A Bibliometric Analysis of NOAA Climate Program Office Publications: FY2017-2021

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About This Report

This report presents a summary-level bibliometric analysis of the known peer-reviewed journal articles produced as a result of ocean exploration missions supported by NOAA's Climate Program Office (CPO). This report was produced using data retrieved from the Web of Science, Science Citation Index Expanded and Social Science Index database and InCites on December 20, 2021, covering articles published from fiscal years 2017 thru 2021 (October 2016 – September 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 CPO 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. The articles analyzed in this report were derived from lists provided by CPO.

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 CPO articles FY2017 – FY2021.

Summary Metrics

Indicator	Number
Total number of publications	1,359
Total number times of these 452 publications have been cited	26,063
Average citations per publication	19.18
Percentage of documents cited at least once	90%
NSSL h-index	65
Percentage of documents in the top 10%*	23.84%

Table 1. Common Bibliometric Indicators calculated for CPO peer-reviewed articles. An h-index of 65 indicates that this group of 1,359 articles includes 65 articles that have each received 65 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; 23.84% of CPO articles published between FY2017 and FY2021 ranked in the top 10% of all articles in the same category published in the same year.

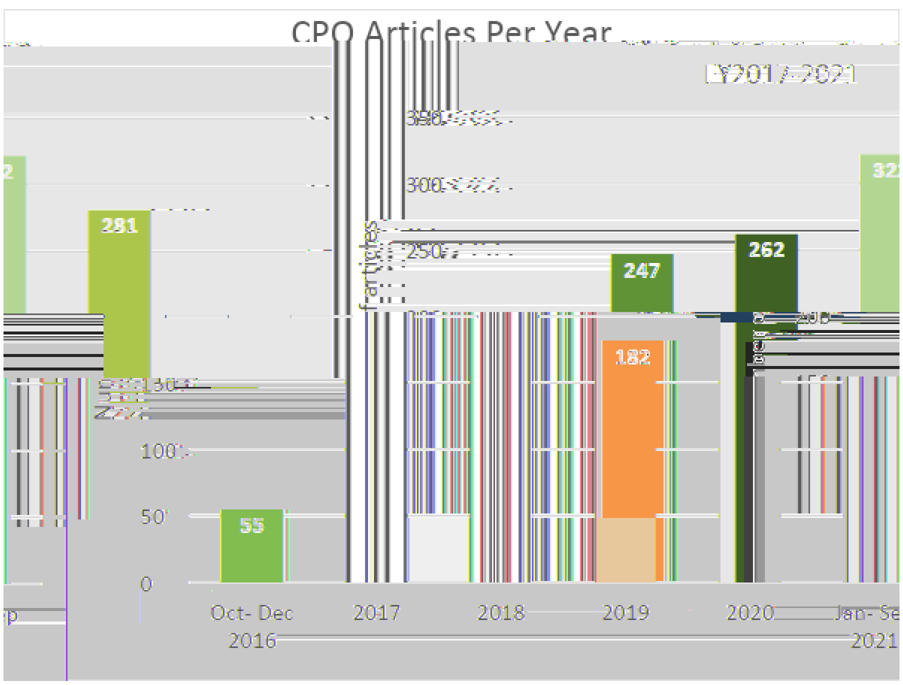


Figure 1. Number of CPO articles published annually, 2016-2021.

Table 2. CPO top-cited articles FY2017-2021	**Times cited**
Beck, H. E., Zimmermann, N. E., McVicar, T. R., Vergopolan, N., Berg, A., & Wood, E. F. (2018). Present and future Koppen-Geiger climate classification maps at 1-km resolution. *SCIENTIFIC DATA, 5*. doi:10.1038/sdata.2018.214	866
Abatzoglou, J. T., & Williams, A. P. (2016). Impact of anthropogenic climate change on wildfire across western US forests. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 113*(42), 11770-11775. doi:10.1073/pnas.1607171113	811
Pelling, M., & High, C. (2005). Understanding adaptation: What can social capital offer assessments of adaptive capacity? *GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS, 15*(4), 308-319. doi:10.1016/j.gloenvcha.2005.02.001	484
Lemos, M. C., Kirchhoff, C. J., & Ramprasad, V. (2012). Narrowing the climate information usability gap. *NATURE CLIMATE CHANGE, 2*(11), 789-794. doi:10.1038/NCLIMATE1614	439
Abatzoglou, J. T., Dobrowski, S. Z., Parks, S. A., & Hegewisch, K. C. (2018). Data Descriptor: TerraClimate, a high-resolution global dataset of monthly climate and climatic water balance from 1958-2015. *SCIENTIFIC DATA, 5*. doi:10.1038/sdata.2017.191	361
Balch, J. K., Bradley, B. A., Abatzoglou, J. T., et al. (2017). Human-started wildfires expand the fire niche across the United States. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 114*(11), 2946-2951. doi:10.1073/pnas.1617394114	288
Huang, J. P., Yu, H. P., Dai, A. G., Wei, Y., & Kang, L. T. (2017). Drylands face potential threat under 2 degrees C global warming target. *NATURE CLIMATE CHANGE, 7*(6), 417-+. doi:10.1038/NCLIMATE3275	268
Meadow, A. M., Ferguson, D. B., Guido, Z., Horangic, A., Owen, G., & Wall, T. (2015). Moving toward the Deliberate Coproduction of Climate Science Knowledge. *WEATHER CLIMATE AND SOCIETY, 7*(2), 179-191. doi:10.1175/WCAS-D-14-00050.1	223
Mote, P. W., Li, S. H., Lettenmaier, D. P., Xiao, M., & Engel, R. (2018). Dramatic declines in snowpack in the western US. *NPJ CLIMATE AND ATMOSPHERIC SCIENCE, 1*. doi:10.1038/s41612-018-0012-1	198
Bowman, D., Williamson, G. J., Abatzoglou, J. T., Kolden, C. A., Cochrane, M. A., & Smith, A. M. S. (2017). Human exposure and sensitivity to globally extreme wildfire events. *NATURE ECOLOGY & EVOLUTION, 1*(3). doi:10.1038/s41559-016-0058	191
L'Heureux, M. L., Takahashi, K., Watkins, A. B., et al. (2017). OBSERVING AND PREDICTING THE 2015/16 EL NINO. *BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY, 98*(7), 1363-1382. doi:10.1175/BAMS-D-16-0009.1	185
Udall, B., & Overpeck, J. (2017). The twenty-first century Colorado River hot drought and implications for the future. *WATER RESOURCES RESEARCH, 53*(3), 2404-2418. doi:10.1002/2016WR019638	166

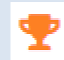
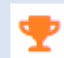
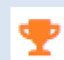
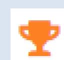
Box, J. E., Colgan, W. T., Christensen, T. R., et al. (2019). Key indicators of Arctic climate change: 1971-2017. *ENVIRONMENTAL RESEARCH LETTERS, 14*(4). doi:10.1088/1748-9326/aafc1b	164 
Nguyen, J. L., Yang, W., Ito, K., Matte, T. D., Shaman, J., & Kinney, P. L. (2016). Seasonal Influenza Infections and Cardiovascular Disease Mortality. *JAMA CARDIOLOGY, 1*(3), 274-281. doi:10.1001/jamacardio.2016.0433	161
Williams, A. P., Abatzoglou, J. T., Gershunov, A., Guzman-Morales, J., Bishop, D. A., Balch, J. K., & Lettenmaier, D. P. (2019). Observed Impacts of Anthropogenic Climate Change on Wildfire in California. *EARTHS FUTURE, 7*(8), 892-910. doi:10.1029/2019EF001210	154 
Slivinski, L. C., Compo, G. P., Whitaker, J. S., et al. (2019). Towards a more reliable historical reanalysis: Improvements for version 3 of the Twentieth Century Reanalysis system. *QUARTERLY JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY, 145*(724), 2876-2908. doi:10.1002/qj.3598	150 
Butler, A. H., Sjoberg, J. P., Seidel, D. J., & Rosenlof, K. H. (2017). A sudden stratospheric warming compendium. *EARTH SYSTEM SCIENCE DATA, 9*(1), 63-76. doi:10.5194/essd-9-63-2017	145 
Dai, A. G., Luo, D. H., Song, M. R., & Liu, J. P. (2019). Arctic amplification is caused by sea-ice loss under increasing CO2. *NATURE COMMUNICATIONS, 10*. doi:10.1038/s41467-018-07954-9	144 
Polade, S. D., Gershunov, A., Cayan, D. R., Dettinger, M. D., & Pierce, D. W. (2017). Precipitation in a warming world: Assessing projected hydro-climate changes in California and other Mediterranean climate regions. *SCIENTIFIC REPORTS, 7*. doi:10.1038/s41598-017-11285-y	142 
Hao, Z. C., Singh, V. P., & Xia, Y. L. (2018). Seasonal Drought Prediction: Advances, Challenges, and Future Prospects. *REVIEWS OF GEOPHYSICS, 56*(1), 108-141. doi:10.1002/2016RG000549	141 

Table 2: List of the twenty most highly cited CPO articles published between FY2017 and FY2021.

 The trophy symbol indicates that a paper received enough citations to place it in the top 1% of its academic field on a highly cited threshold for the field and publication year.

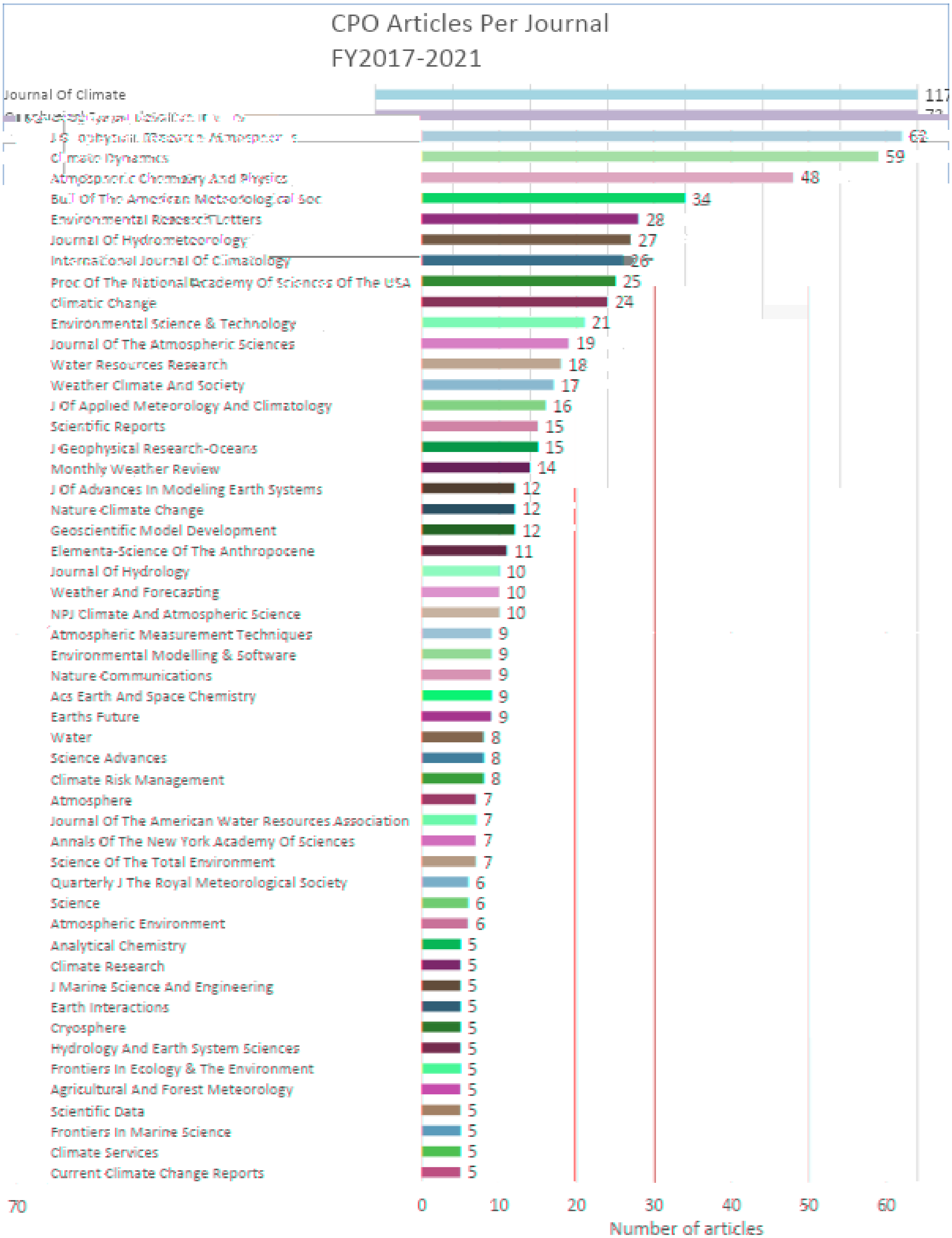

CPO Articles Per Journal
FY2017-2021
Journal Of Climate 117
Climate Dynamics 59
Atmospheric Chemistry And Physics 48
Bull Of The American Meteorological Soc 34
Environmental Research Letters 28
Journal Of Hydrometeorology 27
International Journal Of Climatology 26
Proc Of The National Academy Of Sciences Of The USA 25
Climatic Change 24
Environmental Science & Technology 21
Journal Of The Atmospheric Sciences 19
Water Resources Research 18
Weather Climate And Society 17
J Of Applied Meteorology And Climatology 16
Scientific Reports 15
J Geophysical Research-Oceans 15
Monthly Weather Review 14
J Of Advances In Modeling Earth Systems 12
Nature Climate Change 12
Geoscientific Model Development 12
Elementa-Science Of The Anthropocene 11
Journal Of Hydrology 10
Weather And Forecasting 10
NPJ Climate And Atmospheric Science 10
Atmospheric Measurement Techniques 9
Environmental Modelling & Software 9
Nature Communications 9
Acs Earth And Space Chemistry 9
Earths Future 9
Water 8
Science Advances 8
Climate Risk Management 8
Atmosphere 7
Journal Of The American Water Resources Association 7
Annals Of The New York Academy Of Sciences 7
Science Of The Total Environment 7
Quarterly J The Royal Meteorological Society 6
Science 6
Atmospheric Environment 6
Analytical Chemistry 5
Climate Research 5
J Marine Science And Engineering 5
Earth Interactions 5
Cryosphere 5
Hydrology And Earth System Sciences 5
Frontiers In Ecology & The Environment 5
Agricultural And Forest Meteorology 5
Scientific Data 5
Frontiers In Marine Science 5
Climate Services 5
Current Climate Change Reports 5
70
0
10
20
30
40
50
60
Number of articles

Figure 2. Journals in which CPO has published in five or more times between FY2017 and FY2021. CPO articles were published in 214 titles between FY2017 and FY2021.

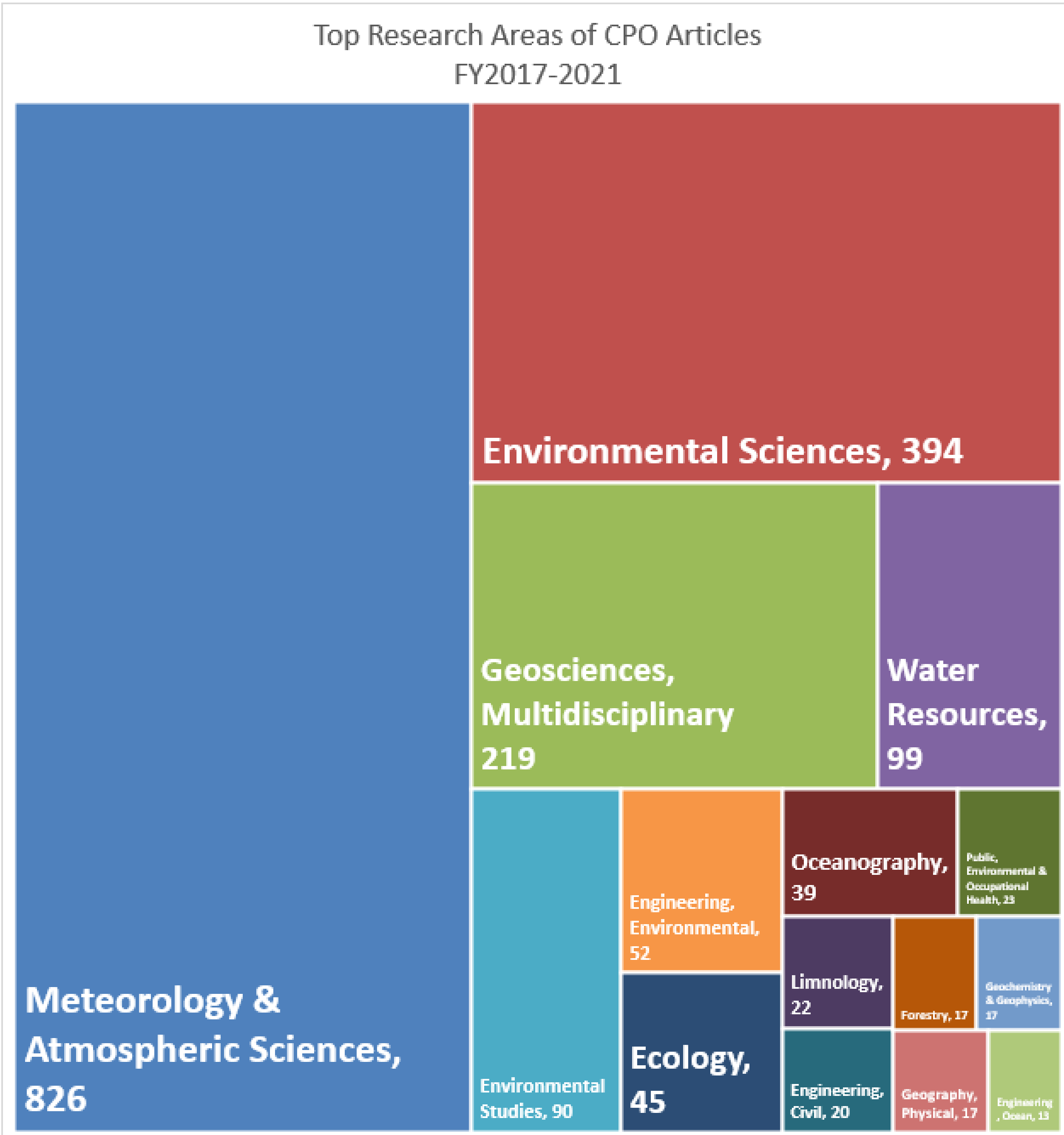


Figure 3. CPO articles appeared in journals categorized in 71 distinct research areas as defined and assigned by Web of Science. The top fifteen research areas by number of publications are presented here. Articles are assigned to subject categories by WoS based on the journal in which the article appeared. These subject categories are not mutually exclusive.

COLLABORATION

This section explores coauthor and institutional relationships.

Name	Number of occurences
NOAA	299
University of California System	259
University of Colorado System	184
Columbia University	157
NASA	128
National Center Atmospheric Research (NCAR)	121
Colorado State University	95
University of Washington	92
George Mason University	85
State University of New York (SUNY) System	83
Princeton University	75
University of Arizona	70
United States Department of Energy (DOE)	60
State University of New York (SUNY) Albany	54
United States Department of the Interior (DOI)	54
California Institute of Technology	51
University of Idaho	51
University of Michigan System	49
Oregon State University	48
State University System of Florida	46
City University of New York (CUNY) System	45
United States Department of Agriculture (USDA)	42
University of Alaska System	41
Massachusetts Institute of Technology (MIT)	40
Nevada System of Higher Education (NSHE)	39
University of Hawaii System	38
University of North Carolina	36
University of Alaska Fairbanks	35
Boston University	34
Chinese Academy of Sciences	33
University System of Maryland	32
University of Montana System	32
Desert Research Institute NSHE	32
University of Miami	31

University of Nebraska System	30
Texas A&M University System	30

Table 3. Top institutional affiliations of collaborating authors on CPO articles FY2017-2021.

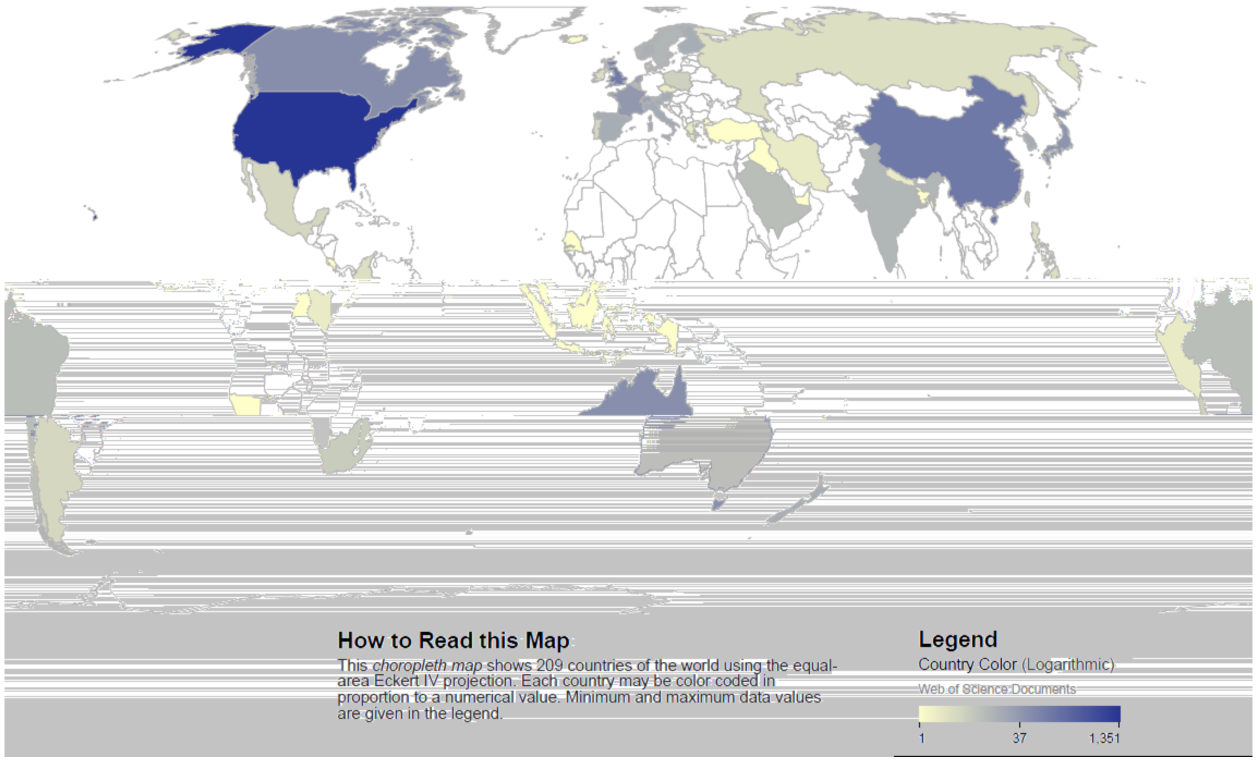


Figure 4. Geographic map illustrating CPO's international collaborations on articles published between FY2017 and FY2021.

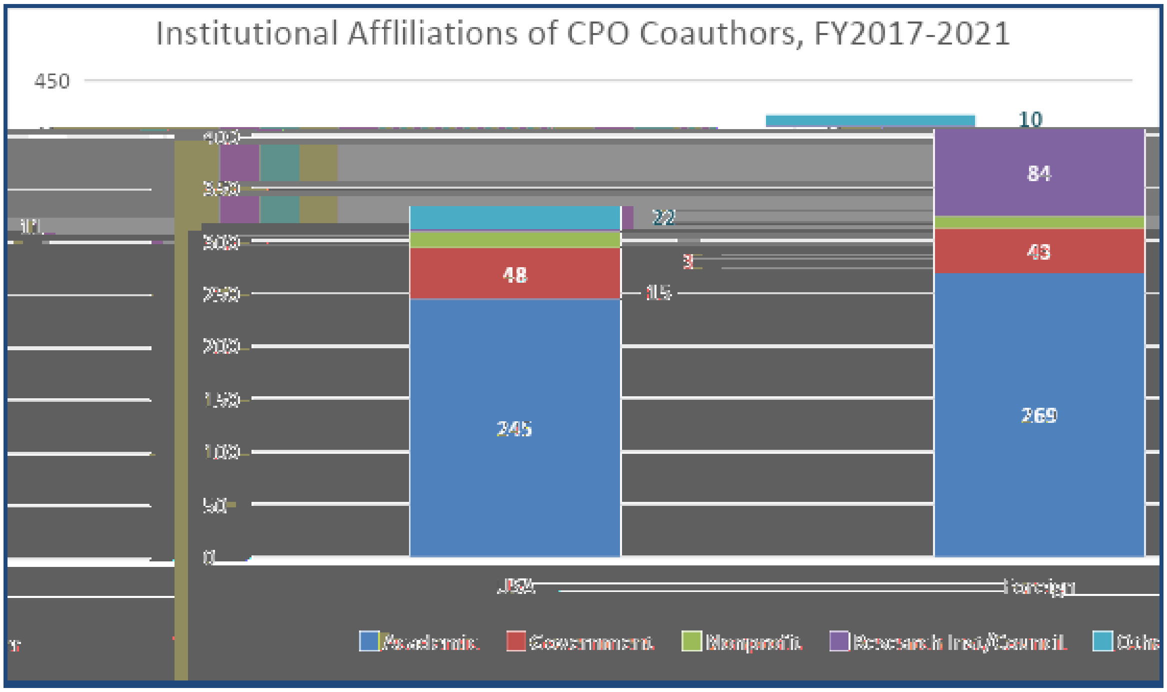


Figure 5. Count of coauthoring organizations as sorted by type. CPO authors coauthored articles affiliated with 750 organizations between FY2017 and FY2021.

IMPACT

This section analyzes the 18,091 publications citing 1,359 CPO articles for insights into the value and impact of CPO research.

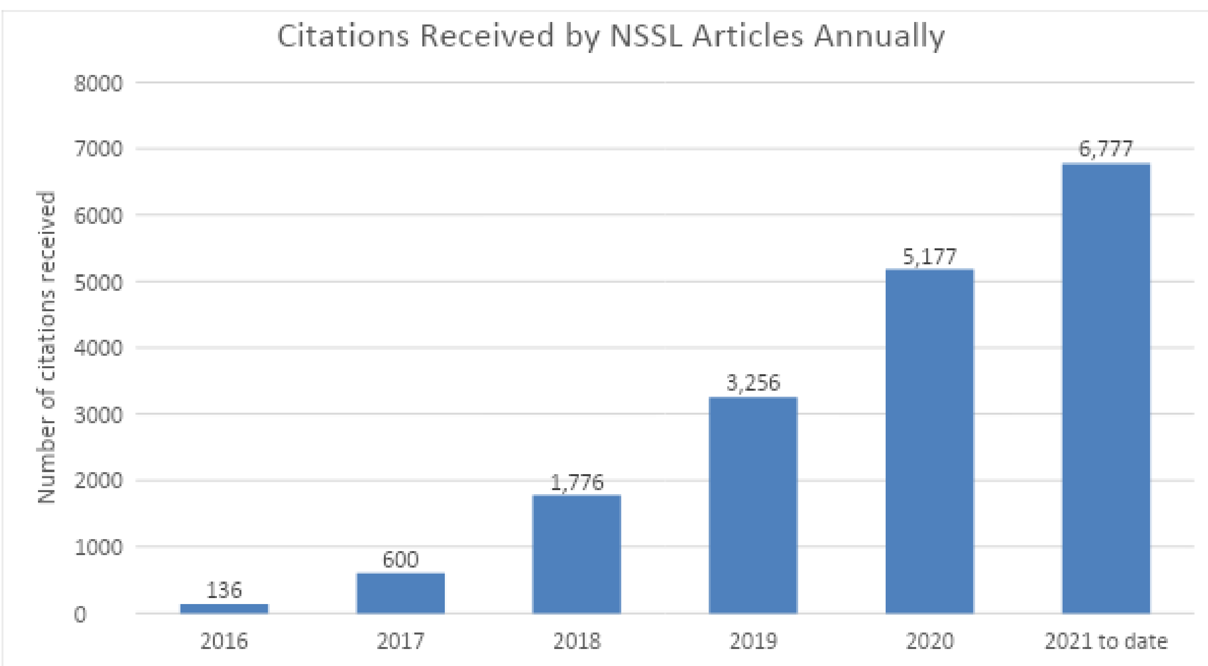


Figure 6: Non-cumulative number of citations received by this set of CPO articles between 2016 and December 2021.

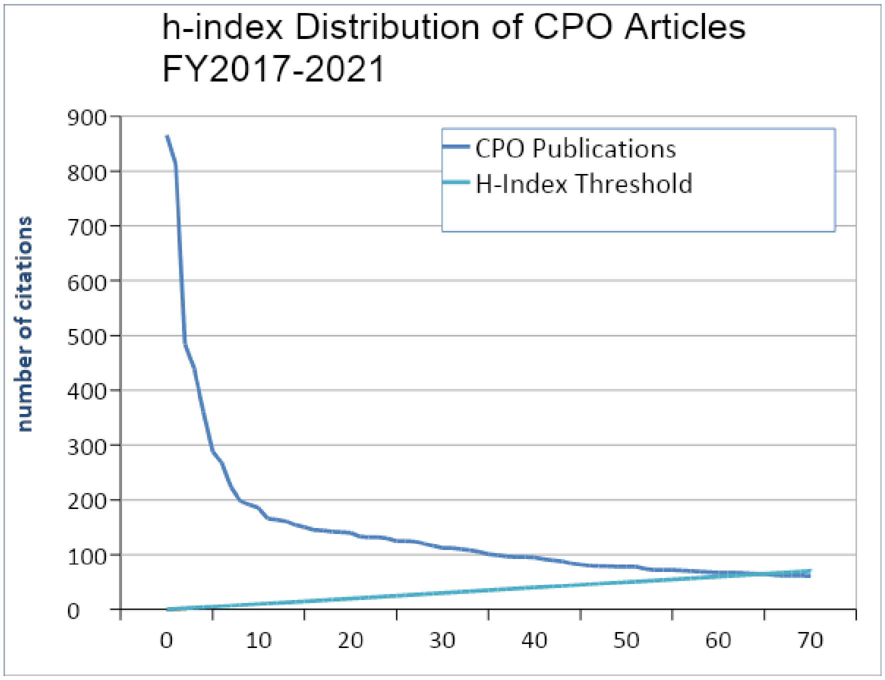


Figure 7: Distribution curve showing the citation counts of the 75 most highly cited CPO articles between FY2017 and FY2021. The straight line indicates the H-Index threshold (slope: y = x). The intersect point of the two curves (65) is the H-Index of CPO articles.

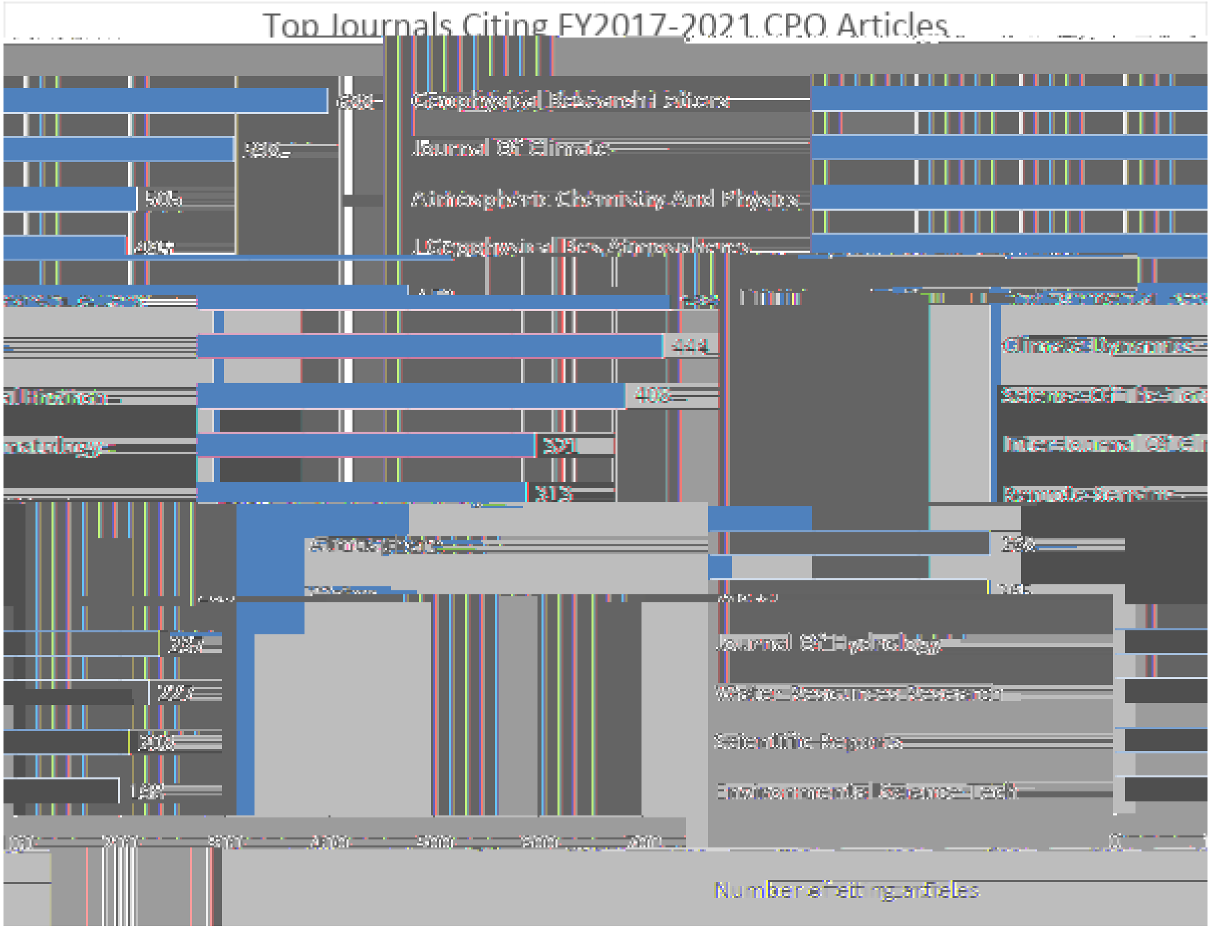


Figure 8: The 1,359 CPO articles analyzed in this report have been cited in 2,021 distinct titles. The top fifteen titles are shown here.

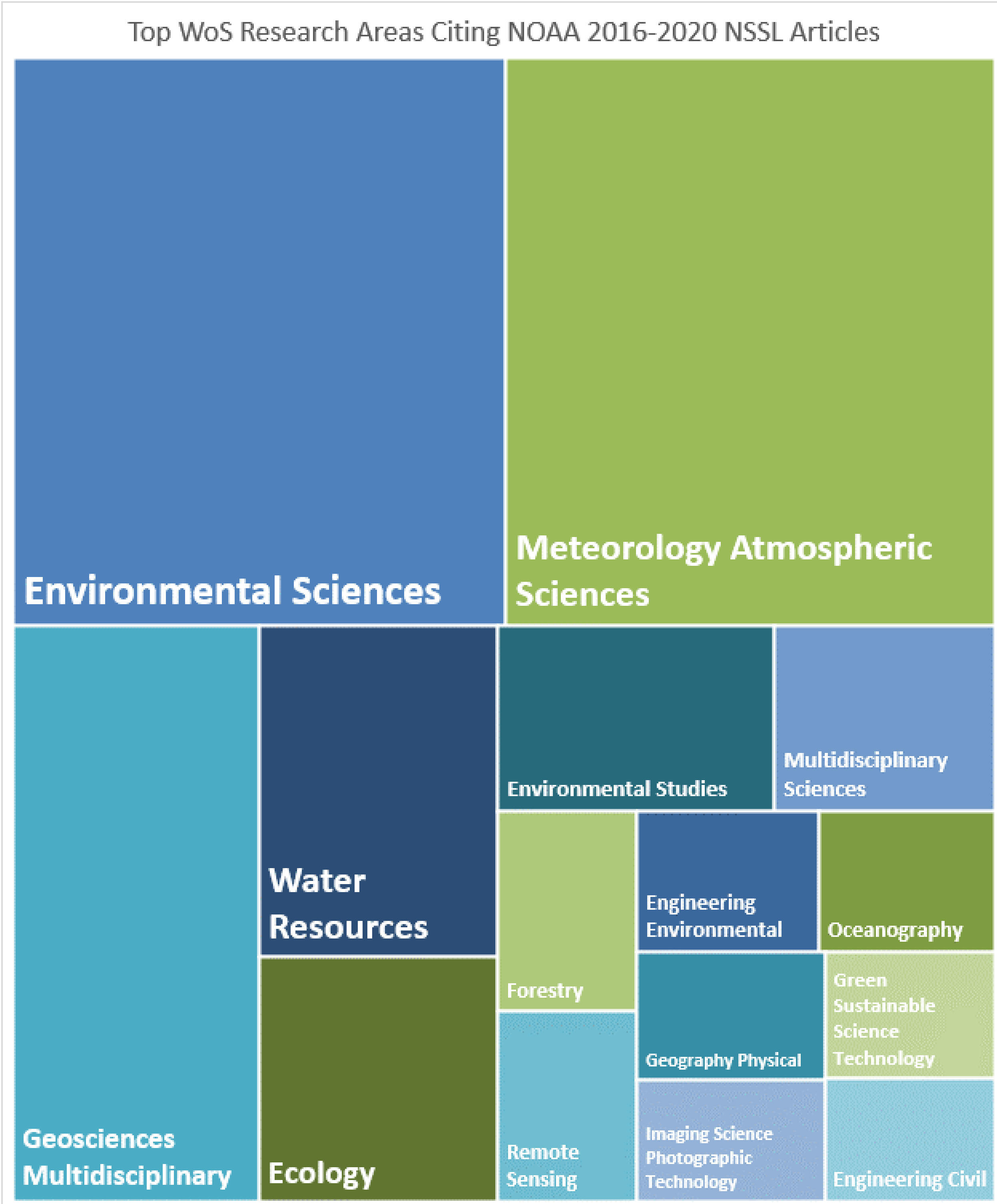


Figure 9: The fifteen most common Web of Science research areas in which these CPO articles were published in. Articles are assigned to subject categories by WoS based on the journal in which the article appeared. These subject categories are not mutually exclusive.

Figure 10: The 1,359 CPO articles analyzed in this report have been cited by authors affiliated with more than 8,000 organizations. The top twenty of these organizations are shown here.

APPENDIX 1: 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 2: METHOD AND SOURCES

This report provides a bibliometric analysis of publications produced by the NOAA Climate Program Office (CPO) from October 2016 to September 2021. For our data source, we used publication lists provided by CPO. Because we use the WoS analytical tools for our bibliometric analyses, CPO 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 December 2021 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 December 20, 2021. 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