



RV KEXUE'S OPERATION in 2023

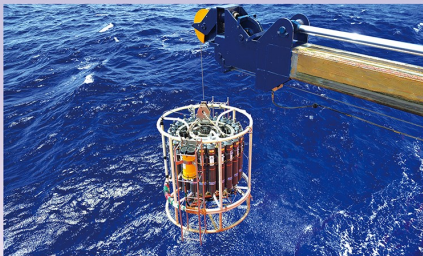
5 cruises 261 days on the sea 34293 n miles

1113.617G scientific data and abundant experimental samples

Representative cruises

2021 Scientific Experimental Research Cruise of Open Research Plan in the Western Pacific (WP)

- Research area:** WP Warm Pool Area, Warm Pool Cold Tongue Confluence Area, and Central Philippine Basin
- Completed over 240 operations with CTD, water sample, deep-sea multi-network, microplastic towing, TV grab, Vertical microstructure profiler, cruise sampling, ADCP, meteorological observation, etc.
 - Helped to explore the distribution, variation, and interconnection of surface, subsurface, and mid-deep water masses in the Western Pacific from a multidisciplinary perspective through the coordinated tracing of carbon, hydrogen, oxygen, beryllium isotopes, and the observation of temperature salinity and dissolved oxygen profiles, marine biodiversity, and geographic distribution.
 - Deepened the understanding of biogeochemical processes and fluxes in the WP, by observing the growth rate and primary productivity of phytoplankton, vertical migration of planktonic animals, carbon, nitrogen, and oxygen cycling, etc.
 - Explored the biogeochemical cycling processes of pollutants through observations of microplastics, mercury isotopes, and fluorocarbons



2022 Scientific Experimental Research Cruise of Open Research Plan in the Western Pacific

- Research area:** WP Warm Pool Area, Warm Pool Cold Tongue Confluence Area, and Central Philippine Basin
- Completed over 240 operations including 4 sections and 96 station observations with CTD profile and water sample, deep-sea pressure maintaining water sample, microplastic towing, TV grab, turbulence observation, in situ filtration, Argo, current and meteorological observation, etc.
 - Successfully completed recovery and deployment operations of more than 10 sets of deep-sea moorings/buoys, maintained and optimized the deep-sea scientific observing network that China has successfully built in the Western Pacific in recent years.
 - Referred to the standards of the international GO-SHIP program, provided internationally standardized in situ observation data and samples for scientific research in the Western Pacific, which guaranteed for solving key scientific problems such as multiscale dynamic processes and their climate and ecological effects.
 - Strong supported China's leading position in the "Northwest Pacific Ocean Circulation and Climate Experiment (NPOCE)" international cooperation program and promoted interdisciplinary scientific research in the Western Pacific.

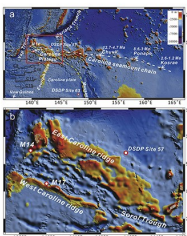


Cruise of Evolution Process and Mechanism of Ocean Structure and Dynamics Center in Indo-Pacific Convergence Region

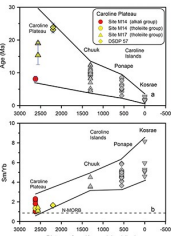
- Research area:** Philippine Basin, Palau Ridge, Parisi Vila Expansion Center, and Manila Trench
- Completed 29 stations of TV Grabber, 5 stations of CTD and seabed sediments sampler, 620km multichannel seismic comprehensive survey lines, 2 continuous profile of underwater heat flow, and deployed 10 sets of OBS.
 - Supported to clarify the structural evolution characteristics of typical subduction zones in the Indo Pacific convergence zone and provided key geological and geophysical evidence for revealing the initiation mechanism of plate subduction.
 - Provided valuable data and samples for studying the formation and evolution of subduction systems in the Indo Pacific convergence zone, and is expected to achieve original results with international influence, which will provide solid data support for promoting the launch of international science program and leading international cooperation research in the Indo Pacific convergence region.

Outcomes

136 papers, 31 invention and utility model patents, 1 scientific prize



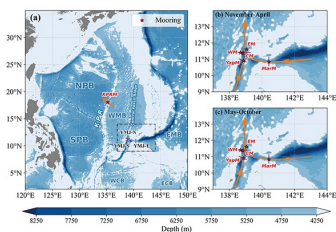
Tectonic setting and location of sampling of Caroline plateau



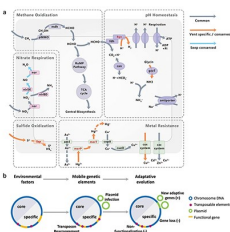
Age and Sm/Yb results of Caroline plateau and seamount chain



Real time monitoring system for on-site environmental elements on the research vessels



Schematic flow pathways (orange arrows) of lower deep branch of the Pacific Meridional Overturning Circulation through the deep channels at the Yap-Mariana Junction (YMJ), seasonal pathways in panels (b and c) and Kyushu-Palau Ridge (KPR, in panel (a)) based on mooring observations.



Genetic heterogeneity and environment-driven adaptive evolution in the symbiotic bacteria of *G. platifrons*.

Social services



Provided lectures for Hongjun Primary School students to inspire children's scientific curiosity in Shandong Province



Served 355 undergraduates to carry out practical courses aboard for better understanding of the connotation of marine scientific research.



Hosted nearly a hundred teachers from primary and secondary schools participating in 2023 Marine Science training program