have a discernible name

All but one (#5, image elements) of the identified issues were present in the usability test report completed by the five participants. These issues were most apparent when testing the language settings on the IPCC website. The accessibility checker can quantify how many recurring issues are present on the site, however, it cannot show qualitative user issues from a user experience perspective.

### *2.2.7. Traffic analysis of https://www.ipcc.ch/ (SimilarWeb)*

Upon running the IPCC website through a traffic analysis tool, visitations in the last 3 months (April-June 2022) show the following 50 countries with the highest number of visitors.

The following comply with the table from SimilarWeb categories:

- Country: Country sending traffic
- Traffic share: Percent of traffic sent to website from this country
- Visit Duration: Average time spent by users on the website per visit

- Pages/Visit: Average website pages viewed per visit
- Bounce Rate: The percentage of visitors that view only one page on the website before leaving

| | Country | Traffic Share | Visit Duration | Pages/Visit | Bounce Rate |
|---|---|---|---|---|---|
| **1** | United States | 16.48% | 0:03:21 | 3.22 | 50.67% |
| **2** | France | 8.37% | 0:03:58 | 4.18 | 45.12% |
| **3** | United Kingdom | 6.75% | 0:03:59 | 3.1 | 50.33% |
| **4** | Germany | 6.43% | 0:03:51 | 3.45 | 46.93% |
| **5** | India | 5.90% | 0:03:45 | 2.66 | 54.42% |
| **6** | Canada | 3.96% | 0:03:22 | 3.05 | 51.72% |
| **7** | Australia | 3.77% | 0:04:31 | 3.83 | 42.69% |
| **8** | Spain | 2.52% | 0:03:12 | 3.01 | 58.03% |
| **9** | Switzerland | 2.49% | 0:02:53 | 3.43 | 49.20% |
| **10** | Italy | 2.32% | 0:05:22 | 4.21 | 43.61% |

**Table 2**
IPCC site visitation by top 10 geographic regions (SimilarWeb) (see Appendices for a full list of 50 geographic regions)

The traffic share by country table was copied from the Geography section of the Audience tab of the SimilarWeb report from April to June 2022. During this period, the top four visiting countries by traffic share were all in Western countries, constituting 38.03% of total traffic volume. Of the top ten visiting countries (constituting 58.99% of total traffic volume), only India at #5 was not a Western nation. This is a signal that the IPCC website is not as well-known, or its authority isn't recognized (or used) to the same degree outside of Western locations. It is important to note that site access from these countries, users, and language are not synonymous. For example, a person from the UK may be in Canada viewing the IPCC website in French. Reading data for localization purposes could (falsely) project that the site visitor is from Canada, in Canada viewing the website in English. In this case, a large population of India speaks English as one of the official languages of the country and access the IPCC website content in (mainly) English (National Portal of India). The ten countries with the highest traffic share had a bounce rate of ~50% and (barring Switzerland) spent at least three minutes on the IPCC website.

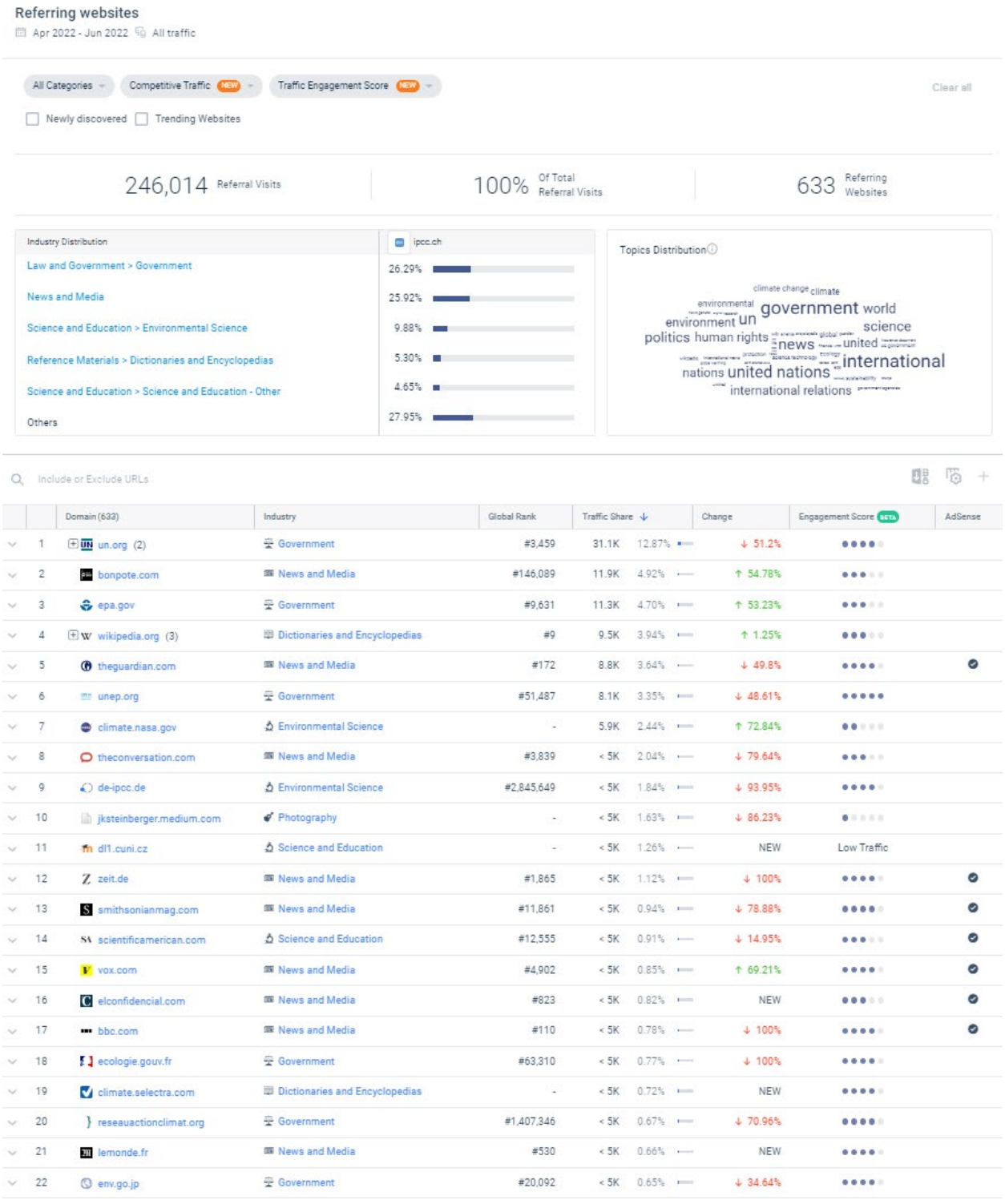


**Figure 1**
Incoming Traffic: Referrals (SimilarWeb)

An analysis of the IPCC's traffic results using SimilarWeb's traffic report tool show that government and news/media industries make up more than half (52.21%) of the IPCC's referral

traffic. Referral traffic is an important component of website traffic because of the nature of browsing websites by users, since not all users will search for the IPCC website directly for climate information. From April-June 2022 most visitors to https://www.ipcc.ch/ came from government (~64,677 visits) or news (~63,791 visits) websites, with a smaller amount of traffic coming from science education sites (~35,745 visits). It should be noted however that the top 20 referring sites by traffic volume all had western domain extensions (.com, .de, .fr). This means that non-Western online spaces are not linking to https://www.ipcc.ch/, a finding consistent with others in this study.

## 3. Discussion

Though the IPCC is an intergovernmental organization, its focus is access to mainly English-speaking users. The https://www.ipcc.ch/ translation menu translates limited sections of their website into Arabic, Chinese, French, Russian, and Spanish. This indicates to users that translation is not a neutral conduit and exposes the IPCC's bias in privileging dominant languages and people from privileged contexts while marginalizing people from other linguistic backgrounds. Climate communication is a necessity to policymakers in less developed countries, whose constituents are most at risk to climate change. These policymakers, who are not as comfortable following climate information in English, are unlikely to access the IPCC (website) as a resource and may fall behind on up-to-date climate information.

A site crawl of https://www.ipcc.ch/ found that over half of the content on the site are PDFs (n=224). The response from the usability test (Scenario 2) also showed that the participants expected long reports to be downloadable PDF files. However, a way for the public to have access to some translated content may be to host the reports as web content rather than a downloadable file. This way, browsers would be able to detect and translate to the user's preferred language. That is not to say that this solution would fix all translation issues, but the content would be readable—which is better than not having any way of reading the report at all. Merely hosting report texts in this format does not solve localization issues (let alone good translation). A study on the usability of emergency management websites showed that such websites can benefit from responsive design and following the contextual needs of the varying language, culture, and demographics of users (Cosgrove, 2018). Cosgrove argues for increasing focus of information architecture, creating standardization within levels of organization and customizing based on local needs, and trying new methods (such as rhetorical analysis) that require few to no users for initial testing for improving the usability of emergency management websites (Cosgrove, 2018). As climate change information may be seen as emergency management (albeit on a wider scope and timescale), global environmental assessments (GEAs) could benefit from adopting some of these recommendations.

Participants who are based in the U.S. recognize the gap in content created for non-Western users. As TPC scholars, it is important to quantify and qualify the range and scope of website content translation or localization. Despite conducing a usability test that featured educated and computer literate English-speaking users, the findings nonetheless provide insight into the level of accessibility. Usability problems found in the usability test included language settings, lack of translated information as well as access to it, and content organization. One particular finding that was not anticipated from conducting this usability test had to do with participants'

perception of the site's .ch domain extension. This was demonstrated when more than half of the usability test participants commented on the political nature of the IPCC website and the intended audience. The comments were made regarding the discussion on the validity of the IPCC website as a source for climate information. All but one participant asked if the domain extension ".ch" was a Chinese extension. When the participants were told that ".ch" was a Swiss domain extension, they were more inclined to trust the website as a source for climate information.

Climate communication as a field relies on GEAs such as IPCC and IPBES. As an authoritative source for hosting, accumulating, creating, and sharing the knowledge on global climate information and policy, the IPCC website should consider the impact and power it holds to shape climate communication. In the future, it is possible that IPBES may become a more highly cited source for climate communication among climate TPC scholars as it is currently preferred over IPCC as a public communication site. However, IPCC has acquired a long-standing reputation as an official source of climate information and research. With this position, IPCC as an organization has the power to create international policies and sanctions for climate-related practices that impact human health, environment, landscape, economy, and quality of life. IPCC is the site of reference by news and media outlets, scholarship, policy makers, and government bodies in both domestic and international societies. As Richards (2019) points out in the usability study of visual risk literacy, TPC scholars should take ethical constraints into consideration when evaluating user agency (Richards, 2019). Those working on the IPCC report and technical communicators who report information from the IPCC website should also be aware of the limitations and lack of inclusion of marginalized groups.

## 4. Conclusion

This paper addresses issues of inclusivity of IPCC which are reflected in the limitations of the IPCC website as a resource for climate information. Limitations of the organization and practices should be recognized and addressed by TPC scholars who use GEAs like the IPCC (and hopefully others).

For TPC scholars studying climate (specifically using the IPCC as a source), it is important to understand that while translation alone may meet the basic needs of some select users, it is limited regarding contribution to the knowledge, as well as interpretation–a situated knowledge that comes with context (knowledge that non-English speaking users may not have) (Agboka, 2013). TPC scholars and practitioners can participate in making climate change communication more inclusive by performing similar accessibility and usability reviews of other GEA websites, evaluating the organization's GEA process, and communicating the source and position of the contributing participants.

Website improvements should consider not just the experts for translation but the needs of non-experts and non-Western users. Human translation may also lead to issues with assessing and validating knowledge and the knowledge-making process (Borie et al, 2021). Various disciplines and participants of the knowledge-making process have shed light on issues of the 'top-down' approach used by the IPCC. This can be addressed and revised by creating a more transparent system of knowledge validation and knowledge-making. With a potential for increased

discussion and knowledge dissemination about climate, a call for more interdisciplinary collaboration and research may address future implications regarding climate information accessibility and inclusivity in which TPC scholars provide a critical role.

## 5. Limitations

The usability test and findings come with limitations, most notably the low number and selection of participants. It is important to note that a repeated usability study may yield different results with participants who speak languages other than English, have other education backgrounds, or a lower computer literacy. My own positionality affects how this usability test is designed and conducted (access to participants who were selected through convenient sampling, initial heuristic evaluation of the website, time constraints of this usability test).

The user analysis tool (SimilarWeb) provides a snapshot of the months April-June 2022 and the number of visitors. In replicating this report, website traffic analysis data will change month-to-month. The user analysis tool (Accessibility Checker) refers to the Americans with Disabilities Act (ADA) compliance; it can only check compliance with U.S. accessibility laws. Other countries and regions may have a higher or lower tolerance and set of guidance for accessibility compliance that is different to ADA. Since the IPCC website is hosted on a Swiss server, it is possible that https://www.ipcc.ch/ is compliant with Swiss accessibility guidelines.

Future studies regarding the usability of the IPCC website may explore marginalized user experiences through a qualitative approach as exemplified by Reeves & Ross (2021). In addition to conducting a traditional usability test, TPC researchers and practitioners studying climate communication may benefit in adopting Simmons & Zoetewey's (2012) call for productive usability for civic websites that require communicators to investigate usefulness and alternative uses from the beginning of the design process; examine and test for patterns that support technical literacy, productive inquiry, place, and multiple user identities (Simmons & Zoetewey, 2012).

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**Appendix A: IPCC site visitation by geography (SimilarWeb)**

| Country | Traffic Share | Visit Duration | Pages/Visit | Bounce Rate |
|---|---|---|---|---|
| United States | 16.48% | 0:03:21 | 3.22 | 50.67% |
| France | 8.37% | 0:03:58 | 4.18 | 45.12% |
| United Kingdom | 6.75% | 0:03:59 | 3.1 | 50.33% |
| Germany | 6.43% | 0:03:51 | 3.45 | 46.93% |
| India | 5.90% | 0:03:45 | 2.66 | 54.42% |
| Canada | 3.96% | 0:03:22 | 3.05 | 51.72% |
| Australia | 3.77% | 0:04:31 | 3.83 | 42.69% |
| Spain | 2.52% | 0:03:12 | 3.01 | 58.03% |
| Switzerland | 2.49% | 0:02:53 | 3.43 | 49.20% |
| Italy | 2.32% | 0:05:22 | 4.21 | 43.61% |
| Netherlands | 2.31% | 0:03:49 | 3.38 | 46.07% |
| Philippines | 1.91% | 0:01:46 | 1.79 | 69.17% |
| China | 1.90% | 0:07:15 | 5.48 | 45.06% |
| Brazil | 1.68% | 0:05:10 | 5 | 56.11% |
| Sweden | 1.48% | 0:04:42 | 5.09 | 46.12% |
| Mexico | 1.33% | 0:03:58 | 3.28 | 57.44% |
| Chile | 1.28% | 0:05:37 | 9.66 | 51.06% |
| Poland | 1.13% | 0:03:26 | 2.42 | 62.25% |
| Colombia | 1.11% | 0:03:27 | 4.42 | 59.42% |
| Belgium | 1.07% | 0:05:11 | 4.82 | 39.09% |
| Denmark | 1.01% | 0:04:44 | 4.61 | 42.85% |
| Hungary | 1.00% | 0:06:20 | 6.2 | 40.36% |
| Korea, Republic of | 0.98% | 0:02:34 | 3.02 | 48.35% |
| Portugal | 0.97% | 0:04:10 | 4.14 | 53.72% |
| Argentina | 0.97% | 0:04:31 | 2.46 | 51.09% |
| Finland | 0.93% | 0:03:26 | 2.91 | 50.93% |
| Norway | 0.92% | 0:03:40 | 3.15 | 40.51% |
| Indonesia | 0.86% | 0:05:24 | 2.22 | 62.61% |
| New Zealand | 0.75% | 0:04:50 | 3.52 | 43.63% |
| Ireland | 0.69% | 0:02:34 | 2.51 | 54.02% |
| Japan | 0.69% | 0:03:23 | 2.74 | 53.89% |
| Singapore | 0.68% | 0:04:03 | 4.8 | 51.83% |
| Turkey | 0.63% | 0:01:15 | 1.9 | 70.09% |
| Austria | 0.62% | 0:03:15 | 2.57 | 46.55% |
| Vietnam | 0.59% | 0:02:45 | 2.03 | 65.97% |
| Peru | 0.54% | 0:02:42 | 2.15 | 53.36% |
| South Africa | 0.53% | 0:04:21 | 4.16 | 44.89% |
| Russia | 0.52% | 0:02:27 | 2.3 | 65.10% |
| Ecuador | 0.51% | 0:08:37 | 3.01 | 47.35% |

| | | | | |
|---|---|---|---|---|
| Malaysia | 0.48% | 0:04:36 | 2.46 | 48.39% |
| Taiwan | 0.47% | 0:04:17 | 4.17 | 40.50% |
| Bahamas | 0.43% | 0:07:43 | 2.57 | 37.14% |
| Pakistan | 0.41% | 0:02:07 | 2.19 | 47.82% |
| Iran | 0.35% | 0:05:55 | 4.52 | 38.65% |
| United Arab Emirates | 0.32% | 0:03:07 | 2.49 | 66.69% |
| Hong Kong | 0.30% | 0:04:41 | 3.36 | 50.23% |
| Paraguay | 0.30% | 0:02:17 | 1.33 | 72.22% |
| Costa Rica | 0.29% | 0:04:00 | 6.46 | 35.74% |
| Kenya | 0.29% | 0:02:45 | 1.82 | 57.42% |
| Greece | 0.28% | 0:03:48 | 3.64 | 43.20% |

**Appendix B:**

**List of articles within TPC for the past five years citing IPCC as a source**

Reeves, C. A., & Ross, M. (2022). Writing climate change assessments: scientific author challenges and rhetorical negotiations. *Journal of Technical Writing and Communication, 52*(2), 182-212. https://doi.org/10.1177/0047281621989640

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