Discussion on Marine Spatial Planning in China: Role and Prospect

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Abstract. Marine spatial planning (MSP) is world widely recognized as a practical approach to manage conflicts and protect ecology and environment of the sea. In China, marine functional zoning (MFZ) application is into the second period and it is facing some challenges in managing conflicts and protecting marine ecology and environment. This article compared MFZ with MSP, discussed the role of MSP in China and provide some perspectives on the prospect of MSP in the land sea overall strategy. It is concluded that current MFZ management framework needs improvement, MSP would be a good practice for China to improve sea utilization management, it would play an important role to cope with the challenges from land areas and achieve goals and objectives, prospectively it would be a possible way to implement MSP in the land sea overall strategy.

Introduction

With 20 years rapid socioeconomic development in coastal and marine areas, sea area utilization management is facing serious challenges. Marine spatial planning (MSP) is considered as a practical approach to manage both conflicts and compatibilities in the marine environment in the face of both increasing development pressures and increasing interest in the conservation of nature. Originally started as a management approach for nature conservation in the Great Barrier Reef Marine Park over 30 years ago, the application of MSP has spread quickly from a handful of countries in Western Europe to places in North America and South Asia.

In China, marine functional zoning (MFZ) has developed independently since it was first proposed by the Chinese government in 1988 [1]. China has approved marine zonal schemes of 11 major coastal regions for the 2011-2020 periods in order to effectively protect ecology and environment of the sea. MFZ in China has been characterized as a practice of MSP [2]. But with 20 years rapid socioeconomic development in coastal and marine areas, degradation of the marine environment and destruction of marine ecosystems which can be solved through MSP practice worldwide is still an unsolved problem in China. Why MFZ is not an effective MSP practice? What kind of improvement does MFZ need? These are important questions for sea utilization management in China.

This article compared MFZ with MSP, discussed the role of MSP in China and provide some perspectives on the prospects of MSP in the land sea overall strategy.
Comparison of MFZ with MSP

MSP is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process [3].

MFZ is the fundamental tool for regulating the use of sea areas, which dividing sea space areas into different functional zones. A functional zone is a designated sea area for human activities based on its geographical and ecological features, natural resources, current usage and socioeconomic development needs. The sea area utilizations must be subject to the approved MFZ schemes.

MFZ and MSP have some same characteristics as integrated, place-based, strategic and participatory. MFZ is more like an ocean zoning than a planning, which is an important regulatory measure to implement comprehensive marine spatial management plans through a zoning map or maps and regulations for some or all areas of a marine regions.

MSP has some specific characteristics as ecosystem-based management and adaptive management. Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans [4]. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors. MFZ provides legal basis for protection of marine ecology and environment and rational exploitation of marine resources. But lacking of implementation plans and strategies, the cumulative impacts of different sectors cannot be managed [5].

The Role of MSP in China

Ocean zoning is considered as an effective tool of MSP. MFZ as an ocean zoning practice in China has built the legal framework for sea utilization management. MFZ has made some efforts in coordinating conflicts by making overall arrangements of the industries involved in the use of sea areas. As mentioned below, current MFZ management framework needs improvement. MSP could help MFZ to cope with the challenges from land areas, achieve management goals and objectives and improve management process through an ecosystem based management and adaptive management process.

To Cope with the Challenges from Land Areas

With the urbanization and industrialization on coastal areas, the increasing needs of sea utilization are going on and keep changing, sea utilization conflicts are outstanding. Increasing population on coastal areas intensifies the pressure on the marine environment. Polluted sea areas are increasing and sea water quality is seriously deteriorated which causes destructions on the marine ecosystems. Most research reported that water pollution from land area was the main pollutant source. Human activities on land have being severely affecting marine space. Recent research pointed out that MFZ revised frequently reflected the problem that it cannot cope with the challenges from land areas.

To Achieve Goals and Objectives

MFZ shall promote the sustainable development of the marine economy and safeguard the health of marine ecosystem, achieving sustainable use of sea areas and the islands.
The comparison between first round MFZ and second round MFZ showed that more function zones near coastline changed than the ones away from distance, more than 40% function zones cannot achieve water quality management objective. Without planning management the goals and objectives of MFZ cannot be guaranteed.

To Improve Management Process

MFZ is functional zones based management. A functional zone is defined by the social and natural attributes of sea area. Project of sea utilization should be in accordance with the type of functional zone. But with the rapid development of social economy, coastal human activities significantly affect the attributes of sea areas. The function type of sea area may change or the management goals, objectives and measures may become invalid, then project of sea utilization is no longer appropriate. There is no management process to evaluate whether the project achieve management objectives. Monitoring and evaluating sea area attributes are important but missing steps to assure or enhance the effects of functional zone management.

Prospect of MSP in the Land Sea Overall Strategy

MSP achieves management goals and objectives in the land sea overall strategy. Coastal area is considered as a whole system in the land sea overall strategy. MSP take sea area as planning object and coastal area as analysis extent. It focuses on the issues caused by socio-economic development on land. Planning process carry out in an adaptive management framework (Fig. 1). This management framework could connect and support MFZ.

Area-based objective management and objective-based process management are the keys to implement land sea overall strategy and achieve management goals and objectives.

Area-based Objective Management

Coastal area is partitioned into sub area by ecosystem boundary to lay a foundation of an ecosystem-based management. Objectives of sea area are determined by the stakeholders in and around the sub area, so it is also objectives of sub area. Objectives of a functional zone in MFZ had some difficulties in achievement because it is emphasized on coordinating conflicts, different types of functional zones split
ecosystem boundary. Objectives of each type of functional zone are different so there are not agreed objectives in an ecosystem. Negative externalities of environmental impacts cannot be managed based on functional zones. Area-based objective management coordinates stakeholders in and around sub area by ecosystem boundary promotes agreed management objectives.

Land sea overall suitability analysis generates functional suitability array for sub areas. Suitability arrangement is not limited to one function as it is in MFZ. Functions which not affect the function of re-use of sea area and achieve the requirements of ecological environment quality management are all available. Ecosystem-based sub area management achieves one area one objectives and multi-functional sea utilization.

Management focus shifted from function positioning to objective achievement.

**Objective-based Process Management**

The specific process management evaluation system is determined according to the objectives. The implementation process of sea utilization is monitored and evaluated. An evaluation is the identification of the effectiveness of the planning process and it enables managers to determine the extent to which planning is implemented and the expected objectives are achieved. Objective-based process management achieves the transition from traditional integrated planning management to adaptive management. A land sea overall suitability monitoring and evaluation system is built to monitor the natural and socio-economic factors of the sub area and evaluate status of sea area dynamically. It helps to discover the change of suitability caused by the environment change in the process of planning implementation and guide the management of sea area utilization in planning period. In the planning process, through the monitoring, assessment find new problems, a new round of planning process is started and continued to monitor the implementation of the planning process until the formation of a satisfactory result program.

**Conclusion**

Current MFZ is not an ecosystem-based adaptive management framework and needs improvement. MSP would be a good practice for China to improve sea utilization management, it would play an important role to cope with the challenges from land areas, achieve goals and objectives and improve management process. Prospectively it would be a possible way to implement MSP in the land sea overall strategy. Planning process carry out in an ecosystem-based adaptive management framework. Area-based objective management and objective-based process management are the keys to implement land sea overall strategy and achieve management goals and objectives.

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