Mapping of Scientific Literature Published in Natural Hazards (2005-2014): A Web of Science Based Bibliometric Analysis

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Abstract

Author has evaluated the research articles published in "*Natural Hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazards*" using bibliometric analysis. The journal is a published by Springer and devoted to the original research work on all aspects of natural hazards for the period of 2005-2014. A total of 2291 research articles were collected from the *Web of Science*, used for the analysis. *Network Analysis Interface for Literature Studies and VOS viewer* were employed for the mapping of the data. The findings of the study include such as the reserach articles kept increasing from 2005-2014 in exponential manner, the Indian Institute of Technologies and Chinese Academic Science is the second most contributing institution are the major contributing institutions. The 'Chen, C. W.' is major contributing author who had contributed 22 research articles and China, USA, India and Italy had contributed more than half of the articles.

Keywords

Natural hazards; bibliometric analysis; citations; *Web of Science*; VOS viewer.

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INTRODUCTION

The Journal "*Natural Hazards*:Journal of the International Society for the Prevention and Mitigation of Natural Hazards" is a published by Springer and devoted to the original research work on all aspects of natural hazards, including the forecasting of catastrophic events, risk management, and the nature of precursors of natural and technological hazards. As per the journal web site the coverage includes such categories of hazard as atmospheric, climatologically, oceanographic, storm surges, tsunamis, floods, snow, avalanches, landslides, erosion, earthquakes, volcanoes, man-made and technological, as well as risk assessment (NH, 2016, Para. 2).

The journal is indexed and abstracted in *Science Citation Index Expanded (SciSearch), Journal Citation Reports/Science Edition, SCOPUS, INSPEC, Google Scholar, EBSCO, CSA, ProQuest, CAB International, Academic OneFile, AGRICOLA, ASFA, CAB Abstracts, Current Contents/Physical, Chemical and Earth Sciences, Earthquake Engineering Abstracts, EMBiology, Environment Index, Gale, Geobase, GeoRef, Global Health, OCLC, PASCAL, Referativnyi Zhurnal (VINITI), SCImago, Speleological Abstracts, Summon by ProQuest* (NH, 2016, Para. 4). According to Durieux and Gevenois (2010), "Bibliometrics is a set of mathematical and statistical methods used to analyze and measure the quantity and quality of books, articles and other forms of publications" (p. 342). Bibliometric analysis serves as a useful instrument in assessing the worth of a journal and its articles (Thanuskodi, 2010). A enamours studies were conducted to study the trends in publication and citation in the individual journals (Bakri & Willett, 2009; Castera et al., 2008; Das & Phil, 2012; Earp, 2010; Kissin, 2011; Kolle, Shankarappa, Manjunatha Reddy, & Muniyappa, 2015; Lee, 2007; Minas, Wright, Zhao, & Kakuma, 2014; Mukherjee, 2009; Nageswara Rao, Sharma, Girija Devi, & Muralidhar, 2014; Naveed & Anwar, 2013; Tiew, Abrizah, & Kaur, 2002; Ullah, Butt, & Haroon, 2008). The main purpose of the bibliometric based analysis of research articles as the impact of citation can provide useful guidelines for journal editors, librarians, information scientists, and other in formulating editorial, subscription, economic, and even social and research policies (Garfield, 1972). An also gives the research trends and more active institution and persons in the given research domain.

Hence, in this research paper, author did a bibliometric analysis of research articles published in "Natural Hazards" Journal of the International Society for the Prevention and Mitigation of Natural Hazards from 2005 to 2014 to provide a picture of publishing trend, citation details, major contributing organizations, most cited authors, most contributing institutions, authors and keywords existed in title and abstract of the articles.

Methodology

The research articles extracted from The Science Citation Index Expanded (SCI-Expanded) database of the Web of Science database, from Thomson Reuters. The keyword phrase "Natural Hazards" was searched as the publication name based on SCI-Expanded and period was given as 2005-2014. A total of 2,291 research articles from 2005 to 2014 were found and the same articles were used for analysis. Further, Excel database of these articles were built for analysis purpose. As the other authors employed in their studies as a method (Kolle et al, 2015), the Network Analysis Interface for Literature Studies (NAILS) application was used to identify the top 25 most popular keywords (Knutas, Hajikhani, Salminen, Ikonen, and Porras, 2015). The software VOSViewer was used for mapping of the most contributing organizations and keyword analysis from the title and abstract of the articles.

Results and Discussion

A total of 2291 published research articles were collected. The figure 1 makes it clear that number of articles has increased continuously, from 2005-2014. It is noticeable that the years 2013(463) and 2014 (498) published the most articles respectively. For the year 2008 and 2009 slight decline was observed, away the articles kept increasing from year to year in exponential manner. The figure 1 exhibits the global trend in increased research on natural hazards topic for the period of 2005- 2014.

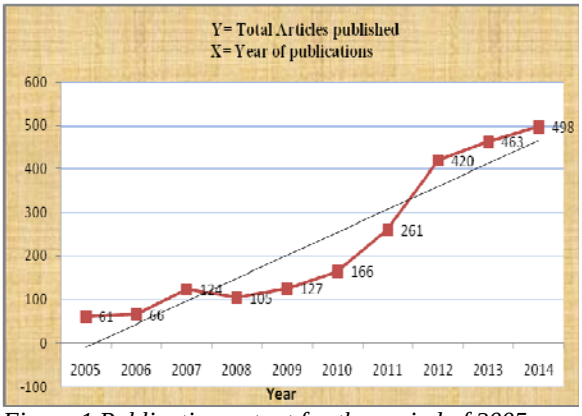


Figure 1 Publication output for the period of 2005-2014 in the Natural Hazards

The table I gives the details about the year wise publication of articles, number of references cited, page counts, and total citation counts for the articles from 2005-2014. The table 1 makes it clear that the number of references cited for each article was increased from 25.96 to 41.35. It again confirms the literature kept increasing during the period. The page counts per article was slightly increased in the year 2014 and the articles published in 2005 enjoy the 22.11 citation counts per article and articles published in 2014, received only 0.98 citation counts. This is firm from the table that the article that published in earlier tend to receive more citation counts than recent one. Number of publications, number references cited, citation is useful indicator for judging the worthiness of the articles. Hence, this clear indication that quality of articles that published in the journal is improving constantly

Table 1: Scientific Descriptors during 2005-2014

PY	TP	NR	NR/PP	PP	PC/PP	TC	TC/PP
2005	61	1584	25.96	1150	18.85	1349	22.11
2006	66	1601	24.25	1204	18.24	1043	15.80
2007	124	3665	29.55	1956	15.77	1749	14.10
2008	105	3164	30.13	1733	16.50	1115	10.61
2009	127	4098	32.26	2131	16.77	1584	12.47
2010	166	6312	38.02	2961	17.83	1536	9.25
2011	261	9278	35.54	4616	17.68	1748	6.69
2012	420	16618	39.56	7579	18.04	2306	5.49
2013	463	19246	41.56	8345	18.02	1418	3.06
2014	498	20596	41.35	9476	19.02	492	0.98
	2291	86162		41151		14340	

The figure 2 shows that the all the institution that contributed at least five articles to the journal "Natural Hazards" for the period of 2005-2014. The 'Indian Institute of Technologies' are the major contributing institutions (84 articles). The 'Chinese Academic Science' is the second most contributing institution (73 articles). Thirdly, 'National Cheng Kung University' is the third major contributing organization (38 articles). Reaming all institution had contributed five or more articles respectively. The figure 2 illustrates the institutions that are highly engaged in the research on natural hazards related topic.

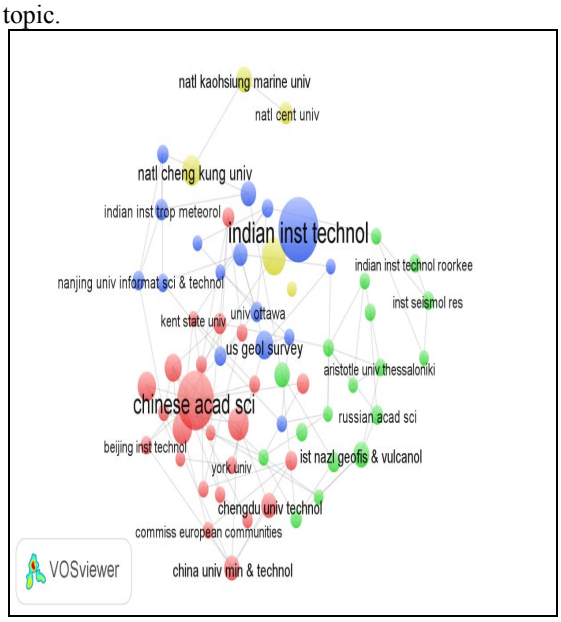


Figure 2 Contribution by institutions for the Natural Hazards for the period of 2005-2014

The figure 3 depicts the author who had contributed at least five articles to the journal of "*Natural Hazards"* in the year of 2005-2014. 'Chen, C. W.' is major contributing author who had contributed 22 research articles on natural hazards. Second major contributing author is 'Mohanty, U.C.' who had contributed 19 articles and third major contributing author is 'Chen, C. Y.' (13 articles). It can be noted from the figure 3 that the major contributions to the journal during the period of 2005-2014 were from Indian, Chinese and USA based authors.

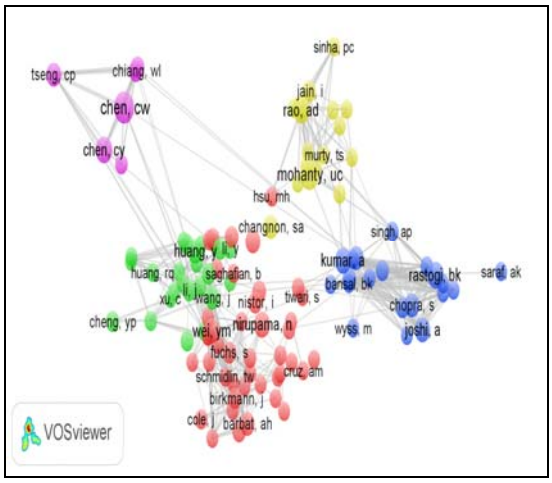


Figure 3 Five or more articles contributing authors during 2005-2014

The table II gives the details of the major contributing country to the "*Natural Hazards"* journal during the period of 2005-2014. The 'China' is the major contributing country with 388 articles followed by 'USA' (387 articles), 'India' (348 articles) and 'Italy' (182 articles). China, USA, India and Italy had contributed more than half of the articles to the journal during 2005-2014. Based on this, it can be said that these four countries (China, USA, India and Italy) highly involved in research on natural hazards topic.

Table 2: Country wise contribution to the natural hazards during 2005-2014

Country/Region	Total Publications	(%) of 291
Peoples R China	388	16.16
USA	387	16.11
India	348	14.49
Italy	182	7.58
Taiwan	129	5.37
Canada	120	4.99
Germany	115	4.79
Japan	94	3.91
England	84	3.49
Australia	82	3.41
Iran	80	3.33
Turkey	79	3.29
France	55	2.29
Spain	55	2.29
Switzerland	55	2.29
Austria	53	2.20

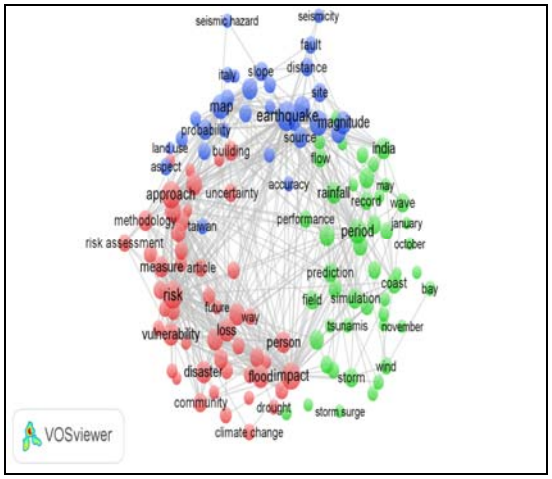


Figure 4 Keyword analyses from the title and abstract of the article

The figure 4 illustrates the keyword that existed in the title and abstract of the research articles published in the Natural Hazards journal for the period of 2005-2014. The keyword existed more than 20 times are shown in the figure. The keyword 'Earthquake' had mentioned 530 times followed by 'approach; (436 times) , 'risk' (461 times), 'vlunaberality' (282 times), 'disaster' (246 times), 'Storm' (160 times), 'China' (243 times) and 'India' (219 times), 'loss' (293 times).

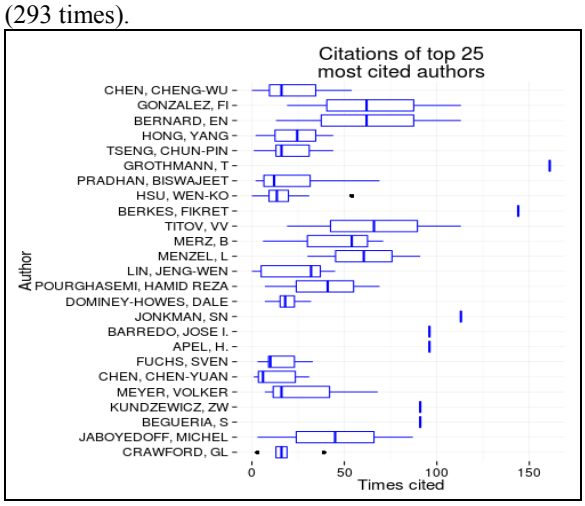


Figure 5 Most cited authors during 2005-2014

Figure 5 shows the most cited authors for their work published in the "*Natural Hazards"* during 2005-2014. The figure gives the list of the top 25 authors who had been cited maximum times for their articles published in the journal of Natural Hazards during 2005-2014. 'Grothamnn, T,' has wrote a article to find out the answer to question of why some people take precautionary action while others do not, with the help of a socio-psychological model based on Protection Motivation Theory (PMT) during flood has received 160 citation counts for his work (Grothmann & Reusswig, 2006). Similarly, 'Berkes, Fikret' has wrote a article titled as "Understanding uncertainty and reducing vulnerability: lessons from resilience thinking' for this, he has received 144 citations (Berkes, 2007) and 'Jonkman, S. N.' wrote article titled as "*Global perspectives on loss of human life caused by floods*" has 113 citations (Jonkman, 2005). Based these, we can interpret that the articles that which providing measures for prevention from the natural hazards are receiving more citations.

CONCLUSION

In this article, author has reported a bibliometric analysis of articles in the Journal '*Natural Hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazard*' during the period from 2005 to 2014. We found an increasing trend in research on natural hazards. The years 2013(463) and 2014 (498) published the most articles in the journal respectively. For the year 2008 and 2009 slight decline was observed, away the articles kept increasing from year to year in exponential manner. The 'Indian Institute of Technology' is the major contributing institutions (84 articles). The 'Chinese Academic Science' is the second most contributing institution (73 articles). Thirdly, 'National Cheng Kung University' is the third major contributing organization (38 articles). 'Chen, C. W.' is major contributing author who had contributed 22 research articles on natural hazards. China, USA, India and Italy had contributed more than half of the articles to the journal during 2005-2014. 'Earthquake' and Risk are the most mentioned keyword in the literature. It indicates major studies were related to earthquake and approaches for handling the natural hazards. 'Grothamnn, T.' has wrote a article to find out the answer to question of why some people take precautionary action while others do not, with the help of a socio-psychological model based on Protection Motivation Theory (PMT) during flood has received 160 citation counts for his work(Grothmann & Reusswig, 2006). The journal is becoming more popular for publication of finding research on natural hazards.

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