A Bibliometric Analysis of NOAA Global Ocean Monitoring and Observing Program Articles: 2017-2021 (A Snapshot)

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About This Report

This report presents a summary-level bibliometric analysis of the most cited peer-reviewed journal articles produced as a result of ocean observing research supported by NOAA's Global Ocean Monitoring and Observing Program (GOMO). This report was produced using a list of publications provided by GOMO and data retrieved from the Web of Science, Science Citation Index Expanded and Social Science Index database and InCites on June 21, 2022, covering articles published from 2017 thru 2021.

The bibliometric indicators presented in this report are based on citations from the select group of peer-reviewed journal articles indexed by Web of Science and, as such, do not reflect GOMO articles from peer-reviewed journals not indexed by Web of Science (WoS) or from other sources such as book chapters, conference proceedings, or technical reports.

More information about the methodology used and a full listing of all of the articles evaluated in this report are available upon request to Sarah.Davis@noaa.gov.

PRODUCTIVITY

General productivity metrics for GOMO articles 2017-2021

Summary Metrics

Indicator	Number
Total number of publications	26
Total number times of these 26 publications have been cited	3,041
Average citations per publication	117
Percentage of documents cited at least once	96%
GOMO h-index	20
Percentage of documents in the top 10%*	53.85%

Table 1. Common Bibliometric Indicators calculated for GOMO peer-reviewed articles. An h-index of 20 indicates that this group of 26 articles includes 20 articles that have each received 20 or more citations. *Percentage of documents in the top 10% is calculated based on the number of articles that ranked in the top 10% of publications in Web of Science based on citations by category, year and document type; 53.85% of GOMO articles published 2017-2021 and analyzed in this report ranked in the top 10% of all articles in the same category published in the same year.

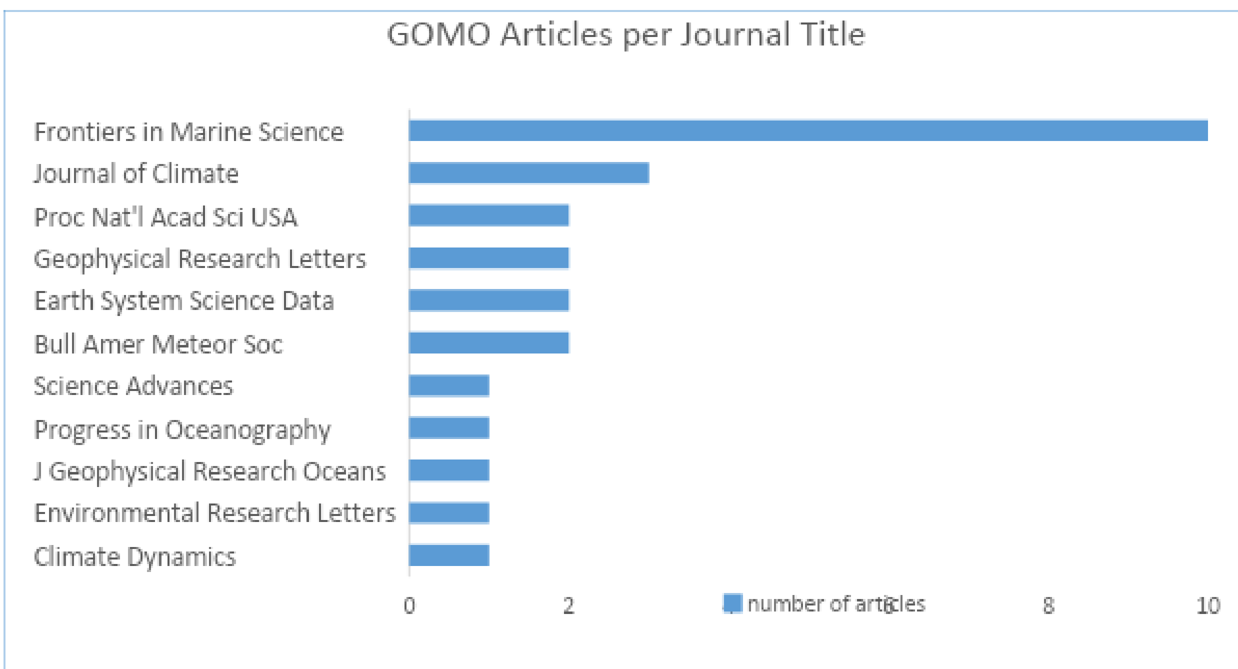

Figure 1: Number of GOMO articles 2017-2021 per journal title

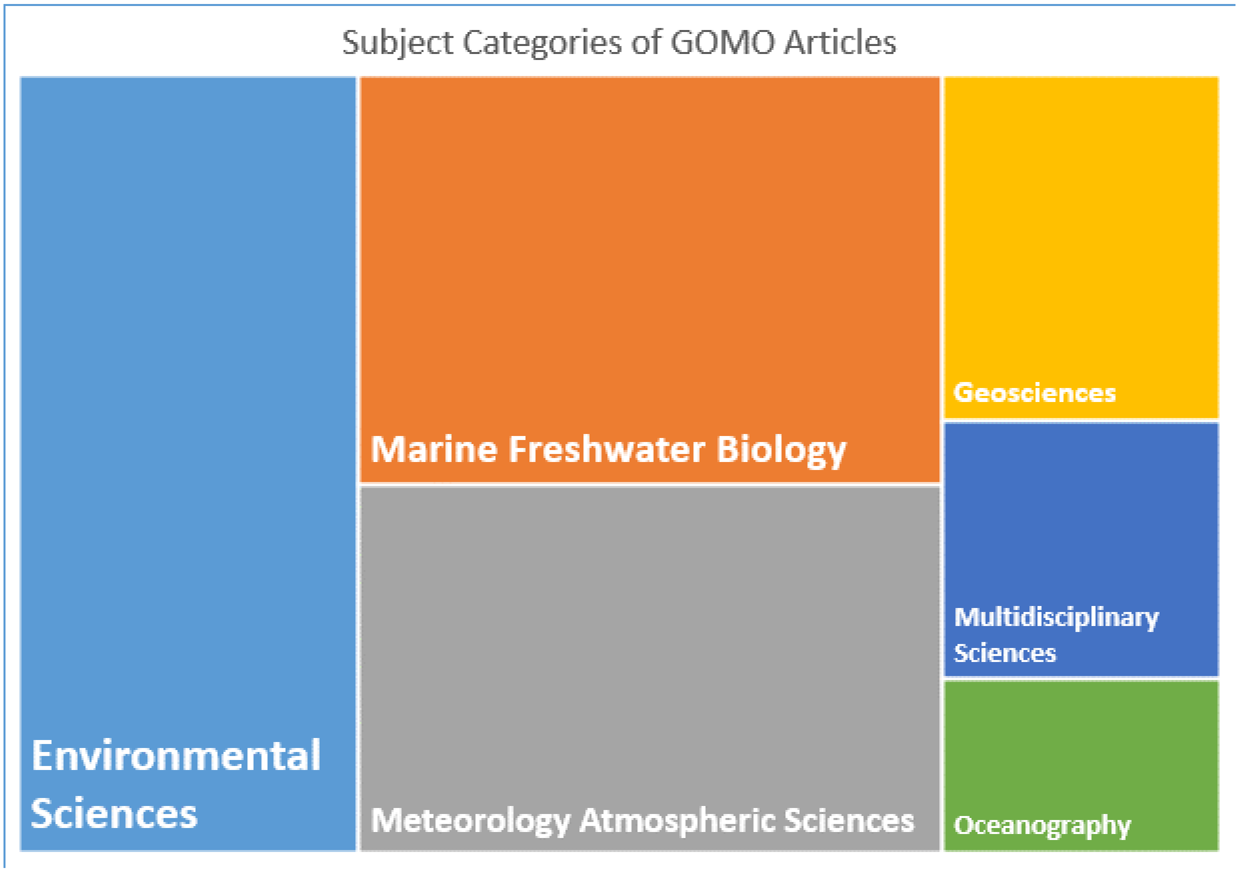

Figure 2: Web of Science subject categories of GOMO articles. Subject categories are assigned by Web of Science based on the journal in which an article appears and one article may be assigned multiple subject categories.

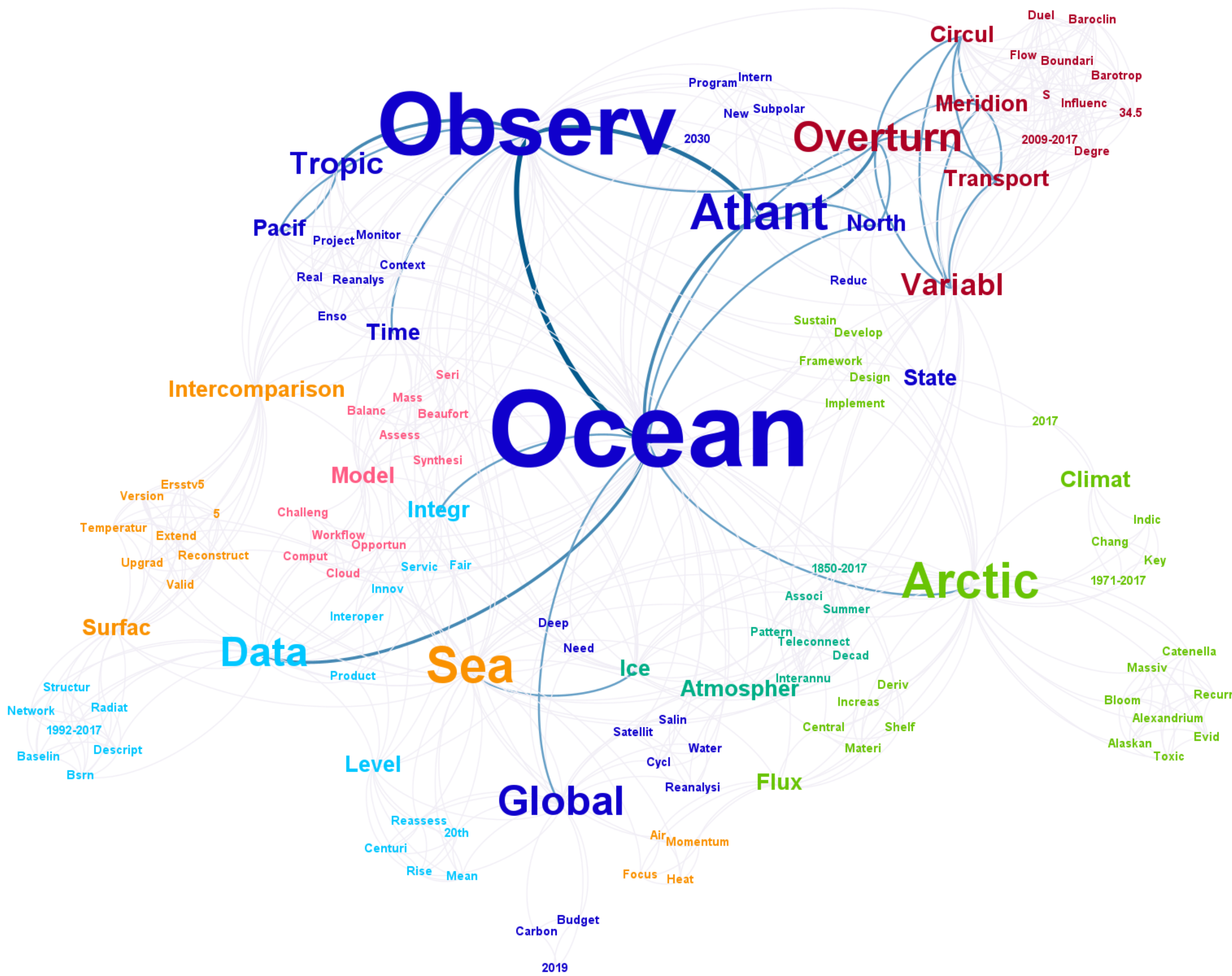

Figure 3: Word co-occurrence network map of the 128 words most commonly co-occurring in the titles of GOMO journal articles. Words were truncated (i.e. word endings like '-es', '-al', and '-ity' were removed) to increase word matching accuracy and stopwords (words that carry little meaning like "and", "the", and "if") were deleted prior to creating the network. In the map, word size indicates the number of article titles in which the word appears; these values range from 1 article to 11 articles. Words are colored based on the results of the community detection algorithm of Blondel and others (2008) to indicate groups of words that tend to appear together in article titles. Lines represent article titles in which the connected words both appear, with line size and darkness indicating the number of articles in which the two connected words both occur.

IMPACT

This section analyzes the 2,975 publications citing 26 GOMO articles for insights into the value and impact of NSSL research.

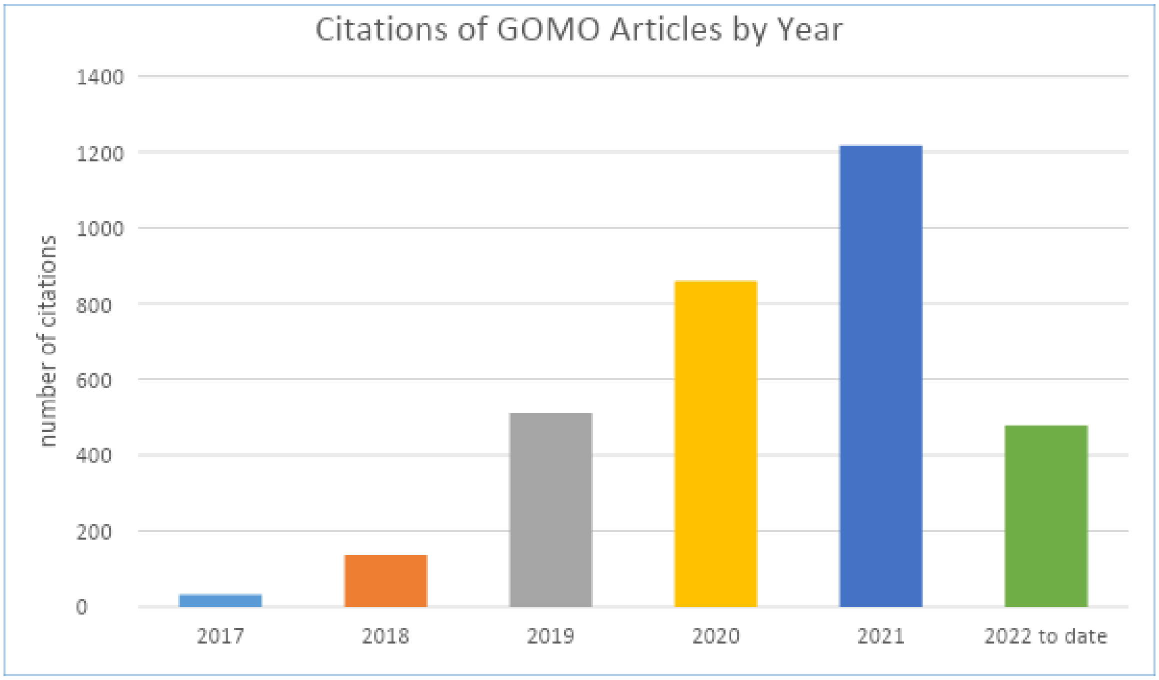

Figure 4: Non-cumulative number of citations received by the GOMO articles analyzed in this report per year.

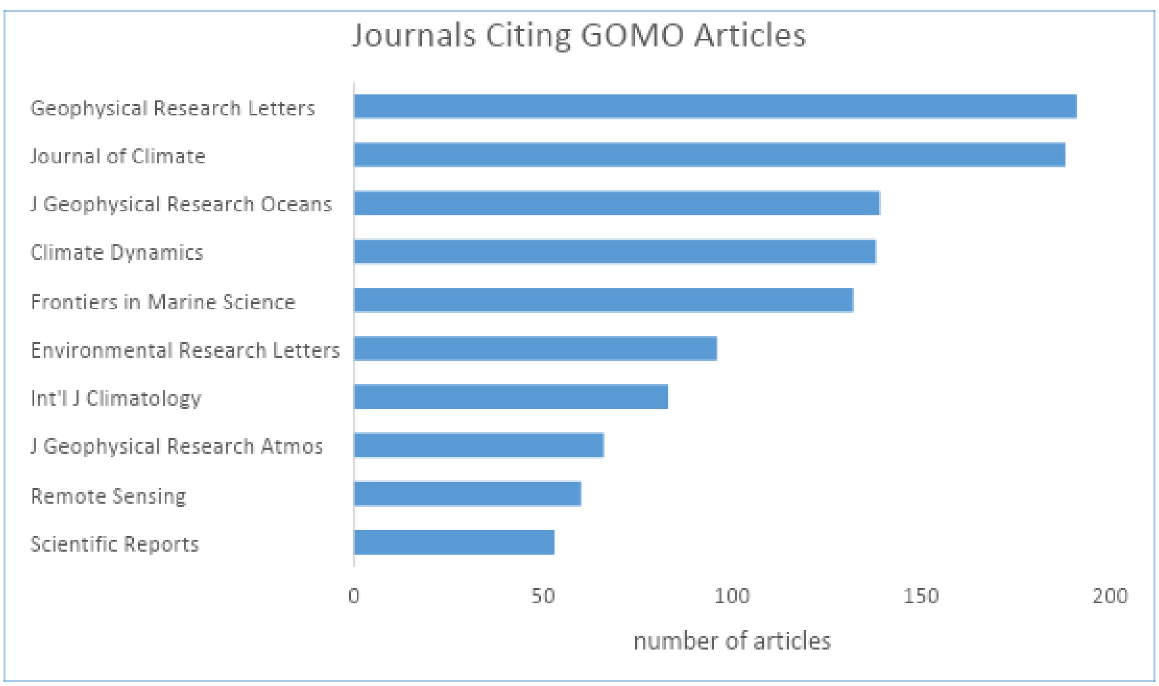

Figure 5: GOMO articles were cited in 534 distinct journal titles, the top ten of which are displayed here.

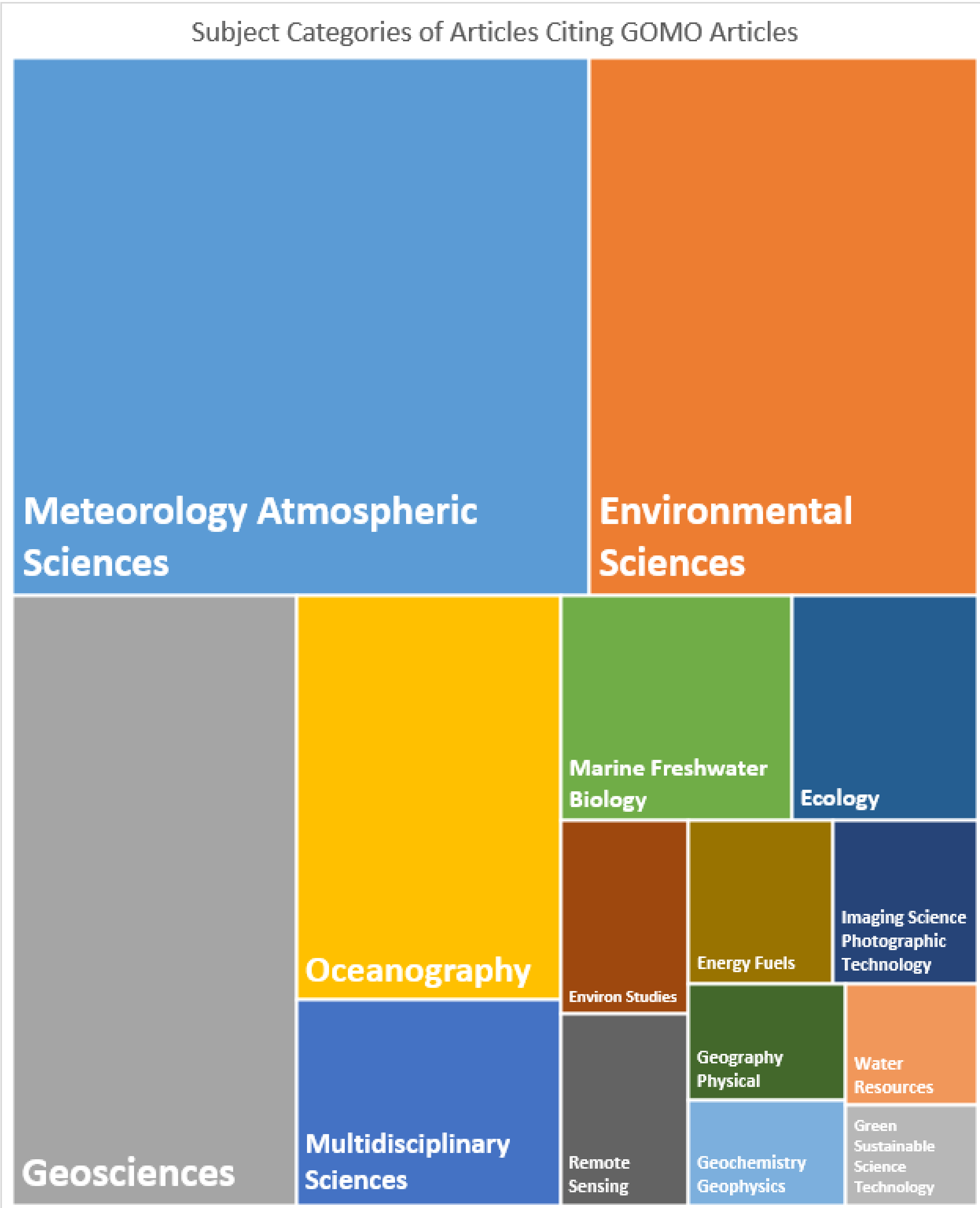

Figure 6: Articles citing GOMO articles appeared in 123 Web of Science Subject Categories, the top fifteen of which are shown here illustrating the impact of GOMO's published research across many research fields.

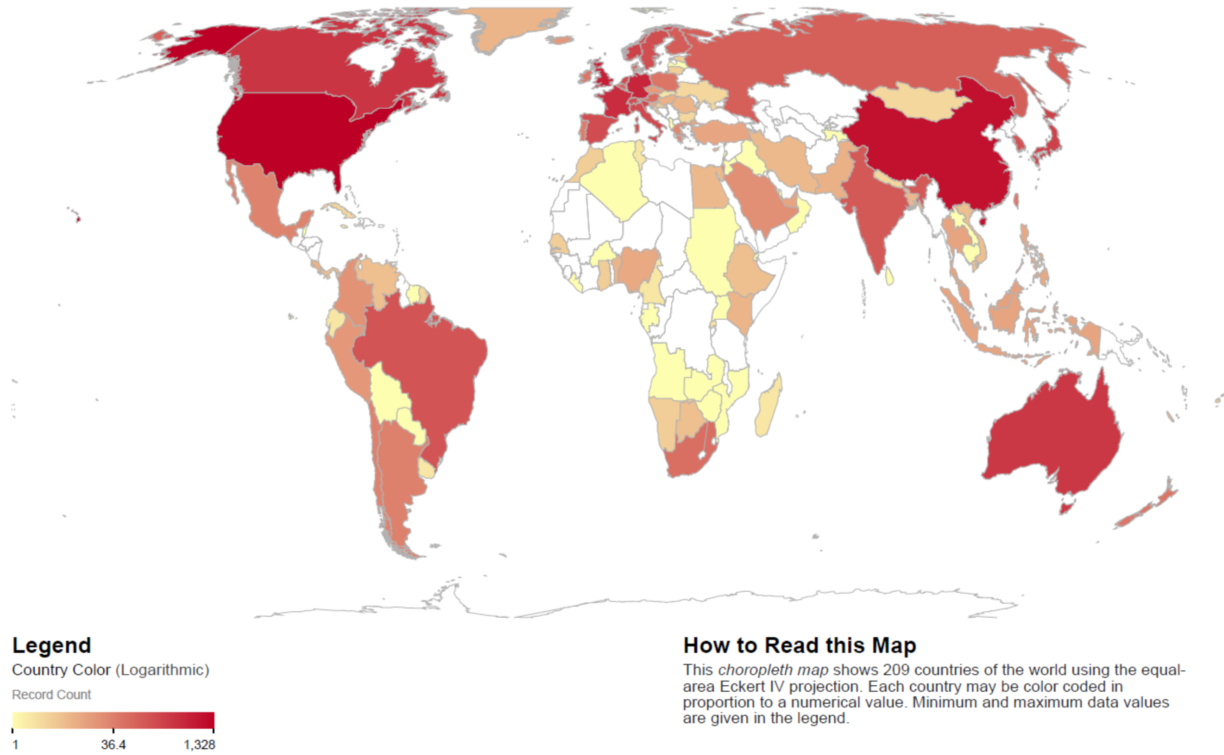

Figure 7: Geographic map illustrating international citations of GOMO articles published between 2017 and 2021 illustrating the global reach of GOMO's research.

APPENDIX 1: LIST OF ARTICLES USED IN THIS ANALYSIS

GOMO Articles 2017-2021	Times cited
Anderson, D. M., Fachon, E., Pickart, R. S, et al. (2021). Evidence for massive and recurrent toxic blooms of Alexandrium catenella in the Alaskan Arctic [Article]. Proceedings of the National Academy of Sciences of the United States of America, 118(41), 11, Article e2107387118. https://doi.org/10.1073/pnas.2107387118	6
Arndt, D. S., Blunden, J., Hartfield, G., et al. (2018). STATE OF THE CLIMATE IN 2017 [Article]. Bulletin of the American Meteorological Society, 99(8), S1-S310. <Go to ISI>://WOS:000453721600001	79
Box, J. E., Colgan, W. T., Christensen, T. R., et al. (2019). Key indicators of Arctic climate change: 1971-2017 [Article]. Environmental Research Letters, 14(4), 18, Article 045010. https://doi.org/10.1088/1748-9326/aafc1b	237
Buck, J. J. H., Bainbridge, S. J., Burger, E. F., et al. (2019). Ocean Data Product Integration Through Innovation-The Next Level of Data Interoperability [Review]. Frontiers in Marine Science, 6, 19, Article 32. https://doi.org/10.3389/fmars.2019.00032	28
Cai, Q. Q., Beletsky, D., Wang, J., & Lei, R. B. (2021). Interannual and Decadal Variability of Arctic Summer Sea Ice Associated with Atmospheric Teleconnection Patterns during 1850-2017 [Article]. Journal of Climate, 34(24), 9931-9955. https://doi.org/10.1175/jcli-d-20-0330.1	108
Corlett, W. B., & Pickart, R. S. (2017). The Chukchi slope current [Article]. Progress in Oceanography, 153, 50-65. https://doi.org/10.1016/j.pocean.2017.04.005	95
Cronin, M. F., Gentemann, C. L., Edson, J., et al. (2019). Air-Sea Fluxes With a Focus on Heat and Momentum [Review]. Frontiers in Marine Science, 6, 30, Article 430. https://doi.org/10.3389/fmars.2019.00430	51
Dangendorf, S., Marcos, M., Woppelmannc, G., Conrad, C. P., Frederikse, T., & Riva, R. (2017). Reassessment of 20th century global mean sea level rise [Article]. Proceedings of the National Academy of Sciences of the United States of America, 114(23), 5946-5951. https://doi.org/10.1073/pnas.1616007114	163
deYoung, B., Visbeck, M., de Araujo, M. C., et al. (2019). An Integrated All-Atlantic Ocean Observing System in 2030 [Review]. Frontiers in Marine Science, 6, 22, Article 428. https://doi.org/10.3389/fmars.2019.00428	17
Driemel, A., Augustine, J., Behrens, K., et al. (2018). Baseline Surface Radiation Network (BSRN): structure and data description (1992-2017) [Review]. Earth System Science Data, 10(3), 1491-1501. https://doi.org/10.5194/essd-10-1491-2018	131
Foltz, G. R., Brandt, P., Richter, I., et al. (2019). The Tropical Atlantic Observing System [Review]. Frontiers in Marine Science, 6, 36, Article 206. https://doi.org/10.3389/fmars.2019.00206	44
Frajka-Williams, E., Ansorge, I. J., Baehr, Jet al. (2019). Atlantic Meridional Overturning Circulation: Observed Transport and Variability [Review]. Frontiers in Marine Science, 6, 18, Article 260. https://doi.org/10.3389/fmars.2019.00260	64
Friedlingstein, P., Jones, M. W., O'Sullivan, M., et al. (2019). Global Carbon Budget 2019 [Article; Data Paper]. Earth System Science Data, 11(4), 1783-1838. https://doi.org/10.5194/essd-11-1783-2019	669

Huang, B. Y., Thorne, P. W., Banzon, V. F., et al. (2017). Extended Reconstructed Sea Surface Temperature, Version 5 (ERSSTv5): Upgrades, Validations, and Intercomparisons [Article]. Journal of Climate, 30(20), 8179-8205. https://doi.org/10.1175/jcli-d-16-0836.1	1064
Kipp, L. E., Charette, M. A., Moore, W. S., Henderson, P. B., & Rigor, I. G. (2018). Increased fluxes of shelf-derived materials to the central Arctic Ocean [Article]. Science Advances, 4(1), 9, Article eaao1302. https://doi.org/10.1126/sciadv.aao1302	53
Lee, C. M., Starkweather, S., Eicken, H., et al. (2019). A Framework for the Development, Design and Implementation of a Sustained Arctic Ocean Observing System [Review]. Frontiers in Marine Science, 6, 21, Article 451. https://doi.org/10.3389/fmars.2019.00451	13
Levin, L. A., Bett, B. J., Gates, A. R., et al. (2019). Global Observing Needs in the Deep Ocean [Review]. Frontiers in Marine Science, 6, 32, Article 241. https://doi.org/10.3389/fmars.2019.00241	78
Lozier, M. S., Bacon, S., Bower, A. S., et al. (2017). OVERTURNING IN THE SUBPOLAR NORTH ATLANTIC PROGRAM A New International Ocean Observing System [Article]. Bulletin of the American Meteorological Society, 98(4), 737-752. https://doi.org/10.1175/bams-d-16-0057.1	120
Meinen, C. S., Speich, S., Piola, A. R., et al. (2018). Meridional Overturning Circulation Transport Variability at 34.5 degrees S During 2009-2017: Baroclinic and Barotropic Flows and the Dueling Influence of the Boundaries [Article]. Geophysical Research Letters, 45(9), 4180-4188. https://doi.org/10.1029/2018gl077408	34
Planck, C. J., Perovich, D. K., & Light, B. (2020). A Synthesis of Observations and Models to Assess the Time Series of Sea Ice Mass Balance in the Beaufort Sea [Article]. Journal of Geophysical Research-Oceans, 125(11), 15, Article e2019JC015833. https://doi.org/10.1029/2019jc015833	2
Smeed, D. A., Josey, S. A., Beaulieu, C., et al. (2018). The North Atlantic Ocean Is in a State of Reduced Overturning [Article]. Geophysical Research Letters, 45(3), 1527-1533. https://doi.org/10.1002/2017gl076350	153
Smith, N., Kessler, W. S., Cravatte, S., et al. (2019). Tropical Pacific Observing System [Review]. Frontiers in Marine Science, 6, 26, Article 31. https://doi.org/10.3389/fmars.2019.00031	34
Tanhua, T., Pouliquen, S., Hausman, J., et al. (2019). Ocean FAIR Data Services [Review]. Frontiers in Marine Science, 6, 17, Article 440. https://doi.org/10.3389/fmars.2019.00440	38
Vance, T. C., Wengren, M., Burger, E., et al. (2019). From the Oceans to the Cloud: Opportunities and Challenges for Data, Models, Computation and Workflows [Review]. Frontiers in Marine Science, 6, 18, Article 211. https://doi.org/10.3389/fmars.2019.00211	8
Xue, Y., Wen, C., Kumar, A., et al. (2017). A real-time ocean reanalyses intercomparison project in the context of tropical pacific observing system and ENSO monitoring [Article]. Climate Dynamics, 49(11-12), 3647-3672. https://doi.org/10.1007/s00382-017-3535-y	24
Yu, L. S., Jin, X. Z., Josey, S. A., Lee, T., Kumar, A., Wen, C. H., & Xue, Y. (2017). The Global Ocean Water Cycle in Atmospheric Reanalysis, Satellite, and Ocean Salinity [Article]. Journal of Climate, 30(10), 3829-3852. https://doi.org/10.1175/jcli-d-16-0479.1	27

APPENDIX 2: RESPONSIBLE USE OF BIBLIOMETRICS

When used alongside other evaluative measures, bibliometrics can be a useful tool for evaluating research. However, all bibliometric indicators have limitations and should not be used out of context or applied without a full understanding of their intended use. No single metric can provide a rounded overview of research performance so responsible use of metrics requires using multiple metrics and providing context for those metrics. It can be helpful to think of a bibliometric analysis as a story where each indicator is a plot point. Additionally, bibliometrics should not be used as the sole basis for decision-making or for evaluating the work of either an individual or group.

Some Pros & Cons of Bibliometrics

Pros

- Quantitative, objective and reproducible
- Easy to understand and easily updated
- Fully scalable - from individual- to country-level

Cons

- Datasets, particularly from standard databases like Web of Science (WOS), may represent only a portion of existing publications
- Most indicators are skewed and are vulnerable to manipulation by authors & publishers. H-index for example highly favors authors with longer careers.
- Indicators don’t necessarily mean what we think they mean (e.g. a high citation count may be the result of “negative” citations rather than an indicator of quality)

Further reading on the responsible use of bibliometrics:

Aksnes, D. W., L. Langfeldt, & P. Wouters. 2019. Citations, Citation Indicators, and Research Quality: An Overview of Basic Concepts and Theories. SAGE Open, 9. doi:10.1177/2158244019829575.

Barnes, C. 2017. The h-index debate: An introduction for librarians. The Journal of Academic Librarianship 43:487-494, doi:10.1016/j.acalib.2017.08.013.

Belter, C.W. 2015. Bibliometric indicators: Opportunities and limits. Journal of the Medical Library Association. 103(4):219-221. doi:10.3163/1536-5050.103.4.014.

Clarivate Analytics. 2020. InCites benchmarking & analytics: Responsible use of research metrics. http://clarivate.libguides.com/incites_ba/responsible-use. Accessed 12/16/2020.

Haustein, S., V. Lariviere. 2015. The use of bibliometrics for assessing research: Possibilities, limitations and adverse effects. In: Welpe IM, J. Wollersheim, S. Ringelhan, M. Osterloh, eds. Incentives and performance. Springer, Cham. Pg. 121–139. doi:10.1007/978-3-319-09785-5_8.

Hicks, D., P. Wouters, L. Waltman, S. de Rijcke and I. Rafois. 2015. Bibliometrics: The Leiden Manifesto for research metrics. Nature 520:420-531. doi:10.1038/520429a.

Pendlebury, D.A. 2010. White paper: Using bibliometrics in evaluating research. Thomson Reuters, Philadelphia, PA. https://lib.guides.umd.edu/ld.php?content_id=13278687.

APPENDIX 3: METHOD AND SOURCES

This report provides a bibliometric analysis of publications produced by the NOAA's Global Ocean Monitoring and Observing Program (GOMO) from January 2017 – December 2021. For our data source, we used a list of publications provided by GOMO. Because we use the WoS analytical tools for our bibliometric analyses, GOMO publications that do not appear in WoS have been omitted from the data set. Bibliographic citations and citation data were downloaded from WoS and Clarivate InCites.

Although we have included publication and citation data through June 2022 in our data set, it is generally agreed that publications must be at least two years old for citation reporting to be meaningful. Therefore it should be noted that the citation data for the more recent publications is preliminary and is most likely not indicative of their eventual impact.

Publication and citation data were downloaded from Web of Science and InCites on June 21, 2022. Because of slight differences in indexing schedules and algorithms, citation data can vary slightly between WoS and InCites. The full publication list and data sets are from Sarah.Davis@noaa.gov