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A Study on Categories and Themes of Chinese Marine Periodicals and in Comparison with Foreign Ones

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Abstract. In the era of maritime power, Chinese marine periodicals are faced with great development opportunities but also various obstacles. In order to better comprehend the current situation and future direction of Chinese marine periodicals, it is of vital importance to understand the differences of research focus between Chinese marine periodicals and foreign ones. Hence by analyzing relevant data, this research studied the classification of categories and themes of Chinese and foreign marine periodicals. The results indicate that both categories and themes (in the field "Oceanography") of Chinese marine periodicals differ significantly from those of foreign ones. Chinese marine periodicals should maintain the output in oceanography, engineering and technology, aquaculture, meanwhile improve the amount in environmental science. In addition to that, Chinese studies in oceanography should supplement the study of international focus in oceanography and meanwhile maintain continuous studies of oceanography in China.

1. Introduction

Marine periodicals are platforms for summarizing and communicating marine scientific and technological achievements. They are pathways for understanding and tracking marine scientific and technological achievements, as well as reference and basis for guiding and planning the development of marine science and technology. Over the years, all kinds of marine periodicals, as platforms for publishing and exchanging marine scientific and technological achievements, have played a significant role in spreading marine scientific and technological achievements, and promoted the transformation and reuse of marine scientific and technological achievements.

Since oceanography is a comprehensive discipline, marine have covered marine hydrology, marine meteorology, marine physics, marine chemistry, marine biology, marine geology, marine geomorphology, marine geophysics and other branches. In the twenty-first Century, a new development goal is established-the further utilization of the ocean and the construction of maritime power. Marine periodicals are also faced with development opportunities and new challenges. To find out and solve the existing problems is the foothold of the development of marine periodicals. At the beginning of 21st century, there were 92% academic periodicals and technical periodicals in the market of Chinese marine periodicals, which were widely distributed in subjects¹. Nevertheless, the amount of information and influence of those Chinese periodicals are unevenly balanced, and there is a serious "Matthew effect" ². Besides, the overall influence of Chinese marine periodicals is not significant, though increasing slowly each year ³. The cause for this phenomena not only relates to the low level of marine scientific research in China, but also the different research areas and research themes of Chinese marine periodicals. And at present, there is no relevant study of systematic analysis on the research areas and research themes of Chinese marine periodicals, which is actually crucial to



understand. While to some extent, the situation and development of marine periodicals represent the situation and development of marine science in China. In order to better understand the current circumstance and future direction of Chinese marine periodicals and also marine science, the research aims to investigate the category and theme (in the field “Oceanography”) distribution of Chinese marine periodicals as well as the foreign ones.

2.Data collection and analysis

2.1 Category Analysis

Based on the information from China National Knowledge Internet (CNKI) and VIP Periodical Resource Integration Service Platform, the Chinese marine periodicals were collected and clarified by subject categories derived from a paper⁴. And based on the information from China Academic Library & Information System (CALIS), the foreign marine periodicals included were then collected and clarified by the same subject categories as well. With the application of EXCEL, the composition of Chinese marine periodicals was compared with that of foreign ones by table and figure. There is no unified principle or acknowledged approach for further classification of marine periodicals. Therefore, the classification made proceeds from the available information of the periodicals.

There have been 59 kinds of marine periodicals in China by 2018, including in China National Knowledge Internet (CNKI) and VIP Periodical Resource Integration Service Platform. According to the subject classification, there are 29 in oceanography, 9 in engineering and technology, 7 in aquaculture, 3 in comprehensive social sciences, 3 in geology, 2 in atmospheric science, 2 in oil and natural gas, 1 in economy and management, 1 in information technology, 1 in pharmacy, 1 in surveying and mapping technique, making up 49.15%, 15.25%, 11.86%, 5.08%, 5.08%, 3.39%, 3.39%, 1.69%, 1.69%, 1.69%, 1.69% of total respectively.

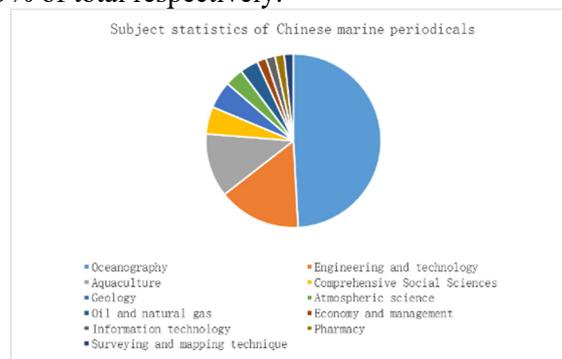


Fig. 1. Category distribution of Chinese marine periodicals.

On the other hand, there have been 336 kinds of foreign periodicals included in the field “Marine science” in China Academic Library & Information System (CALIS) by 2018. We ignored some periodicals in classification whose main topic is actually irrelevant to marine science, which means that these periodicals just get involved in marine science but are not devoted to it. There are 246 kinds of periodicals left, which are meaningful for the category classification. And according to the subject classification, there are 157 in oceanography, 19 in engineering and technology, 18 in environmental science, 12 in atmospheric science, 12 in aquaculture, 10 in comprehensive social sciences, 7 in economy and management, 7 in physical geography, 4 in oil and natural gas, making up 63.82%, 7.72%, 7.32%, 4.88%, 4.88%, 4.07%, 2.85%, 2.85%, 1.63% of total respectively.

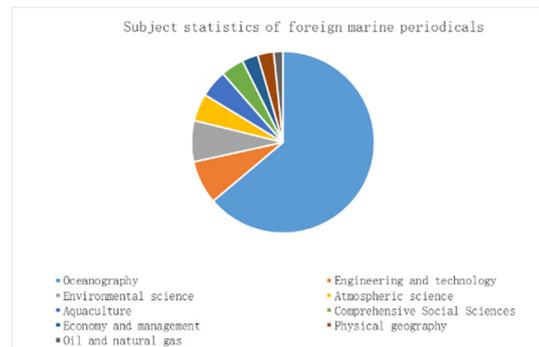


Fig. 2. Category distribution of foreign marine periodicals

It is clear that periodicals in oceanography have the largest proportion for both Chinese ones and foreign ones, about 49% and 63% each. The fundamental study of ocean is the major part of subject categories for marine periodicals, which is of vital importance in this age for coastal states. The profound understanding of ocean is the need of our time⁵. The publications in oceanography accelerate the further digging and exploring in the ocean. Besides, periodicals in engineering and technology account for the second largest proportion, about 15% and 8% for Chinese and foreign ones respectively. No matter from the present situation of development or the overall competitiveness of the industry, Chinese marine industry is insufficient to compete with foreign countries⁶. The percentage of engineering and technology in Chinese marine periodicals subject categories has revealed the emphasis of marine industry in China, which could enhance the strength of it. In addition, periodicals in aquaculture make up a significant part for Chinese periodicals, about 12%, which are just 5% of total foreign marine periodicals. China is one of the countries with the longest history of aquaculture in the world, with rich experience in breeding and popularization of aquaculture technology. China values the benefit of aquaculture and keeps exploiting it⁷. Therefore, the publications in aquaculture are of vital importance for China, as medium in improving and perfecting current aquaculture. While periodicals in environmental science are a relatively notable part for foreign periodicals, about 7%, which actually do not exist in Chinese marine periodicals. Countries like America, Australia and Japan put marine environment in the first place drafting the ocean strategy⁸. With the rapid development of the marine economy in China, the marine environment and the marine ecology have been seriously damaged, hence the task of marine environmental protection is crucial and urgent⁹. Therefore, the study of environmental science should be encouraged and relevant periodicals are responsible for spreading the achievements for further study. There are 3 Chinese marine periodicals in geology, 2 in oil and natural gas, 1 in information technology, 1 in pharmacy, 1 in survey and mapping technique, while 0 for foreign marine periodicals each. On the contrary, there are 18 foreign marine periodicals in environmental science, 7 in physical geography, while 0 for Chinese ones each. (Some Chinese marine periodicals involve physical geography, but they are not typical periodicals in physical geography. Here we classify them into subject “Oceanography”) Therefore, there is a significant difference between Chinese marine periodicals and foreign ones in subject classification, which shows the extra focus of marine periodicals differs pretty much. Besides, the result reveals the comprehensiveness of Chinese marine periodicals, involving more subjects overall.

2.2 Theme Analysis

The top ten Chinese marine periodicals in influence factor up to 2018 were selected. The influence factors of Chinese marine periodicals are derived from China National Knowledge Internet (CNKI). And the top ten foreign marine periodicals in the field “Oceanography” in influence factor up to 2018 were selected. The ranking on influence factor of foreign marine periodicals in the field “Oceanography” is derived from LetPub, which embodies the zoning data of the latest SCI journal from Chinese Academy of Sciences (CAS). Afterward, the papers published in 2017 on the selected journals were collected, with themes clarified into different levels by the reference of Chinese Library

Classification (CLC). The Chinese papers have CLC number printed on their first page. While foreign papers do not have a specific symbol for their themes. Hence the themes were decided by the reference of Chinese Library Classification (4th edition, published by National Library of China Publishing House). With the application of EXCEL, the outcome was shown and the difference was compared in oceanography.

The top ten Chinese marine periodicals in influence factors up to 2018 are Hydrographic Surveying and Charting, *Oceanologia et Limnologia Sinica*, *Acta Oceanologica Sinica*, Journal of Shanghai Ocean University, Chinese Journal of Polar Research, Journal of Dalian Fisheries University, Marine Fisheries Research, Marine Science Bulletin, China Offshore Oil and Gas and Marine Fisheries(not in a particular order). By noting down CLC number, the statistical result of the theme composition in oceanography of Chinese marine periodicals is as follows.

For the papers that are in the first class under P7 (Oceanography) on selected Chinese marine periodicals in 2017, marine basic science (P73) accounts for the largest part of the total composition, approximately 68%. Oceanographic survey and observation (P71) accounts for a notable part, about 19% of total. Marine resources and development (P74), marine engineering (P75), marine environmental science (P76) make up the rest, about 5%, 5%, 3% of total respectively. And in the second class under P7, marine biology (P735), marine geology (P736), investigation and observation methods (P714) and marine hydrology (P731) are the four largest parts, above 10% of total composition, around 35%, 15%, 12%, 11% each.

Table 1-Theme statistics in the field “Oceanography” of the papers published in 2017 on top ten Chinese marine periodicals in influence factor.

First class under Oceanography(P7)	Amount	Proportion
Marine basic science (P73)	256	67.72%
Oceanographic survey and observation (P71)	73	19.31%
Marine resources and development (P74)	20	5.29%
Marine engineering (P75)	17	4.50%
Marine environmental science (P76)	12	3.17%
Total	378	100.00%

Second class under Oceanography(P7)	Amount	Proportion
Marine biology (P735)	121	34.57%
Marine geology (P736)	51	14.57%
Investigation and observation methods (P714)	42	12.00%
Marine hydrology (P731)	39	11.14%
Investigation and observation technology equipment (P715)	28	8.00%
Marine chemistry (P734)	18	5.14%
Marine meteorology (P732)	13	3.71%
Marine mineral resources and their development (P744)	10	2.86%
Marine physics (P733)	9	2.57%
Marine geomorphology (P737)	4	1.14%
Underwater engineering technology (P756)	2	0.57%
Undersea engineering (P754)	2	0.57%
Investigation and observation instrument (P716)	2	0.57%
Development of marine power resources (P743)	2	0.57%
Coastal zone resources and their development (P748)	2	0.57%

Underwater process (P755)	1	0.29%
Organization and layout (P711)	1	0.29%
Marine development technology and equipment (P742)	1	0.29%
Marine biological resources and their development (P745)	1	0.29%
Deep sea engineering, offshore engineering (P751)	1	0.29%
Total	350	100.00%

The top ten foreign marine periodicals in the field “Oceanography” in influence factors up to 2018 are Progress in Oceanography, Oceanography, Journal of Physical Oceanography, Journal of Geophysical Research-oceans, Deep-Sea Research Part I: Oceanographic Research Papers, Continental Shelf Research, Deep-Sea Research Part II: Topical Studies in Oceanography, Ocean Dynamics, OCEANOLOGIA and Journal of Oceanography. Through title, abstract, article, according to the classification that Chinese Library Classification indicates, the theme composition of those foreign marine periodicals is given under P7(Oceanography) class. It is noted that some papers just have the first-class or second-class CLC number and some CLC number do not have further classification, such as P76(Marine environmental science) in the following tables, which will not be counted in further classification.

Table 2. Theme statistics in the field “Oceanography” of papers published in 2017 on top ten foreign marine periodicals in influence factors

First class under Oceanography(P7)	Amount	Proportion
Marine basic science (P73)	953	87.75%
Oceanographic survey and observation (P71)	93	8.56%
Marine environmental science (P76)	17	1.57%
Marine resources and development (P74)	12	1.10%
Regional oceanography(P72)	9	0.83%
Marine engineering (P75)	2	0.18%
Total	1086	100.00%

Second class under Oceanography(P7)	Amount	Proportion
Marine hydrology (P731)	404	37.79%
Marine biology (P735)	282	26.38%
Marine chemistry (P734)	133	12.44%
Marine geology (P736)	71	6.64%
Investigation and observation methods (P714)	49	4.58%
Marine meteorology (P732)	31	2.90%
Investigation and observation technology equipment (P715)	28	2.62%
Marine geomorphology (P737)	18	1.68%
Marine physics (P733)	12	1.12%
Investigation and observation instrument (P716)	7	0.65%
Marine biological resources and development (P745)	6	0.56%
Organization and layout (P711)	5	0.47%
Investigation and observation specification (P712)	4	0.37%
The Atlantic (P725)	4	0.37%
The North Pacific (P722)	3	0.28%
Marine development technology and equipment (P742)	3	0.28%
Marine geophysics (P738)	2	0.19%
The Mediterranean (P726)	1	0.09%

The Arctic Ocean (P727)	1	0.09%
Marine mineral resources and development (P744)	1	0.09%
Development and comprehensive utilization of sea water resources (P746)	1	0.09%
Coastal zone resources and their development (P748)	1	0.09%
Deep sea engineering, offshore engineering(P751)	1	0.09%
Coastal engineering (P753)	1	0.09%
Total	1069	100.00%

For those papers that are in the first class under P7 (Oceanography) on the selected foreign marine periodicals in 2017, oceanographic survey and observation (P71) accounts for a considerable percentage of the entire composition, about 88%. Except marine basic science (P73, about 9%), the rest four components are negligible, making up around 4% of entire composition. In the second class under P7, marine hydrology (P731), marine biology (P736), marine chemistry are the three components that are above 10% of total, around 38%, 26%, 12% respectively.

On the contrast, the themes of Chinese marine periodicals differ significantly from those of foreign ones in the last year, whether the first class under P7 (Oceanography) or the second. Therefore, it is rather clear that the aspects that Chinese studies in oceanography are not similar with those that foreign studies focus on in 2017. Chinese and foreign studies in oceanography focus mainly on Marine basic science in the first class under Oceanography. As for the second class under Oceanography, it is Marine biology that is being the main concentration for Chinese and foreign studies in oceanography. But Marine hydrology is a significant focus for the foreign studies in oceanography. And Marine chemistry is an aspect that foreign studies in oceanography pay attention to. While Chinese studies in oceanography pay extra attention to Marine geology, Investigation and observation methods, Marine hydrology, though not a lot. At present, Chinese marine research field should study the diverse outputs from foreign marine scholars and launch further studies to be at the cutting edge of oceanography. Meanwhile, Chinese marine research field should inherit the outputs of our Chinese oceanography predecessor and try to dig deeper in the studies.

3. Conclusion

The comparison of categories and themes between Chinese marine periodicals and foreign ones was carried out to study, both quantitatively and qualitatively, the difference within and the potential improvement of the current Chinese marine periodicals up to 2017 in the consideration of the era background and overall circumstances, as well as the future research direction of marine science. With the application of tables and figures from EXCEL, as well as the detailed classification, the comparison is well revealed and the statistics are clearly displayed.

To some extent, the category composition revealed the research area distribution in the marine field. Analyzing the difference, Chinese marine periodicals should maintain the amount in oceanography, engineering and technology and aquaculture, meanwhile improve the amount in environmental science. Furthermore, Chinese marine periodicals can involve and contain more content about other subjects, in order to be all-round in marine studies.

The themes of periodical are the focuses of certain aspects in the field. As for oceanography, the themes of Chinese marine periodicals differ significantly from those of foreign ones in 2017. Marine basic science is the joint focus in the first class under Oceanography. While in the second class under oceanography, Marine biology is the main concentration for Chinese and foreign studies in oceanography. Marine hydrology is a notable focus for the foreign studies in oceanography, and Marine chemistry is an aspect that foreign studies in oceanography pay attention to. On the other hand, Chinese studies in oceanography pay some extra attention to Marine geology, Investigation and observation methods, Marine hydrology. Some aspects in oceanography that foreign studies in oceanography dig into may be unfamiliar to the Chinese studies. While some aspects in oceanography that Chinese studies in oceanography dig into may be vital to China. Therefore, Chinese studies in

oceanography should supplement the study of international focuses in oceanography and maintain continuous studies of oceanography in China simultaneously.

4. Recommendation

Firstly, the foreign marine periodicals we discussed in category classification are derived from China Academic Library & Information System (CALIS), a Chinese authoritative database, which may not include foreign marine periodicals as much as possible. Scholars who intend to dig into the topic may gather the foreign marine periodicals in a different way or from a different database.

Secondly, the subjects we choose for the categories of marine periodicals are from a paper, compared with other papers, since there are no uniform categories for marine periodicals, varying from paper to paper.

Thirdly, the classification of the Chinese or foreign marine periodicals is based on the information and data of the periodicals from authorities or official websites, but also our personal judgement and experience. Consequently, there could be errors for the classification of category. But at present, as far as I am concerned, there is no universally acknowledged approach for periodical classification in one field.

Fourthly, the top ten foreign marine periodicals in influence factors are those in the field "Oceanography". We cannot get a precise ranking for all the foreign marine periodicals in influence factors, because the principle for judging foreign marine periodical is unclear. As a result, we just rank the periodicals in the field "Oceanography". And that is why we just analyze the theme difference between Chinese marine periodicals and foreign ones in oceanography rather than on the whole. Researchers could extend the theme comparison broader, in the whole marine field.

Last but not least, since the classification of themes is derived from Chinese Library Classification, for the foreign marine periodicals, we decide the theme of papers by analyzing the title, abstract and article, while not by the specific CLC number on Chinese papers. Self organization mapping and knowledge mapping analysis are the advanced research approaches in theme analysis. For better theme comparison between Chinese marine periodicals and foreign ones, researchers can refer to papers involving these approaches.

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