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A SCIENTOMETRIC STUDY ON JOURNAL OF CLIMATE BASED ON WEB OF SCIENCE DATABASE

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Abstract

The present study explores the Scientometric analysis of the journal on “JOURNAL OF CLIMATE”. This study covered 2787 records worldwide from 2014 to 2018. The data were collected from the web of science database. In this study discussed the Journal of climate year by year in this study. The study was undertaken to examine the year wise distribution of contributions, authorship pattern, co-author index and degree of collaboration, relative growth rate and doubling time, Document wise distribution of records. A Number of publications published in the year of 2015 with 575(20.6%) records. USA ranked first in the journal of climate research with 1707 (61.2%) records followed by China (650), UK (308), and Australia (182) with second, third and fourth position. A number of records published through the article 2698 (96.8%). Only 3% of the total publications were contributed by the single authors and rest of the 97% research publications were contributed by multi-authors in this study. The study revealed that the Degree of Collaboration was high i.e. 2014(0.91). The study analyzed the relative growth rates (RGR) has decreased from 2013(0.71) to 2017 (0.28) in the span of five years. The doubling time (DT) has rapidly increased while calculated year wise i.e.2013 (0.97) to 2017(2.47).

Keywords: *Scientometric, RGR, CAI, Doubling Time, Climate, authorship pattern, web of science,*

Introduction

Scientometric is one of the techniques which are a set of mathematical and statistical methods used to analyze and measure the quantity and quality of the journals, articles and other forms of publications.

Journal of climate (JOC) is an American meteorological society (AMS) publication. The journal on “journal of climate” started its publication in the year 1988 and still, 2019 have been 32 volumes published. It is a semi-monthly publication that publishes book reviews, articles, and bibliographic essays; the journal impact factor is 4.553(2018).

The present study highlights the journal issue of materials science research development as reflected in web of science database for the period from 2014 to 2018. Climate is a major determinant of the evolution and manifestation of life. Modern human societies are changing the global climate. The investigation of climate dynamics and of the interaction of climate with ecosystems, and the assessment and control of human impacts are among the greatest challenges facing present and future generations. Climate Research evaluates the important new information in these vital areas of environmental research, with specific emphasis on the effect of climate variability and change on organisms and ecosystems.

Review

Husain, S., & Mushtaq, M. (2017) their study analyzed the climate change during the period 2009-2013 as produced in the field of environmental science and ecology. The source of data downloaded from Web of Science and its data found that about 17, 266 publications are produced in the field from different research-based institutes around the globe. The highest data were published in the year 2013 (4788), and the lowest data was published in the year 2009 (2238) publications. The highest number of publications produced USA country followed by England. W. Thuiller followed by P. Smith was the most prolific authors in the field of climate change. The articles most widely used document forms followed by reviews. The prolific journals were Climatic Change and Global Change Biology. The study also assessed the citation

patterns received by these articles and provides a comprehensive outline of the different aspects of the citations including the average, self and unique citations received.

Dutta, B., & Rath, D. S. (2013) had paper reports on a scientometric study of 834 articles on Carbon nanotube research in India spanning over the years 1999 to 2012 downloaded from Web of Science. The study analyses literature growth rates, which shows initiation of potential growth of research in this subject since 2008. It also examines collaborations with different countries, authorship pattern, document types are involved and active Indian institutions co-coordinating research in this subject have been studied. Bradford law of scattering was applied to identify the core journals and Lotka's law to study the authors' productivity pattern. In the year 2011 have published 206 (24.7%) records out of 834 publications. The maximum of records published the USA with 70 (25.8%) records. Out of 834 publications, journal articles amount to 776 accounting for 93%; It is observed that two-authored and three –authored publications (51%) are higher than the other modes of authorship.

Venkatesan, M., Gopalakrishnan, S., & Gnanasekaran, D. (2013) has presented the study the research productions on climate change were downloaded from 'Web of Science' database. The study covered 94756 records worldwide from 1999 to 2012. The distribution of publications based on the yearly output, country, language and document type of the publications were studied. Relative growth rate and doubling time of the publications was calculated. The majority of the researches have been concentrated in environmental science and ecology, and geology. About 60% of the researches carried out on climate change are sponsored by funding agencies. The highest publications published in the year 2012 with 15952 (16.83%) records. The most records contributed by USA 34551 records with 36.46%. India has got 1649 records with 1.74%. Most of the records published in English 93214 records with 98.373%. 82845 records are published by Article out of 94756 records, with 87.43%. RGR 1999 & 7.77 0.09 to 2012 0.18 & 3.76

Alex, P., & Preedip Balaji, B. (2010) has aimed to map the climate change research output from India in a five-year period 2005-2009. It examines the key factors including a number of works published on the topic of climate change science and the journals publishing this research work and their position in rankings. Climate change research in India is mapped based on papers abstracted in the ISI Science Citation Index (SCI). There are 25,081 publications

published all over the world and Indian subcontinents have published 391 papers, and there are published more than 101scholarly journals. The scope of the paper is limited to studying the growth and dynamics of Indian research output in climate change research of a five year period

Objectives

The following are the important objectives of the study:

- To analysis the year-wise publication of the journal of climate,
- To determine the degree of collaboration,
- To measure the relative growth rate and doubling time,
- To Analysis of co-authorship index,
- To analyze the Year Wise Authorship Pattern
- To analysis the time serious,
- To activity index of India.

METHODOLOGY

Scientometric details about the journal on "Journal of Climate" for data collection are reachable in a web of science database which is published by Thomson Reuters [WOS]. The keyword "Deforestation" for five years during the year 2014 - 2018 to take for the study 2787 records were retrieved in the present study. The collected data analyzes through Histcite, Bibexcel and calculated using Excel to find out the result. VOS viewer is used to generating and visualization of bibliographic networks.

DATA ANALYSIS

Table 1 Year-Wise Publication of Journal of Climate

S.No	Publication Year	Records	Percentage
1	2014	556	19.9%
2	2015	575	20.6%
3	2016	525	18.8%
4	2017	572	20.5%

5	2018	559	20.1%
Total		2787	100%

To analyse the year wise publication of the journal of climate during the period of 2014 to 2018. These are about 2787 total output on climate in the last five years. In the year 2015, the output measured is 575(20.6%); this is the highest records out of 2787 records. In the year 2016, the output measured is 525(18.8%); this is the lowest records out of 2787 records. The study includes the data covered in the web of science database from 2014 to 2018.

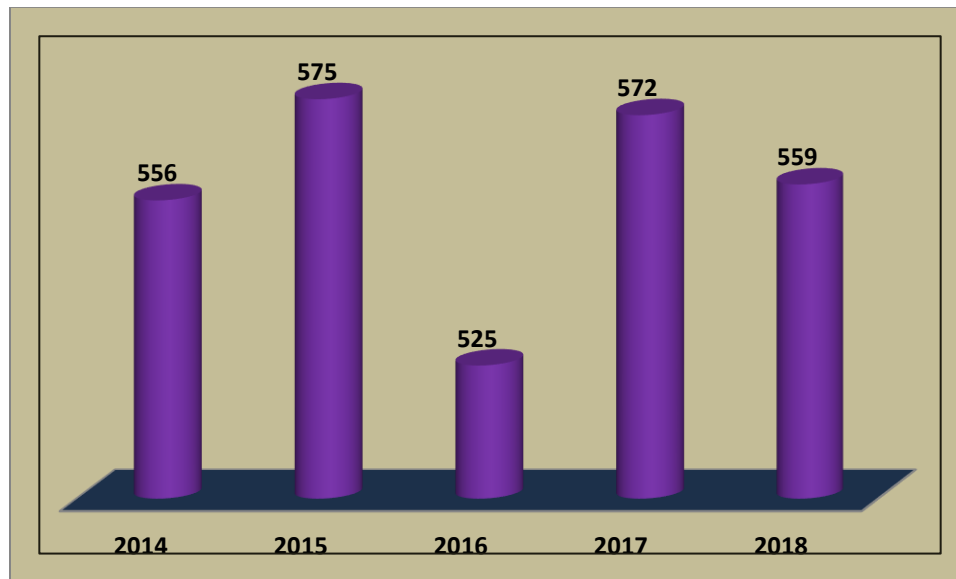


Figure 1 Year-Wise Publication

Table 2 Document Wise Distribution

S.No	Document Type	Records	Percentage
1	Article	2698	96.8%
2	Correction	38	1.4%
3	Editorial Material	26	0.9%
4	Review	22	0.8%

5	Letter	3	0.1%
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This table indicates the document wise distribution of journal of climate. There are about 5 items of publications in the study. The Articles observed in 2698(96.8%) records on out of 2787 records. Followed by the form of Correction got the second position among the 5 items. It has shown a 38(1.4%) records of the study period. The other preferred forms followed by the studies are Editorial Material, Review, and Letter the period of study.

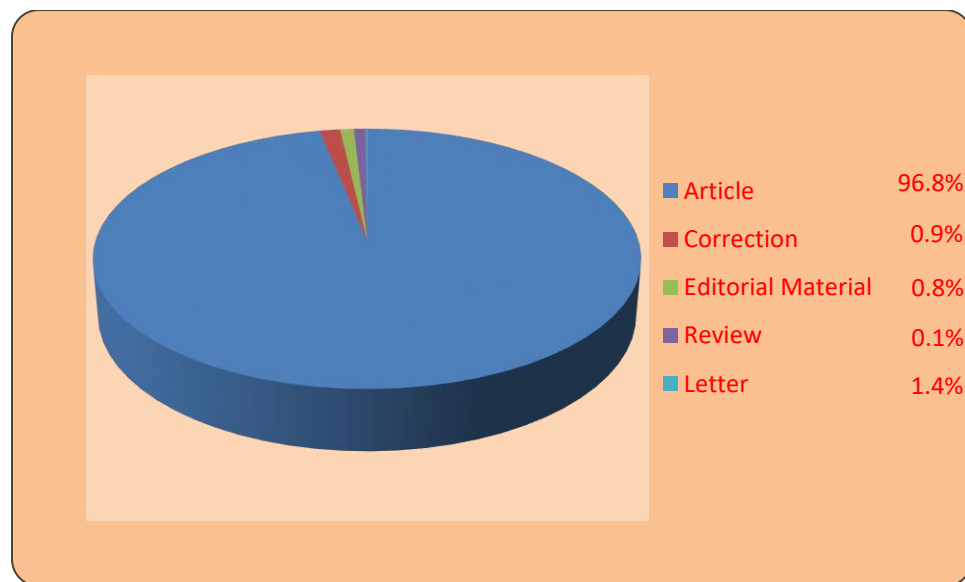


Figure 2 Document Wise Distributions

Table 3 Single author Vs Multi-Author

S.No	Authorship Pattern	Publication	Percentage
1.	Single Author	93	03%
2.	Multi-Author	2694	97%
Total		2787	100%

It is observed from the table 3 that the authorship pattern in terms of Single Authors and Multi-Authors during the period of study (2014 to 2018). Out of 2787 research outputs, Multi – authors published the majority of 2694(97%) papers and single authors published the rest of 93(03%) journals.

Table 4 Degree of Collaboration

Years	Single Author (NS)	Multiple Author (NM)	Total Authors (NS+NM)	Degree of Collaboration
2014	28	528	556	0.95
2015	19	556	575	0.97
2016	16	509	525	0.97
2017	16	556	572	0.97
2018	14	545	559	0.98
Total	93	2694	2787	0.97

The table shows the details about the degree of collaboration which indicate a trend in single and multiple authors during 2014 – 2018 as shown in a Table. The degree of collaboration ranges from 0.90 to 0.92 and the average degree of collaboration is 0.90. The DC is calculated by using the formula of K.Subramaniam, 1982:

$$DC = \frac{Nm}{Ns + Nm}$$

DC = Degree of Collaboration

NM = Number of Multi Authors

NS = Number of Single Authors

$$DC = \frac{2694}{93 + 2694} = 0.97$$

In the present study, the value of DC is 0.97.

Table 5 Relative Growth Rate and Doubling Time

Year	No. of publications	Cumulative Total of publications	W1	W2	R(a) W2-W1	Mean R(a)	Doubling Time (Dt)	Mean (Dt)
2014	556	556	6.32	-	-	0.96	-	0.51
2015	575	1131	6.35	7.03	0.68		1.02	
2016	525	1656	6.26	7.41	1.16		0.60	
2017	572	2228	6.35	7.71	1.36		0.51	
2018	559	2787	6.33	7.93	1.60		0.43	

This table shows that Relative growth rate and doubling time. The highest relative growth rate is 1.60 in the year of 2018. And the lowest relative growth rate is 0.68 in the year of 2015. The highest doubling time is 1.02 in the year of 2015 and the lowest doubling time is 0.43 in the year of 2018.

Table 6 Co-Authorship Index

S.No	1		2		3		3+		Total
	NO	CAI	NO	CAI	NO	CAI	NO	CAI	
2014	28	151	134	47	137	55	256	177	555
2015	19	99	149	51	139	54	268	179	575
2016	16	91	143	54	126	53	240	175	525
2017	16	84	145	50	137	53	274	184	572
2018	14	75	113	40	128	51	305	209	560
	93		1418		1254		727		2787

This table shows the co-authorship index during the year of 2014 to 2018. The table shown co-author index for single authors decline from 151 in the year 2014 to 75 in the year 2018, and then the CAI for the two authors is declined from 47 to 40 and three authors is declined started from 55 to 51 and above three authors is declined started from 177 to 209 during the year 2013 to 2017.

Table 7 Year Wise Authorship Pattern

Year	1	2	3	4	5	5+	Total
2014	28	134	137	96	69	91	555
2015	19	149	139	107	68	93	575
2016	16	143	126	99	55	86	525
2017	16	145	137	112	64	98	572
2018	14	113	128	126	72	107	560
Total	93	684	667	540	328	475	2787

It shows that year wise authorship pattern of the research journal of climate. It indicates that out of the 93 contributions to a single author. The two authors highest contributed in the year 2015 is 149 articles and the lowest contributed in the year 2016 is 55 articles. The above 5 authors highest contributed in the year of 2018 the output measured is 107 and the lowest contributed is the year of 2016 the output is measured is 86.

Table 8 Authorship Pattern

S.No	Author	Publication	Percentage
1	Single author	93	03%
2	Two author	684	25%
3	Three author	667	24%
4	Four author	540	19%
5	Five author	328	12%

6	Above five author	475	17%
Total		2787	100%

This table shows that Authorship Pattern of the research output on the journal of climate. It indicates that out of 2787 contributions to the single author, two authors, three authors, four authors, five authors and above five authors. Two authors highest is 684(25%). The lowest single author is 93(03%). And followed by three authors, four authors, five authors and above five authors.

Table 9 Time serious analysis

Year	No. of publication	X	X²	XY
2014	556	-2	4	-1112
2015	575	-1	1	-575
2016	525	0	0	0
2017	572	1	1	572
2018	559	2	4	1118
Total	2787		10	03

The calculated value of Time Serious Analysis output of Deforestation for the year 2029 is 560.4 and research output for the year 2034 is 3270. With the application of the formula, the Time serious analysis calculated from the results for the year 2029 and 2034, it is found that the Future trend of growth of research output in Deforestation research may take increasing for upcoming years. The expectation from the calculations proved there is positive Growth in the research output of the journal of climate.

Straight line equation:

$$Y_c = a + bX$$

$$\text{Since } \sum X = 0$$

$$a = \sum Y/N = 2787/5 = 557.4$$

$$b = \sum XY/\sum X^2 = 03/10 = 0.3$$

Estimated literature in 2028 is when $X = 2029 - 2019 = 10$

$$= 557.4 + (0.3 \times 10) = 560.4$$

Estimated literature in 2033 is when $X = 2034 - 2019 = 15$

$$= 557.4 + (0.3 \times 15) = 561.9$$

$$= 557.4 + (0.3 \times 20) = 563.4$$

Table 10 Activity Index of India

Year	Global output	Indian output	Activity Index
2014	556	03	1.66
2015	575	04	1.28
2016	525	05	0.94
2017	572	07	0.73
2018	559	06	0.84
Total	2787	25	100.00

This table indicates that Activity Index of India journal of climate. The highest global output is 575 and Indian output is 04 the activity index is (1.28%) in the year of 2015. And the lowest global output is 525 and Indian output is 05 the activity index is (0.94%). It shows that the level of climates during the year of 2014 to 2018 in India.

Table 11 Country-wise Distribution

S.No	Country	Records	Percentage	S.No	Country	Records	Percentage
1	USA	1707	61.2	11	Switzerland	69	2.5
2	Peoples R China	650	23.3	12	Sweden	58	2.1
3	UK	308	11.1	13	Italy	52	1.9
4	Australia	182	6.5	14	Spain	50	1.8
5	Japan	164	5.9	15	Netherlands	41	1.5
6	Germany	150	5.4	16	Taiwan	35	1.3
7	Canada	137	4.9	17	Saudi Arabia	28	1.0
8	France	132	4.7	18	India	25	0.9
9	South Korea	114	4.1	19	Brazil	19	0.7
10	Norway	77	2.8	20	Israel	18	0.6

In this table shows that country-wise distribution of publications journal of climate, the total observed in the study is 2787 during the period. The analyses bring out the fact that the considered to be the first and it has given the producing of 1707(61.2%) records of climate and the USA is considered to the most productive country is brought out research. The considered to the most productive country is brought out research. The second rank is country Peoples R China which has brought out 650(23.3%) publications journal of climate. The third rank to the UK. It has produced the 308(11.1%) publications output.

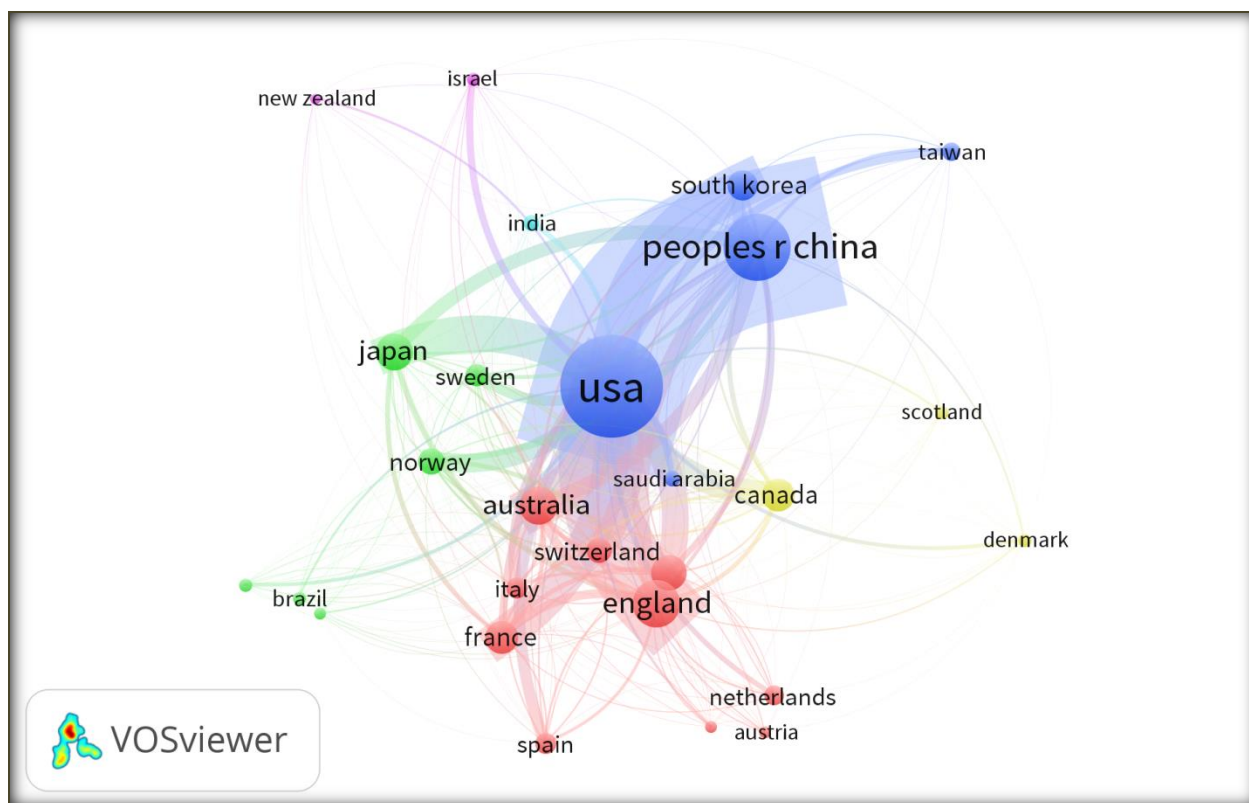


Figure 3 Visualization of citation country

Table 12 keywords wise analysis

S.No	Word	Records	Percentage
1	Climate	522	18.7
2	Variability	381	13.7
3	Tropical	340	12.2
4	Pacific	334	12.0
5	Precipitation	320	11.5

S.No	Word	Records	Percentage
6	North	305	10.9
7	Sea	305	10.9
8	Ocean	299	10.7
9	Model	267	9.6
10	Surface	238	8.5

The keywords wise analysis of the top ten keywords is using respectively. The highest time the climate keyword is using 522(18.7%) out of 2787 records. The second time keyword variability is using 381(13.7%) out of 2787 records the study period of publications. Followed by Tropical, Pacific, Pacific, Precipitation, North and Sea has third, fourth, fifth sixth and seventh position. And remaining words are having below 10 percentages.

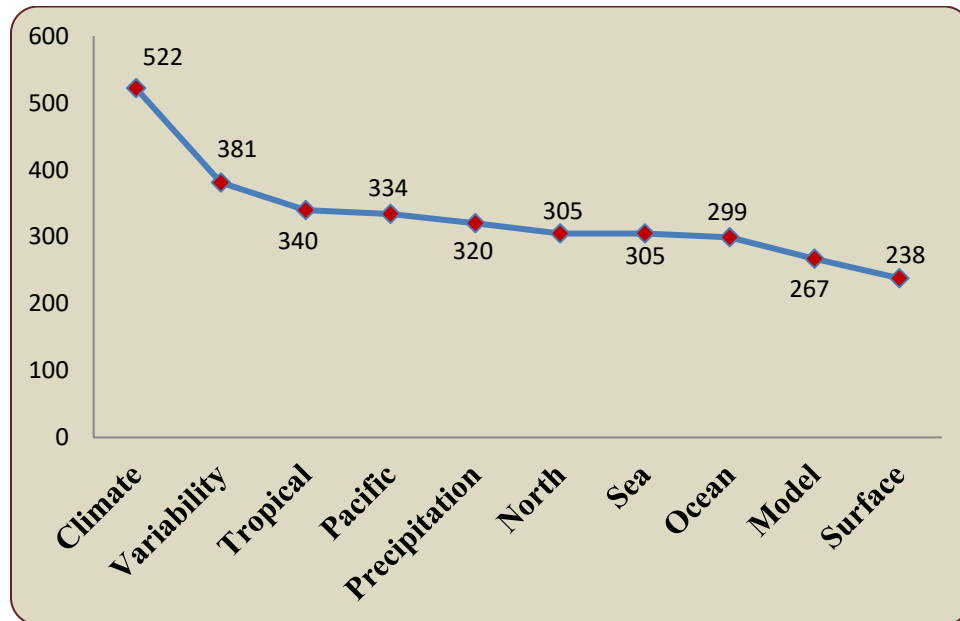


Figure 4 keywords

FINDINGS

- ❖ The most number of records published in the year of 2015. In the year of 2015 contains 575 records with an average of 20.6 percentages. The least number of records are published in the year of 2016. In the year of 2016 is containing 525 records with an average of 18.8 percentages.
- ❖ An article is a leading source with 96.8 (2698) percent of the total documents. Then Correction, editorial material, Review and letter are following second, third, fourth and fifth position (1.4%, 0.9%, 0.8%, and 0.1%).
- ❖ The normal DC rate is 0.95 to 0.98. The average degree of collaboration rate is 0.97.
- ❖ The Relative Growth Rate is increased the year (2015) to year (2018). A mean growth rate is 0.96. Doubling time is decreasing in a year to year. In the year 2015, a DT is 1.02 but in the year of 2018, a DT is 0.43. A mean Doubling time is 0.51.
- ❖ The multiple authors publishing 2694 records with an average of 97 percentages, but the single author only contributed to 93 works with an average of 3 percentages.
- ❖ The word "CLIMATE" is the most used keywords with 522 records.
- ❖ The calculated value of Time Serious Analysis output of "Journal of Climate" for the year 2029 is 560.4 and research output for the year 2034 is 561.9. It is found that the Future trend of growth of research output in "Journal of Climate" research may take increasing for upcoming years.

Conclusion

This research has highlighted quantitatively the research output on "Journal of Climate" during the years 2014-2018 found the total 2787 articles, as available in Web of Science database. As per countries distribution, USA contributed 1707 article (Rank 1), China 650 articles (Rank 2), UK 308 (Rank 3), etc. This study reveals that the categories of article distributions are remarkable in this research journal. The majority of the articles were contributed by joint authors. It is registered that Climate, Variability, and Tropical are the most proliferate keywords and contributed 522 articles, 381 articles, and 340 articles.

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