

# A Comparative Study of Scopus and Web of Science: Climate Related Literature Retrieval

Arijit Das<sup>1\*</sup> and Sukanya Mondal<sup>2</sup>

<sup>1</sup>Department of Library and Information Science, Jadavpur University, Kolkata - 700032, West Bengal, India; arijitdas399@gmail.com

<sup>2</sup>Dr. B. R. Ambedkar Institute of Education, Baruipur, Kolkata - 700144, West Bengal, India; sukanya24.mandal@gmail.com

## Abstract

There are various databases to retrieve information; sometimes users find it difficult to select the material to be read. To make the right decision for selecting the appropriate database there are some important factors such as coverage, functionality etc. This paper compares two popular bibliographic databases - Web of Science and Scopus for their coverage and retrieval of Climate related literature. Four keywords were used to carry out the searches and the paper examines the weakness and strength of these two databases.

**Keywords:** Climate Research, Coverage, Databases, Information Retrieval, Scopus, Web of Science

## 1. Introduction

A few comparative studies of Web of Science and Scopus have been reported covering such aspects such as the user interface, author sets, countries, language, institutions etc. This study compares two databases in a systematic way in respect of retrieval of climate related literature.

Until just a few years ago, the single most comprehensive citation indexes were those published by ISI even though these were often criticized for various reasons (Bar-Ilan, 2008). "In 2004 an alternative to the ISI Citation Indexes became available with the publication of Scopus (<http://www.scopus.com/>) by Elsevier. The Science Citation Index was first published in print in 1963 with citation data from 1961 (Garfield, 1963)". "The Web of Science provides seamless access to current and retrospective multidisciplinary information from approximately 8,700 of the most prestigious, high impact research journals in the world (Thomson Scientific, 2018)". Scopus gives the full citation from 1961 to date; they call themselves "the largest abstract and citation database of research literature and select results from the web. Scopus covers 27 million abstracts, 230 million references and 200 million web pages (Elsevier, 2018)".

Each of them has its own collection policy that has influenced the number of citations to any given item and coverage. This paper seeks to examine the differences between these two databases and offers a few suggestions based on the analysis of the two databases.

The two popular databases Web of Science and Scopus are compared based on retrieval of climate related literature using four keywords; viz., Monsoon, Cyclone, El Nino, Jet Streams. These search terms were chosen for their effect on global climate. They all disrupt normal weather patterns and affect health and social life. So, these terms are widely used in the various articles of the scholarly journals.

## 2. Literature Review

According to Glanzel and Moed (2012), mentioned "The constant expansion of coverage towards more local or national relevance or additional publication types thus represents a serious challenge for citation based methods and indicators". Bartol, et. al. (2014), observed that "Scopus leads over WOS in indexed documents as well as citations in all research fields. This is especially evident in social sciences, humanities and engineering

\*Author for correspondence

and technology. The least citations per document were received in humanities and most citations in medical and natural sciences, which exhibit similar counts. Engineering & technology reveals only half the citations per document compared to the previous two fields. Agriculture is found in the middle. The differences are most obvious in the fields of social sciences, humanities, and engineering and technology, with SCOPUS returning noticeably more results than WOS in the number of total documents and citations”.

A study of Australian education journals, by Lasda Bergman (2012), also found that “the coverage in SCOPUS outperformed WOS. Scopus also performed better in some areas of the social sciences”.

Leydesdorff and others (2010) state that “In general, however, the advantage of Scopus over WOS lies in the better coverage of journals in languages other than English”. For example, Zibareva and others (2011) found “240 Russian journal titles are indexed by SCOPUS, and 160 by WOS”. Lopez-Illescas and others (2009) state: “On the other hand, such national journals play a more peripheral role in the international journal communication system”.

Bar-Ilan et. al. (2007), found “Despite the differences, both databases are comparable in terms of rankings”. Archambault and others (2009) highlight that “with the important exception of certain authors who publish their research in some major series that are only indexed by Scopus, ... the top countries have similar ranks in both databases”. Meho and Sugimoto (2009), also say: “Here, however, it needs to be pointed out that analyses based on smaller entities (publications, institutions) produce considerably different results for the two databases than an analysis based on larger entities such as research domains and previously mentioned countries”.

Lopez-Illescas and others (2009) mention that: “It needs to be underlined that the coverage, scope, and search functionalities in both databases are constantly evolving; therefore, the information in the literature can only refer to the coverage that exists at the time of the analysis”.

### 3. Objectives

The objectives of this study are to compare the two databases in terms of their coverage and few other parameters.

## 4. Methodology

### 4.1 The Databases

“Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. Delivering a comprehensive overview of the world’s research output in the fields of science, technology, medicine, social sciences, and arts and humanities, Scopus features smart tools to track, analyze and visualize research”.

Web of Science: Web of Science (2018), a product of Clarivate Analytics, “is a platform consisting of several literature search databases designed to support scientific and scholarly research. It has a rich collection of citation indexes representing the citation connections between scholarly research articles found globally significant journals, books, and proceedings in the sciences, social sciences and art and humanities”.

### 4.2 Selection of Search Terms

Climate literature is an area of Physical Geography where temperature, Humidity, Precipitation, Air Pressure and wind intersect. Four search terms were taken:

*Monsoon*: Monsoon is one of the defining features of Earth’s climate. The Free Dictionary by FARLEX (2018d), defines Monsoon as “A system of winds that influences the climate of a large area and that reverses direction with the seasons. Monsoons are caused primarily by the seasonal changes in temperature over large areas of land and water. In southern Asia, a wind that blows from the southwest in summer and usually brings heavy rains”.

*Cyclone*: The Free Dictionary by FARLEX (2018a), defines Cyclone as “An atmospheric system characterized by the rapid inward circulation of air masses about a low-pressure center, usually accompanied by stormy, often destructive weather. Cyclones circulate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere”.

*El Nino*: The Free Dictionary by FARLEX (2018b), defines El Nino as “A climatic event occurring every two to seven years, characterized by warming of surface waters and reduced upwelling of cold, nutrient-rich water off the western coast of South America, causing die-offs of plankton and fish and influencing jet stream winds, altering storm tracks and affecting the climate over much of the world”.

*Jet Stream*: The Free Dictionary by FARLEX (2018c), defines Jet Stream as “A high-speed, meandering wind current, generally moving from a westerly direction at speeds often exceeding 400 kilometers (250 miles) per hour at altitudes of 10 to 15 kms,” near the top of the troposphere.

### 4.3 Search Technique

Scopus and WOS are conventional databases which give various browsing and searching facilities. There are two types of search facilities: *Standard Basic search* and *Advanced Search* in both databases. There are various search fields and document types which help users to narrow the search. There are also various search parameters for sorting the outcome such as first author, relevance, cities, etc. Searches may be limited by subject area, author, document type, year, institutions, source, countries, languages, funding agencies, etc. Both databases give user the facility to create and manage their own profile for getting better output.

The terms were searched in “Keywords” or “Topic” or Title fields. The evaluation of the journal coverage of the databases was made to compare the lists of top ten journal

titles. All searches were done from 20 December 2017 to 22 January 2018.

## 5. Data Analysis

**Table 1.** Number of documents retrieved

Keywords	Scopus		Web of Science	
	By Article Title	By Topic	By Article Title	By Topic
Monsoon	8247	13762	6847	28308
Cyclone	10597	15468	6205	17408
El Nino	5929	12515	2955	19085
Jet Stream	1079	3118	423	6310
<b>Total</b>	<b>25852</b>	<b>44863</b>	<b>16430</b>	<b>71111</b>

Table 1 presents a comparative view of the number of documents available in these two databases. Scopus had more hits (i.e. 25852) when searched by article title while WOS had more hits (i.e. 71111) when searched by topics or keywords. Cyclone had found most number of hits (i.e. 10597) when searched by article title in Scopus, while the search for Monsoon in topic/keyword yielded most hits (i.e. 28308) in WOS.

**Table 2.** Top 10 journal coverage in both databases for retrieving climate related literature

Journal's Rank	Scopus		Web of Science	
	Sources	No. of Articles	Sources	No. of Articles
1.	Journal of Climate	3032	Journal of Climate	4643
2.	Geophysical Research Letters	1986	Geophysical Research Letters	2618
3.	Climate Dynamics	1616	Journal Of Geophysical Research Atmosphere	2567
4.	Monthly Weather Review	1404	Climate Dynamics	1940
5.	International Journal of Climatology	1274	Monthly Weather Review	1796
6.	Journal of the Atmospheric Sciences	993	Journal of the Atmospheric Sciences	1560
7.	Journal of Geophysical Research Atmosphere	954	Journal of Geophysical Research Oceans	1065
8.	Quarterly Journal of the Royal Meteorological Society	378	International Journal of Climatology	1048
9.	Weather and Forecasting	308	Palaeogeography Palaeoclimatology Palaeoecology	533
10.	Journal of Geophysical Research Oceans	257	Quarterly Journal of The Royal Meteorological Society	473
	<b>Total</b>	<b>12202</b>		<b>18243</b>

Top ten Journals having most no. of articles from both the databases were checked to compare their contribution of no. of articles in climate related literature. The results

presented in Table 2 show that ranked lists are very similar. Journal of Climate and Geophysical Research Letters rank one and two respectively in both the databases.

**Table 3.** Comparison of citation counts for specific articles

Keywords	Article Title	Source Information	Cited by in Scopus	Cited by in WOS	Diff.
Monsoon	Numerical study of convection observed during the Winter Monsoon Experiment using a mesoscale two-dimensional model	Journal of the Atmospheric Sciences. 46(20), pp. 3077-3107, 1989	2285	2237	+48
	A high-resolution absolute-dated late pleistocene monsoon record from Hulu Cave, China	Science. 294(5550), pp. 2345-2348, 2001	1560	1492	+68
Cyclone	Increasing destructiveness of tropical cyclones over the past 30 years	Nature. 436(7051), pp. 686-688, 2005	1678	1478	+200
	Atmospheric science: Changes in tropical cyclone number, duration, and intensity in a warming environment	Science. 309(5742), pp. 1844-1846, 2005	1499	1369	+130
El-Nino	Decadal atmosphere-ocean variations in the Pacific	Climate Dynamics. 9(6), pp. 303-319, 1994	1581	1524	+57
	ENSO-like interdecadal variability: 1900-93	Journal of Climate. 10(5), pp. 1004-1020, 1997	1452	1442	+10
Jet Stream	Expansion of the Hadley cell under global warming	Geophysical Research Letters . 34(6), L06805, 2007	496	191	+305
	Electrospinning and electrically forced jets. II. Applications	Physics of Fluids. 13(8), pp. 2221-2236, 2001	480	433	+47

The number of papers citing the top two papers (in each of the four topics) in the databases are compared and presented in Table 3. Generally, SCOPUS retrieved more items than WoS. This may be due to the coverage of SCOPUS.

Figure 1&2 gives a comparison of the publication productivity of top ten countries from both the databases. Countries are ranked according to the number of records.

1, 2 and 3 position according to the number of record contributed by a country goes to USA, China and India respectively in both the databases. WOS has registered more no. of records than Scopus for each of the country. Total contribution of WOS is 75,715 records, whereas Scopus has only 43,973 records.

**Table 4.** Total citation counts

Sl. No.	Keywords	Scopus		Web of Science		Diff.
		No. of Documents	Total Citations	No. of Documents	Total Citations	
1.	Monsoon	13762	316479	28308	173832	142647
2.	Cyclone	15468	213449	17408	106462	106987
3.	El Nino	12515	394435	19085	94033	300402
4.	Jet Stream	3118	40715	6310	6197	34518

In respect to total citation counts, Scopus has more citations than WOS for each of the keywords. Table

4 shows that for four of the keywords, WOS had less number of cited references than Scopus.

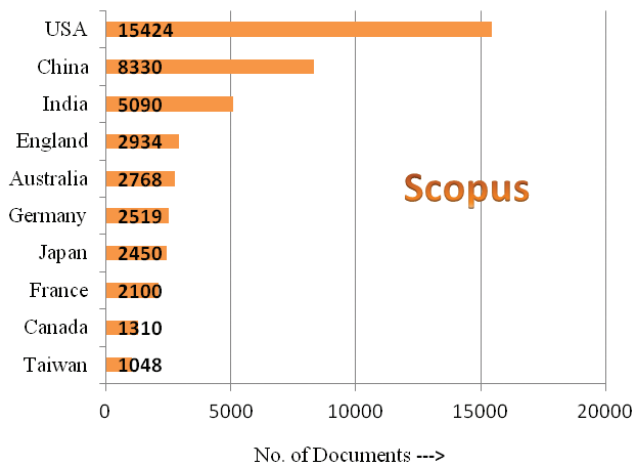


Figure 1. Top countries in scopus.

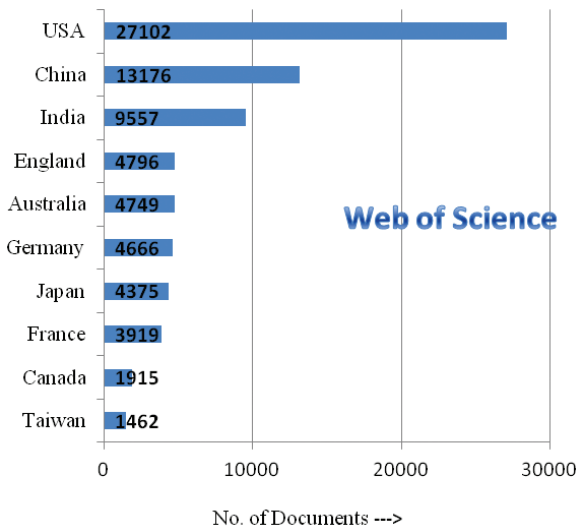


Figure 2. Top countries in WOS.

## 6. Findings

In general, SCOPUS appears to retrieve a greater number of items than WoS. This is probably due to the wider coverage of SCOPUS. However, there are no major differences between the two databases in terms of the ranking of most productive journals and most productive countries.

## 7. Conclusion

This study provides an overview of two citation databases. From a practical point of view, it is best to choose both databases because they complement each other.

## 8. References

- Archambault, E., Campbell, D., Gingras, Y. & Lariviere, V. (2009). Comparing bibliometric statistics obtained from the web of science and scopus, arXiv: 0903.5254, doi:10.1002/asi.21062. <https://doi.org/10.1002/asi.21062>.
- Bar-Ilan, J, Levene, M. & Lin, A. (2007). Some measures for comparing citation databases. *Journal of Informetrics*, 1, 26-34. <https://doi.org/10.1016/j.joi.2006.08.001>.
- Bar-Ilan, J. (2008). Which h-index? A comparison of WOS, Scopus and Google Scholar. *Scientometrics*, 74, 257-71. <https://doi.org/10.1007/s11192-008-0216-y>.
- Bartol, T. et al. (2014). Assessment of research fields in Scopus and Web of Science from the viewpoint of national research evaluation in Slovenia. *Scientometrics*. 98, 1491-504. <https://doi.org/10.1007/s11192-013-1148-8>.
- Chadegani, A. et al. (2013). A comparison between two main academic literature collections: Web of Science and Scopus Databases. *Asian Social Science*, 9, 1911-2025. <https://doi.org/10.5539/ass.v9n5p18>.
- Elsevier (2018). Scopus. Accessed on 15 Feb 2018. Available at: <https://www.elsevier.com/solutions/scopus>.
- Garfield, E. (1963). Science citation index. *Science Citation Index 1961*, 1(16). Available at: <http://garfield.library.upenn.edu/papers/80.pdf>.
- Glanzel, W. & Moed, H. F. (2012). Opinion paper: Thoughts and facts on bibliometric indicators. *Scientometrics*, DOI: 10.1007/s11192-012-0898-z. <https://doi.org/10.1007/s11192-012-0898-z>.
- Lasda Bergman, E. M. (2012). Finding citations to social work literature: The relative benefits of using Web of Science, Scopus, or Google Scholar. *The Journal of Academic Librarianship*, 38, 370-79. <https://doi.org/10.1016/j.acalib.2012.08.002>.
- Leydesdorff, L., Moya-Anegón (de), F. & Guerrero-Bote, V. P. (2010). Journal maps on the basis of Scopus data: A comparison with the Journal Citation Reports of the ISI. *Journal of the American Society for Information Science and Technology*, 61, 352-69.
- Lopez-Illescas, C., MoyaAnegon (de), F. & Moed, H. F. (2009). Comparing bibliometric country-by-country. Rankings derived from the Web of Science and Scopus: The effect of poorly cited journals in Oncology. *Journal of Information Science*, 35, 244-56. <https://doi.org/10.1177/0165551508098603>.
- Lopez-Illescas, C., Moya-Anegon, F. & Moed, H. F. (2008). Coverage and citation impact of oncological journals in the Web of Science and Scopus. *Journal of Informetrics*, 2, 304-16. <http://dx.doi.org/10.1016/j.joi.2008.08.001>.
- Meho, L. I. & Sugimoto, C. R. (2009). Assessing the scholarly impact of information studies: A tale of two citation databases—Scopus and Web of Science. *Journal of the American*

- Society for Information Science and Technology*, 60, 2499–508. <https://doi.org/10.1002/asi.21165>.
- The Free Dictionary by FARLEX (2018a). Cyclone definition. Accessed on 03 Mar 2018. Available at: <https://www.thefreedictionary.com/cyclone>.
- The Free Dictionary by FARLEX (2018b). El Nino definition. Accessed on 03 Mar 2018. Available at: <https://www.thefreedictionary.com/el+nino>.
- The Free Dictionary by FARLEX (2018c). Jet stream definition. Accessed on 05 Mar 2018. Available at: <https://www.thefreedictionary.com/jet+stream>.
- The Free Dictionary by FARLEX (2018d). Monsoon definition. Accessed on 05 Mar 2018. Available at: <https://www.thefreedictionary.com/monsoon>.
- Thomson Scientific (2018). Web of Science. Accessed on 26 Feb 2018. Available at: <http://scientific.thomson.com/products/WoS/>.
- Web of Science, Clarivate Analytics (2018). Accessed on 28 Feb 2018. Available at: <https://clarivate.libguides.com/webofscienceplatform/>.
- Zibareva, I., & Soloshenko, N. (2011). Russian scientific publications 2005–2009 in the science citation index, Scopus, and chemical abstracts databases. *Scientific and Technical Information Processing*, 38, 212–23. <https://doi.org/10.3103/S0147688211030178>.