

## A Scientometric Analysis of Global Warming Literature during 2012-2017

**Ajitha A**

Research scholar  
Department of Library and Information Science  
University of Calicut  
Thenjipalam, Malappuram  
e-mail:ajithavaliyanthodi@gmail.com

**Dr. Vasudevan T M**

Professor & Head  
Department of Library and Information Science  
University of Calicut  
Thenjipalam, Malappuram.  
E-mail: amandev44@gmail.com

***Abstract-** This paper analyses publication trend of global warming literature during 2012-17. The study focuses on year wise growth, document wise growth, language of publication, authorship pattern, most published journals, institution wise distribution and country wise distribution. The data for the study was retrieved from web of science database. The study revealed that the yearly output showed an increasing trend, English is the most preferred language, majority of the publications are articles followed by review and book chapter, the Journal of Climate is the core journal and USA is the top among the countries. However, India stands at the eleventh position.*

**Keywords:** Scientometrics, global warming, publication trend, histcite, web of science.

### Introduction

Global warming is a major issue of concern all over the world. Our earth's surface is becoming hotter day by day due to the trapping of sunlight and the alarming rise in the level of atmospheric carbon dioxide. This will in turn lead to climate change and rise in sea level. It affects the health of living beings on earth. So the scientists are focusing in this area to overcome the future problems of global warming. Scientometric evaluation of scientific output is an important tool to know the publication trend and thus it will be helpful for the development of a scientific policy in this field. The present study emphasises growth of literature, type of document, language preferred for publication, authorship pattern, core journals and the most publishing countries.

### Review of related literature

Dhawan, et al. studied mobile computing research output for the period of 2007-2016. The study found out that mobile computing research is growing at 9.3% rate per annum and its citation input averaged to 3.39 citation per paper. Most publishing country is found to be china (31.06%) followed by USA (15.35%). International collaboration varied from 11.55% to 48.6%. Computer science accounted for the largest publication (89.55%) among other subjects. The study explored the journals with the highest citation of published papers in mobile computing. A study by Soumen Teli and Bidyarthidutta analysed the superconductivity research in India during 1989 to 2014. Jinu S Rajan and Vijayakumar conducted a study of publications of library and information science faculty members in

south India during 1995-2014. In a study, Sivasekharan and AshokKumar revealed thorium literature output during 2000-2014. A study carried out by Gopikuttan and Aswathy analysed the research productivity of the University of Kerala based on the data collected from web of science over a period of thirteen years from 2000 to 2012. The Study conducted by Vinithaet.al reflected research productivity of water resource management in India. Swine flu research in India has been analysed by N sivakami and C Bhaskaran.Issac newton and Gomathy p analysed global warming research output during the period 2008-10. The study emphasized on year wise growth, relative growth, Doubling time, language, type of document, source wise distribution and authorship pattern. Stanhill G studied growth of climate change science deals many aspect of this subject.

### **Need and significance of the study**

Global warming is a grave issue for the whole world. It is the phenomenon of increasing the heat of the earth by the emission of carbon dioxide and other greenhouse gases. It causes environmental hazards like climate change and increasing sea level. It also affect the health of all living things. The researchers in the world are focusing on it to save our mother earth. Understanding the publishing research output along with the core journals and the latest trend of publishing the research output is important in the field. Hence the study focuses on the overall growth of literature, collaboration trend and the most publishing journals.

### **Objectives of the study**

The main objective of the study is to examine the performance of global warming research during 2012-17 based on publications covered in the web of science database. The specific objectives are:-

- To study the year-wise growth of world global warming research output.
- To explore document wise research output.
- To identify the most preferred language for publication.
- To analyse authorship trend of publication.
- To find out most productive institution in the field.
- To identify the journal in which maximum number of publications are produced.
- To understand the international collaboration of the top ten most productive countries.

### **Methodology**

The study retrieved the publication data of world in global warming research from the ISI web of knowledge database for six years. keywords such as global warming OR climate change used in key word tag and restricted it to the period of 2012-17 in data range tag was used for searching all publication data and this becomes the main search string. A total of 21450 records were retrieved for the study period. Analyses is done using histcite and MS excel.

## Analysis and interpretation

### Year –wise growth of publication.

The year-wise analysis of global warming literature for the year 2012-2017 shown in table 1.

Table 1: year wise growth of global warming literature

Year	Recs	Percent	TLCS	TGCS
2012	2824	13.2	9022	83085
2013	3180	14.8	9938	84390
2014	3298	15.4	6815	62292
2015	3698	17.2	4403	48026
2016	3975	18.5	2147	30305
2017	4470	20.8	529	14585

Table 1 shows a gradual increase in the number of publications. The highest number of publications are produced in 2017(20.8%) and the lowest in 2012(13.2%). The Total Local Citation Score (TLCS) shows a decreasing trend except in 2013. The highest Total Global citation score (TGCS) also shows a decreasing trend. The highest TGCS is observed in 2013 and the lowest in 2017.

### Document wise analysis

Research outputs are published in various forms .They are tabulated in the table2.

Table 2: document wise analysis

Article	18650	87	29248	269229
Review	1324	6.2	2750	43767
Article; Book Chapter	376	1.8	183	2126
Article; Proceedings Paper	306	1.4	172	3104
Proceedings Paper	268	1.2	2	155
Editorial Material	234	1.1	279	2038
Book Review	72	0.3	1	9
Review; Book Chapter	54	0.3	143	1565
News Item	41	0.2	8	42
Letter	33	0.2	32	234
Correction	23	0.1	0	20
Meeting Abstract	20	0.1	0	0
Editorial Material; Book Chapter	16	0.1	0	8
Article; Data Paper	12	0.1	8	220
Book	10	0	27	152
Article; Retracted Publication	2	0	1	9
Biographical-Item	2	0	0	0
Reprint	1	0	0	4
Review; Retracted Publication	1	0	0	1

From table 2 we find that the majority of the publications are in the form of articles (87%), followed by reviews (6.2%) and article; bookchapter (1.8%).only few publications appeared

in the form of Book, Article; retracted publication bibliographical item, reprintand review; retracted publication.TLCS and TGCS are higher for articles.

**Language wise analysis**

Global warming literature output is published in various languages .Top ten languages are shown in table 3.

Table 3: Language wise distribution of publications

Languages	Recs	Percent	TLCS	TGCS
English	21119	98.5	32828	322283
Spanish	73	0.3	7	92
Chinese	60	0.3	4	103
French	42	0.2	0	22
Russian	28	0.1	4	11
Portuguese	27	0.1	4	22
Korean	22	0.1	2	15
German	18	0.1	4	47
Turkish	12	0.1	0	10
Japanese	10	0	1	35

Table 3 indicates that the majority of the publications are in English (98.5.) followed by Spanish (0.3%) and Chinese (0.3%).TLCS for English is 32828 and TGCS is 322283.

**Authorship pattern**

Authorship pattern of global warming literature is shown in table 4.

Table 4: Authorship pattern

No.of authors	Records	Percentage
Single	1996	9.31
Double	3679	17.15
Three	3976	18.54
Four	3495	16.30
Five or more	8304	38.70

From the table4, we find that single authored publications are less than that of multiauthored publications. Out of a total of 21450 publications, only 1996 are single authored. This indicates that multiple authorship is predominant. The highest number of publications are five or more (8304) authored publications.

**Journal-wise analysis**

Journals are the most important medium for communication of research output. Top 10 journals in global warming area is tabulated in table 5.

Table 5: Journal -wise analysis

Journal	Recs	Percent	TLCS	TGCS
JOURNAL OF CLIMATE	540	14.48	2501	11864
JOURNAL OF CLEANER PRODUCTION	445	11.93	555	6290
GEOPHYSICAL RESEARCH LETTERS	419	11.23	1107	7410
CLIMATE DYNAMICS	401	10.75	1372	7713

GLOBAL CHANGE BIOLOGY	396	10.62	1497	12135
PLOS ONE	386	10.35	0	4883
JOURNAL OF GEOPHYSICAL RESEARCH- ATMOSPHERES	316	8.47	643	6346
SCIENTIFIC REPORTS	303	8.12	0	2171
ENVIRONMENTAL RESEARCH LETTERS	284	7.62	0	4781
NATURE CLIMATE CHANGE	239	6.40	3207	18848

The table 5 shows that the Journal of Climate (14.48%) is the most number of publications in the area of global warming followed by Journal of Cleaner Production (11.93%) and Geophysical Research Letters (11.23%). TLCS for Journal of Climate is 2501 and TGCS is 11864.

### Institution- wise analysis

Top 10 institutions publishing global warming literature are listed in table 6.

Table6: top 10 institutions on global warming

Institution	Recs	Percent	TLCS	TGCS
Chinese AcadSci	1466	6.8	2460	21640
Univ Chinese AcadSci	376	1.8	394	3388
NOAA	371	1.7	1783	11692
Columbia Univ	294	1.4	1417	10766
NatlCtr Atmosphere Res	285	1.3	2417	12648
Univ Washington	275	1.3	1278	9129
NASA	257	1.2	1274	9523
Univ Colorado	245	1.1	990	8919
Univ Tokyo	219	1	826	5991
CALTECH	217	1	555	5064

Table 6 shows that Chinese Academy Science (6.85%) is in first position, followed by University of Chinese Academy of Science (1.8%) and NOAA (1.7%).

### Country- wise analysis

The distribution of publications of global warming literature across the world are listed in table 6.

Table 6: country wise analysis of global warming literature output

Country	Recs	Percent	TLCS	TGCS
USA	6457	30.1	16575	141725
Peoples R China	3620	16.9	5541	52412
UK	2275	10.6	6347	59794
Germany	1971	9.2	4528	45706
Australia	1582	7.4	4492	38231
France	1390	6.5	3001	30925
Canada	1204	5.6	2860	27718
Japan	1192	5.6	2703	22227
Spain	1078	5	1481	19855
Italy	1010	4.7	1728	19364
India	918	4.3	1045	13111
Switzerland	725	3.4	2461	22584

Netherlands	712	3.3	1925	20888
Sweden	678	3.2	1588	16849
South Korea	658	3.1	770	7740
Norway	597	2.8	1976	17023
Denmark	491	2.3	1302	10714
Brazil	460	2.1	516	6310
Russia	414	1.9	601	6967
Taiwan	369	1.7	307	4080

From the Table 6, found that USA is the top most country with 6457 records followed by Peoples Republic of China (16.9%), UK (1.6%) and Germany (9.2%). The least number of publications are from Russia (1.9%) and Taiwan (1.7%). Among the top 20 countries India stands at the eleventh position with 918 records.

### Major findings of the study

- Growth of the global warming literature during 2012-17 shows gradual increase.
- Majority of the publications are article (87%) followed by review (6.2%).
- Most preferred language is English (98.5%).
- Collaborative authorship is dominant.
- Journal of Climate is the core journal.
- Chinese academy of science is the most published institution.
- USA contribute majority of the publications followed by China and UK.
- India stands eleventh position in global warming research publication.

### Conclusion

The present study “A Scientometric Analysis of Global warming Literature during 2012-17” is focused on publication trends and collaboration with institutions and countries. It reveals that there is a tremendous increase in the world output of global warming literature during 2012-17. USA is the top most country producing large no. of publications and India stands at the eleventh position among other countries.

### References

1. Gupta, Dhawan and Ritugupta. (2017) Mobile computing: A scientometric analysis of global publication output. *Annals of library and information science*, 64(1), 182-194
2. Issac, Newton A and Gomathi. (2018). Research output on Global warming during the year of 2008-10: A scientometric analysis. *International journal of recent scientific research*. Doi: <http://dx.doi.org/10.24321/ijrsr.2018.0901.1381>
3. Rajan, Jinu S. and Vijayakumar, K. (2017). publication of library and information science faculty members in south India: a study based on Googlescholar. *KELPRO bulletin*, 21(2), 131-139.

4. Sivakami, M and Baskaran (2015) .Growth of swine flu research in India through linear regression analysis. *National conference on innovative librarianship in the knowledge of society: Enhancing teaching learning and research*, 377-382.
5. Sivasekharan, K., Ashok Kumar P. and Chithiraivel S. (2015). Mapping of literature output on thorium: A scientometric study. *National conference on innovative librarianship in the knowledge of society: Enhancing teaching learning and research*, 5, 383-389.
6. Stanhill G.(2001). The growth of climate change science: A scientometric study.*Climate change*, 48:15-524.
7. Teli, Soumenand Bidyarthi Dutta. (2017). Scientometric study of superconductivity research in India from 1989 to 2014.*Srels journal of information management*, 54(5), 246-252.

