

Key Points:

- It is critically important for the AGU to issue position statements that reflect the state of the science and consensus of scientists
- AGU's GeoHealth section identified critical impacts and actions that should be included in its updated climate change position statement
- There is value in focusing on the purpose, uses, and process for engagement in and consensus on scientific society position statements

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A GeoHealth Response to a Geoscience Community Climate Change Position Statement

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Abstract The American Geophysical Union (AGU) issues position statements reflecting the state of the science and scientific consensus. AGU position statements can be used to support public and institutional policy development, conversations with peers and policymakers, and formal and informal education. The recent climate change position statement, “Society Must Address the Growing Climate Crisis now,” provides important baseline information but lacks detail on critical climate and health impacts and actions for AGU and members. This commentary shares feedback from the AGU's GeoHealth Section and encourages members to use the AGU statement and engage in the comment process for other statements.

1. Introduction

1.1. The Importance of Organizational Position Statements

As a leading membership association for earth and space scientists around the world, it is critically important for the American Geophysical Union (AGU) to issue position statements that reflect the state of the science and consensus of scientists and include the strengths and limitations of the position itself. AGU position statements can be used to support public and institutional policy development, conversations with peers and policymakers, and formal and informal education with neighbors and communities. Members have the opportunity to shape AGU's position statements through a public comment process. In this *GeoHealth* commentary, our objective is to bring to light several critical issues related to climate and health that were left out of the current statement. We briefly outline AGU's position statement development and review process, share comments provided by the AGU GeoHealth Section on the AGU's climate change position statement, “Society Must Address the Growing Climate Crisis now,” (AGU, 2019b), and encourage members to use this statement and engage in the comment process for other statements.

1.2. Climate Change and Human Health

Climate change impacts human health across the globe in a myriad of ways. Climate change presents new hazards and challenges, acts as a threat multiplier, and exacerbates existing inequities. The health impacts of climate change are well documented and have been summarized in a number of scientific and government reports (Crimmins et al., 2016; Masson-Delmotte et al., 2018; Reidmiller et al., 2018; Salas et al., 2019; Watts et al., 2019; World Health Organization, 2018). Increasing temperatures, frequent and more severe storms coupled with longer drought seasons, wildfires, and worsening air and water pollution are changing disease patterns, destroying property and livelihoods, and impacting community cohesion and individual mental health. Climate change will amplify current inequalities in all populations with less capacity and fewer resources to adapt to change. Low-income populations and communities of color, as well as children, pregnant women, the elderly, and people with limited mobility, are some of the most vulnerable to climate impacts. Geographic location is among the factors impacting vulnerability, in addition to systemic racism, gender inequity, and barriers in access to housing and healthcare. Existing inequities are compounded by the fact that those who contribute the least to the problem are often the most impacted. While there is work to be done in the fields of convergence research, cumulative science, and translational efforts to improve modeling and preparedness, we know enough to recommend healthy and equitable climate solutions now.

The health sector is unifying in its responsibility to address climate change to improve public health, evidenced by the more than 140 organizational signatories to the U.S. Call to Action on Climate, Health,

and Equity (U.S. Call to Action on Climate, Health, and Equity, 2019) and the many more who have signed the Global Call to Action (Global Call to Action on Climate, 2019). Further, many public health and health care institutions are working to mitigate their own carbon footprints as part of their healthcare mission because of the clear link between greenhouse gas emissions and climate change. Reducing or eliminating the use of fossil fuels (mitigation), including efforts to increase energy efficiency, is a critical step toward addressing climate change. Additional categories of solutions include advances in clean and renewable energy, adaptation and preparedness, restoration, and carbon capture. Each of these categories of solutions can be implemented at varying scales from personal lifestyle changes to international agreements. AGU's members are working in many of these areas to identify emerging problems and develop solutions. GeoHealth scientists are testing air quality across the globe, analyzing ice cores and measuring ice melt, and analyzing disease patterns and methods of transmission, among many other activities. They are engineering new climate-friendly materials, clean energy technologies, and enhancing communications infrastructure for first responders. Further, through AGU's Thriving Earth Exchange, scientists are collaborating with community members to address the most pressing threats. These efforts place AGU at the forefront of current efforts to develop climate solutions.

2. Background

2.1. AGU's GeoHealth Section

AGU's GeoHealth section was established in 2017, the first new section added to the organization in 15 years. "The GeoHealth section of AGU aims to nurture transdisciplinary collaborations in order to advance our understanding of the complex interactions between our geospheric environment (including earth, water, soils and air) and the health, well-being, and continued progress of human populations in concert with all ecosystems. Combining expertise across the geo- and health sciences will facilitate advancement toward a healthier and more sustainable future. GeoHealth is broadly defined to fully encompass the expansive spectrum that covers earth and climate dynamics, exposure risks, and health impacts." With its links to the award-winning *GeoHealth* journal and recent accomplishments in fundraising through AGU's Austin Challenge supporting student travel grants, the GeoHealth section is working to build a strong reputation as an important pillar of the geosciences.

2.2. AGU's Climate Change Position Statements

AGU's position statements, including updates, are written by a task force of experts, submitted for a member review period, and approved by AGU's Board and Council. The stated timeline for review is every 4 years, but this can happen more or less frequently. AGU members can also submit topics for a policy statement. The first AGU position statement on climate change was adopted by AGU in December 1998, with a new version adopted December 2003. The position statement was then revised and reaffirmed in December 2007, February 2012, August 2013, and most recently November 2019. AGU announced through its online communications that its new 2019 draft climate change policy statement would be open for AGU member input for 30 days (through 13 October 2019). GeoHealth section leadership seized this opportunity for the section to apply its expertise, in addition to soliciting and providing comments as individual members, at the same time that the AGU's panel of experts was reviewing the statement.

AGU's GeoHealth section felt compelled to comment on the August 2013 version of the Climate Change position statement, "Society Must Address the Growing Climate Crisis Now" because this previous statement did not provide information about impacts on human health and misclassified some regional impacts. Working closely with AGU staff, the GeoHealth section first endeavored to learn more about the institutional position statement update and comment process and then the specific timeline for the climate change position statement. In what is the first organizational move of its kind for an AGU section, the policy committee collected input from across section leadership, and our section president submitted comments on the statement on behalf of the entire AGU GeoHealth section.

3. AGU's 2019 Climate Change Position Statement

Overall, the November 2019 statement introduced a number of important topics related to climate change and health within the word count allotted. Notably, equity and health were embedded throughout the GeoHealth section comment on the statement, including mention of mental health and the importance of

youth engagement in geosciences. However, the collaborative assessment conducted by the GeoHealth section identified several additional areas that need to be emphasized to provide a more comprehensive picture of issues related to climate change and health. Notably, there were three topics in the section's comments that did not make it into the final statement: expanding upon the inequities that climate change will cause and exacerbate, adding youth to the categories of people scientists and engineers must continue to engage, and a more detailed list of responses needed by both the political/policy sector and the scientific community. Here, we discuss these topics and highlight why they are important to consider in addition to the topics raised in the new AGU climate change policy statement.

The “consequences” section of the position statement begins with differential impacts on lower-income populations. In this discussion, it is critical to also mention additional populations vulnerable to climate change, including communities of color, indigenous peoples, children, the elderly, and people with disabilities and preexisting conditions. Although the current framing is important and correct, it is incomplete without considering these additional groups. In particular, a discussion solely about income masks the impacts that race and racism have on health, social, and economic outcomes. Preparing for the consequences of climate change can best be understood within the context of individual and group baseline need, access to additional resources, and capacity to adapt to change, inclusive of the impacts of stress from current conditions and anticipated future climate change on mental health and society at large. Here is an ample body of evidence demonstrating that environmental injustices, starting with the landmark “Toxic Waste and Race” in 1987 (United Church of Christ, 1987), are often driven by race independent of income.

The youth climate movement has been building momentum and is making a difference by changing the tenor of the climate change discussion worldwide. Scientists and scientific institutions must support youth in their advocacy and activism, as well as in Science, Technology, Engineering, and Math (STEM) careers to support climate research. This sentiment deserves placement in AGU's climate change position statement.

Finally, the deleterious consequences of global climate change can be moderated by taking prompt actions. The full list of the recommendations included in the GeoHealth section's comments is presented in the following section and includes several additional framing details for the purposes of this commentary.

4. Recommendations

Climate change solutions range from modest modifications of land use and natural landscapes to technological changes in energy production or sequestration of carbon dioxide. Climate solutions can also be discussed in terms of the scale at which they can be implemented, including lifestyle changes to make at home, work with communities and professional associations, state and local policies, and international treaties. In developing this list, the GeoHealth section considered research needs in GeoHealth and parallel disciplines, how GeoHealth could contribute to meeting these needs, and where GeoHealth as a discipline can grow within AGU to support further development of climate solutions including funding support and policy advocacy. The following list includes the original recommendations of the GeoHealth section leadership and italicized text developed by this Commentary's author team to provide additional details and framing around human health impacts.

Political and Societal Recommendations (*additional author team clarifications*):

- transition to renewable sources of energy that offer direct health cobenefits while contributing to a transition to low carbon economies.
- reduce demand for high greenhouse gas emitting products and services that pollute the air and water and drive further climate change, which adversely impact human health (e.g., lung capacity and development).
- implement existing and novel technologies and practices to remove CO₂ from the atmosphere to reduce risks of dangerous climate change and its consequences for human health.
- change diets and promote sustainable food systems and equitable access to nutritious foods, as well as reduced carbon emissions.
- improve access to family planning and women's education, with benefits to social justice, community resilience, and climate change mitigation.
- promote collective action/mobilization in engaging with policymakers, including emphasis on the critical health relevance of climate policies.

- promote active transport and smart design of cities to achieve direct health cobenefits of increased physical activity and reduced carbon emissions.
- develop processes that enhance and diversify decision making, including that related to public health, based on direct input from the geoscience community, including scientifically accurate technical explanations of Earth processes and climate change impacts to humanity.
- support innovative geoscience communication and education efforts aimed at the public health sector which improve individual data reasoning in a digital world
- prepare for changes already underway.

Scientific Community Recommendations: (*additional author team clarifications*):

- measure and model the feedback of moderating actions (listed above) *on human, ecosystem, and planetary health outcomes* using current observations and climate predictions.
- expand diverse, inclusive and culturally relevant geoscience education that enables growth of a global digitally enabled geoscience research, education, and information management workforce, which can be used to
- develop innovative education initiatives, which address the broader impacts of the physical and mental health risks to individuals when presented with geoscience and data reasoning related to future uncertainties. *Educational models need to continuously evolve in order to leverage the benefits of diversity and inclusion on the learning and creative process.*
- translate high-impact, accessible, geoscience research products to the public, education, and scientific research communities that *improve access and* enable individual action and participation in moderating actions (listed above) in order to advance our understanding of changes already underway. *Research products from academic work can provide broader impacts with more effort toward translation for multiple audiences, including K-12, undergraduate, and linguistic translation.*
- invest in research processes, training, and open publications that use software formats and data standards supported across scientific domains, in anticipation of future uses after the research project completion. *This is required to enable computationally ready reproducible scientific experiments that converge Earth observations, climate projections, human behavior, and GeoHealth impacts.*

Our original recommendations are broad and encompass direct responsibilities within the field of GeoHealth and other fields that would see the benefit of GeoHealth actions. A healthy climate future will take an “all of the above approach,” and we wanted to at least try to lay out a number of solutions so that even if AGU and members implemented a few of them we would make progress toward a more equitable and sustainable future. These actions will also need more dedicated funding from government and philanthropic sources, creativity from the scientific community, and partnership with a committed, engaged public.

5. Conclusion

AGU works to support scientific integrity and protects scientists in their critical search for knowledge and solutions. Addressing climate change is a moral imperative and improving human health and wellbeing must necessarily be at the center of climate solutions. AGU's recently updated position statement is an important tool for the organization and members to engage on climate solutions at the local, state, and federal levels. The position statement can be a platform on which to stand to encourage policy and decision makers at all levels to implement healthy and equitable climate solutions.

AGU provides support for member comments on its position statements (AGU, 2019a), as well as content-specific information that may be helpful in the comment process, like fact sheets and issue briefs (e.g., the Fact Sheet on Climate Change; AGU, n.d.).

To learn more about AGU's GeoHealth Section, visit <https://connect.agu.org/geohealth/home> and follow us on Twitter: @AguGeohealth. The community is invited to share and discuss comments about the position statements with us here (<https://github.com/waterhackweek/Climate-Change-Position>).

Conflict of Interest

The authors declare no conflicts of interest relevant to this commentary.

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