

## Post publication careers: communication, engagement and impact

Afonso Gonçalves Neto <sup>1,2</sup>✉

Rapid warming of coastal waters in the Northwest Atlantic is affecting local fisheries and ecosystems. Our article revealed the role of the Gulf Stream in this warming, thereby helping to define environmental management in New England and inspiring students in Brazil.

I defended my PhD dissertation at the University of Rhode Island remotely, early in 2021, not knowing that two months later my work would be appearing in the media and gaining international attention. I had investigated why the northwest Atlantic coastal ocean is warming faster than the global average, which is affecting the strong economic and cultural relationship between the coastal communities of New England and Nova Scotia with the ocean. For example, Rhode Island lobster fisheries are in decline as lobster populations migrate north in search of cooler waters. However, until recently the mechanisms driving this warming were unclear, which made the prediction of future changes and effective management of fisheries difficult.

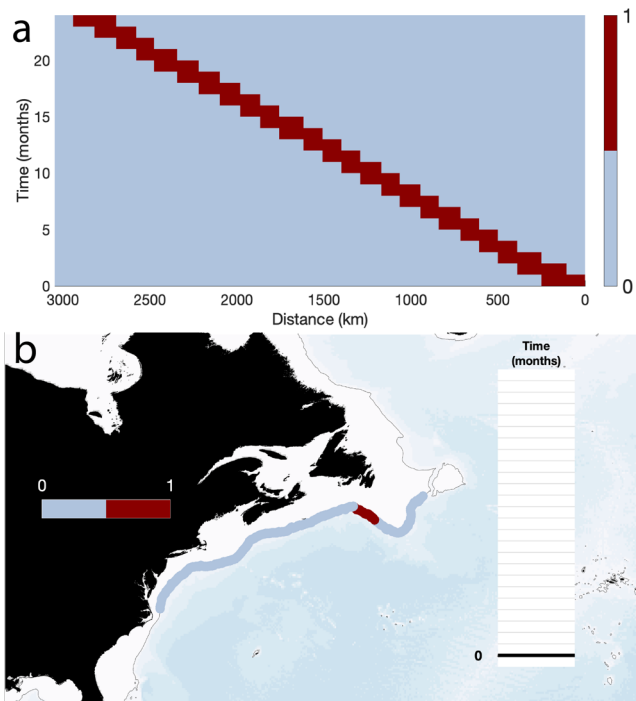
### A captive audience

Through analysing data from satellites, ships and autonomous floats, we showed that recent warming was in part driven by a change in the behaviour of the Gulf Stream. In 2008, the Gulf Stream changed position such that it restricted the Labrador Current that delivers cold water to the shelf<sup>1</sup>. It quickly became apparent that these insights transcended mere scientific curiosity as environmental managers, local communities and media outlets showed strong interest in our findings. Working closely with our institutional media relations team, we shared the implications of our findings with local news outlets and successfully reached all of the relevant stakeholders: ecologists, environmental managers and the local community. Not only did we take part in interviews in America, we were also invited to present our results at numerous universities and research institutions in both America and Europe.

We used a range of media to help enhance the communication of our findings to our broad audience. I most enjoyed developing visual products, which included animations designed to better represent the information contained in static figures in the article. For example, we turned a Høvmøller diagram (Fig. 1a), a powerful representation of the evolution of phenomena over time and space, into an animated map (Fig. 1b and Supplementary Video 1). We also used animation to connect a simplistic view of the famous Atlantic Meridional Overturning Circulation with a more realistic representation of the ocean currents in the North Atlantic (Supplementary Video 2). These visual products proved a great asset in encouraging engagement with our work, and received a lot of attention during presentations and on social media.

We are particularly proud of how our study is influencing environmental management. Later in 2021, alongside my co-authors, I gave presentations to Maine's Department of Marine Resources and our work contributed to the Maine Climate Council's 2021 Climate Science Update<sup>2</sup>. We continue to work with colleagues at NOAA's Northeast Fisheries Science Center and contributed to

<sup>1</sup>Graduate School of Oceanography, University of Rhode Island, Narragansett, USA. <sup>2</sup>Present address: Department of Oceanography, Federal University of Santa Catarina, Florianópolis, Brazil. ✉email: [afonso@uri.edu](mailto:afonso@uri.edu)



**Fig. 1 Static image vs. animated map. a** Hovmöller diagram, with distance (km) on the horizontal axis and time (months) on the vertical axis. The red shades indicate the propagation of a signal in space and time, from the bottom right to the top left corner. **b** Map of the Northwest Atlantic showing a different representation of the Hovmöller diagram. The red signal propagates along the blue line as a function of time. The animated map is available as Supplementary Video 1. For simplification, the data used here is not that originally used in the manuscript.

NOAA's 2022 "State of the Ecosystem for New England" report<sup>3</sup>. In this way, we have achieved our main goal: our article is helping define how New England will mitigate and adapt to face the effects of current and future ocean warming, and we couldn't be prouder.

### Beyond scientific impact

As a first-generation Ph.D. graduate from Brazil, being the lead author of such an impactful article has greatly influenced my life and career. When this study was published, I had recently started a postdoctoral research fellow position at the Federal University of Santa Catarina, in my home country of Brazil. The article has helped my voice become part of the conversation in the global Physical Oceanography community and has even led to me being invited to present my work at the 2021 Physical Oceanography Dissertation Symposium.

The positive impacts of the article reach beyond the author list, however, with my story also inspiring students not directly involved in the study. My current role is based at the same university in Brazil where I received my undergraduate degree in Oceanography, eight years ago. Since publishing our article, I have spoken to the cohort of oceanography students currently graduating. Many were feeling lost and hopeless. Nowadays, opportunities in our field are rare in Brazil. Many students feared what might lie ahead as they graduated during a global pandemic that has had devastating consequences in Brazil and amid a federal administration that seizes funds from education and research.

One thing that I have learned through my own academic career is that representation matters. I have always looked up to other successful first-generation, Brazilian scientists, and the time had

finally arrived when younger students could see me as an example. So, I addressed their feelings of fear and hopelessness by telling them of my own journey and struggles, and how it felt when I received my Ph.D. and published this article. Their feedback was beyond positive and, to me, this recognition was just as rewarding as having my work being useful for environmental managers in New England.

At the end of the day, the most important things in my life are the personal connections, especially those that are associated with contributions to a healthier planet. Fortunately, the outcomes of this article have reinforced some of these connections and helped me build others. Now I have the chance to continue collaborating with my colleagues at the University of Rhode Island and to work on new challenging scientific questions with my team at the Federal University of Santa Catarina. Perhaps most importantly, I have the confidence to help other first-generation students and early-career scientist find their own path in Oceanography.

Received: 4 May 2022; Accepted: 26 July 2022;

Published online: 08 August 2022

### References

1. Gonçalves Neto, A., Langan, J. A. & Palter, J. B. Changes in the Gulf Stream Preceded Rapid Warming of the Northwest Atlantic Shelf. *Commun. Earth Environ.* **2**, 74 (2021).
2. Maine Climate Council et al. Maine Won't Wait One-Year Progress Report, 2021. 2272 (General University of Maine Publications, 2021).
3. Northeast Fisheries Science Center (U.S.). State of the Ecosystem 2022: New England. (2022).

### Acknowledgements

I would like to thank my co-authors Dr. Jaime B. Palter and Dr. Joe A. Langan for their invaluable contribution to the manuscript.

### Author contributions

A.G.N. came up with the concept and wrote the article.

### Competing interests

The author declares no competing interests.

### Additional information

**Supplementary information** The online version contains supplementary material available at <https://doi.org/10.1038/s43247-022-00508-4>.

**Correspondence** and requests for materials should be addressed to Afonso Gonçalves Neto.

**Reprints and permission information** is available at <http://www.nature.com/reprints>

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2022