

# Scopus and Web of Science (WoS) Indexed Indian Earth and Planetary Science Journals: An Infometric Analysis and Visualization

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## ABSTRACT

Indian journals in Earth and Planetary Sciences indexed in Scopus and Web of Science (WoS) are examined using various journal-level metrics provided by both databases. These metrics include CiteScore, Source Normalized Impact per Paper (SNIP), SCImago Journal Rank (SJR), SCImago Journal Quartiles, Journal Impact Factor, and their respective Quartiles. A comparative analysis is conducted on the coverage of Indian Earth and Planetary Science (EPS) journals in Scopus and WoS, with the goal of describing, understanding, and visualizing the distinctions between these two databases. Additionally, VOSviewer, a science mapping software, is employed to visualize the keywords from the most cited articles published in Indian EPS journals indexed in both Scopus and WoS. The results of this analysis provide a foundation for the strategic development and improvement of Indian EPS journals, contributing to the ongoing advancement of research in Earth and Planetary Sciences.

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## 1. INTRODUCTION

The Web of Science, owned by Clarivate, is the oldest scholarly database, established as a tool for information retrieval. It was invented by Eugene Garfield of the Institute of Scientific Information (ISI) in 1964, as outlined in his 1955 book. Initially launched as the Science Citation Index (SCI) with 700 journals, it served as a citation index. Over time, the Social Sciences Citation Index (SSCI) was added in 1973, followed by the Arts & Humanities Citation Index (AHCI) in 1978, and the Book Citation Index (BKCI) in 2011. In 1997, the SCI, SSCI, and AHCI were combined to form what is now known as the Web of Science. Somoza-Fernandez et al. (2018) noted that the Emerging Sources Citation Index (ESCI) was introduced in 2015 to give early visibility to titles being considered for inclusion in SCIE, SSCI, and

AHCI. As of 2020, the Web of Science Core Collection contains approximately 74.8 million scholarly records and 1.5 billion referenced citations dating back to 1900, spanning 254 fields. The Science Citation Index Expanded (SCIE) includes 9,200 journals across 178 scientific categories with 53 million records and 1.18 billion cited references. The Social Sciences Citation Index (SSCI) covers 3,400 journals in 58 social science disciplines with 9.37 million records and 122 million cited references, while the Arts & Humanities Citation Index (AHCI) indexes 1,800 journals in 28 fields, containing 4.9 million records and 33.4 million cited references.

Scopus, established in 2004 by the Dutch academic publisher Elsevier, is one of the largest curated databases of scientific journals, books, and conference papers. Its content undergoes careful se-

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lection and continuous re-evaluation by the Content Selection and Advisory Board, which determines which journals, conferences, and publications are included. Initially, Scopus contained 27 million publication records spanning from 1966 to 2004. Over time, the database expanded, and by October 2019, it covered 23,452 journal titles, 120,000 conferences, and 206,000 books from more than 5,000 international publishers. Additionally, around three million new items are added to Scopus every year (<https://www.elsevier.com/solutions/scopus/how-scopus-works/content>).

The purpose of this article is to provide a comparative analysis of the coverage of Indian Earth and Planetary Sciences (EPS) journals in two major databases, Web of Science and Scopus. The primary objective is to describe, comprehend, and visualize the key differences between the two databases in their treatment and representation of Indian EPS journals.

## 2. REVIEW OF LITERATURE

A comparative analysis of bibliographic databases has shed light on their coverage, strengths, and limitations across various academic disciplines. Mikki (2009) found that Google Scholar retrieved 85% of Web of Science (WoS)-indexed literature in Earth Sciences, suggesting its potential as a complementary tool. Barnett and Lascar (2012) noted that Scopus contains more unique article titles in Earth and Atmospheric Sciences compared to WoS. Despite data inaccuracies, Mingers and Lipitakis (2010) and Clermont and Dyckhoff (2012) concluded that Google Scholar covers global, English-language journals more effectively than both Scopus and WoS in the field of Business and Management. Franceschet (2009) observed that Google Scholar provides stronger indicator scores than WoS in Computing Sciences, although citation rankings from both databases were comparable. Kousha and Thelwall (2007) highlighted that Google Scholar features a higher proportion of non-journal academic citations across numerous scientific domains, implying that it can access academic non-journal articles that are not available through WoS. Studies by Martín-Martín et al. (2018, 2021) revealed overlaps in subject categories between Google Scholar, WoS, Scopus, and other databases. Archambault et al. (2009) found a strong correlation between the paper counts and citations in Scopus and WoS, affirming their utility in scientometric analysis. How-

ever, Mongeon and Paul-Hus (2016) noted that the presence of unique titles in these databases had minimal impact, suggesting they hold limited importance in this context. De Groote and Raszewski (2012) recommended using WoS, Scopus, and Google Scholar in tandem for assessing the impact of nursing research. In Indonesia, Irawan et al. (2021) reported a prevalence of English-language scientific articles in Earth Science, and the limited availability of open-access publications in Scopus and WoS contributed to the heightened significance of publications indexed in these two databases.

## 3. OBJECTIVES OF THE STUDY

This study focuses on analyzing Indian Earth and Planetary Science journals indexed in Scopus and Web of Science (WoS) using journal-level metrics from both databases. The specific objectives of the research are:

- To identify the characteristics of Indian Earth and Planetary Science journals indexed in Scopus and WoS.
- To determine the top Indian Earth and Planetary Science journals in Scopus and WoS based on journal-level metrics such as SCImago Journal Rank (SJR), CiteScore, Source Normalized Impact per Paper (SNIP), and Journal Impact Factor (JIF).
- To analyze the top-cited articles from Indian Earth and Planetary Science journals indexed in Scopus and WoS.
- To identify the most frequently occurring author keywords in the top ten most cited articles from Indian Earth and Planetary Science journals in both Scopus and WoS.

## 4. METHODOLOGY

### 4.1. Data collection

We collected data on Indian Earth and Planetary Sciences journals indexed in Scopus from the SCImago Journal and Country Rank databases, which can be accessed at <https://www.scimagojr.com/journalrank.php>. In 2022, a total of 19 Indian journals in this field were included in the SCImago databases, of which only nine were also indexed in the

Web of Science. Journal metrics were gathered from the Scopus Source List, which has provided metrics for its indexed journals since 2011. The metrics used in this study include CiteScore, Source Normalized Impact per Paper (SNIP), SCImago Journal Rank (SJR), SCImago Journal Quartiles, Journal Impact Factor (JIF), and Quartiles. CiteScore, SJR, and SNIP were obtained from the Scopus Source List, while SCImago Journal Quartiles were retrieved from the SCImago Journal and Country Rank databases. The SJR index is available through both SCImago and the Scopus Source List. Journal Impact Factor and quartile information were sourced from the 2023 Journal Citation Report of Web of Science. To visualize the keywords from the most cited articles in Indian Earth and Planetary Sciences journals indexed in both Scopus and Web of Science, we utilized the science mapping software VOSviewer (version 1.6.19), following the methodology described by Van Eck and Waltman (2010).

#### 4.2. Variables (Journal-level metrics)

For each journal, the following variables were extracted from the SCImago Journal and Country Rank, Scopus, Web of Science (WoS), and the 2023 Journal Citation Report of WoS:

- CiteScore (CS): This metric measures the average number of citations received per document published in the journal.
- SCImago Journal Rank (SJR): The SJR metric calculates weighted citations received by a journal, with citation weighting depending on the subject field and the prestige of the citing journal (SJR).
- Source Normalized Impact per Paper (SNIP): SNIP evaluates the actual number of citations a journal receives, relative to the number of citations expected based on the subject field of the journal.
- SCImago Quartiles:
  - Quartile 1 (Q1): Represents journals within the 99<sup>th</sup> to 75<sup>th</sup> percentile based on CiteScore.
  - Quartile 2 (Q2): Represents journals within the 74<sup>th</sup> to 50<sup>th</sup> percentile based on CiteScore.
  - Quartile 3 (Q3): Represents journals within the 49<sup>th</sup> to 25<sup>th</sup> percentile based on CiteScore.
  - Quartile 4 (Q4): Represents journals within the 24<sup>th</sup> to 0 percentile based on CiteScore.
- Journal Impact Factor (JIF): The JIF is defined as the average number of citations per paper received by articles published in the journal during the two preceding years.
- Web of Science (WoS) Quartile:
  - Quartile One (Q1): Includes the top 25% of journals in a given scientific category, based on their Impact Factor scores.
  - Quartile Two (Q2): Includes journals in the second 25% of the highest Impact Factor scores in a scientific category.
  - Quartile Three (Q3): Represents the third 25% of journals based on their Impact Factor scores.
  - Quartile Four (Q4): Represents the lowest 25% of journals in a scientific category based on Impact Factor scores.

## 5. ANALYSIS AND INTERPRETATION

### 5.1. Scopus journal metrics of Indian EPS journals indexed in Scopus and WoS

Journal-level metrics, which are derived from citation and usage data, offer key insights into the performance of scientific journals in the databases where they are indexed. In the field of bibliometrics, especially for Indian Earth and Planetary Sciences (EPS) journals, a thorough analysis of citation data from Scopus provides valuable information. This analysis focuses on critical metrics such as CiteScore, Source-Normalized Impact per Paper (SNIP), and SCImago Journal Rank (SJR), with these metrics exclusively accounting for peer-reviewed articles when calculated.

CiteScore is a prominent metric that measures the average number of citations received by articles published in Scopus-indexed journals over the past four years. It is calculated by dividing the total number of citations by the total number of citable items (articles, reviews, conference papers, data papers, and book chapters) within the same four-year period. For

Table 1. Scopus journal metrics of Indian EPS journals indexed in Scopus and WoS (\*value in braces indicate rank).

Sl. No.	Title	CiteScore (2022)	SJR (2022)	SNIP (2022)	SCImago Quartile
1	Journal of Astrophysics and Astronomy	2.1 (4)	0.472 (2)	0.690 (6)	Q3
2	Journal of the Indian Society of Remote Sensing	4.1 (1)	0.467 (3)	0.884 (2)	Q2
3	Indian Geotechnical Journal	2.1 (4)	0.396 (4)	1.067 (1)	Q3
4	Journal of the Geological Society of India	2.2 (3)	0.376 (5)	0.728 (5)	Q3
5	Himalayan Geology	1.0 (7)	0.322 (6)	0.807 (4)	Q3
6	Mausam	1.4 (5)	0.263 (7)	0.505 (7)	Q3
7	Journal of the Palaeontological Society of India	1.1 (6)	0.181 (9)	0.487 (8)	Q4
8	Journal of Earth System Science	3.0 (2)	0.480 (1)	0.809 (3)	Q2
9	Indian Journal of Geo-Marine Sciences	1.4 (5)	0.235 (8)	0.411 (9)	Q4

instance, the CiteScore for 2022 represents citations from 2019 to 2022 for the relevant types of documents published during those years.

Table 1 showcases the rankings of Indian Earth and Planetary Sciences journals in Scopus based on their CiteScore values for 2022. Leading the list is the *Journal of the Indian Society of Remote Sensing*, which boasts the highest CiteScore of 4.1 for 2022, making it a top performer. The *Journal of Earth System Science* holds second place with a CiteScore of 3.0. Additionally, the *Journal of Geological Society of India* (CiteScore 2.2) and the *Indian Geotechnical Journal* (CiteScore 2.1) secure the third and fourth spots, respectively.

These metrics not only highlight the academic impact of Indian EPS journals but also underscore their growing importance and recognition in the broader Indian academic community, positioning them as influential contributors to the field. SJR (SCImago Journal Rank), a crucial bibliometric indicator, operates on a system where journal prestige exerts a significant influence. It is imperative to recognize that various factors such as subject field, quality, and the overall reputation of a journal directly impact the citation value, as underscored by Nundy et al. (2022) in their recent study. The SJR metric employs a method that assigns relative scores to all sources within a citation network, mirroring the logic behind the Google PageRank algorithm. This approach acknowledges that not all citations hold the same weight in scholarly discourse. In essence, when a source cites another, it effectively transfers a portion of its own prestige and status to the cited source. Consequently, a citation originating from a source with a relatively high SJR carries more significance than one from a source with a lower SJR score. This nuanced consideration of citation value highlights the intricate web of influence and recognition within the academic community. Table 1 offers a current glimpse into the ranking of Indian Earth

and Planetary Sciences journals in Scopus based on their SJR values for the year 2022. Notably, *Journal of Earth System Science* emerges as the leader with the highest SJR of 0.480, signifying its substantial prestige within the field. Following closely, *Journal of Astrophysics & Astronomy* has an SJR of 0.472, while *Journal of the Indian Society of Remote Sensing* has an SJR of 0.467. These rankings illustrate the dynamic landscape of scholarly recognition in Indian Earth and Planetary Sciences journals.

The Source Normalized Impact per Paper (SNIP), introduced by Moed (2010), represents a central bibliometric metric designed to account for the varying citation patterns observed across diverse academic disciplines. SNIP takes into consideration a source's contextual citation impact by assigning weights to citations based on the total number of citations within a specific subject field. This approach enables a direct comparison of sources operating within distinct subject areas, enabling a more equitable evaluation of scholarly influence. In the context of Indian Earth and Planetary Sciences journals, our exploration of their 2022 SNIP values, as detailed in Table 1, offers valuable insights into their relative impact and standing. Notably, the top three ranked journals based on their 2022 SNIP values are '*Indian Geotechnical Journal*' (SNIP: 1.067), '*Journal of the Indian Society of Remote Sensing*' (SNIP: 0.884), and '*Journal of Earth System Science*' (SNIP: 0.809). These rankings illuminate the notable contributions and influence of these journals within their respective subject fields. It is worth highlighting that '*Journal of the Indian Society of Remote Sensing*' and '*Journal of Earth System Science*' not only excel in SNIP values but also demonstrate a favorable position in Scopus journal metrics, reflecting their multidimensional scholarly impact. Further insights emerge from the categorization of Indian EPS journals into quartiles (Q1, Q2, Q3, & Q4) within the SCImago Journal and Country Rank database, based on their CiteScore

Table 2. Impact factor of Indian EPS journals indexed in Scopus and WoS.

Sl. No.	Title	IF (2022)	WoS Quartile
1	Journal of Astrophysics and Astronomy	1.1 (5)	SCIE(Q3)
2	Journal of the Indian Society of Remote Sensing	2.5 (1)	SCIE(Q4)
3	Indian Geotechnical Journal	-	ESCI(N/A)
4	Journal of the Geological Society of India	1.3 (3)	SCIE(Q4)
5	Himalayan Geology	1.2 (4)	SCIE(Q3)
6	Mausam	0.6 (6)	SCIE(Q4)
7	Journal of the Palaeontological Society of India	0.6 (6)	SCIE(Q4)
8	Journal of Earth System Science	1.9 (2)	SCIE(Q3)
9	Indian Journal of Geo-Marine Sciences	0.5 (7)	SCIE(Q4)

\*value in braces indicate rank

percentiles. Remarkably, only ‘*Journal of the Indian Society of Remote Sensing*’ and ‘*Journal of Earth System Science*’ attain positions in the highest quartile, namely Q2, for the year 2022, underlining their exceptional scholarly performance. The majority of journals (5) occupy the third quartile (Q3) based on their CiteScore percentiles, indicating a commendable standing within their respective subject categories. In contrast, ‘*Journal of the Palaeontological Society of India*’ and ‘*Indian Journal of Geo-Marine Sciences*’ find themselves in the lower quartile (Q4), reflecting areas where potential growth and improvement may be sought (see Table 1). These observations not only provide a comprehensive overview of the scholarly landscape but also point to avenues for strategic development and enhancement within the Indian EPS journal ecosystem.

## 5.2. Web of Science journal metrics of Indian EPS journals indexed in Scopus and WoS

The annual Journal Citation Report (JCR) is the cornerstone of bibliometric assessment, drawing its data from the Web of Science (WoS) and offers a rich array of journal-level metrics, with the Journal Impact Factor (JIF) being one of the most revered among them. Conceived in the 1950s, the Journal Impact Factor has maintained its prominence as a citation metric over the decades. It finds its place within the Journal Citation Reports, deriving its calculations from the extensive data reservoir of the Web of Science database. The JIF for a specific JCR year is computed by dividing the total number of citations received during that year by the total number of articles published in the preceding two years. To illustrate, an Impact Factor of 1.0 signifies that, on average, articles published one or two years ago have been cited at least once. An Impact Factor of 2.5, on the other hand, indicates that these articles have been cited an average of two and a half times within

the same timeframe. Both the CiteScore (CS) and the JIF metrics are rooted in a common principle: they gauge the number of citations garnered by a journal in a given year, considering papers published during a specific period, relative to the total number of papers published by the journal within that same timeframe. However, a crucial distinction lies in the calculation period: the Journal Impact Factor utilizes the previous two years as the basis for citation count, while CiteScore extends its purview over a four-year horizon. As we examine the 2022 CiteScore and Impact Factor values of Indian EPS journals indexed in Scopus and WoS, we encounter a dynamic landscape of scholarly influence and recognition (Table 2). These metrics not only serve as vital indicators but also prompt thoughtful discussions on the evolving role of these journals within the global academic ecosystem (see Fig. 1).

Metrics like the JIF and CiteScore offer invaluable insights into the collective quality of articles within a journal, although they do not give any hint on the quality of individual articles within that journal. These metrics serve a crucial role by facilitating direct comparisons of citation patterns between diverse journals. Beyond mere statistical figures, they function as compasses, guiding journals in their ongoing quest for enhanced article quality and increased scholarly recognition. Furthermore, the quartiles that categorize journal rankings in databases like the JCR and SCImago Journal Rank (SJR) furnish similar beacons for journals aiming to elevate their standing. These quartiles represent a gradient of performance, and striving to achieve higher levels within them signifies an ongoing commitment to excellence. It is important to recognize that while metrics provide a starting point, the journey toward improvement in quality and visibility remains a dynamic and multifaceted endeavor for journals in the continuously evolving landscape of academic publishing.

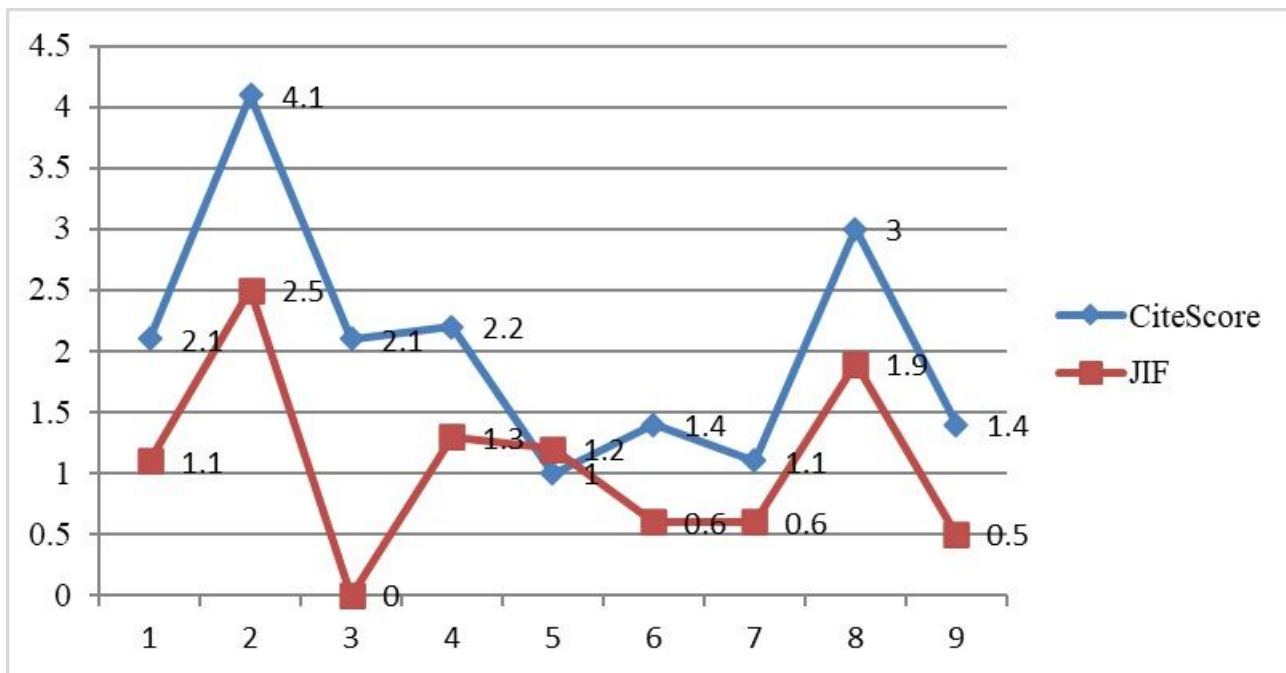


Fig. 1. Line graph showing 2022 CS and IF values of Indian EPS journals indexed in Scopus and WoS.

### 5.3. Publisher and coverage-wise analysis of Indian EPS journals indexed in Scopus and WoS

The landscape of Indian EPS journals, as indexed in Scopus and WoS, warrants a closer examination, not only in terms of their publishers but also their temporal coverage. *Springer Nature* emerges as a notable publisher, overseeing the publication of four Indian EPS journals, while the remaining five journals are steered by individual publishers, adding diversity to the scholarly ecosystem. An interesting facet of these journals lies in their historical coverage within the Scopus and WoS databases, which reveals their enduring contributions to the field. Notably, the *Journal of the Indian Society of Remote Sensing* boasts the longest coverage, spanning an impressive 51 years (from 1973 to the present) within Scopus. It stands as a testament to the journal's sustained impact and relevance over time. Following closely, the *Journal of the Geological Society of India* lays claim to a substantial 45-year coverage period (from 1979 to the present), underlining its long-lived scholarly significance. Meanwhile, the *Journal of Astrophysics and Astronomy* secures the third spot with an impressive 44-year coverage (from 1980 to the present) in Scopus (Table 3).

Shifting our focus to the WoS database, *Journal of Astrophysics and Astronomy* and *Journal of the Geological Society of India* share the limelight with identical coverage spanning 35 years (from

1989 to the present), further emphasizing their long-standing scholarly contributions. Trailing slightly behind, *Journal of Earth System Science* showcases a commendable 19-year coverage (from 2005 to the present), cementing its position as a journal of lasting value. *Himalayan Geology* and *Mausam* round out the group, both with a coverage period of 17 years (from 2007 to the present), making noteworthy contributions to the contemporary scientific discourse (Table 3).

This analysis has thus gives an understanding of the Indian EPS journal landscape, shedding light on the roles played by both established publishers and individual champions. It also highlights the enduring scholarly contributions of these journals, serving as a foundation for informed decisions and deeper explorations within the field of Earth and Planetary Sciences.

### 5.4. Subject area-wise analysis of Indian EPS journals indexed in Scopus and WoS

An insightful exploration of Indian EPS journals necessitates a detailed subject area analysis, to understand their categorization within the Scopus journal classification system, known as the "All Science Journal Classification (ASJC)." This system comprises two hierarchical levels, with the lower level encompassing 304 categories, while the upper level consists of 27 overarching categories. Our re-

Table 3. Publisher and coverage-wise analysis of Indian EPS journals indexed in Scopus and WoS.

Title	Publisher	Coverage in Scopus*	Coverage in WoS**
1 Journal of Astrophysics and Astronomy	Springer Nature	1980 to Present (44)	1989 to present (35)
2 Journal of the Indian Society of Remote Sensing	Springer Nature	from 1973 to Present (51)	2004, 2009 to present (16)
3 Indian Geotechnical Journal	Springer Nature	from 1972 to 1989, from 2012 to Present (30)	Indexed in ESCI
4 Journal of the Geological Society of India	GeoScienceWorld	from 1979 to Present (45)	1989 to present (35)
5 Himalayan Geology	Wadia Institute of Himalayan Geology	from 2007 to 2018, from 2020 to Present (16)	2007 to present (17)
6 Mausam	India Meteorological Department (IMD)	1979, 1981, 1983, 1985, from 2008 to Present (20)	2007 to present (17)
7 Journal of the Palaeontological Society of India	The Palaeontological Society of India	from 2011 to present (13)	2011 to 2022 (12)
8 Journal of Earth System Science	Springer Nature	from 2005 to Present (19)	2005 to present (19)
9 Indian Journal of Geo-Marine Sciences	National Institute of Science Communication and Policy Research	from 2007 to 2010, from 2012 to present (16)	2011 to 2022 (12)

\* Scopus Database \*\*Web of Science Database (value in braces shows coverage in years)

search has been centered on the top-level category labeled “Earth and Planetary Sciences” in Scopus. Within the top-level category “*Earth and Planetary Sciences*” a multifaceted array of sub-disciplines at the lower level comes into view. These encompass a diverse spectrum, including ‘*General Earth and Planetary Sciences*,’ ‘*Earth and Planetary Sciences (miscellaneous)*,’ ‘*Atmospheric Science*,’ ‘*Computers in Earth Sciences*,’ ‘*Earth-Surface Processes*,’ ‘*Economic Geology*,’ ‘*Geochemistry and Petrology*,’ ‘*Geology*,’ ‘*Geophysics*,’ ‘*Geotechnical Engineering and Engineering Geology*,’ ‘*Oceanography*,’ ‘*Paleontology*,’ ‘*Space and Planetary Science*,’ and ‘*Stratigraphy*.’ Each of these sub-disciplines serves as a distinct realm of scientific inquiry, contributing uniquely to the broader field of EPS. A deeper enquiry reveals that specific journals are allocated to these sub-disciplines. Notably, the subject category ‘*Earth and Planetary Sciences (miscellaneous)*’ embraces two journals, while a journal each finds its place in ‘*Geophysics*,’ ‘*Oceanography*,’ ‘*Geotechnical Engineering and Engineering Geology*,’ ‘*Geology*,’ ‘*Paleontology*,’ ‘*General Earth and Planetary Sciences*,’ and ‘*Space and Planetary Science*.’ It is noteworthy that the journal ‘*Mausam*’ holds the distinction of being situated in two subject areas, namely ‘*Geophysics*’ and ‘*Atmospheric Science*,’ under the overarching umbrella of “*Earth and Planetary Sciences*”.

Adding a layer of complexity to this categorization, ‘*Journal of Astrophysics and Astronomy*’ and

‘*Journal of the Indian Society of Remote Sensing*’ each extend their scholarly reach beyond the confines of ‘*Earth and Planetary Sciences*’ into different subject areas within the Scopus classification. This subject area-wise analysis provides a novel perspective on the multifaceted nature of Indian EPS journals, demonstrating their wide-ranging contributions across various sub-disciplines. Such insights open doors for further exploration and collaboration within these specialized areas, fostering a richer understanding of the multidimensional EPS landscape (Table 4).

#### 5.5. Top most cited articles (in Scopus and WoS) of Indian EPS journals indexed in Scopus and WoS

A unique case arises with the third most highly cited article (281 citations), which is published in the ‘*Journal of Geological Society of India*’ under the title “*Crustal structure along Kavali-Udipi profile in the Indian peninsular shield from deep seismic sounding*,” authored by Kaila et al. (1979). Intriguingly, this particular article is absent from WoS due to the journal’s non-coverage during that period. Notably, the journal’s inclusion in WoS began in 1989. This situation underscores the evolving nature of scholarly databases and the importance of historical context while assessing citations. This exploration of highly cited articles within Indian EPS journals highlights the lasting significance of research contributions, reflecting their impact across temporal and disciplinary boundaries. It also underscores the dynamic inter-

Table 4. Subject area-wise analysis of Indian EPS journals indexed in Scopus and WoS.

Sl. No.	Title	Subject Area in Scopus	Subject Area in WoS
1	Journal of Astrophysics and Astronomy	Physics and Astronomy: Astronomy and Astrophysics	Astronomy and Astrophysics
2	Journal of the Indian Society of Remote Sensing	Earth and Planetary Sciences: Space and Planetary Science	Environmental Sciences - Remote Sensing
3	Indian Geotechnical Journal	Social Sciences: Geography, Planning and Development	Engineering, Geological
4	Journal of the Geological Society of India	Earth and Planetary Sciences: Earth and Planetary Sciences (miscellaneous)	Geosciences, Multidisciplinary
5	Himalayan Geology	Earth and Planetary Sciences: Geotechnical Engineering and Engineering Geology	Geology
6	Mausam	Earth and Planetary Sciences: Earth and Planetary Sciences (miscellaneous)	Meteorology and Atmospheric Sciences
7	Journal of the Palaeontological Society of India	Earth and Planetary Sciences: Geophysics Earth and Planetary Sciences: Atmospheric Science	Paleontology
8	Journal of Earth System Science	Earth and Planetary Sciences: Paleontology	Geosciences, Multidisciplinary
9	Indian Journal of Geo-Marine Sciences	Earth and Planetary Sciences: General Earth and Planetary Sciences	Oceanography
		Earth and Planetary Sciences: Oceanography	

play between database coverage and the visibility of quality research.

Of the eight Indian EPS journals indexed in WoS, the limelight falls on ‘*Mausam*,’ boasting the highest citation count—an impressive 867 citations in WoS for the paper by [Pai et al. \(2014\)](#) (cf. Section 5.5) (Table 6). Contributing to the league of highly cited articles, the ‘*Journal of Earth System Science*’ showcases an article with 435 citations, titled “*Active and break spells of the Indian summer monsoon*”. This work resonates in Scopus as well, where it accumulates 454 citations. This research into the dynamic patterns of the Indian summer monsoon, continues to serve as a valuable reference for meteorological investigations. A compelling third entry is found in the ‘*Journal of the Indian Society of Remote Sensing*,’ with a highly cited article (240 citations) authored by [Pradhan \(2010\)](#), titled “*Landslide susceptibility mapping of a catchment area using frequency ratio, fuzzy logic, and multivariate logistic regression approaches*”. This paper’s citation count in Scopus, standing at 280, underscores its significance in the realm of geospatial analysis and hazard assessment. This exploration of the most highly cited articles in Indian EPS journals, as indexed in WoS and Scopus, unravels the enduring impact of Indian EPS re-

search contributions. These articles not only serve as foundations for scientific progress but also illustrate the enduring relevance of multidisciplinary research within the Earth and Planetary Sciences.

#### 5.6. Most frequent keywords (author keywords) in the top 10 most cited articles of Indian EPS journals in Scopus

Analysis of the most frequently occurring Author Keywords in the Top 10 Most Cited Articles published in Indian Earth and Planetary Science papers, indexed in Scopus (Table 7 and Fig. 2) reveals the following

- 1. Performance (6 occurrences):** The presence of “Performance” as the most frequently occurring keyword suggests that research related to the evaluation and assessment of various aspects within EPS holds substantial importance. This may encompass the performance of scientific instruments, models, or methodologies.
- 2. Emissions (4 occurrences):** The presence of “Emissions” reflects a noteworthy focus on environmental concerns and the impact of emissions, likely related to studies involving air



Table 5. Top most cited articles (in Scopus) of Indian EPS journals indexed in Scopus and WoS.

Sl. No.	Title of the Article	Author(s)	Name of the Journal and Publication Year	Citation (Scopus) (Rank)	Citation (WoS) (Rank)
1	Exact relativistic model for a superdense star	Vaidya, P.C., & Tikekar, R.	<i>Journal of Astrophysics and Astronomy</i> , 3(3), pp. 325–334, 1982	178 (5)	No coverage (Coverage from 1989)
2	Landslide susceptibility mapping of a catchment area using frequency ratio, fuzzy logic and multivariate logistic regression approaches	Pradhan, B.	<i>Journal of the Indian Society of Remote Sensing</i> , 38(2), pp. 301–320, 2010	280 (4)	240
3	Strength anisotropies in rocks	Singh, Jagdeep, Ramamurthy, T., & VenkatappaRao, G.	<i>Indian Geotechnical Journal</i> , 19(2), pp. 147–166, 1989	88 (6)	Indexed in ESCI database (Not available in WoS Core Collections)
4	Crustal structure along Kavali-Udipi profile in the Indian peninsular shield from deep seismic sounding.	Kaila, K.L.	<i>Journal Geological Society of India</i> , 20(7), pp. 307–333, 1979	281 (3)	No coverage (Coverage from 1989)
5	An appraisal of ICP-MS technique for determination of REEs: Long term QC assessment of silicate rock analysis.	Khanna, P.P., Saini, N.K., Mukherjee, P.K., Purohit, K.K.	<i>Himalayan Geology</i> , 30(1), pp. 95–99, 2009	74 (8)	73
6	Development of a new high spatial resolution (0.25° × 0.25°) long period (1901–2010) daily gridded rainfall data set over India and its comparison with existing data sets over the region.	Pai, D.S., Sridhar, L., Rajeevan, M., ... Satbhai, N.S., Mukhopadhyay, B.	<i>Mausam</i> , 65(1), pp. 1–18, 2014	895 (1)	867
7	Upper Siwalik mammalian faunas of the Himalayan foothills	Nanda, A.C.	<i>Journal of the Palaeontological Society of India</i> , 58(1), pp. 75–86, 2014	28 (9)	24
8	Active and break spells of the indian summer monsoon	Rajeevan, M., Gadgil, S., Bhate, J.	<i>Journal of Earth System Science</i> , 119(3), pp. 229–247, 2010	454 (2)	435
9	An environmental effect of GSO methyl ester with ZnO additive fuelled marine engine.	Karthikeyan, S., Elango, A., Prathima, A.	<i>Indian Journal of Geo-Marine Sciences</i> , 43(4), pp. 564–570, 2014	84 (7)	60

quality, pollution, and their effects on the Earth's atmosphere.

- 3. Groundwater (4 occurrences):** The frequency of “Groundwater” indicates a significant emphasis on studies related to groundwater resources, quality, and management, which is of critical importance in the context of water sustainability in India.
- 4. India (4 occurrences):** The presence of “India” as a keyword underscores the geographical context and relevance of the research. It suggests that a substantial portion of highly cited articles in Indian Earth and Planetary Science papers pertains to the specific conditions and challenges faced within the Indian

subcontinent.

- 5. Blending (3 occurrences):** “Blending” implies research involving the mixing or combining of various substances or components, which could be particularly relevant in fields such as geology, chemistry, or materials science.
- 6. Transesterification (3 occurrences):** The repetition of “Transesterification” indicates a notable focus on biodiesel production or related chemical processes within the EPS domain.
- 7. Remote sensing (3 occurrences):** “Remote sensing” suggests a strong emphasis on the use of remote sensing technologies such as satellite and aerial imagery for Earth and Planetary Sciences applications, including environmental

Table 6. Top most cited articles (in WoS) of Indian EPS journals indexed in Scopus and WoS.

Sl. No.	Article	Author(s)	Name of the Journal & Publication Year	Citation (WoS)	Citation (Scopus)
1	A revised catalogue of 294 Galactic supernova remnants	Green, D.A.	<i>Journal of Astrophysics and Astronomy</i> , 40(4), 2019	135 (6)	141
2	Landslide susceptibility mapping of a catchment area using frequency ratio, fuzzy logic and multivariate logistic regression approaches	Pradhan, B.	<i>Journal of the Indian Society of Remote Sensing</i> , 38(2), pp. 301–320, 2010	240 (3)	280
3	<i>Indian geotechnical journal</i> Indexed in ESCI database		(Not available in WoS Core Collections)		
4	Major ion chemistry of groundwater in Delhi area: Chemical weathering processes and groundwater flow regime	Datta, PS and Tyagi, SK	<i>Journal of the Geological Society of India</i> , 47 (2), pp. 179–188, 1996	223 (4)	268
5	An appraisal of ICP-MS technique for determination of REEs: Long term QC assessment of silicate rock analysis	Khanna, P.P., Saini, N.K., Mukherjee, P.K., Purohit, K.K.	<i>Himalayan Geology</i> , 30(1), pp. 95–99, 2009	73 (7)	74
6	Development of a new high spatial resolution (0.25° × 0.25°) long period (1901–2010) daily gridded rainfall data set over India and its comparison with existing data sets over the region	Pai, D.S., Sridhar, L., Rajeevan, M., ... Satbhai, N.S., Mukhopadhyay, B.	<i>Mausam</i> , 65(1), pp. 1–18, 2014	867 (1)	895
7	Cambrian trace fossils from the parahio formation (Tethyan Himalaya) in its type section and elsewhere	Hughes, NC; Sell, BK; (...); Singh, BP	<i>Journal of the Palaeontological Society of India</i> , 58 (2), pp. 175–193, 2013	28 (8)	26
8	Active and break spells of the Indian summer monsoon	Rajeevan, M., Gadgil, S., Bhate, J.	<i>Journal of Earth System Science</i> , 119(3), pp. 229–247, 2010	435 (2)	454
9	Comparison of DPPH and ABTS assays for determining antioxidant potential of water and methanol extracts of <i>Spirulina platensis</i>	Shalaby, EA and Shanab, SMM	<i>Indian Journal of Geo-Marine Sciences</i> , 42 (5), pp. 556–564, 2013	187 (5)	225

monitoring and land use studies.

8. **Climate change (3 occurrences):** The presence of “Climate change” highlights the urgency and significance of climate-related research within this domain, reflecting concerns about the Earth’s changing climate and its consequences.
9. **GIS (3 occurrences):** The repeated mention of “GIS” (Geographic Information Systems) underscores the widespread use of geospatial data and technologies for EPS research, including mapping and spatial analysis.
10. **Tropical cyclone (3 occurrences):** The focus on “Tropical cyclone” suggests a particular interest in the study of these weather phenomena, which can have significant impacts on the Indian subcontinent.

In summary, the keyword analysis indicates a diverse range of research topics within Indian EPS papers, reflecting a multidisciplinary approach to addressing various challenges, including environmen-

tal issues, climate change, geospatial analysis, and the management of vital resources like groundwater. The prevalence of India as a keyword highlights the specific regional context, while other keywords like “Performance” and “Remote sensing” emphasize the importance of methodological and technological advancements in this field.

#### 5.7. Most Frequent Keywords (Author Keywords) in the Top 10 Most Cited Articles of Indian EPS journals in WoS

Analysis of the most frequently occurring Author Keywords in the Top 10 Most Cited Articles published in Indian Earth and Planetary Science papers, indexed in WoS (Table 8 and Fig. 3) reveals the following

1. **Remote Sensing (5 occurrences):** The prominence of “Remote Sensing” as a keyword underscores the significant role of remote sensing technologies and methodologies in Indian

Table 7. Most frequent keywords (author keywords) in the top 10 most cited articles (90 articles) in Scopus.

Keyword	Occurrences	Keyword	Occurrences
Performance	6	Ultrasonicator	2
Emissions	4	Diesel engine	2
Groundwater	4	Emission	2
India	4	Methyl ester	2
Blending	3	Nanoparticles	2
Transesterification	3	Frequency ratio	2
Remote sensing	3	Landslides	2
Climate change	3	Heat waves	2
GIS	3	Vorticity	2
Tropical cyclone	3	Bay of Bengal	2
Cerium oxide	2	Enso	2

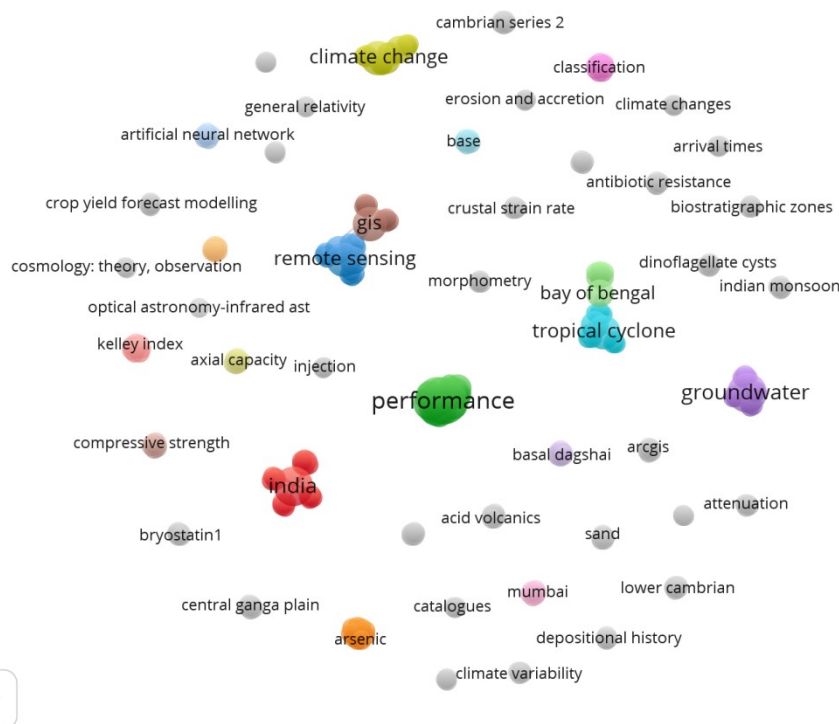


Fig. 2. Visualization of keywords (292 author keywords) of top 10 most cited articles each (in Scopus) of Indian EPS journals indexed in Scopus and WoS (Total 90 papers).

EPS research. This indicates a strong focus on data collection, analysis, and interpretation using satellite and aerial imagery.

- 2. GIS (Geographic Information Systems) (5 occurrences):** The high occurrence of “GIS” suggests a widespread use of geospatial analysis and mapping techniques within the field. Geographic Information Systems play a crucial role in visualizing and analyzing spatial data, which is valuable for EPS.
- 3. India (5 occurrences):** The repeated mention of “India” reflects the geographic context and relevance of the research. This indicates that a substantial portion of highly cited arti-

cles in Indian EPS papers pertains to studies conducted within the Indian subcontinent.

- 4. Performance (4 occurrences):** The presence of “Performance” suggests a focus on assessing and evaluating various aspects related to EPS, possibly related to the evaluation of models, technologies, or scientific instruments.
- 5. Bay of Bengal (3 occurrences):** The occurrence of “Bay of Bengal” as a keyword likely signifies research related to this specific geographical region. It may encompass studies on oceanography, meteorology, or environmental conditions in the Bay of Bengal area.
- 6. Spiti (3 occurrences):** The presence of

“Spiti” points to a specific region or locality within India that is the subject of research interest. This may be linked to geological, environmental, or climatic studies in the Spiti region.

7. **Himalaya (3 occurrences):** The repeated mention of “Himalaya” suggests a notable focus on this mountain range and its geological, climatic, or environmental aspects within Indian EPS research.
8. **Geochronology (3 occurrences):** The presence of “Geochronology” likely indicates research related to dating geological events and understanding the timing of Earth’s processes, providing insights into the history of geological formations in India.
9. **Morphometric Analysis (2 occurrences):** “Morphometric Analysis” suggests a quantitative study of landforms and landscapes, which is a fundamental aspect of Earth and Planetary Science. It often involves the measurement and analysis of land surface features.
10. **Frequency Ratio (2 occurrences):** The presence of “Frequency Ratio” suggests research involving statistical analysis techniques, which may be used to analyze various geological or environmental data sets.
11. **Climate Change (2 occurrences):** The occurrence of “Climate Change” highlights the relevance of climate-related research within this field, reflecting concerns about the changing climate and its impacts on the Earth.
12. **Landslides (2 occurrences):** The focus on “Landslides” suggests research into the causes, monitoring, and mitigation of landslides, which is crucial in many regions with the complex terrain like India.
13. **Emissions (2 occurrences):** The presence of “Emissions” may indicate research related to environmental pollution and emissions, particularly in the context of diesel engines or other sources.

In summary, the keyword analysis reveals a diverse range of research topics within Indian Earth and Planetary Science papers indexed in the Web of Science. These topics encompass geographic regions of interest, environmental concerns, technological methodologies, and geological phenomena. The frequent occurrence of “Remote Sensing” and “GIS”

underlines the critical role of advanced technologies in modern EPS research.

## 6. DISCUSSION

The analysis of Indian Earth and Planetary Science (EPS) journals indexed in Scopus and Web of Science (WoS) provides valuable insights into the landscape of scholarly publishing in this field. The presence of nine Indian EPS journals in both Scopus and WoS demonstrates their global recognition.

The ‘*Journal of the Indian Society of Remote Sensing*’ emerges as a standout performer with the highest CiteScore in 2022. This ranking underscores the journal’s significance and its substantial influence within the field of Earth and Planetary Sciences. The presence of ‘*Journal of Earth System Science*’ and ‘*Journal of Geological Society of India*’ among the top-ranked journals further emphasizes their noteworthy contributions. SJR, which assesses the prestige and influence of journals within citation networks, positions ‘*Journal of Earth System Science*’ at the forefront with the highest SJR in 2022. This underscores the journal’s prestige and recognition in the academic community. ‘*Journal of Astrophysics & Astronomy*’ and ‘*Journal of the Indian Society of Remote Sensing*’ also secure commendable SJR scores, highlighting their scholarly prominence. SNIP, designed to account for citation patterns across diverse academic disciplines, reveals that ‘*Indian Geotechnical Journal*,’ ‘*Journal of the Indian Society of Remote Sensing*,’ and ‘*Journal of Earth System Science*’ are the top-ranked journals. These findings indicate their relative impact within their subject fields and their ability to maintain contextual citation impact.

The categorization of Indian EPS journals into quartiles based on CiteScore percentiles provides additional insights. Journals like ‘*Journal of the Indian Society of Remote Sensing*’ and ‘*Journal of Earth System Science*’ secure positions in the highest quartile (Q2), showcasing their exceptional scholarly performance. The majority of journals fall into the third quartile (Q3), reflecting their still commendable standing in their respective subject categories.

The subject area analysis reveals the diverse range of sub-disciplines within Indian EPS research, with journals contributing to various subject categories. The presence of journals in multiple categories, such as ‘*Geophysics*’ and ‘*Atmospheric Science*,’ underscores their multidisciplinary nature. Highly cited

Table 8. Most frequent keywords (author keywords) in the top 10 most cited articles (80 articles) in WoS.

Keyword	Occurrences	Keyword	Occurrences
Remote Sensing	5	Diesel Engine	2
GIS	5	Emission	2
India	5	Indian Summer Monsoon	2
Performance	4	Maharashtra	2
Bay of Bengal	3	Nanoparticles	2
Spiti	3	Himalaya	2
Geochronology	3	Morphometric Analysis	2
Frequency Ratio	2	Climate Change	2
Landslides	2	Emissions	2
Arabian Sea	2	Enso	2
Biostratigraphy	2	Heat Waves	2
Cerium Oxide	2	Karnataka	2
Climatology	2	Groundwater	2

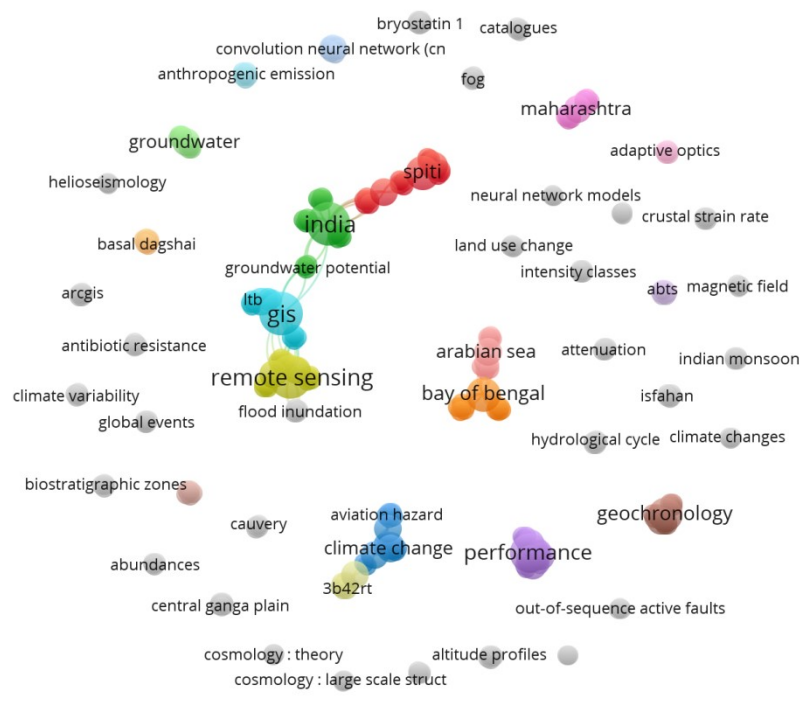


Fig. 3. Visualization of keywords (306 author keywords) of most cited 10 articles each (WoS) of Indian EPS journals indexed in Scopus and WoS (Total 80 papers).

articles from Indian EPS journals, as indexed in Scopus and WoS, reflect the enduring impact of research contributions. These articles not only contribute to scientific progress but also demonstrate the lasting relevance of multidisciplinary research within Earth and Planetary Sciences. It is noteworthy that Elsevier has not taken over the publishing of any of the top Indian EPS journals, while Springer Nature has already taken over the publishing of four, on behalf of the original publishers like the Indian Academy of Sciences, Indian Institute of Remote Sensing etc. Another study would be necessary to study the impact of such a takeover by an established publishing

entity. Springer has taken over the publishing of 19 journals from various entities including universities, from across the world in 2022–23 (<https://www.springernature.com/gp/librarians/licensing/journalscatalog/takeovers>). The journals published by the Indian science establishments like Wadia Institute of Himalayan Geology and National Institute of Science Communication and Policy Research have low quartile rankings, indicating lower visibility, and lesser editorial rigour. Incidentally *J of Geological Society of India* has moved from Springer to Geoscience World as publishing partner in 2023.

## 7. CONCLUSIONS

This manuscript's comprehensive analysis of Indian EPS journals provides a nuanced understanding of their scholarly impact, recognition, and contributions. It underscores the evolving landscape of scholarly publishing and the multifaceted nature of research within this field. The findings serve as a foundation for strategic development and enhancement of Indian EPS journals, fostering continued excellence in Earth and Planetary Science research. Moreover, the study highlights the enduring significance of Indian EPS research, contributing to global scientific discourse and addressing pressing challenges such as climate change, geospatial analysis, and resource management. While assessing journals on the basis of their indexing in Scopus and WoS the evolving nature of scholarly databases should be taken into consideration and the importance of historical context should not be missed while assessing citations. This is very important in order to avoid false reporting of the inadequacy of certain journals. Takeover of Indian EPS journals by international publishers like Springer may be beneficial for the authors, due to increased visibility and improved quartile status. But in the times of Make-in-India, the question remains whether India should be reliant on such oligopolistic publishing houses.

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