

National Oceanographic and Atmospheric Administration  
US Department of Commerce

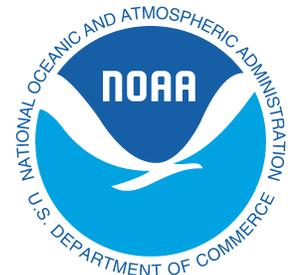
# A Bibliometric Analysis of Articles Sponsored by NOAA's Office of Ocean Exploration and Research

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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 research sponsored by NOAA’s Office of Ocean Exploration and Research (OER). This report was produced using data retrieved from the Web of Science, Science Citation Index Expanded database on 01 October, 2012. 51 articles known to have resulted from OER-funded research had to be omitted from this analysis, either because the articles are still in press or because Web of Science does not index the journals in which the articles were published. 16 of these omitted articles were produced with support from OER’s underwater archaeology program.

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 citations to OER-sponsored research from peer-reviewed journals outside of Web of Science 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 [Chris.Belter@noaa.gov](mailto:Chris.Belter@noaa.gov).

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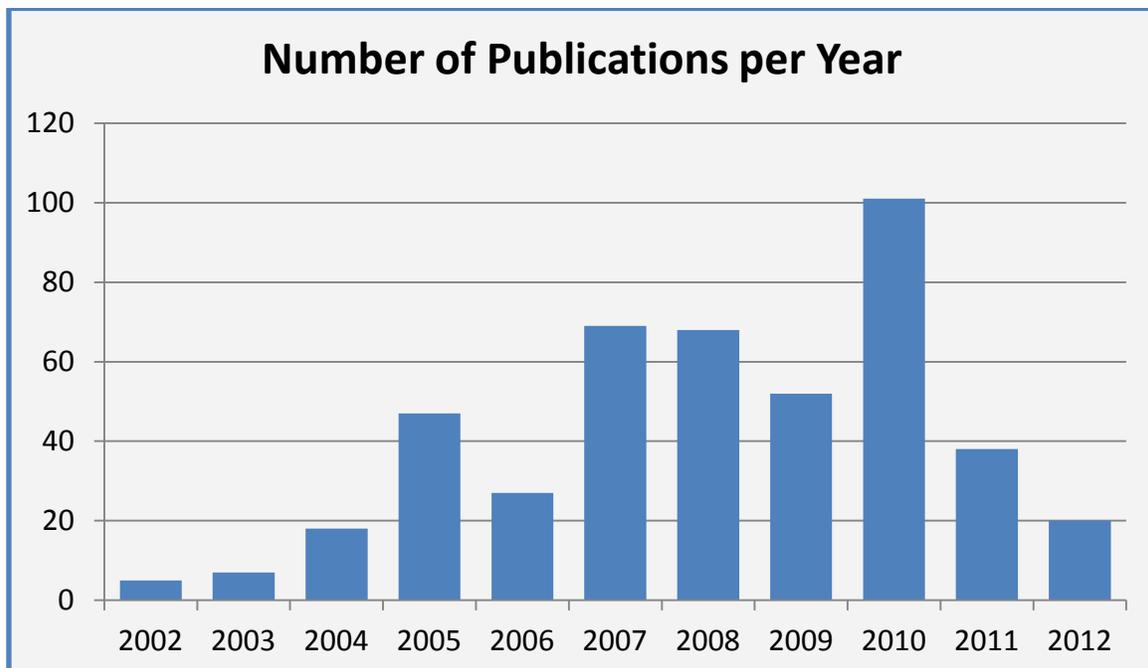
## Summary Metrics

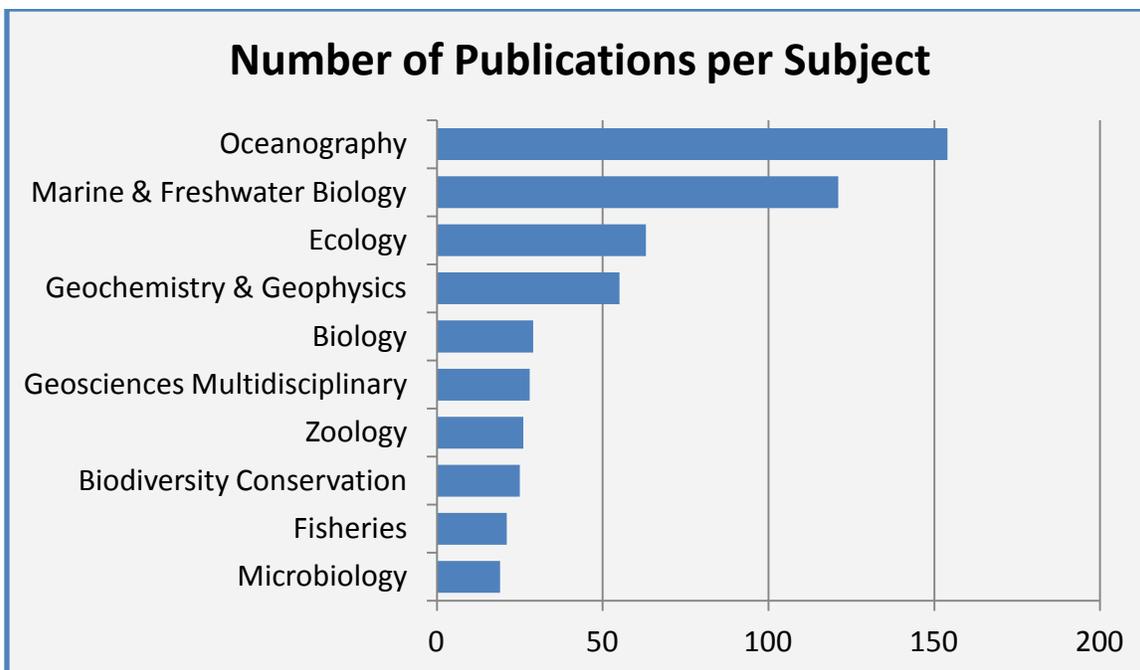
Bibliometric Indicator	Value
Number of Publications (p)	452
Total Number of Citations Received (c)	4,950
Average Number of Citations per Paper (c/p)	10.95
H- Index*	32

\*An H-Index of 32 means that this group of 452 publications includes 32 articles that have received 32 or more citations each. For more details on the H-Index, see Hirsch (2005).

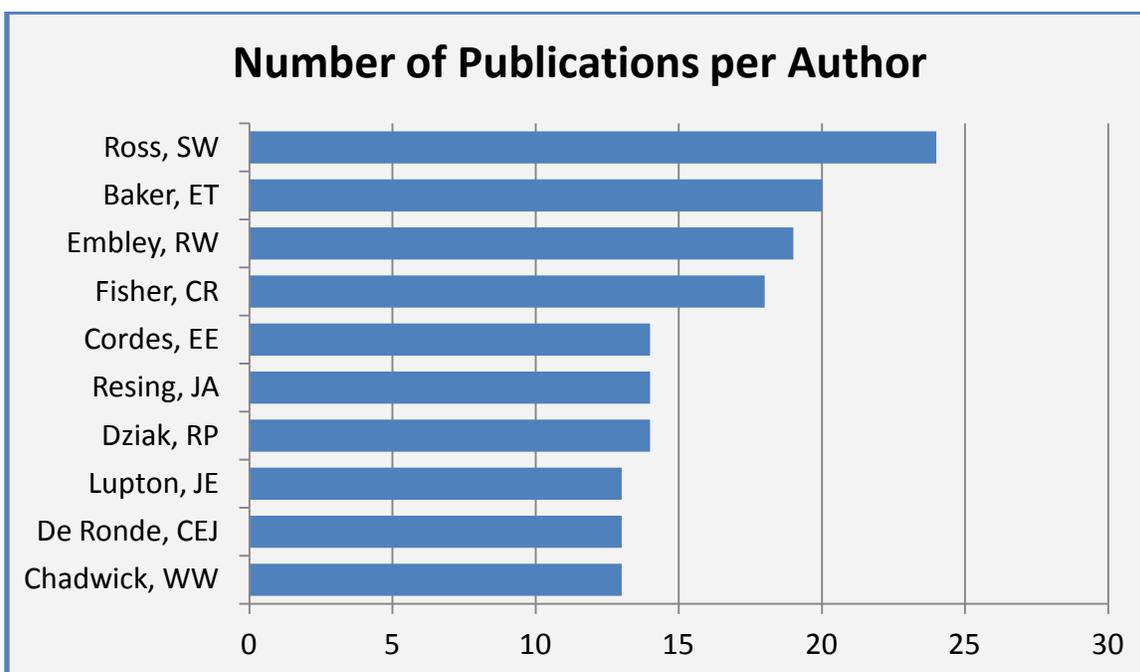
## Publication Analysis

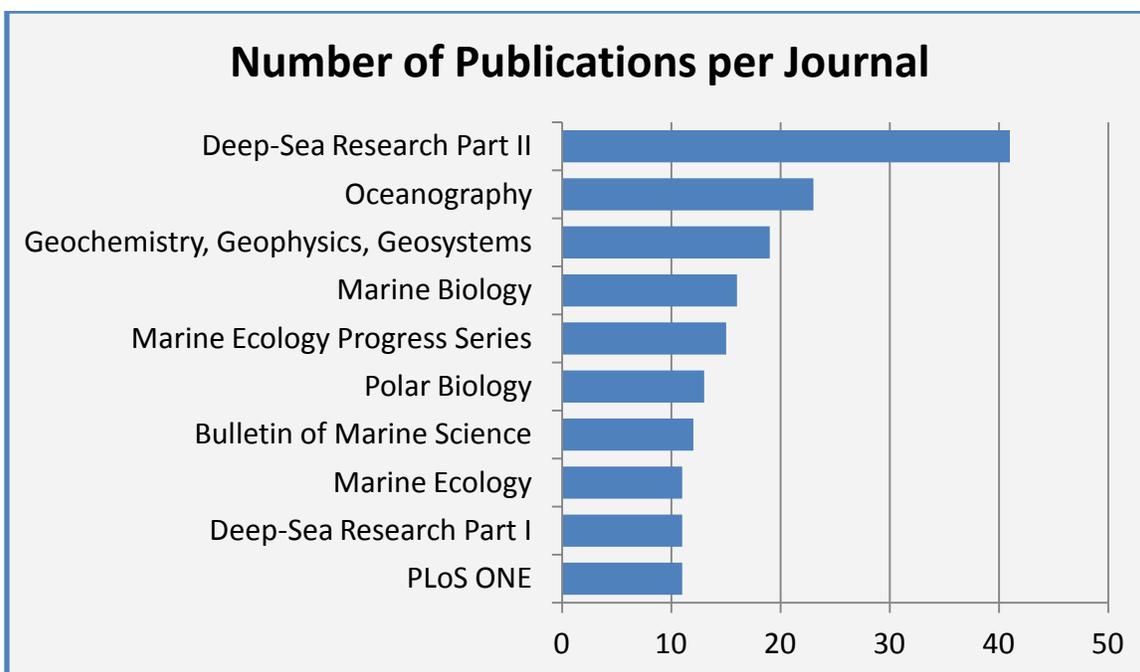
The following tables analyze the number of publications produced as a result of OER-sponsored research. For brevity, the tables showing the number of publications per subject, author, journal, and institution only list the top 10 results in each category.



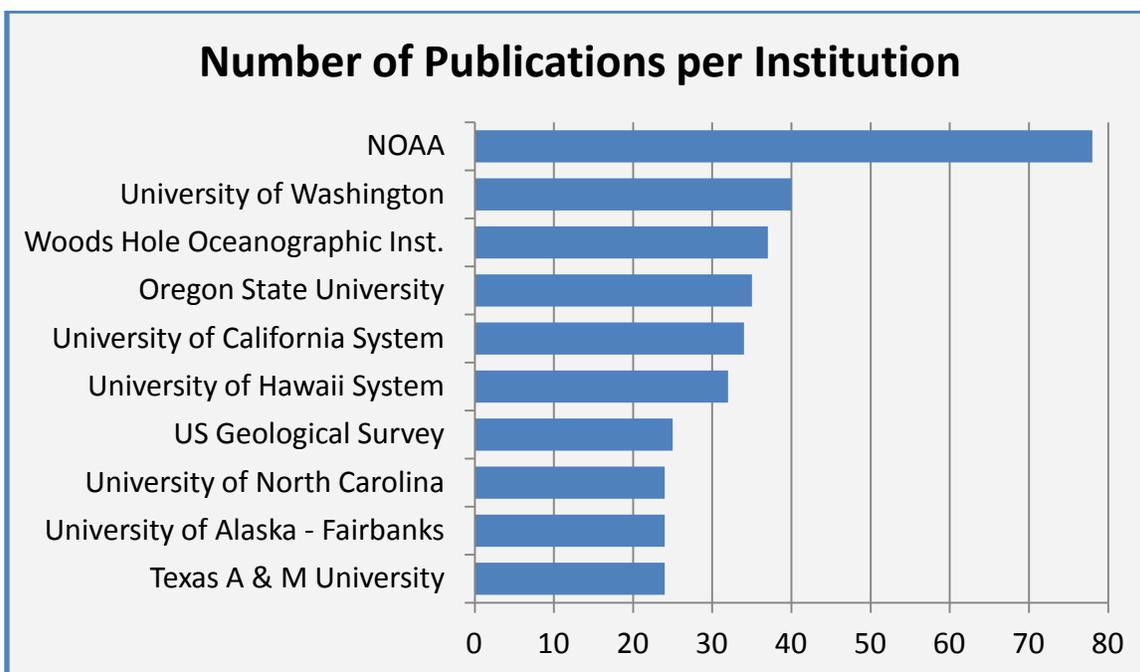


\*Subject categories are defined and assigned to articles automatically by Web of Science based on the journal in which an article appears. These subject categories are not mutually exclusive.

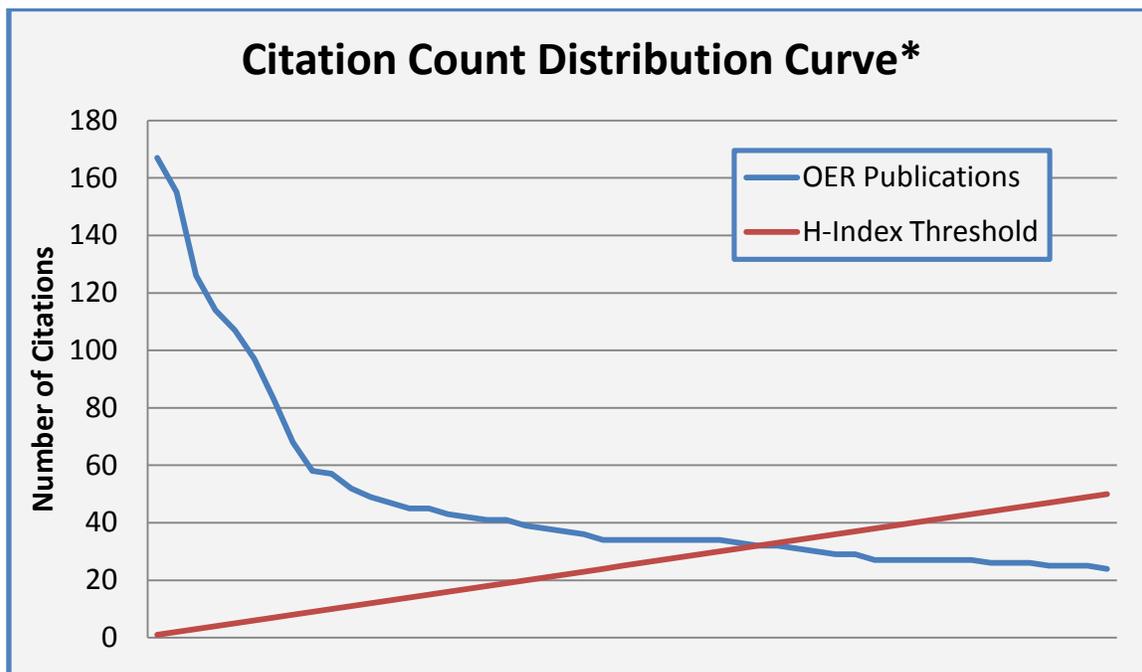




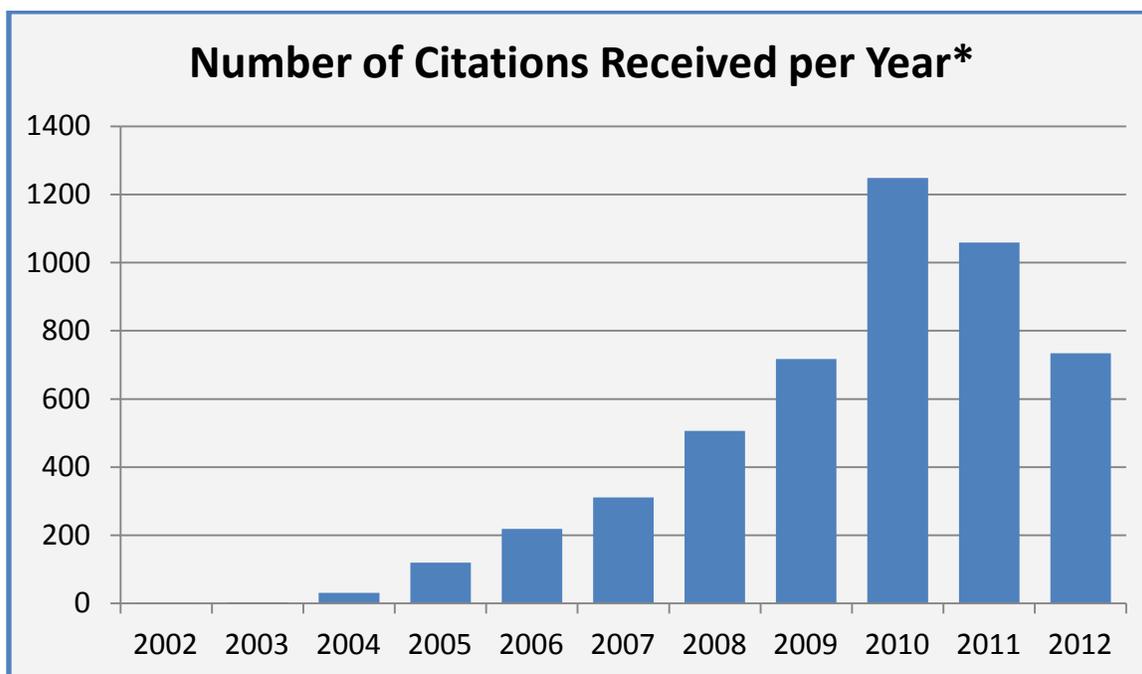
Note: Journal special issues on OER research explorations include: Deep-Sea Research Part II (v.57 i.1-2, i.21-23, and i.24-26), Journal of Geophysical Research – Solid Earth (v.113 i.B8), Oceanography (v.20 i.4), and Polar Biology (v.28 i.3).



## Citation Count Analysis



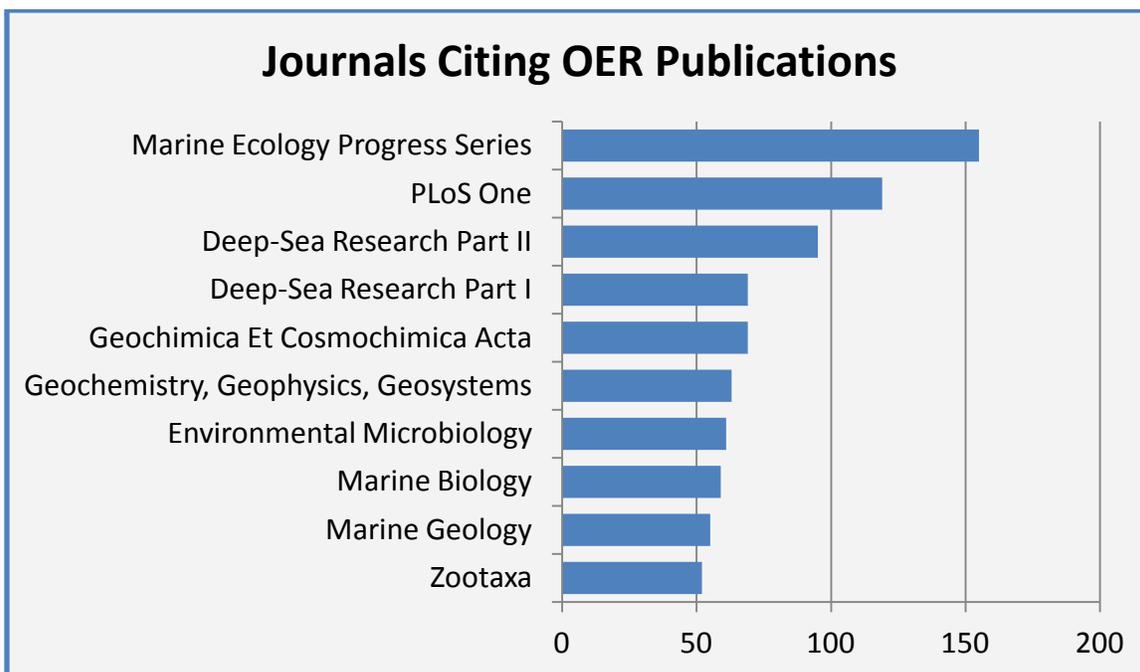
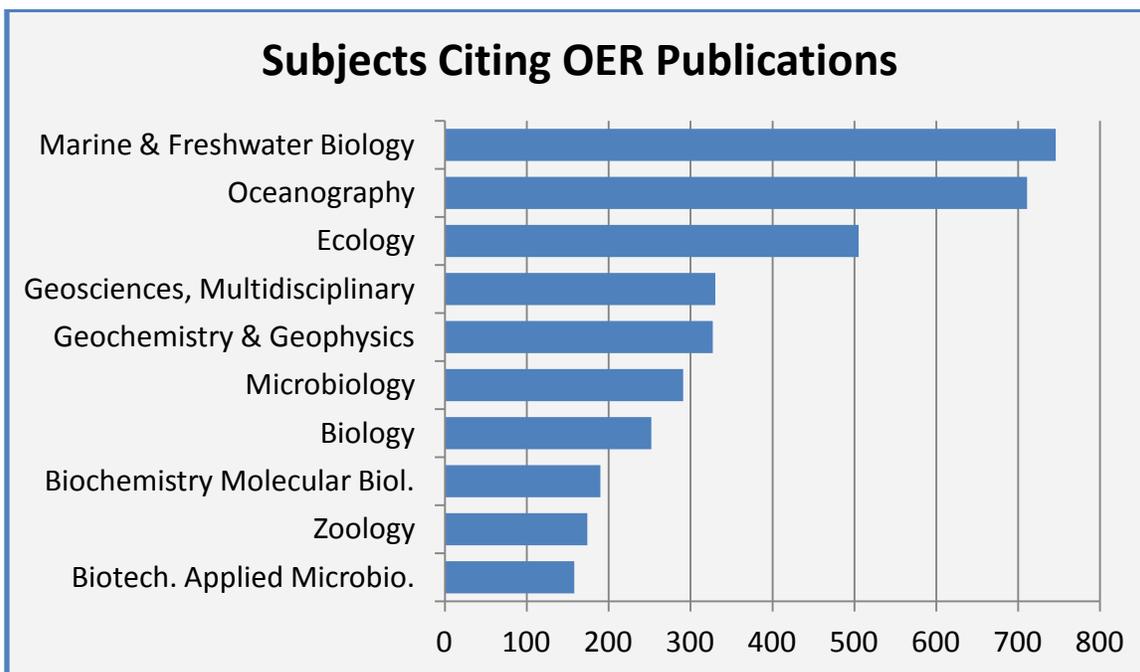
\*Top 50 OER articles by citation count shown. The red line indicates the H-Index threshold (slope:  $y = x$ ). The point at which this line intersects with the OER article curve (32) is the H-Index of these articles.

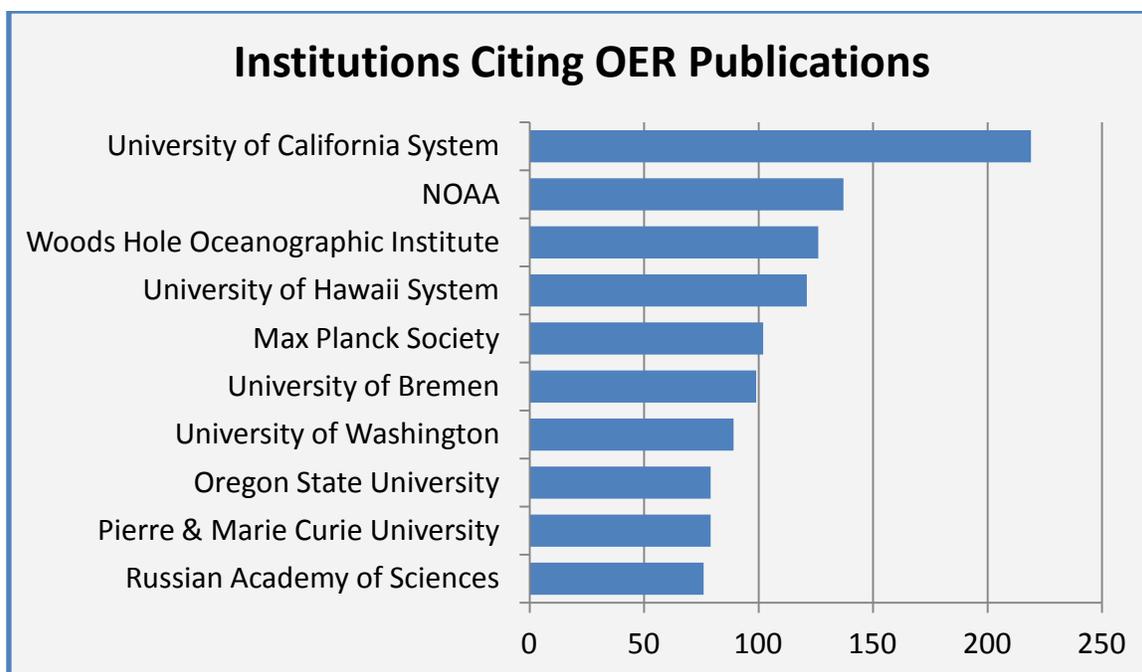


\*Non-cumulative number of citations received by all 420 articles in this set per year

## Citing Article Analysis

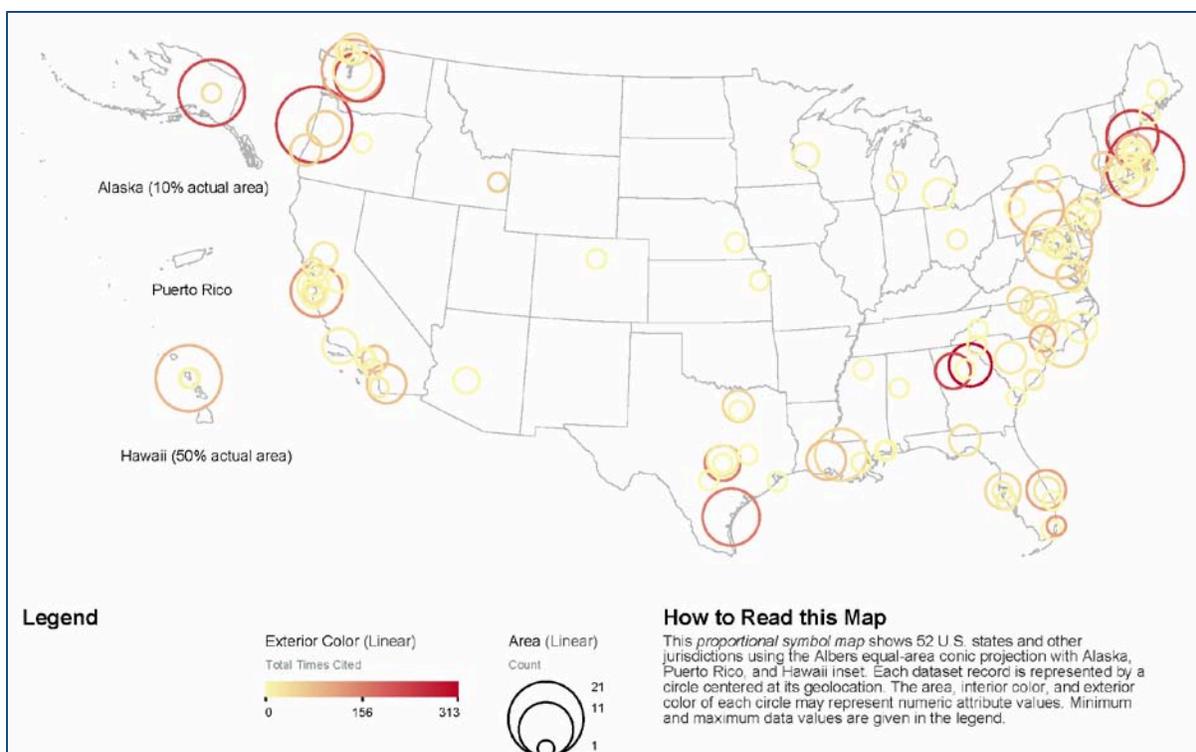
The following tables analyze the articles that cite OER-sponsored journal articles in order to determine the subjects, journals, and institutions citing OER-sponsored research. These tables include self-citations. For brevity, the tables only include the top 10 results in each category.





## Geographic Mapping

The following map illustrates the article productivity and citation impact of OER articles by geographic location in the US. OER articles were assigned to zip codes based on the address of each article's reprint author. Articles were then aggregated by zip code and article citation counts were summed. These values were then superimposed onto a map of the US using the Science of Science (Sci2) Tool (Sci2 Team 2009). 359 (79%) of the 452 articles were assigned to 116 unique zip codes depicted on the map. The other 93 articles (21%) had reprint addresses outside the US and are not shown. On the map, circles are positioned over each zip code that produced at least one OER article; circle size indicates the number of articles produced at that zip code and circle color indicates the total citation count of those articles.



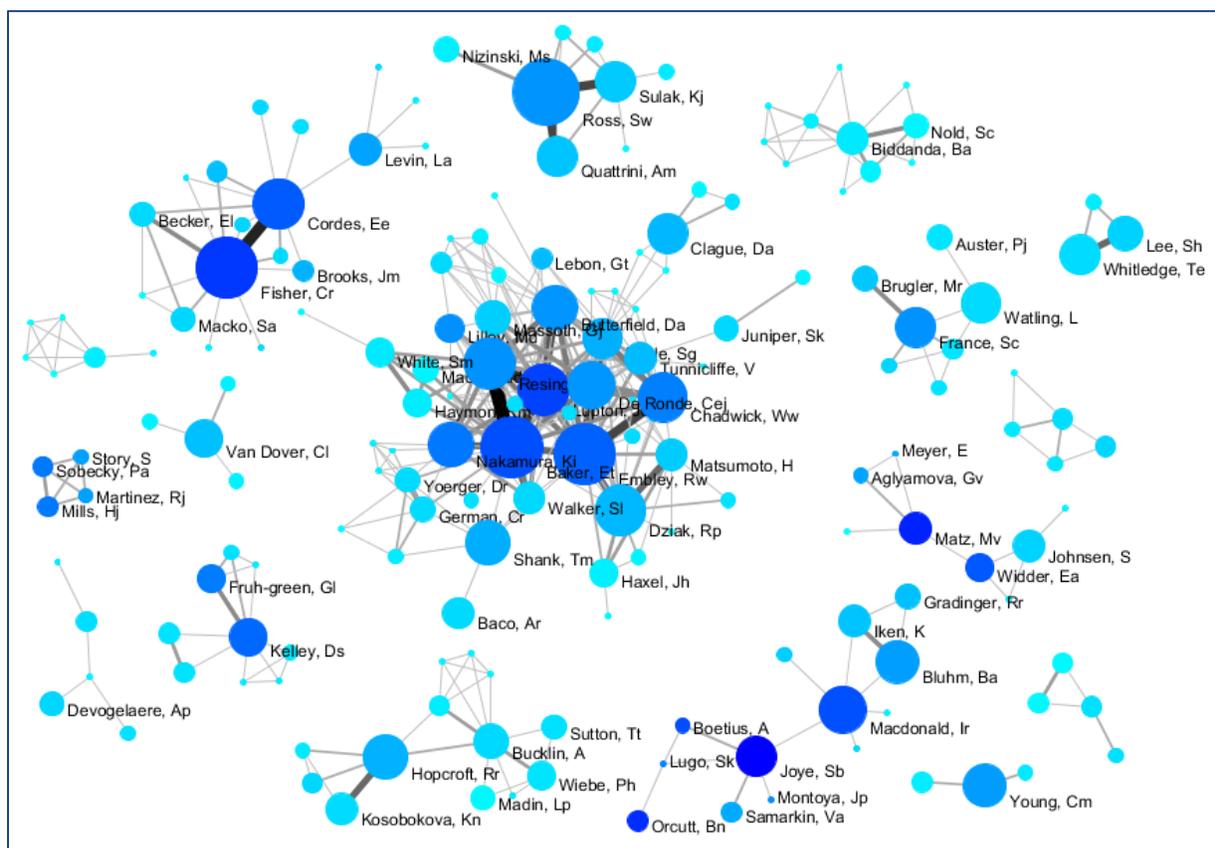
## Bibliometric Mapping

Bibliometric maps attempt to create visual representations of the structure of scientific research by analyzing networks of scientific publications. Depending on the level of analysis, bibliometric maps attempt to show the relationships between different lines of research on a single topic, between sub-disciplines within a field, and between major disciplines. Such maps can be constructed depicting co-authorship networks (Newman 2001), article citation networks (Boyack and Klavans 2010), or article keyword networks (Mane and Borner 2004). For an extensive survey of the field, see Borner and others (2003).

The following maps depict co-authorship, paper citation, and word co-occurrence networks derived from OER journal articles indexed in Web of Science. These maps were generated using the Science of Science Mapping Tool (Sci2 Team 2009). Higher resolution images of these maps are available upon request.

## Co-Authorship Network

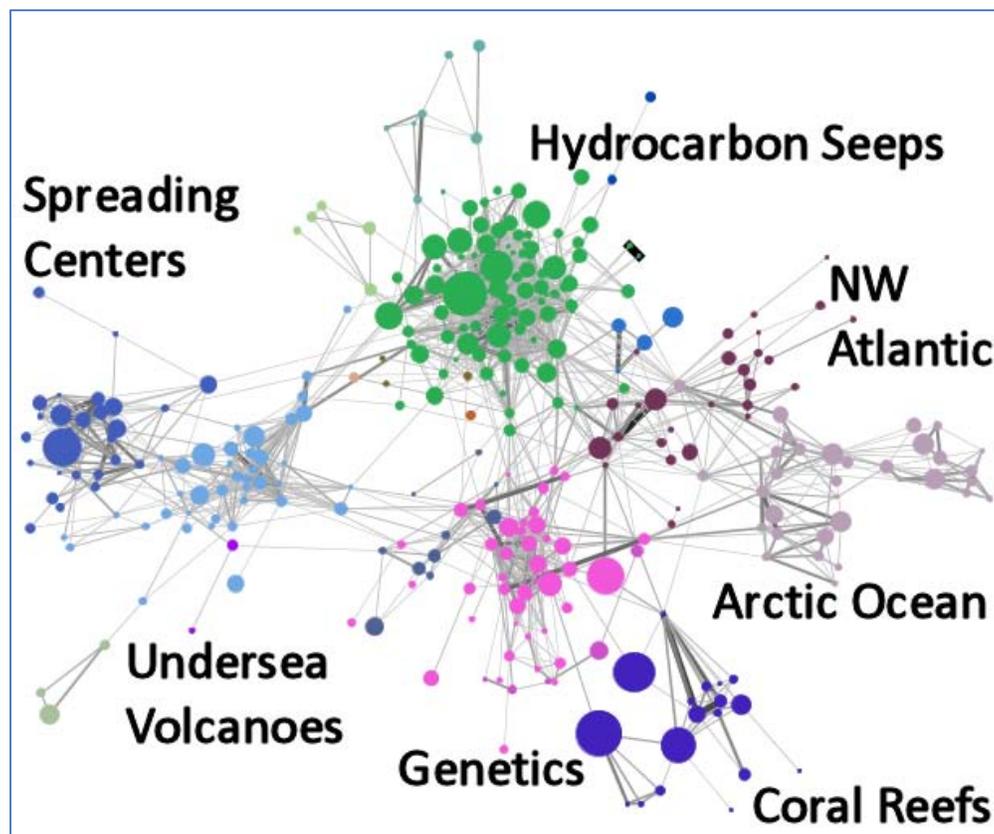
The following map depicts the largest connected co-authorship network of authors of OER-supported research. This map was produced using a cleaned version of the publication data used in the rest of this report. In this map, nodes represent authors and edges represent co-authored works. Node size is proportional to the number of publications by that author; values range from 2 to 24 publications. Node color is proportional to the number of times the author's OER-supported work has been cited; a darker color indicates a higher citation count. Citation counts range from 1 to 382. Edge size and darkness are proportional to the number of co-authored works between the connected authors; values range from 2 to 14. For clarity, edges with a weight of less than 1 were removed and only the largest groups of authors are shown. Author names are displayed for authors who have published 5 or more OER-supported articles, or whose articles have been cited 100 or more times.



This map shows the 400 strongest co-author relationships between 208 of the most prolific authors of OER-sponsored publications.

## Article Bibliographic Coupling Network

The following map depicts the bibliographic coupling network of 330 of the 452 articles in this set. Bibliographic coupling (Kessler 1963) is a method of grouping papers into topical clusters based on the number of cited references they share. The larger the number of common references between two articles, the higher the probability that they are about the same topic. The 330 articles depicted on this map had the highest similarity ranking based on the bibliographic coupling method. As such, they are representative of the major topics covered by OER-sponsored journal articles. In this map, nodes represent articles and edges represent bibliographic coupling links. Node size is proportional to the article's citation count; paper citation counts range from 0 to 174 citations. Node colors represent paper communities, or research topics, identified by the community detection algorithm developed by Girvan and Newman (2002). Community labels have been added to the map based on a review of the articles grouped in each community. Edge size and darkness are proportional to the number of shared references between the connected articles; the number of shared references depicted ranges from 3 to 41. For clarity, edges with a weight of less than 3 were removed and only the largest connected component of the network is shown.

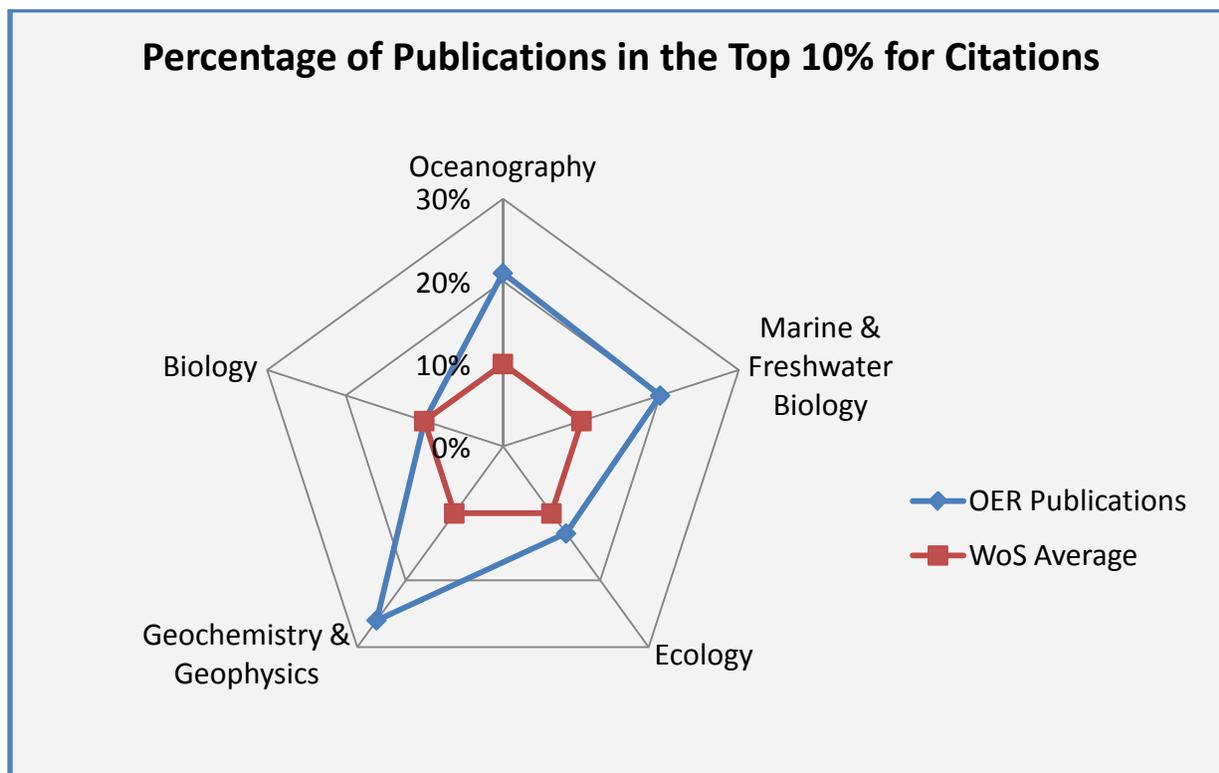




## Citation Performance Evaluation

Bibliometric researchers have recently agreed that paper citation counts ought to be evaluated using percentiles rather than averages. In this new method, a paper is assigned a percentile rank (top 1%, top 10%, etc.) based on how its citation count compares to that of all other publications in a given set. Sets of papers, such as those by an author or by a research group, are evaluated by calculating the percentage of those papers that have citation counts that rank in a certain percentile (or set of percentiles) when compared to a similar set of papers. For more information about these methods, see (Bornmann and others 2012; Centre for Science and Technology Studies 2011; Leydesdorff and others 2011; National Science Board 2012).

Here, I calculated the percentage of OER publications in five subject categories that had citation counts ranking in the top 10% of all publications in WoS that were published in the same categories during the same years. The five subject categories selected were those in which OER-supported research was most often published. The following chart shows the percentage of OER-supported publications (blue) that rank in the top 10% for citation counts in each of these five subject categories as compared to the average (red) of all similar publications in WoS.



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