

# Publication trends on Estuary Research [2015-2020] : A Scientometric approach

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## Abstract

The present study examines the research publication trend in the field of estuary research from 2015 to 2020. The primary data for the research was retrieved from the Web of Science database. Totally 18144 records were downloaded for analysis. Further, the study covers year-wise growth, Ration of Growth, types of documents, etc., The results highlights that maximum of 3232 publications is found in 2020. The Ratio of Growth is increasing trend. One fourth of estuary publications are contributed from USA and India placed 8th rank in estuary publication. The word estuary is the top most key word.

**Keyword:** Scientometric, Estuary, ratio of growth, Zip's law,

## Introduction

Scientometrics is the quantitative study of science. It aims to analyze and evaluate science, technology and innovation. The main research involves measuring the influence of authors, publications, journals, institutes, and countries or regions to cite a range of scientific publications, such as articles and patents. It also aims to understand the behaviour of scientific citations as a means of academic communication, and to draw a map of scientific knowledge.

The word estuary comes from the Latin aestus, which means tide. The adjective aestuarium also means tides or sudden big waves, a highly dynamic environment that changes due to natural forces. The term is often used to denote the confluence of a river and the sea, and to describe the flow of coastal rivers. It is a transitional ecosystem between the continent and the ocean: complexity, variability and human disturbance are common features of all estuaries. Under normal conditions, their biological productivity is higher than that of rivers and adjacent oceans because their high nutrient concentration stimulates primary production.

## Literature Review

More number of studies were carried out in the field of scientometric studies at global level. Few reviews related to the present study is presented below:

**Shukla, (2019)** has analyzed the research output in the field of genetic disorder from 2008 to 2017. A researcher collected 3673 articles during the study period. The results in year-wise distribution of publication are increasing year after year and the highest 504 of publications were published in 2017 and lowest 184 records were published in the year 2008. The author Ghosh, K was the most productive author with 66 publications. Out of 3673 records, the maximum 2421 of documents were related to medicine subject.

**Natarajan, V. and Sanjeevi, K. (2015)** have analyzed the research output on Neutrino publications. Year-wise publication was fluctuating trend. Majority of the articles was published in the form of Journal Articles. The United States of America has contributed more articles compared to other nine countries and India has occupied in 8<sup>th</sup> rank.

**Dutt, et al** have examined 2566 publications in the field of dengue research from 1987 to 2008 retrieved from Science Citation Index. Based on their findings, 80% of the articles were published in journals originating from USA, UK, the Netherlands, France and Germany.

**Objectives**

The major objectives of the studies is to

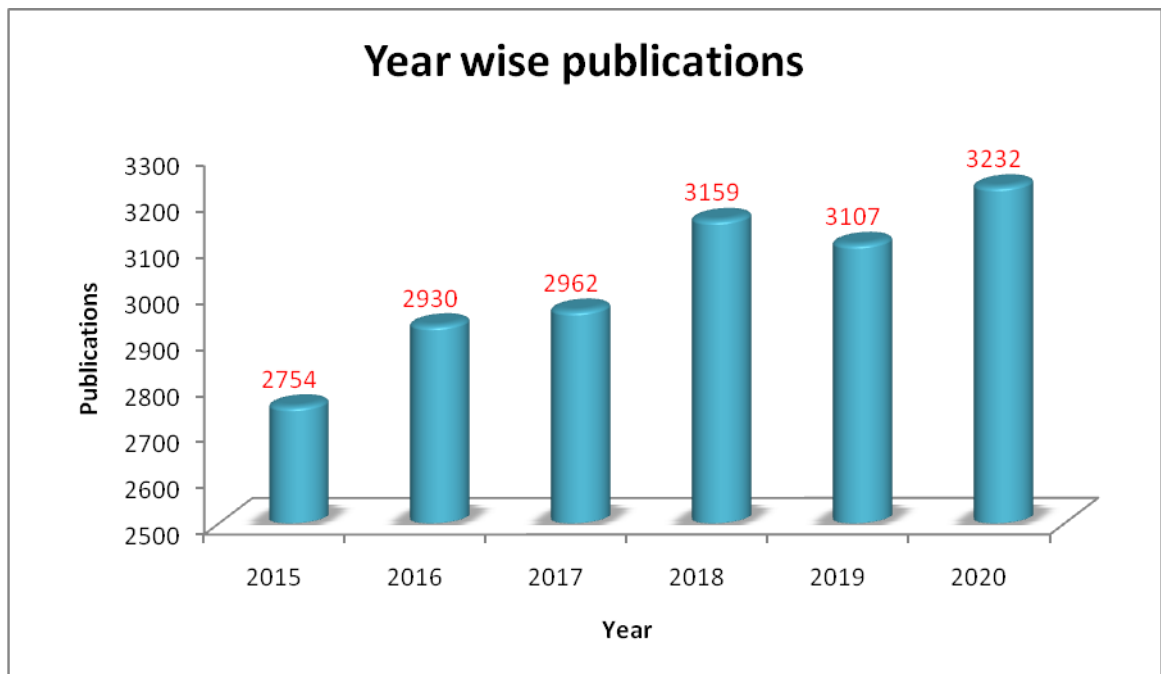
- study year-wise growth of Estuary research publications;
- analyze Ratio of Growth published articles on Estuary research;
- identify the forms of publications;
- examine the articles published among different languages;
- find out contributions of top 10 countries in estuary research;
- apply the Zipf's law for word frequency.

**Results**

The year-wise publications in the field of estuarine research were analyzed and presented in Table-1 and Figure 1.

**Table-1 Year-wise publication**

S. No.	Year	No. of articles Published	Cumulative Publications	Percentage
1	2015	2754	2754	15.18
2	2016	2930	5684	16.15
3	2017	2962	8646	16.32
4	2018	3159	11805	17.41
5	2019	3107	14912	17.12
6	2020	3232	18144	17.81
Total		18144		



From the Table 1, it is clearly shown that, the year-wise growth of estuary publications the highest number of articles (3232) published in the year 2020 and lowest publication was recorded (2754 articles) in the year 2015. Further, it is noticed that the publication trend is gradually increasing from 2016 to 2019.

The analyzed results on Ratio of Growth in estuary research from 2015 to 2020 are given in Table 2.

**Table-2 Ratio of Growth (RoG)**

S. No.	Year	Articles published	Ratio of Growth
1	2015	2754	--
2	2016	2930	0.99
3	2017	2962	1.07
4	2018	3159	0.98
5	2019	3107	1.04
6	2020	3232	1.06
<b>Total</b>		<b>18144</b>	

The annual ratio of growth has been calculated with the current year's publications divided by the previous year's publications. It is identified in the year 2016 the total number of publications in estuaries is 2930. In the year 2020, it increased to 3232. The annual ratio of growth ranges between 0.98 and 1.07.

**Table-3 Forms of documents published**

S. No.	Document Type	Publications
1	Journal Articles	17777
2	Proceedings Papers	405
3	Review Articles	405
4	Corrections	91
5	Editorial Materials	74
6	Meeting Abstracts	45
7	Book Chapters	14
8	Book Reviews	13
9	Data Papers	13
10	Letters	10

Table-3 highlights the publication of information on estuary research is in different forms viz., Journal Articles, Conference Proceedings, Review Articles, Reviews, Book chapters, etc. Out of 3232 records, majority of information is published in the form of Journal article. The proceedings paper and Review articles published each 405 records. The other forms occupy less than 75 records during the study period.

The language-wise publication of documents are categorized under eleven types and presented in Table-4.

**Table-4 Language wise Publications**

S. No.	Language	Publications	Percentage
1	English	17,984	99.11%
2	Spanish	53	0.29%
3	Portuguese	38	0.21%
4	Chinese	14	0.08%
5	French	14	0.08%
6	Russian	10	0.05%
7	German	9	0.05%
8	Japanese	7	0.04%
9	Malay	3	0.02%
10	Eskimo	1	0.01%
11	Polish	1	0.01%

From the table-4, it is noticed that majority (99.11%) of the documents published in English language followed by Spanish and Portuguese in 0.29% and 0.21% respectively. The publication of documents in other languages is less than 10%.

The top 10 country-wise distribution of research publication in estuary research is analyzed and given in Figure 2.

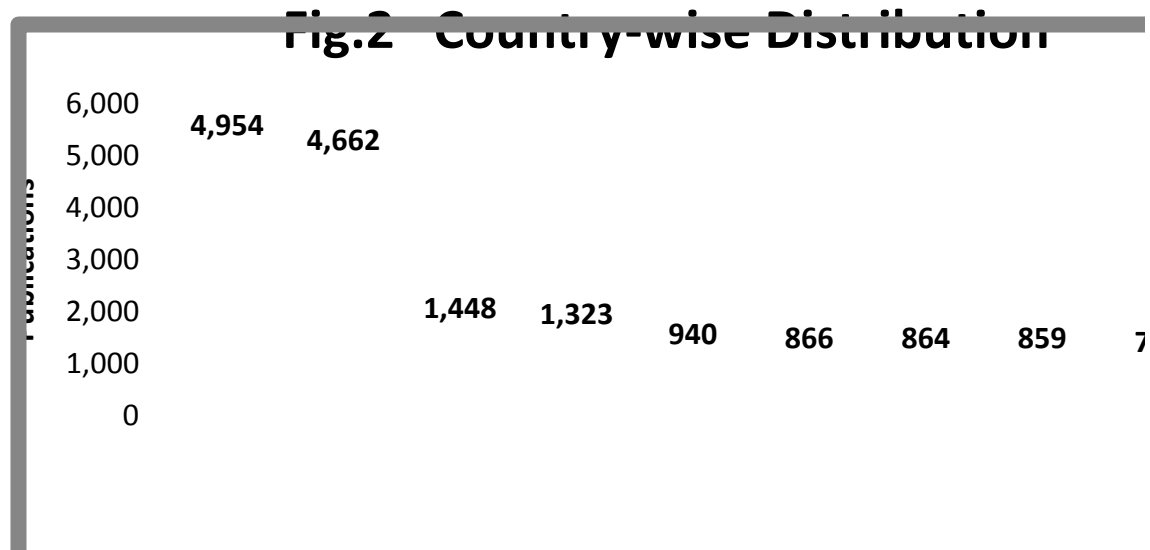


Figure 2 shows that the research publication of estuary research among top 10 countries and it is clearly noticed that the United States of America contributed 4954 articles and occupies first position followed by China 4662 publications, Australia 1448 publications and shared the second and third position respectively. India has contributed 859 articles and placed 8<sup>th</sup> position. Further, this study identified that top four countries are contributed nearly 75% of overall publications in estuary research from 2015 to 2020.

**Table-5 Applicability of Zipf’s Law for word frequency**

S. No	Word	Records (f)	Rank (r)	Log f	Log r	Log C
1	ESTUARY	4833	1	3.68	0.00	3.68
2	RIVER	3230	2	3.51	0.30	3.81
3	COASTAL	2217	3	3.35	0.48	3.82
4	CHINA	2191	4	3.34	0.60	3.94
5	SEA	1825	5	3.26	0.70	3.96
6	ESTUARINE	1785	6	3.25	0.78	4.03
7	SEDIMENTS	1607	7	3.21	0.85	4.05
8	WATER	1526	8	3.18	0.90	4.09
9	SEDIMENT	1482	9	3.17	0.95	4.13
10	DISTRIBUTION	1438	10	3.16	1.00	4.16

Zipf’s law states that, “in a long textual matter if words are arranged in their decreasing order of frequency, then the rank of any given word of text will be inversely proportional to the frequency of occurrence of the word “.

$$r \cdot f = c$$

Where, r is rank, f is frequency and c is constant.

Taking log on both the sides,  $\text{Log}(f) + \text{log}(r) = \text{log} c$

To apply this law, the terms were collected from the title of the articles and ranked according to their frequency of occurrence in decreasing order.

The log of frequency of the most potent word appeared in the title “ESTUARY " is given in the table.

Word : ESTUARY

Frequency : 4833

Rank : 1

Log of frequency + log of rank

Log 4833 + log 1

$$= 3.68 + 0$$

$$= 3.68 \text{ word}$$

Thus, it is proved that Zipf s law is valid even now.

**FINDINGS**

Based on the above results, the present study revealed that:

- the year-wise publications on estuarine research is gradually increasing during the study period.

- The ratio of growth on published articles falls between 0.98 and 1.07.
- Majority of the documents published in the form of Journal Articles compared to other forms.
- English language is the dominant one.
- Among the top 10 countries, the United States of America is contributed more articles compared to other nine countries.
- Applicability Zipf's law for word count is fit to present study.

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