

## LETTER TO THE EDITOR

# South China Sea Pollution Control and Navigation Freedom from the Perspective of the Community of Sea Destiny

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The community of marine destiny refers to the collective formed by people under certain common conditions, or the unified organization or organization of forms formed in the marine field by a number of state actors and non-state actors based on common maritime interests or values. The idea of building a community of marine destiny contributes to the formation of a good marine ecosystem. However, the South China Sea pollution has caused serious damage to the marine ecosystem. The early work of marine environmental workers focused on the detection of on-site pollutants, the toxic effects of pollutants on some organisms, and the behavior of pollutants. Physical migration process, etc. With the development of marine environmental science, ecology has been transformed from an observational science to experimental science. The marine enclosure ecosystem experiment is a medium-scale marine ecological simulation. It is a comprehensive research work of biology and chemistry. It has been widely used in the quantitative study of pollutant ecological effects and biogeochemical behaviors. In addition to controlling pollution in the South China Sea, the construction of a marine destiny community must also stipulate the freedom of navigation system in the South China Sea and fully safeguard national economic security and national sovereignty.

Marine destiny community; South China Sea pollution; freedom of navigation; marine ecosystem

### 1 Introduction

In order to better control the pollution of the South China Sea, this paper selects marine enclosure ecosystem experiments to conduct quantitative research on pollutant ecological effects and biogeochemical behaviors. Some experts have introduced this research. This paper will combine the research results, focus on the characteristics and application of marine enclosure ecosystem experiments, and explore the South China Sea navigation freedom system in accordance with the United Nations Convention on the Law of the Sea, and promote the development of the concept of marine destiny community.

Yu-Xiao Liu, Yi Wang published an article in Ekoloji Issue 107, 2019. The title is: "Real-time Monitoring System for Pollution Intensity of Carbon Emission in Ecological Environment". In order to monitor the pollution intensity of ecological environment in real time, this paper analyzes the specific impacts of various regions on pollution changes in China, and uses a complete decomposition model to decompose and analyze them. A Zig Beed-based real-time monitoring system for pollution intensity is proposed. The system is based on CC2530, and the hardware design

consists of two parts: the design and routing design of the acquisition node. The software part of the PC terminal consists of four modules: a communication module, a real-time data display module, a data storage module and a communication interface selection module.(Parrish et al., 2016) The test results show that the system has high monitoring efficiency and accuracy, and the system has certain application value for this research.

Lai et al designed a new model of marine pollution hazard, and completed the overall framework of the model by constructing a supporting database, numerical model and graphical visualization. Based on the construction of a marine pollution disaster impact assessment database and the development of marine pollution disaster numerical model components Marine pollution disasters are highly effective in assessing damage to biological resources, and the extent of damage and damage to biological resources are obtained. The experimental results show that the designed model has accurate results and high credibility in analyzing the contaminated area of biological resources, but it has not been answered in terms of how to control pollution. Li et al introduced the characteristics of marine environmental pollution and the types of pollution, and reviewed the current status and application techniques of marine pollution monitoring at home and abroad. It is beneficial to strengthen the awareness of coastal environmental protection in China and improve the automation level of marine environmental pollution monitoring, but it lacks the support of scientific theory and actual data.

## **2 Idea Description**

### **2.1 Control of pollution in the South China Sea**

#### *2.1.1 Characteristics of marine enclosure ecosystem experiments*

Enclosure ecosystem experiment is to enclose a part of the seawater in the field and make its temperature, illumination, ecological environment and structure similar to the ocean it encloses in the experimental cycle, so as to study the physical, chemical and biological interaction and influence in the system. There are many ways to do the experiment of marine enclosure ecosystem at present, but it can be divided into two main types. The marine scene encloses the sea water and maintains the original marine ecological structure and vertical stratification (Wang et al. 2016). Since the 1980s, many small enclosed ecosystems have emerged, such as the Hamburg Closed System, which uses small plastic bags to attach to the floating frame and then fix a whole series of them to the floating frame.

The site enclosure ecosystem is the most widely used type at present, and its cost is low. Different designs can be selected according to the needs of research. In addition, it is not necessary to control illumination, temperature and other conditions artificially, so the operation and maintenance are relatively simple. However, due to the closed water, it is impossible to simulate the effects of current and eddy diffusion in the field, so it is difficult to extrapolate to the field conditions. The other type is based on the land bank and establishes a seclusion ecosystem on the land. It is a study of the on-site sea water pump in a huge water tank under controlled temperature, current, disturbance and bottom sedimentation conditions. Due to the characteristics of seawater circulation in the water tank, the ecological simulation can be closer to the near-shore water affected by the tidal current, and the ecological effect of the pollutant can be continuously studied for one year. For marine chemistry, the biogeochemical processes such as migration, degradation, assimilation, and sedimentation of pollutants can be closer to the actual results on site, but the cost is higher, and the operation and maintenance are more complicated, which limits its use.

The most important feature of the marine enclosure ecosystem experiment is that the ecological structure and

evolution rate in the enclosure water is very similar to the site situation. There has been a lot of research on the ecological simulation reproducibility of the marine enclosure ecosystem, and the Japanese scholar Takahashi et al. Four experimental plastic bags were placed for nearly 30 days of experimentation. The reproducibility of ecological changes between plastic bags and between the inner and outer environments of plastic bags was studied. The results showed that the time variations of diatoms, flagellates, chlorophyll, copepods and particle size spectrum were very similar between the four plastic bags, which proved that the primary producers and succession rules inside and outside plastic bags were similar. The ecological effects of petroleum pollutants and Baltic oil spill were investigated in enclosure ecosystem experiments. The results showed that the ecological effects of petroleum pollutants were identical in many aspects, which made the effects of pollutants on marine ecosystems possible to be extended from small-scale studies to large-scale field studies and their ecological effects. Reasonable valuation should be made.

The second characteristic of marine enclosure ecosystem experiment is that it has enough water body and condition control, so it can study the long-term ecological effects of pollutants under sublethal concentration, which is more practical than acute toxicity research. At present, besides enclosure ecosystem experiments, there are not many methods to study the long-term ecological effects. Its experimental water body can study the ecosystems of three different trophic level organisms. At the same time, it can study from several weeks to one year or even longer, and keep the consistency of enclosure ecosystems. At present, a large number of problems facing the marine environment are still the long-term consequences of exposure under low pollution concentration, especially the harm to primary producers. It is possible to change the structure and function of regional marine ecosystems through food webs, thereby endangering fisheries, aquaculture and even human health.

The third characteristic of marine enclosure ecosystem experiment is that it can quantitatively understand the rate-dynamics of biological, chemical, physical changes and interactions by measuring the ecological structure, evolution law and time series of chemical pollutant migration, assimilation, degradation and sedimentation. Due to the complexity of the marine field, the simultaneous action of various factors, the uneven distribution of organisms, the difficulty of synchronous sampling, etc., reliable data of this dynamics can not be obtained by the general method of ocean survey. This dynamic data is very important for the mathematical simulation of the marine environment, and the development of mathematical simulation of the marine environment will further deepen people's experience with marine organisms. Understanding the mechanism of process, ecological succession, and ecological effects of pollutants opens up a way for predicting environmental hazards of pollutants, which has advantages in field investigation and enclosure ecosystem experiments.

### *2.1.2 Marine ecological effects of pollutants*

The ecological effects of pollutants are much more sensitive than people expected. If copper is added to the marine enclosure ecosystem up to 8 ppb, the autotrophic and heterotrophic processes of plankton communities will be significantly affected. The heterotrophic microorganisms are the most obvious, which will decrease the uptake rate of microorganisms. As a result, the copper-insensitive microorganisms can reproduce and destroy the stability of the original ecosystem. It is well known that copper content in most coastal seawater is very close to this level. This indicates that many coastal seawater has been in a critical state of ecological impact. Most of the results in the general laboratory have obvious toxic effects when the mercury content exceeds 100 ppb. From the results of the marine enclosure ecosystem experiment, when the mercury content is greater than 1.0 ppb, it shows toxic effects on the ecosystem (Jang Et al. 2016). At this time, the growth of bacteria was inhibited, and the growth of phytoplankton was also significantly inhibited when the mercury concentration reached ppb. When sediments or tailings slags into the ocean, the large amount of particulate matter weakens the ambient light intensity, significantly reduces the

photosynthesis of phytoplankton, increases the proportion of autotrophic microalgae, inhibits heterotrophic microalgae, and increases zooplankton. Secondary production. These ecological effects are shown in the experiments of marine enclosure ecosystems. The ecological effects of petroleum pollutants are different. After the addition of petroleum (concentration 90-180ppb), the photosynthesis of phytoplankton has a short-term inhibition, and the rate of photosynthesis increases significantly. This is mainly due to the addition of people. After the oil also inhibited the growth rate of zooplankton, which reduced the feeding pressure on phytoplankton. The impact of oil on benthic organisms is the most significant. After the addition of oil, the density of macrobenthos decreased within two months, and it was difficult to restore the original experimental period (10 months). Among them, small benthic animals were affected. The effect was most pronounced, as the number of nematodes decreased a lot in a month. The mesophyll was significantly reduced in two months and almost completely disappeared at the end of the experiment. It appeared to be the most sensitive group of benthic organisms (Zhen et al.2016).

### 2.1.3 *The fate of the contaminant and the rate at which it is excluded*

Contaminants can affect the growth of marine organisms. In turn, marine organisms can assimilate, degrade, and carry pollutants, thereby removing pollutants from the ocean. The process of removing contaminants can be approximated by first-order reaction kinetics, and the magnitude of the elimination rate is the result of simultaneous action of biological, physical, and chemical factors. Mercury is a non-essential element of organisms, which is easily adsorbed on various particulate matter and quickly eliminated from the water body. During the experimental period, there are two distinct different elimination rates, which are exactly opposite to the two different blooms of dinoflagellate, which indicates that different organisms have a direct impact on the mercury removal rate; Chlorinated hydrocarbons are artificial pollutants, which are chemically stable and are not easily biodegraded. The removal rate and the evaporation rate calculated by vapor pressure are basically the same.

## 2.2 Chinese freedom of navigation in the South China Sea

Chinese Nansha Islands and its adjacent waters are at the throat of the Malacca Strait. Our country has the need to safeguard the security and interests of territorial sovereignty, while other countries will be concerned about whether freedom of navigation will be restricted. With the strengthening of China's ability to safeguard the South China Sea, the United States has shown a keen interest in intervening in order to achieve the so-called "return to Asia strategy" and the coastal country's claim to maritime rights and interests must not violate the freedom of navigation system. In this regard, the Chinese government has repeatedly stated that the claim of sovereignty over the South China Sea has never hindered freedom of navigation.

According to the United Nations Convention on the Law of the Sea, the right to navigation in the territorial sea and in the exclusive economic zone and the high seas are different in content and scope. Although China's claim in the South China Sea is based on the South China Sea "discontinuous line" map, it does not specifically clarify the legal nature of the "interrupted line", nor does it cover the specific waters such as the territorial sea and exclusive economic zone of the South China Sea Islands. Delimited. Therefore, around the nature of the "interrupted line", the academic community has put forward a variety of views, including the "traditional sea line", "historic waters" theory, "island attribution line" and "historical rights". However, no matter how the academics interpret the "interrupted line", it may involve the discussion of the freedom of navigation.

Secondly, if we advocate territorial sovereignty over the islands and reefs within the Jiu Duan line and have historical rights to the waters of the islands and reefs, we still cannot avoid some official figures or scholars making a fuss from the perspective of freedom of navigation (Zheng et al. 2016).The main reason is that the meaning and scope of "historic rights" are rather vague.The concept itself is not clearly defined in the United Nations Convention on the Law of the Sea, thus giving a lot of room for free interpretation. Based on this claim,

China will be able to conduct technical jurisdiction over ship navigation based on natural resource protection or environmental protection, for example, delineating fishery resource protection zones, improving ship pollution discharge standards, etc., and restricting foreign vessels in certain specific sea areas. Sailing inside. In this way, China's sovereignty claim to the South China Sea is almost identical to that of China's view of the sea area within the intermittent line as an exclusive economic zone. The navigation of ships in the exclusive economic zone is very weak, but it cannot be said that there is no limit at all. China's claims on sovereignty, sovereign rights and related rights in the South China Sea will inevitably involve other countries' doubts about the freedom of maritime navigation. To this end, the Chinese government has repeatedly stated that China is committed to resolving disputes with its neighbors through friendly consultations and negotiations, and attaches importance to maintaining freedom of navigation in the South China Sea.

The South China Sea Channel is safe, and freedom of navigation has never been affected by the disputes in the South China Sea. Active participants and builders of navigation safety in the South China Sea. On the other hand, there is an objective conflict between the freedom of navigation and the sovereign interests of the coastal states. Especially in today's rapid development of military science and technology, the relevant countries advocate absolute freedom of navigation in disregard of the sovereign interests of the coastal states, and they cannot stand in international law. With the increasing strategic interests of overseas countries, China will pay more attention to freedom of navigation and security, but it does not abandon its efforts to advocate and advocate the balance of freedom of navigation and respect for the sovereign interests of coastal states in the international community.

### 3 Results

The marine destiny community contains values such as peace, development, fairness, and justice, emphasizing that human-sea harmony is a symbol of the community of marine destiny. The idea of the community of ocean destiny regards human beings and the ocean as a whole, focusing on the search for human commonality. It can stimulate the global ocean governance subject to pay more attention to the overall interests of human beings and the healthy development of the ocean while solving the interests of the industrial civilization. The contradiction between the seas and the harmonious coexistence between man and the sea. Reviewing the development of marine enclosure ecosystem experiments in the past ten years, it has carried out a lot of research on the ecological impact of pollutants and the rate and mechanism of pollutant elimination, and accumulated considerable data, as well as in ecology and physiology. Achieving certain results has greatly helped to control the pollution problem in the South China Sea.

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