

Materials for the 22nd meeting of the informal consultative process on oceans and the law of the sea

1. Main Problems in Ocean Observation

Strengthening ocean observation capability is required by marine disaster prevention and mitigation. China is one of the countries facing the most frequent and serious marine disasters in the world. There are diverse marine disasters in China with a wide range of impacts. Under the background of global warming, the risks of extreme climate events in China is increasing. Extreme weather and climate phenomena such as super typhoon, strong convection system and El Nino / La Nina aggravate the frequency and intensity of marine disasters. From 1980 to 2020, China's coastal sea level rise rate was 3.4 mm/yr (2.8 mm/yr of global average). High sea level exacerbates the impacts of marine disasters including storm surge and coastal flood. The observation ability of earthquake and tsunami in the South China Sea is generally weak, which seriously affects the timeliness of tsunami early warning. It is urgent to further improve the ocean observation capability.

Expanding ocean observation capacity is urgently needed to solve emerging maritime problems. Emerging global maritime issues such as ocean acidification, marine pollution, destruction and degradation of marine ecosystems and marine biodiversity are attracting more and more attention. Human activities including over-fishing, resource development, land-based pollution discharge and maritime transportation have led to many problems, such as marine habitat degradation and species extinction, seawater eutrophication, as well as marine garbage pollution. Coral reefs, mangroves, seagrass beds and other marine ecosystems are shrinking year by year. The global marine ecosystem is facing serious threats, which has also affected human health and well-being in coastal areas. The existing ocean observation system design and technique is not enough to support the understanding and in-depth study of these problems.

2. Capacity building situation

The observation layout is further optimized. In China's coastal and offshore areas, the number of national basic oceanic observation stations continues to increase. The national departments of ecological environment, transportation, water conservancy, agriculture & rural affairs and meteorology, as well as local coastal authorities, have also set up observation facilities such as marine monitoring stations, water level observation stations, estuary hydrology stations, marine-meteorological stations, and ocean buoy (subsurface buoy) stations. The average distance between marine observation stations along the coastline of China is less than 100 kilometers.

Mooring buoys, deep-sea submersible buoys and drifting buoys are deployed in key deep-sea areas, and regular voyage surveys are carried out. Comprehensive oceanographic and meteorological observations are carried out in the Polar Regions, and scientific expeditions to the North Pole and South Pole are organized and implemented annually. Series of ocean-color and ocean-dynamic-environment satellites have been launched, and the observation range has basically achieved global coverage.

The observation methods and elements are constantly enriched. An ocean observation network system consisting of ocean station network, radar network, buoy network, seabed observation network, voluntary observing ship, oceanographic sectional investigation and satellite remote sensing has been constructed. Observation elements are increasingly abundant, including marine hydro-meteorological elements (such as tide, current, wave, sea ice, sea temperature, salinity, wind and pressure), marine biological elements, as well as marine chemical elements, with a total number of more than 50. The capabilities of operational observation continue to improve, and a national global-ocean stereoscopic observation network covering shore-based, sea-based, air-based, and space-based ocean observation systems is basically established.

The operational support capability is steadily enhanced. A relatively complete ocean observation standard system has been constructed. The data transmission network which is dominated by special ground lines and supplemented by wireless communication, has been improved, and the step-by-step, real-time upload of ocean observation data has been realized. The capabilities on data management, data analysis and data processing have been greatly improved. The ocean observation data has been widely shared and applied. The operational status of equipment in the observation network has been monitored in real time. The maritime comprehensive test platform has been equipped with capability in testing and measuring. The 3,000-ton professional buoy operation has been put into use. The operation and maintenance capacity of ocean observation facilities in China has been greatly improved.

3. International Cooperation

China has played an active role in international organizations such as the Intergovernmental Oceanographic Commission of United Nations Education Scientific and Cultural Organization (UNESCO/IOC) and the World Meteorological Organization (WMO), and has actively connected with the Global Ocean Observation System (GOOS), and participated in international observation programs such as Argo global ocean observation network, Tropical Pacific Ocean Observation System (TPOS 2020), and Asia-Africa-Australia monsoon analysis and prediction Research Anchor Moored Array (RAMA).

In 2021, researcher Qiao Fangli of the First Institute of Oceanography, MNR, was elected as a member of the Advisory Committee of the ‘UN Decade of Ocean Science for Sustainable Development’ to participate in the relevant works during the implementation of the ‘Ocean Decade’. According to the official website of the ‘Ocean Decade’, by October 2021, the total number of activities of the ‘Ocean Decade’ reached 335, covering the initiatives at four different levels, including plans, projects, activities and contributions. The latest accreditation activities released in November 2021 shows there are mainly three ‘Ocean Decade’ plans and projects led by China, namely the ‘River Delta Plan’ led by the State Key Laboratory of Estuarine and Coastal Research of East China Normal University, the ‘Global Estuarine Monitoring Plan’ initiated by the State Key Laboratory of Marine Pollution of City University of Hong Kong, and the ‘Integrating Science, Management and Social Participation: helping the sustainable development of coastal zone’ led by the State Key Laboratory of Offshore Marine Environmental Science of Xiamen University.

During the ‘The Fourteenth Five-Year Plan’, based on the international and regional marine observation programs, China will deeply participate in the international and regional ocean cooperation mechanisms such as the ‘Ocean Decade’, the Intergovernmental Oceanographic Commission of United Nations Education Scientific and Cultural Organization (UNESCO-IOC), the Partnership for Observation of the Global Oceans (POGO), the East Asia Sea Partnership (PEMSEA), and the North Pacific Science Organization (PICES). China will also deeply participate in the international ocean observation programs such as Argo, the Tropical Pacific Ocean Observation System (TPOS 2020), the Asia-Africa-Australia monsoon analysis and prediction Research Anchor Moored Array (RAMA), and the Deep Ocean Observation System (DOOS). China will promote cooperation with major coastal countries in the fields of ocean observation and monitoring and build joint observation stations, and we will cooperate with small island states to build coral reef ecological monitoring stations and enhance the capacity to cope with climate change. We will also strengthen international cooperation in the aspects of marine satellite calibration methods, the construction of calibration sites and ground receiving stations, accelerate the joint data processing and global data promotion of China-French marine satellites, and promote the international sharing of marine satellite data.