

2021 United Nations Decade  
2030 of Ocean Science  
for Sustainable Development

# Japan's Initiatives for UN Decade of Ocean Science II

National Decade Committee of Japan,  
UN Decade of Ocean Science

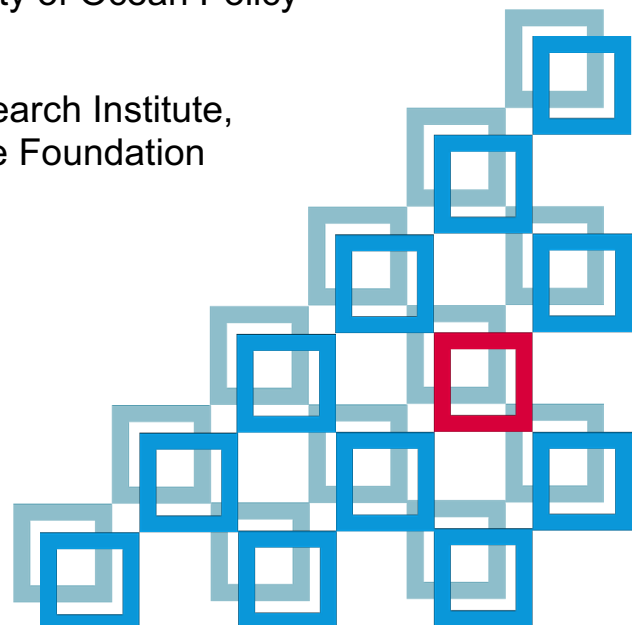
Edited by Japan Society of Ocean Policy

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Ocean Policy Research Institute,  
Sasakawa Peace Foundation



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## Preface

Four years have passed since the United Nations (UN) Decade of Ocean Science for Sustainable Development began in January 2021. This UN Decade of Ocean Science was proclaimed at the 72nd session of the UN General Assembly in 2017 and will cover the 10-year period from 2021 to 2030. Under this UN Decade of Ocean Science, efforts will be promoted mainly toward the realization of Sustainable Development Goal (SDG) 14, which particularly focuses on the ocean sector where many unknowns remain.

As a maritime nation with strength in science and technology, Japan recognizes the promotion of marine science as an important part of the foundation for its ocean policy. Japan is expected to demonstrate leadership in the area of science and technology diplomacy. However, collaboration among industry, government, academia and the private sector in marine science has not been developed to a sufficient level. The UN Decade of Ocean Science is not just for ocean researchers, but aims at collaborative design (co-design), promotion (co-production) and utilization (co-delivery) with various stakeholders. To this end, the Japan Society of Ocean Policy and the Ocean Policy Research Institute of the Sasakawa Peace Foundation launched the Study Group on the UN Decade of Ocean Science in August 2020 to facilitate dialogue for effective collaboration.

This collection of case studies, the second since the first publication in 2021, showcases national initiatives. It aims to share Japan's efforts in marine science with stakeholders around the world and to facilitate activities for the UN Decade of Ocean Science. We would be more than happy if this collection of case studies proves to be helpful to a wide range of national and international stakeholders, thereby fostering increased collaboration and accelerating cross-cutting initiatives under the UN Decade of Ocean Science.

Shigeki Sakamoto  
Chairman, Japan Society of Ocean Policy








Atsushi Sunami  
President, Sasakawa Peace Foundation

Table of case studies with corresponding outcomes

Title	Organization(s)	A clean ocean	A healthy and resilient ocean	A productive ocean	A predicted ocean	A safe ocean	An accessible ocean	An inspiring and engaging ocean	Pages
									
Promotion of measures against marine litter and marine plastic waste	Ministry of the Environment, Prefectures, Municipalities, others	◎							8, 9, 10
Comprehensive Marine Litter Prevention Project CHANGE FOR THE BLUE	The Nippon Foundation, Ministry of the Environment, Social Sports Initiative, others	◎							11, 12
Marine debris	Cabinet Secretariat, Consumer Affairs Agency, Ministry of the Environment, others.	◎	○	○	○	○	○	○	13, 14
Towards environmental protection and suitability of closed sea areas	International Environmental Management of Enclosed Coastal Seas (EMECS) Center	◎	○	○		○	○	○	15
Nation-wide ocean restoration project	Japan Coast Guard; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of the Environment; others	◎	○	○			○	○	16
Carbon dioxide capture and storage (CCS) and Carbon dioxide capture, utilization and storage (CCUS)	Ministry of Economy, Trade and Industry (Agency for Natural Resources and Energy and National Institute of Advanced Industrial Science and Technology); Ministry of the Environment.	◎	○	○		○			17
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International contributions to the conservation of coastal ecosystems	[Domestic] Kashima Technical Research Institute, Tokyo Institute of Technology, NPO Seaside Building Society, others [International] the University of Maryland (USA), the University of the Philippines Diliman, others.		◎	○	○		○	○	19, 20, 21
Biotechnology for Marine Microbiology	Waseda University, University of the Ryukyus, Shizuoka Prefecture/Institute of Water and Marine Technology, others	○	◎	○	○	○		○	22, 23
Marine Protected Area	Ministry of Foreign Affairs; Ministry of the Environment; Ministry of Agriculture, Forestry and Fisheries.	○	◎	○		○		○	24
Deep-sea monitoring of organisms in marine protected areas	Japan Agency for Marine-Earth Science and Technology, others	○	◎	○	○	○		○	25
Monitoring Site 1000	Ministry of the Environment (Biodiversity Center of Japan)	○	◎	○				○	26
Environmental impact assessment	Ministry of the Environment; Ministry of Economy, Trade and Industry; Ministry of Education, Culture, Sports, Science and Technology (MEXT, Japan Agency for Marine-Earth Science and Technology)	○	◎	○	○	○	○	○	27
A model project for Reiwa's SATOUMI creation	Ministry of the Environment	○	◎	○		○	○	○	28
International Partnership for the Satoyama Initiative	United Nations University Institute for Sustainability and Higher Education		◎	○					29
Coastal zone management in enclosed waters	Ministry of the Environment; Ministry of Land, Infrastructure, Transport and Tourism.	○	◎	○	○	○			30
Fisheries as a growth industry	Ministry of Agriculture, Forestry and Fisheries (Japan Fisheries Research and Education Agency); Ministry of Internal Affairs and Communications; Ministry of Land, Infrastructure, Transport and Tourism		◎	○	○			○	31
Study on National Land Vision in the 21st Century from Viewpoint of Oceans	NPO Umi-Roman 21, Ocean Energy Research Centre, Saga University, others		◎	○	○			○	32
Harmonization of development and use with environmental protection	Ministry of the Environment; Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology); Ministry of Land, Infrastructure, Transport and Tourism	○	◎	○	○	○	○	○	33
Research and study for the appropriate management of biofouling organisms	Japan Ship Technology Research Association	○	◎						34
Promotion of polar research	Ministry of Education, Culture, Sports, Science and Technology (National Institute of Polar Research, Japan Agency for Marine-Earth Science and Technology; Hokkaido University); others.	○	◎	○	○	○			35
Certification Program and eco-labeling for Sustainable Fisheries	Marine Stewardship Council (MSC)			◎					36
Japan's Original Marine Ecolabel: Marine Eco-label Japan	Marine Eco-label Japan Council, others			◎					37
Blue Seafood Guide	Sailors for the Sea Japan			◎					38
Sustainable, Healthy and "Umai" Nippon Seafood (SH"U"N) Project	Japan Fisheries Research and Education Agency			◎				○	39
Indonesian coastal fishing village project under the Official Development Assistance, Japan	North Pacific Marine Science Organization, others	○		◎		○	○		40

Title	Organization(s)	A clean ocean	A healthy and resilient ocean	A productive ocean	A predicted ocean	A safe ocean	An accessible ocean	An inspiring and engaging ocean	Pages
									
Bioresources	Ministry of Education, Culture, Sports, Science and Technology			○			○	○	41
Appropriate management of fisheries resources	Ministry of Education, Culture, Sports, Science and Technology; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of Foreign Affairs; others		○	○	○		○	○	42
Building smart aquaculture systems in tuna farming operations.	Sojitz Corporation, Sojitz Tuna Farm Takashima Corporation; Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology)			○					43
Offshore wind power	Cabinet Office; Ministry of Economy, Trade and Industry (Agency for Natural Resources and Energy); Ministry of Land, Infrastructure, Transport and Tourism; Ministry of the Environment			○				○	44
Ocean Energy	Cabinet Office; Ministry of Economy, Trade and Industry (Agency for Natural Resources and Energy); Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology)	○		○				○	45
Program for the development of technology to promote the utilization of marine resources	Ministry of the Environment; Ministry of Education, Culture, Sports, Science and Technology	○	○	○	○	○	○	○	46
Cooperation with ASEAN and Pacific Island countries	Ministry of Foreign Affairs, Ministry of Defense, Ministry of Land, Infrastructure, Transport and Tourism, Ministry of the Environment, Cabinet Office			○		○			47
Ocean analysis and forecasting systems assimilating satellite data	Ministry of the Environment; Ministry of Education, Culture, Sports, Science and Technology (Japan Aerospace Exploration Agency, Japan Agency for Marine-Earth Science and Technology); others		○	○	○	○	○		48, 49
"Kuroshio Oyashio Watch", a forecast of ocean conditions off the coast of Japan	Ministry of the Environment; Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology)				○		○		50
Forecasting ocean conditions and supporting fisheries along the Kyushu coast	Kyushu University Advanced Science Institute, Nagasaki University, Fukuoka Prefecture, Saga Prefecture, Nagasaki Prefecture, etc.			○	○				51
Research and development towards sustainable initiatives in the marginal seas of South and East Asia (SIMSEA)	Ministry of the Environment; Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology); Sasakawa Peace Foundation Institute for Ocean Policy; others.	○			○	○	○		52
Development of new technologies in the oceans	Ministry of Education, Culture, Sports, Science and Technology; Ministry of Economy, Trade and Industry; Ministry of Land, Infrastructure, Transport and Tourism (Japan Coast Guard)			○	○		○	○	53
Initiative for climate change and ocean acidification	Japan Meteorological Agency; Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology); Ministry of the Environment; others	○	○		○	○	○	○	54
OneArgo: a global, full-depth, multidisciplinary integrated oceanographic array for beyond 2020	Argo steering team		○	○	○	○	○	○	55
Promotion of ocean research	Cabinet Office; Ministry of Foreign Affairs; Ministry of Education, Culture, Sports, Science and Technology; Ministry of Agriculture, Forestry and Fisheries; Ministry of Economy, Trade and Industry; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of the Environment; others			○	○		○	○	56, 57
Promotion of basic science and Research & Development	Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology), University of Tokyo, Tokyo University of Marine Science and Technology, National Institute for Polar Research)			○	○		○	○	58
Promotion of research and development to be undertaken as a national initiative	Ministry of Education, Culture, Sports, Science and Technology; Ministry of Land, Infrastructure, Transport and Tourism; Cabinet Office; Ministry of Agriculture, Forestry and Fisheries; Ministry of the Environment	○	○	○	○	○	○	○	59
Promotion of Arctic observation and research	Ministry of Education, Culture, Sports, Science and Technology (National Institute for Polar Research, Hokkaido University, Japan Agency for Marine-Earth Science and Technology), others	○	○	○	○	○	○		60
Promotion of observational research in the Antarctic region	Ministry of Education, Culture, Sports, Science and Technology; Ministry of Defense; Ministry of Internal Affairs and Communications; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of the Environment; Ministry of Foreign Affairs; others	○	○	○	○	○	○		61
Enhancement and strengthening of the common infrastructure of ocean science and technology	Ministry of Education, Culture, Sports, Science and Technology; Ministry of Internal Affairs and Communications; Ministry of Land, Infrastructure, Transport and Tourism			○	○	○	○	○	62

Title	Organization(s)	A clean ocean	A healthy and resilient ocean	A productive ocean	A predicted ocean	A safe ocean	An accessible ocean	An inspiring and engaging ocean	Pages
									
Northwest Pacific Tsunami Advisory Centre	Japan Meteorological Agency					⊙			63
Monitoring of Waves on Land and Seafloor (MOWLAS)	National Research Institute for Earth Science and Disaster Resilience					⊙			64
Seafloor geodetic observation to elucidate the mechanism of major subduction-zone earthquakes	Japan Coast Guard, The University of Tokyo					⊙			65
Contribution to coastal disaster reduction by provision of detailed information about ocean currents and temperatures	Japan Meteorological Agency				○	⊙	○		66
Comprehensive safety and security measures for passenger ships	Ministry of Land, Infrastructure, Transport and Tourism					⊙		○	67
Safety and security measures in maritime transport	Ministry of Land, Infrastructure, Transport and Tourism				○	⊙	○	○	68
Responding to natural disasters of marine origin	Ministry of Agriculture, Forestry and Fisheries; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of Education, Culture, Sports, Science and Technology				○	⊙	○		69
Capacity building support	Ministry of Foreign Affairs (Japan International Cooperation Agency); Ministry of Land, Infrastructure, Transport and Tourism; Cabinet Office; Ministry of Defense; Ministry of the Environment; Nippon Foundation; others			○	○	⊙	○		70
Oceanographic Section Time-series Dataset for the 137° E Meridian	Japan Meteorological Agency	○	○		○		⊙		71
GEBCO Seabed 2030	The Nippon Foundation						⊙		72
Satellite observation of the marine environment and data dissemination	Japan Aerospace Exploration Agency (JAXA)	○	○	○	○	○	⊙		73, 74
Observing air-sea interactions strategy (OASIS)	SCOR Working Group #162 OASIS		○		○		⊙		75
The 2 <sup>nd</sup> cooperative study of the Kuroshio and its adjacent regions (CSK-2)	IOC/WESTPAC	○					⊙		76
One Ocean Network for Deep Observation	French National Institute for ocean science and technology; Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology)		○		○		⊙		77
Operation of the Japan Oceanographic Data Center	Japan Coast Guard; Fisheries Agency; Geospatial Information Organization of Japan; Japan Meteorological Agency; Ministry of the Environment; Regional Development Bureau; Local Public Entities; others						⊙		78
Effective use and enhancement of the function of the MDA ocean status display system (Umi-Shiru)	Cabinet Secretariat, Cabinet Office; Ministry of Education, Culture, Sports, Science and Technology; Ministry of Economy, Trade and Industry; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of the Environment; Ministry of Defense; others						⊙		79
Development and promotion of technologies for wind farms that create cross-sectoral synergies	Promotion and Research Institute for Ocean Economics, others	○	○	○	○		⊙	○	80
Utilization and conservation of ocean areas in coastal and remote island regions through "next-generation mobility" at the ocean	Ministry of Land, Infrastructure, Transport and Tourism; Cabinet Office; Fisheries Agency; Ministry of the Environment	○	○	○	○	○	⊙	○	81
Collection and dissemination of research data and efforts to effect behavioral change and build marine capacity at the Global Oceanographic Data Center (GODAC)	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)/Global Oceanographic Data Center (GODAC)	○	○			○	⊙	○	82, 83
Educational and research facilities on the Japanese coast: Marine Biological Laboratory and Fisheries Research Station	National, public and private universities	○	○				⊙	○	84
International cooperation efforts for a maritime order	Ministry of Foreign Affairs; Ministry of Education, Culture, Sports, Science and Technology; Ministry of Agriculture, Forestry and Fisheries; Cabinet Office			○		○	⊙		85
Information collection and disclosure	Cabinet Office; Ministry of Education, Culture, Sports, Science and Technology (National Institute of Policy Research); Ministry of Agriculture, Forestry and Fisheries; Ministry of the Environment, others	○	○	○	○	○	⊙	○	86
Oceanographic surveys and data sharing through international collaboration	Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology (JAMSTEC)); Ministry of Agriculture, Forestry and Fisheries (MAFF); Fisheries Research and Education Organization); Ministry of Land, Infrastructure, Transport and Tourism (MLIT)				○		⊙	○	87
Marine Open Innovation Project (MaOI Project)	Shizuoka Prefecture, Marine Open Innovation Institution	○	○	○	○	○	○	⊙	88

Title	Organization(s)	A clean ocean 	A healthy and resilient ocean 	A productive ocean 	A predicted ocean 	A safe ocean 	An accessible ocean 	An inspiring and engaging ocean 	Pages
Human resource development in ocean science	The Japan Science Society							◎	89, 90, 91
UNESCO associated school	Ministry of Education, Culture, Sports, Science and Technology (MEXT)							◎	92
Ocean Education Pioneer School Program	The Nippon Foundation, Ocean Policy Research Institute of the Sasakawa Peace Foundation							◎	93
Education and human resources development in ocean science	Ministry of Education, Culture, Sports, Science and Technology (MEXT); The University of Tokyo, National Institute of Polar Research (NIPR), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Tokyo University of Marine Science and Technology, others)							◎	94, 95, 96, 97
Activities of Early Career Ocean Professional Japan (ECOP Japan)	Ministry of Economy, Trade and Industry (Japan Agency for Marine-Earth Science and Technology) and Ocean Policy Research Institute							◎	98
Project for Women in Ocean	Ministry of Land, Infrastructure, Transport and Tourism; Fisheries Agency; Japan Coast Guard							◎	99
Social Cooperation Course	The University of Tokyo, others							◎	100
Attractive marine contents and leisure	Ministry of Land, Infrastructure, Transport and Tourism, Ministry of Agriculture, Forestry and Fisheries, Ministry of the Environment	○		○		○	○	◎	101
Creation of a plan for the future of coastal shipping and maritime transportation base	Ministry of Land, Infrastructure, Transport and Tourism,							◎	102
Public awareness	Cabinet Office: Ministry of Education, Culture, Sports, Science and Technology (MEXT); University of Marine Science and Technology); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of Foreign Affairs (MOFA); Tokyo University of Marine Science and Technology	○	○	○	○	○	○	◎	103

## “UN Decade of Ocean Science” Seven Outcomes

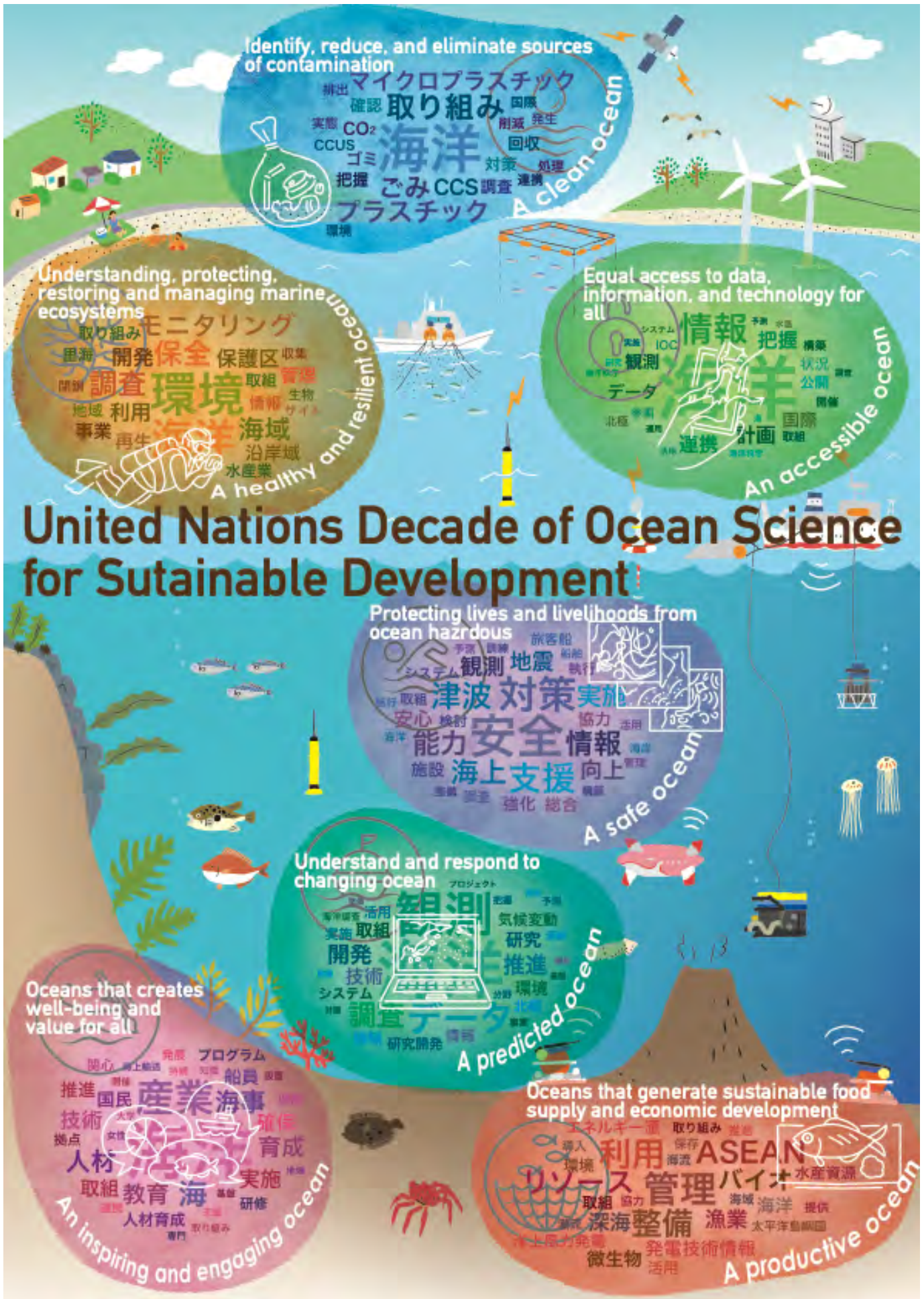
The United Nations Decade of Ocean Science outlines the following seven outcomes of "the Ocean We Want", which we aim to achieve through our activities during the decade from 2021 to 2030.

- A clean ocean: Investigate the effects of contaminants on humans and other lives.
- A healthy and resilient ocean: Investigate ecosystem anomalies associated with sudden changes in the marine environment.
- A productive ocean: Create a rich ocean where fish can be caught sustainably
- A predicted ocean: Enable accurate prediction of various ocean phenomena
- A safe ocean: Protect people's lives from various marine disasters
- An accessible ocean: Enable people everywhere to make better use of marine information
- An inspiring and engaging ocean: Create an ocean where all people, through their understanding of the ocean, act to use and protect it

In this collection, we show examples of initiatives being implemented in Japan, in a format organized by seven outcomes.

Reference: United Nations Decade of Ocean Science website  
<https://oceandecade.org/>





Identify, reduce, and eliminate sources of contamination

マイクロプラスチック  
 排出 確認 取り組み 国際  
 実態 CO<sub>2</sub> 削減 発生  
 CCUS ゴミ 回収  
 把握 ごみ CCS 調査 連携  
 プラスチック 環境

A clean ocean

Understanding, protecting, restoring and managing marine ecosystems

モニタリング  
 取り組み 開発 保全 保護区 収集  
 里海 調査 環境 取組 資源  
 開創 調査 環境 情報 生物  
 地域 利用 海洋 海域  
 事業 再生 沿岸域  
 水産業

A healthy and resilient ocean

Equal access to data, information, and technology for all

情報 把握 構築 状況 公開 調査  
 システム IOC  
 観測 データ  
 北極 運用 国際 取組  
 連携 計画

An accessible ocean

# United Nations Decade of Ocean Science for Sustainable Development

Protecting lives and livelihoods from ocean hazards

観測 地震 津波 対策 実施  
 システム 観測 地震 津波 対策 実施  
 旅行 取組 安心 検討 海洋 能力 安全 情報  
 施設 海上支援 向上  
 連携 強化 総合

A safe ocean

Understand and respond to changing ocean

観測 推進 研究 推進 環境 北極 調査 データ  
 システム 調査 データ  
 活用 取組 開発 技術 システム 調査 データ  
 研究開発

A predicted ocean

Oceans that creates well-being and value for all

産業 海事 育成 実施  
 推進 国民 産業 海事 育成 実施  
 技術 人材 取組 教育 海 研修  
 人財 取組 教育 海 研修  
 人財育成

An inspiring and engaging ocean

Oceans that generate sustainable food supply and economic development

ASEAN 利用 管理 漁業 提供  
 電子ルギー 取組 保存 海流 環境  
 取組 協力 管理 漁業 提供  
 深海 整備 漁業 太平洋島 提供  
 微生物 発電 技術 情報 活用

A productive ocean

# Promotion of measures against marine litter and marine plastic waste (1)

Project to promote local countermeasures against beach debris



Period: 2009–

Organization: Ministry of the Environment, Prefectures, Municipalities, others

Reference: 「The document of the 12<sup>th</sup> Countermeasures promotion meeting of marine debris」 (Ministry of the Environment)

([https://www.env.go.jp/water/marine\\_litter/conf/c02-12.html](https://www.env.go.jp/water/marine_litter/conf/c02-12.html)) (in Japanese)

In recent years, concerns have been growing about the degradation of coastal functions, deterioration of the environment and landscape, and obstructions to vessel navigation caused by marine litter. The Ministry of the Environment provides subsidies for projects implemented by prefectural and municipal governments to formulate regional plans against marine litter, collection and disposal of marine litter, and taking measures to control its generation (e.g., events such as coastal cleanup activities and environmental education for the purpose of spreading awareness), based on the Law for Promotion of Coastal Debris Disposal. By promoting marine litter countermeasures throughout Japan, we aim to conserve the marine environment and maintain and preserve the excellent marine landscape in the future, thereby realizing a beautiful and rich ocean that is essential for local communities and the promotion of local key industries such as fisheries and tourism.



Marine debris collection and processing activities by volunteers and heavy equipment

## Promotion of measures against marine litter and marine plastic waste (2)

### Smart Plastic



Period: 2019–

Organization: Ministry of the Environment

Reference: Plastic-smart (Ministry of the Environment)

(<https://plastics-smart.env.go.jp/>) (in Japanese)

“Plastic Smart” is an initiative promoted by the Ministry of the Environment to help solve the problem of marine plastic waste. A wide range of entities, including ministries, industry groups, corporations, local governments, NGOs, and consumers, are invited to submit ideas for “smart ways to deal with plastics,” such as curbing unnecessary single use plastics and developing and using alternatives, and these ideas will be disseminated widely in Japan and abroad using a variety of opportunities and methods. The website (<http://plastics-smart.env.go.jp/>) launched as part of this effort has more than 3400 initiatives registered as of the end of June 2024.



The Plastic Smart logo.

The “Plastic Smart” logo is provided free of charge for use by “Plastic Smart” endorsers. The logo can be used in news releases, product catalogs, business cards, etc. to promote the fact that the company is implementing initiatives that contribute to solving the ocean plastic problem.

## Promotion of measures against marine litter and marine plastic waste (3)

**Study and construct a database that maps marine plastic litter**



Period: 2020–

Organization: Ministry of the Environment

In order to reduce marine plastic litter, which has become a global issue, it is necessary for countries around the world to share scientific data on the distribution of marine plastic litter and to develop effective countermeasures based on this data. The Ministry of the Environment will collect and centralize monitoring data on marine plastic debris from around the world and study the establishment of a global data aggregation center.

# Comprehensive Marine Litter Prevention Project CHANGE FOR THE BLUE (1)

## Simultaneous action of litter pickup



Period: 2019 年–

Organization: The Nippon Foundation, Ministry of the Environment, Social sports initiative

Reference: 「SPO-GOMI」 Website (<https://www.spogomi.or.jp/>) (in Japanese)

CHANGE FOR THE BLUE is a project to create a movement to reduce marine litter, which is increasing globally and is feared to be impacting living organisms and human health. This project is designed to develop a pioneering model of reducing marine litter, through collaboration among various stakeholders in industry, government, academia, and the private sector, together with the Nippon Foundation, and to promote nationally and internationally. The project is developing simultaneous actions in Japan and overseas, as well as projects in the Seto Inland Sea, using the two major approaches based on evidence, data, and scientific findings from surveys: (1) controlling the generation of marine litter and (2) collecting the litter after it has been generated.

Since most marine litter is believed to originate on land, litter pickup is the "last resort" to prevent litter from flowing out to sea. We also believe that once people pick up litter, they will not litter again. Therefore, we provide various opportunities for litter pickups as activities for people to casually take action to reduce litter.

For example, since 2019, Change for the Blue has been jointly holding the "Marine Litter Zero Week" with the Ministry of the Environment twice a year, in spring and fall, as part of a nationwide cleanup campaign. The Foundation provides garbage bags to groups with a total of 30 or more people, and hundreds of thousands of people participate each year. In addition, this action supports the spread of "Spo-GOMI," which is a completely new sport originating in Japan that adds the essence of "sport" to the traditional litter pickup and allows people to participate while having fun. In addition to planning and supporting the "Spo-GOMI Koshien" for high school students, we hosted the first ever world championship "Spo-GOMI World Cup" in 2023.



# Comprehensive Marine Litter Prevention Project CHANGE FOR THE BLUE (2)

Setouchi Oceans X



Period: 2020–

Organization: The Nippon Foundation; Okayama, Hiroshima, Ehime, and Kagawa Prefectures

Reference: 「Setouchi Oceans X」 website (<https://setouchi-oceansx.jp>) (in Japanese)

As litter moves across boundaries of prefectures and municipalities, the role-sharing and responsibilities as to who and how collects it can sometimes be unclear. In addition, waste management in each region often remains a regional and individual effort, and there has been a lack of cross-disciplinary efforts among local governments, companies, researchers, and others.

In response, the Nippon Foundation and the four prefectures (Okayama, Hiroshima, Ehime, and Kagawa) surrounding the Seto Inland Sea, a closed sea area, concluded a partnership agreement in December 2020 to jointly implement a comprehensive marine litter control project. With the four pillars of "research and study;" "corporate and regional cooperation;" "awareness-raising, education, and action;" and "policy formation," the project aims to reduce the inflow of new litter into the Seto Inland Sea by 70% by 2025 and increase the amount collected by at least 10%, thereby decreasing the overall volume of litter in there. In order to develop the project based on evidence and data, a large-scale survey was conducted at the start of the project to determine the current status of garbage hotspots, sources, and the annual amount of garbage generated and collected. Based on these data, the project is, among other initiatives, developing a demonstration project to efficiently clean up large amounts of litter accumulated on remote islands, peninsulas, and other areas that are difficult for the general public to access; exploring new management methods for fishing-related litter such as buoys and floats, which are common in the Seto Inland Sea; and promoting the recycling of plastic resources.



The Nippon Foundation  
SETOUCHI  
Oceans X

# Marine debris (1)

## Initiatives to Reduce Marine Plastic Debris



Duration: 2019–

Organization: Cabinet Secretariat; Cabinet Office; Consumer Affairs Agency; Ministry of the Environment (MOE); Ministry of Foreign Affairs (MOFA); Ministry of Education, Culture, Sports, Science and Technology (MEXT, Japan Agency for Marine-Earth Science and Technology); Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of Economy; Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

References: 1) <https://www.env.go.jp/press/106864.html>  
2) <https://www.env.go.jp/press/106865.html>  
3) <https://www.env.go.jp/press/106073.html> (all in Japanese)

In recent years, plastics and other marine debris have been found in the world's oceans, raising concerns about pollution of the marine environment and its impact on ecosystems. Based on the "Basic Policy Based on the Law for Promotion of Shoreline Debris Disposal"<sup>1</sup> MOE and other relevant ministries and agencies are working together to identify the actual status of marine debris, collect and dispose of it, and take measures to control its generation, as well as to promote international cooperation. In addition, based on the "Action Plan for Marine Plastic Litter Countermeasures"<sup>2</sup> and other related plans, MOE and other relevant ministries and agencies are promoting efforts to identify the actual status of marine plastic litter, collect and dispose of it, and take measures to reduce its generation. Examples in Japan include support for the accumulation of scientific knowledge necessary to prevent the discharge of marine plastic litter in cooperation with international organizations such as the United Nations Environment Programme and support for environmentally appropriate plastic waste management and disposal in the Asian region (MOFA, MOE). Efforts to recycle marine plastic waste in the fisheries and aquaculture industries are supported under the "Sustainable Plastic Utilization in Agriculture, Forestry and Fisheries" project (MAFF). MOE publishes surveys and results to quantify the composition and distribution of marine debris, including microplastics, in coastal and offshore waters under the "Plastic Smart" program.<sup>3</sup> MLIT deploys marine environment maintenance vessels and collects marine debris using these vessels and others.

## Marine debris (2)

### Development of marine debris control technology



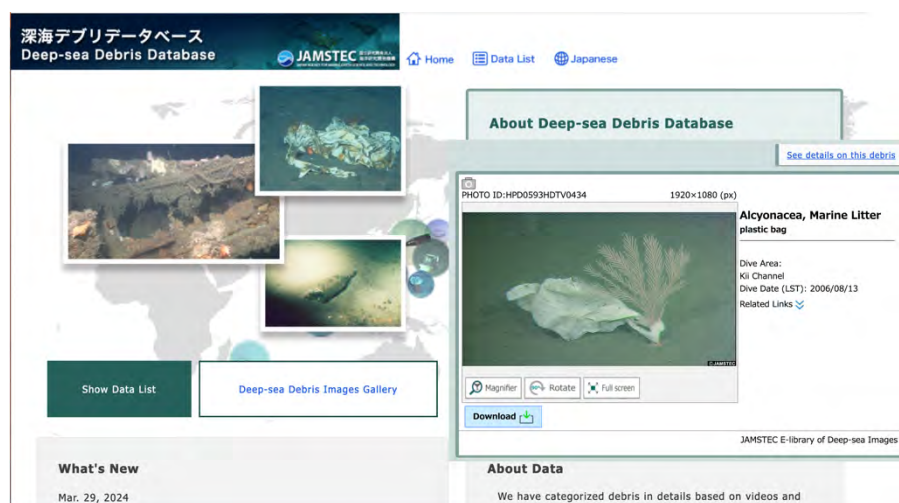
Period: 2019–

Organization: Ministry of the Environment (MOE); Ministry of Education, Culture, Sports, Science and Technology (MEXT); Japan Agency for Marine-Earth Science and Technology (JAMSTEC))

References: 1) <https://www.jamstec.go.jp/sdgs/j/case/027.html> (in Japanese)

2) [https://www.env.go.jp/press/press\\_02377.html](https://www.env.go.jp/press/press_02377.html) (in Japanese)

To implement the "Basic Policy Based on the Law for Promotion of Shoreline Debris Disposal," relevant ministries and agencies are developing various technologies to understand the actual status of marine debris, collecting and disposing of it, and taking measures to control its generation. Examples in Japan include the publication of a survey and its results to quantitatively understand the composition and distribution of marine debris, including microplastics, in coastal and offshore waters (MOE); the publication of the "Deep-sea debris database"<sup>1</sup> that extracts information on revised litter revealed by submarine surveys using submersible research vessels, unmanned probes, etc. (MEXT); research on the actual distribution of microplastics around Japan and in the Arctic region and the effects of microplastics on marine organisms (MEXT); research and development of a system for rapid and automatic analysis of the material, size, shape, and number of microplastic particles in seawater by using a hyperspectral camera, and a system for analysis of microplastics in seawater using Raman spectroscopy (MEXT(JAMSTEC)); preparation of guidelines for international harmonization of microplastics in drifting water<sup>2</sup>; and organization of international conferences to promote database construction and harmonization (MOE).



Deep-sea debris database (cited by MEXT, JAMSTEC)



# Towards environmental protection and suitability of closed sea areas



Period: Established in 1994 and became a public interest incorporated foundation in 2012

Organization: International Environmental Management of Enclosed Coastal Seas (EMECS) Center

Reference: International EMECS Center website (<https://www.emecs.or.jp/en/>)

The International EMECS Center was established to build an interactive network among governments, researchers, businesses, citizens, and other entities, to promote international and interdisciplinary exchanges, to conduct research and training, and to provide support for activities, thereby contributing to the conservation and creation of the environment of the world's enclosed seas and to the construction of a society in which humans can develop sustainably and coexist in harmony with nature. The organization also conducts surveys and research, human resource development, and public awareness programs. As a partner of PEMSEA (Partnership for Environmental Management in the Seas of East and Southeast Asia), we are working to promote development in harmony with environmental conservation in the seas of East and Southeast Asia.



Major enclosed seas of the world,  
including the Japan Sea and the Seto Inland Sea



Newsletter

# Nation-wide ocean restoration project



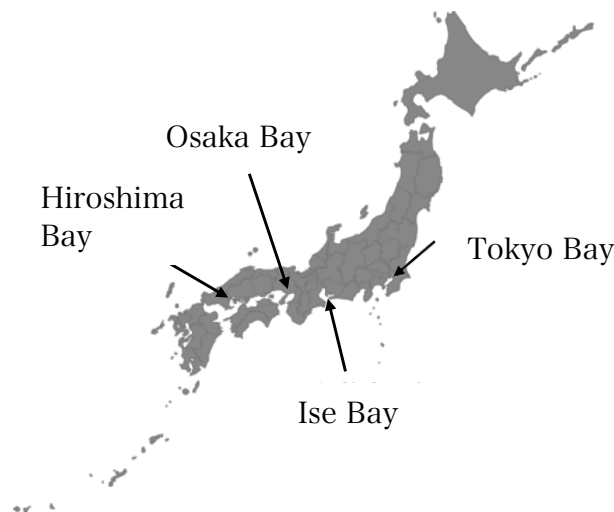
Period: 2002–

Organization: Japan Coast Guard; Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of the Environment (MOE); others

Reference: International EMECS Center website (<https://www.emecs.or.jp/en/>)

In highly enclosed seas near large cities, such as Tokyo Bay, large amounts of domestic wastewater and other pollutants flow into the sea; this pollution, together with the limited exchange of seawater with the open sea, results in many problems, such as chronic red tides and anoxia, that significantly harm aquatic biota.

To address such problems and contribute to restoration of the marine environment, the National Project for the Restoration of the Sea is cooperating with relevant ministries and agencies, mainly the Japan Coast Guard, MLIT, MOE, and local governments, to promote various measures. Starting with the Tokyo Bay Restoration Project that began in 2002, ocean restoration projects are currently being promoted in four bays throughout Japan (Tokyo, Osaka, Ise, and Hiroshima Bays).



Locations where the ocean restoration project is ongoing

# Carbon dioxide capture and storage (CCS) and Carbon dioxide capture, utilization and storage (CCUS)



Period: 1972–

Organization: Ministry of Economy, Trade and Industry (METI; Agency for Natural Resources and Energy, and the National Institute of Advanced Industrial Science and Technology) and Ministry of the Environment (MOE).

Reference: <https://www.enecho.meti.go.jp/about/special/johoteiky/ccus.html> (Japanese only)  
<https://blog.enerbank.co.jp/environment/ccs-how-is-going-on/> (Japanese only)

Thermal power generation and chemical plants that use fossil fuels, such as oil and coal, as energy emit large amounts of carbon dioxide (CO<sub>2</sub>) every day. Atmospheric CO<sub>2</sub> is one of the drivers of global warming, and reducing emissions has become an important issue worldwide. In recent years, among the various efforts to reduce CO<sub>2</sub> emissions are carbon dioxide capture and storage (CCS) and carbon dioxide capture, utilization, and storage (CCUS). In CCS, the CO<sub>2</sub> emitted from power plants and chemical factories is separated from other gases, collected, and stored or injected deep underground. CCUS is a process that utilizes separated and stored CO<sub>2</sub>.

Examples of CCS and CCUS efforts in Japan are organized by METI (the development of an optical fiber-based formation stability system, a study to improve the social acceptability of CCS, and the holding of tours and workshops at the Tomakomai CCS demonstration project) and MOE (a study to assess the environmental impact of CO<sub>2</sub> capture and storage and organizing the 3rd International Symposium on CCUS and Hydrogen in Japan in August 2022).



CCS Plant  
(Tomakomai, Hokkaido)  
From the METI website

# Preventing marine pollution

## Monitoring of radioactivity of radioactive materials



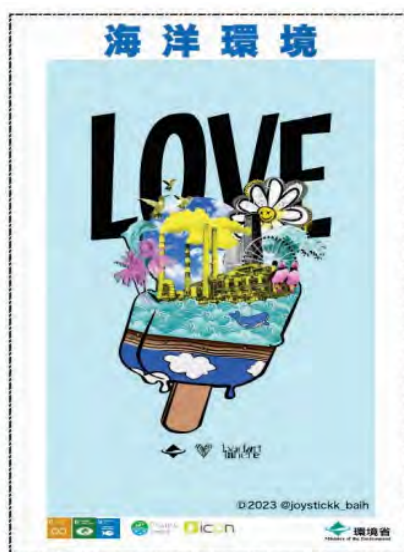
Period: 1970–

Organization: Ministry of the Environment (MOE; Nuclear Regulation Authority); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of Agriculture, Forestry and Fisheries (MAFF)

Reference: Monitoring and Coordination Meeting, Comprehensive Monitoring Plan (<https://www.env.go.jp/content/000120256.pdf>) (Japanese only)

Efforts to prevent marine pollution in Japan began with the enactment of the Law Concerning Prevention of Marine Pollution and Other Marine Disasters in 1970. Specific efforts are organized by MOE (confirmation of proper disposal and reporting of monitoring results for the offshore disposal of waste materials and sub-sea CCS, which are conducted under license from the Minister of the Environment) and MOE, MLIT (regulations on the discharge of oil, hazardous liquid substances, and waste materials from ships and offshore facilities; the use of fuel oil; confirmation of ballast water treatment equipment and assessment of unassessed liquid substances; and confirmation of the effectiveness of the relevant agencies training to strengthen close cooperation with related organizations; confirmation of contracts of surety, issuance of certificates of contracts of surety; and confirmation of information on contracts of surety reported by ocean-going vessels scheduled to enter a port, in order to ensure an appropriate response to oil pollution and other accidental damage.

In addition, since the accident at the Tokyo Electric Power Company's (TEPCO) Fukushima Daiichi nuclear power plant (NPP) triggered by the Great East Japan Earthquake on 11 March 2011, related organizations have been collaborating to conduct radiation monitoring of seawater, seabed sediments, marine organisms, and marine products in the vicinity of TEPCO's Fukushima Daiichi NPP, coastal areas, offshore areas, open sea, and Tokyo Bay based on the "Comprehensive Monitoring Plan". Radiation monitoring is being conducted by MAFF, MLIT, MOE (this ministry and the Nuclear Regulation Authority).



海洋環境保全ポスター

# International contributions to the conservation of coastal ecosystems (1)

## Coastal Ocean Assessment for sustainability and Transformation (COAST Card) Project



Period: 1 April 2020–31 March 2025

Organization: [Domestic] Kajima Technical Research Institute, Tokyo Institute of Technology, NPO Association Shore Environment Creation, Tokyo University of Marine Science and Technology, Japan Fisheries Research and Education Agency, and others

[International] The University of Maryland (USA), University of the Philippines Diliman, the Indian Council of Scientific and Industrial Research, the National Institute of Oceanography (India), and the University of Bergen (Norway).

This project aims to develop and apply the COAST Card, an integrated system consisting of innovative tools such as the Report Card (RC), Social Network Analysis (SNA), and System Dynamics Modelling (SDM), and thereby to create a new framework based on a transdisciplinary network that enables rational policymaking for the realization of a sustainable 'society-coastal ecosystem coexistence system'. The COAST Card is characterized by the fact that stakeholders in the target regions are closely involved in the development process of each system component and play active roles in the system operation. For this reason, emphasis is placed in this project on building close collaborations with various stakeholders.

## International contributions to the conservation of coastal ecosystems (2)

### Integrated Coastal Ecosystem Conservation and Adaptive Management under Local and Global Environmental Impacts in the Philippines (CECAM) Project



Period: 1 June 2009–28 February 2015

Organization: [Domestic] Tokyo Institute of Technology; Atmosphere and Ocean Research Institute, the University of Tokyo; Asia Center for Biological Resources and Environmental Research, University of Tokyo; Hokkaido University; Hachinohe Institute of Technology; Kochi University; Nagasaki University; University of the Ryukyus; Port and Airport Research Institute  
[International] University of the Philippines Diliman, and others

Coastal ecosystems in the Southeast Asia are characterized by their rich biodiversity, but have been rapidly deteriorated due to combined effects of various anthropogenic impacts and global environmental changes. This project investigated the mechanism of maintaining biodiversity of the coastal ecosystems in the Philippines, conducted comprehensive assessment of the environmental stresses on them, and analyzed the ecosystem response and recovery processes under multiple environmental stresses and the socioeconomic structure of the local communities causing the stresses. Based on these, it was attempted to develop and implement a new coastal ecosystem conservation and management scheme to maintain high biodiversity and disaster prevention function of coastal ecosystems and to realize sustainable development of local communities.

# International contributions to the conservation of coastal ecosystems (3)

## Comprehensive Assessment and Conservation of Blue Carbon Ecosystems and their Services in the Coral Triangle (*BlueCARES*)

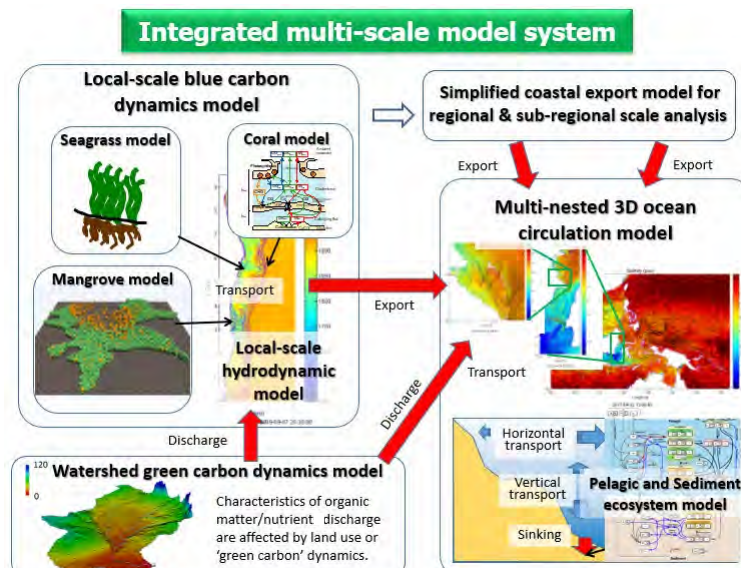


Period: 1 June 2016–31 March 2023

Organization: [Domestic] Tokyo Institute of Technology; Atmosphere and Ocean Research Institute, the University of Tokyo; Hokkaido University; Nagoya University; Hachinohe Institute of Technology; Forestry and Forest Products Research Institute; Japan International Research Centre for Agricultural Sciences; others.

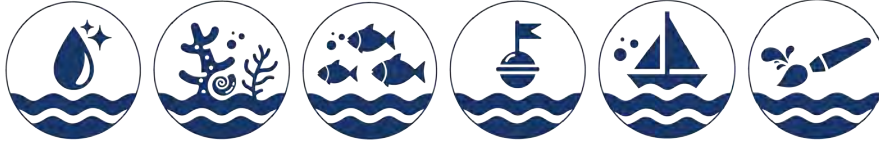
[International] University of the Philippines Diliman, Ministry of Marine Affairs and Fisheries of Indonesia, Bandung Institute of Technology (Indonesia), and others

Focusing on blue carbon, which is biological carbon sequestered in coastal-marine ecosystems, in the Philippines and Indonesia located in the Coral Triangle as the world center of biodiversity, this project aimed at establishing and proposing ‘Blue Carbon Strategy’, based on various surveys and model development and analyses, as an effective scheme for enhancing local efforts to conserve coastal ecosystems and improve their resilience and thereby for contributing to mitigation of global warming.



# Biotechnology for Marine Microbiology (1)

## Analyzing the impact of microbes in coral tissue on coral health



Period: 2012–

Organization: Department of Life Science and Medical Biosciences, Waseda University; Faculty of Science and Tropical Biosphere Research Centre, University of the Ryukyus; Okinawa Institute of Science and Technology

Reef-building corals comprise a diverse community known as the coral holobiont; this holobiont includes not only the coral animals but also a highly diverse microbial community of dinoflagellates (zooxanthellae), bacteria, Archaea, fungi, and viruses that live within the coral tissues and mucus layers. This coral holobiont is thought to have a significant impact on coral health. Until now, there has been much research on zooxanthellae, but research on the functions of commensal microbes has lagged. This initiative focuses on coral commensal microbes in Okinawa Prefecture and aims to analyze the impact of these microbes on coral health based on genome sequences.



Coral reef in Okinawa



# Biotechnology for Marine Microbiology (2)

## Large-scale genomic analysis reveals the diversity of biological resources in Suruga Bay

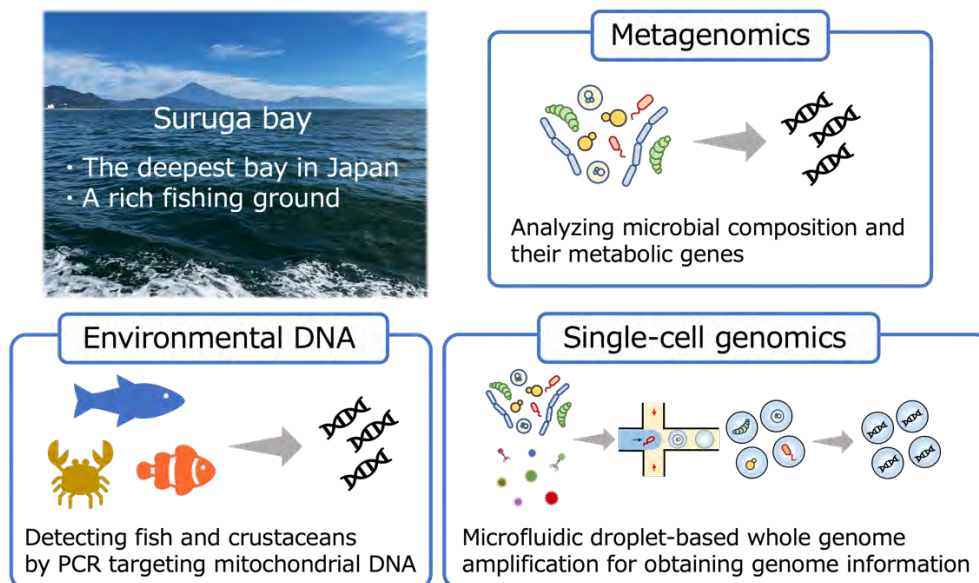


Period: 2020 –

Organization: Department of Life Science and Medical Bioscience, Waseda University; Marine Open Innovation Organization; Shizuoka Prefecture/Institute of Fisheries and Ocean Technology; National Institute of Advanced Industrial Science and Technology-Waseda Computational Bio Big-Data Open Innovation Laboratory; Department of Biotechnology, Tokyo University of Agriculture and Technology

Reference: Waseda University, Biomolecular Engineering Laboratory (Takeyama Laboratory)  
(<https://www.takeyama-lab.sci.waseda.ac.jp/en/>)

Suruga Bay, famous as the deepest bay in Japan, is also known as a rich fishing ground. To reveal the diverse ecosystems of Suruga Bay based on genomic information, this initiative carries out large-scale analyses of metagenomes, single-cell genomes, and environmental DNA. By collecting seawater samples from multiple sites, depths, and seasons in Suruga Bay and acquiring sequence big data, we have revealed the diversity of organisms ranging from fish to bacteria and viruses. In addition, the spatiotemporal localization and variation of various bacterial and viral lineages have been clarified, and it has become clear that dynamic changes in ecosystems associated with changes in the marine environment can be detected by large-scale genome sequencing.



# Marine Protected Area



Period: 2012–

Organization: Ministry of Foreign Affairs; Ministry of the Environment (MOE); Ministry of Agriculture, Forestry and Fisheries (MAFF)

Reference: <https://www.env.go.jp/nature/biodic/kaiyo-hozen/viewpoint/viewpoint05.html> (in Japanese)

Marine Protected Areas (MPAs) are marine areas designated and managed by law or other effective means, in consideration of use modalities, aimed at the conservation of marine biodiversity supporting the sound structure and function of marine ecosystems and ensuring the sustainable use of marine ecosystem services. In Japan, marine areas that are considered to fall under marine protected areas have long been designated in various ways, and a number of protected areas exist, including designated Natural Parks and Natural Monuments, Protected Waters and Coastline Marine Resource Development Area. Efforts related to marine protected areas include the acquisition of basic data for environmental surveys and adaptive management in some Offshore Seabed Nature Conservation Areas with the aim of enhancing appropriate establishment and management of marine protected areas (MOE); the dissemination of information on research results related to changes in ecosystem services in marine protected areas (MAFF and MOE); monitoring surveys of coral communities in Iriomote-Ishigaki National Park (Okinawa Prefecture), including monitoring of bleaching (MOE); and follow-up on the status of initiatives under the Coral Reef Ecosystem Conservation Action Plan 2022–2030 (MOE).



Table coral

MOE, 'Challenges and future efforts to establish marine protected areas based on the extraction of important marine areas'

<https://www.env.go.jp/council/12nature/y120-35/900433322.pdf> (in Japanese)

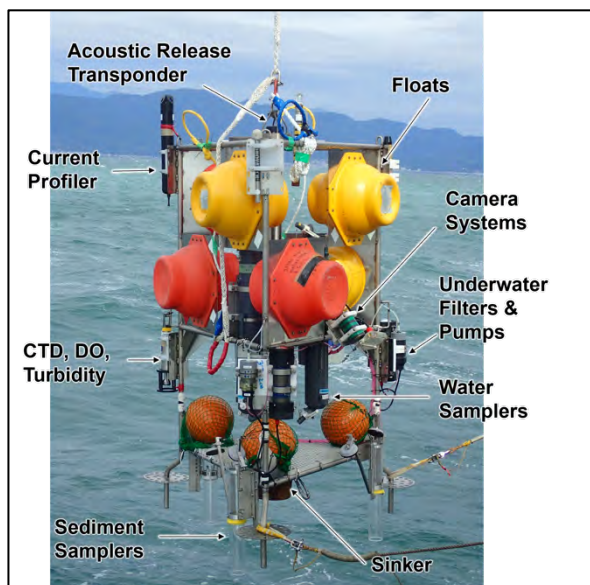
# Deep-sea monitoring of organisms in marine protected areas



Period: 2022–2030

Organization: Japan Agency for Marine-Earth Science and Technology, others

Marine biodiversity is monitored using a variety of methods, but several technical challenges remain in monitoring deep-sea organisms, and our understanding of deep-sea biodiversity is still insufficient. In this project, monitoring equipment and methods will be devised and improved, and deep-sea biodiversity surveys will be conducted using them. The project will survey the deep sea within Japan's Exclusive Economic Zone, collect knowledge on potential new Marine Protected Areas (MPAs) and other effective area-based conservation measures (OECMs), and discuss a possibility to set MPAs and OECMs with relevant stakeholders, including the Japanese Ministry of the Environment. The project will then aim to contribute towards the establishment of MPAs/OECMs in the High Seas. This project falls under the umbrella of the 'Marine Life 2030' program of the 'UN Decade of Marine Science'.



Small free-fall lander for use in the project to enable efficient field surveys in deep-sea areas



Manganese nodules developed on the seabed and a fish that appears to be a kind of macrourids.

# Monitoring Site 1000

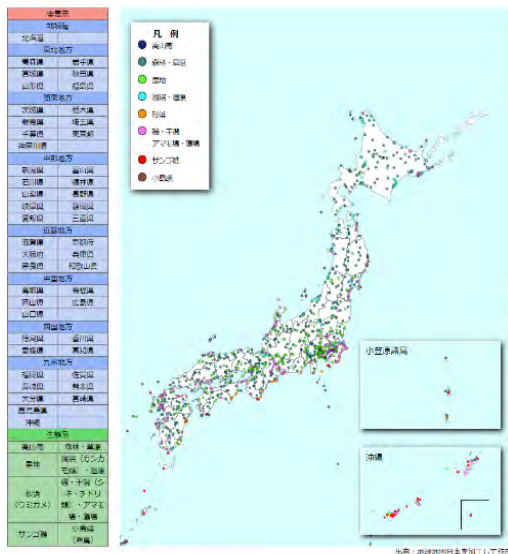


Period: 2003–

Organization: Ministry of the Environment (Biodiversity Centre of Japan)

Reference: Monitoring Site 1000 (<https://www.biodic.go.jp/moni1000/>) (in Japanese)

Japan is made up of thousands of islands spanning the subarctic to subtropical zones, and its varied topography and diverse climatic conditions have created rich ecosystems. In 2003, the Ministry of the Environment launched the 'Monitoring Site 1000' project to quickly identify the degradation of Japan's complex and diverse ecosystems and link the results to appropriate biodiversity conservation measures. Monitoring Site 1000 is a project to establish more than a thousand research sites across Japan and to continue collecting basic environmental information over more than 100 years. Monitoring Site 1000 has five characteristics: (1) a long-term perspective, (2) surveys throughout the country, (3) surveys anytime, anywhere using the same methods, (4) surveys in cooperation with others, and (5) a detailed analysis every five years. As part of efforts to address the marine ecosystem, monitoring surveys are carried out at research sites set up in coastal areas, coral reefs, and small islands on indicator organisms such as shorebirds, benthic organisms, seaweed, reef-building corals, and seabirds, as well as the surrounding vegetation and physical environment. Data obtained from the shorebird and plover surveys are provided to the Asian Waterbird Census. The Centre is also an active contributor to the International Coral Reef Initiative (ICRI) and the Global Coral Reef Monitoring Network established under the ICRI, and leads the analysis work in the East Asian region.



Monitoring Site 1000  
Coral reef survey

Location of monitoring sites [https://www.biodic.go.jp/moni1000/site\\_list.html](https://www.biodic.go.jp/moni1000/site_list.html) (in Japanese)

# Environmental impact assessment



Period: 1972 –

Organization: Ministry of the Environment (MOE); Ministry of Economy, Trade and Industry (METI); Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology, JAMSTEC)

Reference: Overview of the environmental assessment system (MOE)  
([http://assess.env.go.jp/files/1\\_seido/pamph\\_j/pamph\\_j.pdf](http://assess.env.go.jp/files/1_seido/pamph_j/pamph_j.pdf)) (in Japanese)  
(<https://www.jamstec.go.jp/bioenv/e/meia/>)

Environmental impact assessment (environmental assessment) is a process whereby, when deciding on the content of a development project, the project proponent itself carries out surveys, forecasts, and assessments of how the project will affect the environment in advance and then publishes the assessment to obtain opinions from the general public and local authorities; the resulting assessment is then used to create a better project plan based on the results, from the perspective of environmental preservation. In Japan, environmental assessment was introduced in 1972 for public works projects, and by 1980 a system had been established for port planning, land reclamation, power plants, and Shinkansen bullet trains. Subsequently, the Environmental Impact Assessment Law was passed in 1997, and the revised Environmental Impact Assessment Law came into force in 2013. Surveys have been conducted to upgrade environmental impact assessment methods and confirm their applicability in other ocean areas as initiatives for marine environmental assessment for marine mineral resources; presentations of the results have been made at international conferences and other events to contribute to international rule-making on deep-sea mining (METI). Regional environmental basics that can be used for environmental impact assessment, named “Environmental Assessment Database: EDAS15”, have been developed by MOE. MOE also collects marine environmental data for the environmental assessments for offshore windfarm. New technology for deep-sea biodiversity monitoring at the Offshore Seabed Nature Conservation Areas is under development by MEXT (JAMSTEC).



Initiative of JAMSTEC Marine Environmental Impact Assessment Research Group  
<https://www.jamstec.go.jp/bioenv/e/meia/>

# A model project for Reiwa's SATOUMI creation



Period: 2022–

Organization: Ministry of the Environment

Reference: Ministry of the Environment Website ([https://www.env.go.jp/press/press\\_01564.html](https://www.env.go.jp/press/press_01564.html)) (in Japanese)

It is important to conserve, restore and create seaweed beds and tidal flats, which have multifaceted functions, such as spawning grounds, habitats and growth areas, water purification, and carbon dioxide absorption and fixation. Some of these coastal areas are also 'Satoumi', where beautiful nature and human activities have coexisted in harmony for centuries. It is necessary to 'develop Satoumi based on local contexts', including detailed nutrient management in coastal areas and conservation, restoration, and creation of seaweed beds and tidal flats. The Reiwa's Satoumi Creation Model Project aims not only to conserve and restore seaweed beds and tidal flats, but also to create a virtuous circle scheme of 'conservation and utilization' using local resources. In this model, various local entities participate and cooperate in the 'conservation and restoration of the Satoumi' and 'utilization of the Satoumi' in both directions, resulting in conservation and restoration of seaweed beds and tidal flats. This is a model project that funds excellent local initiatives by organizations such as regional public bodies, councils, NPOs, companies, fisheries cooperatives, educational institutions, and private organizations (tourism associations, etc.), to create the interactive virtuous circle schemes described above.

**令和5年度「令和の里海づくり」モデル事業**

Ministry of the Environment

- 藻場・干潟がもつ多面的機能を最大限発揮する地域の「令和の里海」づくり活動(10地域程度)を支援
- 単なる藻場・干潟の保全再生等だけでなく、地域資源を利用した「保護と利活用」の好循環型スキーム(「里海の保全・再生」と「里海の利活用」が双方向に関与するモデル)の創出を目指す

 <p><b>里海×エコツーリズム</b> (提供：一般社団法人あこう魅力発信基地)</p>	 <p><b>里海×ブルーカーボン</b> (提供：新庄漁業協同組合)</p>
 <p><b>里海×特産品</b> (提供：岡山水産物流通促進協議会)</p>	 <p><b>里海×企業</b> (提供：ENEOS株式会社堺製油所)</p>

藻場・干潟等の保全・再生・創出と地域資源の利活用の好循環イメージ(令和4年度の事例)

令和5年度「令和の里海づくり」モデル事業  
(提供：一般社団法人あこう魅力発信基地、新庄漁業協同組合、岡山水産物流通促進協議会、ENEOS株式会社堺製油所)

A model project for Reiwa's SATOUMI creation (in Japanese)

# International Partnership for the Satoyama Initiative



Period: 2010–

Organization: United Nations University Institute for the Advanced Study of Sustainability

Reference: <https://satoyama-initiative.org/concept/satoyama-initiative/>

The International Partnership for the Satoyama Initiative (IPSI) was established during the 10th Conference of the Parties to the Convention on Biological Diversity. Its mission is to contribute to the realization of societies in harmony with nature through the conservation and sustainable use of biodiversity nurtured through human-nature relationships. The Partnership accumulates and shares knowledge and provides policy recommendations on the conservation and sustainable use of socio-ecological production landscapes and seascapes.

The secretariat of IPSI is hosted by the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) in Tokyo, with operational funding contributed by the Government of Japan.



A conceptual overview of the Satoyama Initiative

Source: The Satoyama Initiative (International Partnership for the Satoyama Initiative)

# Coastal zone management in enclosed waters



Period: 1970 –

Organization: Ministry of the Environment (MOE); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); and others

Reference: MOE, 'Guidance on community-led environmental improvement of enclosed marine areas' (<https://www.env.go.jp/water/%E5%85%A8%E4%BD%93%E7%89%88.pdf>) (in Japanese)

Many of Japan's coastal areas, such as Tokyo Bay and Ise Bay, are enclosed marine areas surrounded by land and with narrow connections to the open sea. Enclosed marine areas are characterized by a tendency for the exchange of seawater between the inner bay and the open sea to be constrained and for accumulation of organic pollutants and nutrients contained in domestic and industrial wastewater that flows into the bay from the land via rivers and other sources. During the period of rapid economic growth around 1975, the number of red tides in enclosed marine areas increased due to population growth and industrial development, causing large-scale damage to fisheries. Another problem is that when large amounts of organic matter, such as dead phytoplankton, settle to the seabed and are decomposed by micro-organisms, a large amount of oxygen is consumed near the bottom layer, causing depletion of dissolved oxygen, resulting in large anaerobic water masses and blue tides (bitter tides) that cause the death of aquatic organisms. Coastal zone management in such enclosed marine areas includes constant monitoring of water quality in public waters (MOE); implementation of environmental monitoring based on regeneration action plans prepared for Tokyo, Osaka, Ise and Hiroshima Bays; the creation of biological habitats and seaweed beds in Yokohama Port; collection of drifting rubbish on the sea surface by marine environmental improvement vessels; and dredging of sludge and other waste to conserve and improve the marine environment (MLIT).



Tokyo Metropolitan Government, Bureau of Port and Harbor, 'Sludge dredging and sand lining works for the Shibaura Canal in 2008' ([https://www.kouwan.metro.tokyo.lg.jp/jigyo/hp\\_18d18\\_shibaura.pdf](https://www.kouwan.metro.tokyo.lg.jp/jigyo/hp_18d18_shibaura.pdf)) (in Japanese)



## Fisheries as a growth industry



Period: 2018–

Organization: Ministry of Agriculture, Forestry and Fisheries (MAFF; Japan Fisheries Research and Education Agency); Ministry of Internal Affairs and Communications; Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

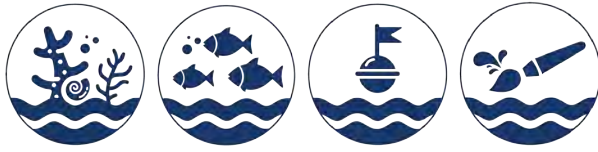
Reference: Prime Minister's Office, 'Growth Industrialization of Fisheries and Appropriate Management of Fisheries Resources' (<https://www.kantei.go.jp/jp/singi/nousui/dai21/siryou6.pdf>) (in Japanese)

Japan's fisheries production has significantly declined since the 1980s, and the number of fishermen has continued to decline. In response, the Government of Japan has strengthened its efforts to reinforce the structure of the fisheries industry and to shift it to sustainable and profitable operations (making the fisheries industry a growth industry). MAFF is involved in all of the following specific initiatives, some with participation by other indicated ministries: promotion of the formulation of the 'Revitalization Plan for Beaches'; holding follow-up meetings of the Liaison Conference of Relevant Ministries and Agencies for Maritime Broadband (with MLIT); improving the functions of fishing ports and other facilities to enhance the competitiveness of the fishing industry and promote exports; ensuring that production and distribution systems meet the needs of export destination countries; securing production and distribution systems to strengthen the competitiveness of the fishing industry and promote exports; developing fishing grounds to create a rich ecosystem and improve the productivity of the sea area; supporting border surveillance activities and marine disaster rescue training by fishermen and others through grants for activities that contribute to the fulfilment of the multifaceted functions of the fishing industry and fishing villages; promotion of research for the advancement of resource surveys using research vessels, etc.; resource surveys and breeding experiments to strengthen the competitiveness of the fishing and aquaculture industries; and the collection of scientific information on the ecological characteristics of fishery resources.



Bluefin tuna raised from hatchery-produced larvae growing at the sea surface fish ponds

# Study on National Land Vision in the 21st Century from Viewpoint of Oceans



Period: 2016–

Organization: NPO Umi-Roman 21; Institute of Ocean Energy, Saga University (IOES); Deep Ocean Water Application Society (DOWAS); International Energy Association, Japan (IOEJ); Global Ocean reSource and Energy Association Institute (GOSEA)

Reference: NPO Umi-Roman 21 website (<http://ur21.net/>) (in Japanese), GOSEA website (<https://www.gosea.info/en/>)

Based on the principle that the 21st century is the era of the development of a new maritime civilization, this project is supporting ocean researchers and educators, as well as research and study activities related to marine resources and energy, which have great potential to elucidate the diversity of the ocean, a common asset of humanity, and to widely disseminate the results of such research. In particular, as a countermeasure against serious global warming and climate change, we are studying various ways to utilize lifted deep ocean water (DOW) based on the application of OTEC technology, such as reducing the disaster of typhoon by cool-down of surface temperature, and promoting the absorption of carbon dioxide in the atmosphere by stimulating primary production through the supply of nutrients from deepwater. The cultivation of prawns, oysters and fish using deep oceanwater (DOW), which is cold, clean, and rich in nutrients, is on track for further expansion and effective utilization. The "Kumejima Model", which aims to commercialize thermal power generation, is attracting international attention. Furthermore, international cooperation projects are underway to transfer ocean thermal energy conversion (OTEC) technology overseas to contribute to the economic and social development of island countries such as Palau and Mauritius.



Kumejima Model (website of Kumejima-cho, Okinawa)



International Cooperation on Ocean Thermal Energy Conversion (OTEC). (Engineers from the Republic of Fiji visited the demonstration facility on Kumejima) (From the website of the town of Kumejima, Okinawa) Prefecture)

Temperature difference at depth 20m of the eastern Okinawa 100km mesh

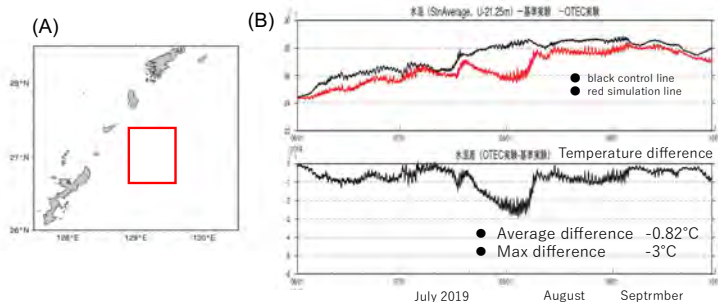


Fig. A (left). Map of the study area (100km mesh: red square) located in the eastern Okinawa Islands (Fig. A), and numerical simulation of surface water temperature change induced by artificial up-welling (AU)(Fig. B) .

Fig. B (right). (upper) indicates time-series of the surface water temperature (20m depth) change obtained from AU simulation from 800m depth and control without AU. Fig. B (lower) indicates the difference of surface water temperature between the above two conditions. (from the report of Umi-Roman21, 2023)

## Harmonization of development and use with environmental protection



Period: 2007–

Organization: Ministry of the Environment (MOE); Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology, JAMSTEC); Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Reference: Basic Act on Ocean Policy (<https://elaws.e-gov.go.jp/document?lawid=419AC1000000033>) (in Japanese)

The Basic Act on Ocean Policy, which came into force in July 2007, states in Chapter 3, Article 25, 'Integrated Management of the Coastal Zone' that it is necessary to pay sufficient attention to the conservation of the coastal environment and to ensure appropriate use of the coast. The motivation is that to continue to enjoy the benefits of the resources and natural environment of coastal waters in the future, it is necessary to develop and utilize them in a sustainable manner while maintaining a healthy ecosystem. Efforts to harmonize the development and use of the ocean with environmental conservation include comprehensive assessment of environmental conservation, business feasibility, social adjustment, and the establishment of areas where the introduction of renewable energy can be promoted; support for local authorities through zoning assistance projects for initiatives to utilize these areas (MOE); and support for the understanding of the marine environment in coastal areas through environmental monitoring surveys and technological studies on water quality, sediment and benthic organisms in order to understand the marine environment in coastal areas (MOE). MEXT and JAMSTEC develop methods for observing marine biodiversity and habitats and for assessing development impacts through analysis of collected data. MLIT develops port infrastructures that promote the settlement of diverse marine life. MOE supports the development and use of offshore wind power projects, which are expected to increase in the future in terms of development and utilization. MOE is involved in the collection of marine environmental information necessary for environmental impact assessments and appropriate environmental impact assessment procedures for offshore wind and other development projects.



Seaweed thriving on populated reefs.  
(<https://www.mlit.go.jp/river/kaigan/main/kaigandukuri/sugata04.html>)  
(in Japanese)

# Research and study for the appropriate management of biofouling organisms



Period: 2013–

Organization: Japan Ship Technology Research Association

Reference: “Strategic response to the International Maritime Organization”

(Japan Ship Technology Research Association, <https://www.jstra.jp/en/regulations/response/>)

The Ballast Water Management Convention entered into force in September 2017 with the aim of reducing the impact on ecosystems caused by invasion of aquatic organisms through ballast water (water taken and discharged in each sea area to adjust the balance of ships). Japan has concluded the Convention and been working to protect the marine environment by requiring ocean-going vessels to install equipment to manage organisms contained in ballast water.

Meanwhile, the International Maritime Organization (IMO) has been discussing the impact on the marine environment caused by the transfer of organisms attached to ships' hull, etc. A revised Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species was adopted in 2023, and the new guidance on underwater hull cleaning, one of the most important measures for ships' biofouling management, is currently being discussed. In order to make these guidelines more realistic and effective, the Japan Ship Technology Research Association (JSTRA) holds meetings with relevant industries to ascertain the current situation in Japan and submits opinions to IMO for improving the guidance.



Before cleaning



Before cleaning



After cleaning



After cleaning

# Promotion of polar research



Period: 1955–

Organization: Ministry of Education, Culture, Sports, Science and Technology (National Institute of Polar Research, Japan Agency for Marine-Earth Science and Technology, Hokkaido University); Ministry of the Environment; Ministry of Internal Affairs and Communications (National Institute of Information and Communications Technology); Ministry of Land, Infrastructure, Transport and Tourism (Geographical Survey Institute, Japan Meteorological Agency, Japan Coast Guard); Ministry of Defense; Tokyo University of Marine Science and Technology; and others

There is a great societal need to understand the global climate system and to predict future climate with high accuracy. In recent years, it has become clear that atmospheric and oceanic conditions in both polar regions have a significant impact on the climate of mid-latitude regions, including Japan. In an era of human activity spreading globally, observations in the geographically isolated polar regions are important, and this importance is expected to increase further.

Research expeditions in Antarctic region are engaged in long-term, continuous research and observations that take advantage of the unique characteristics of the Antarctic region, which is little affected by human activities. The expeditions conducted joint oceanographic observations with the Antarctic research vessel Shirase and the Tokyo University of Marine Science and Technology training ship Umitaka-Maru.

In the Arctic region, where the effects of global warming, such as the rapid decrease in sea ice cover, have been most noticeable in recent years, advanced research into weather and climate prediction is promoted and is also strategically engaged in human resource development and information dissemination. Furthermore, as an international research platform for the Arctic, an Arctic research vessel MIRAI II with ice-breaking capabilities and the ability to observe the Arctic sea ice area has been built. Polar research will be accelerated through these initiatives.



Image of the new Arctic research vessel MIRAI II

Arctic Challenge for Sustainability II (ArCS II)  
<https://www.nipr.ac.jp/arcs2/e/about/>

# Certification Program and eco-labeling for Sustainable Fisheries



Period: 1997 –

Organization: Marine Stewardship Council (MSC)

Reference: MSC website (<https://www.msc.org/jp>)

The MSC ecolabel is used only for seafood caught by fisheries that meet the MSC Fisheries Standard, a benchmark for sustainable fishing based on the UN FAO Code of Conduct for Responsible Fisheries. The MSC Fisheries Standard is used when assessing whether fishing activities are being carried out in a sustainable manner based on appropriate management practices, taking impact on marine resources and the environment into account. If a fishery is certified as having satisfied the MSC Fisheries Standard, seafood coming from the certified fisheries will be entitled to affix the MSC ecolabel. To ensure only certified seafood carries the label, every business in the supply chain must be certified against the MSC Chain of Custody Standard. This standard is applicable to all fisheries that catch fishes living in natural seawater and freshwater bodies. The scope of eligible species includes fish, shellfish, and crustaceans (but not mammals, birds, amphibians, or reptiles). A fishery is assessed by a third-party independent assessment body that has been independently accredited by Assurance Services International (ASI).



MSC ecolabel

# Japan's Original Marine Ecolabel: Marine Eco-label Japan



Period: 2007 –

Organization: Marine Eco-label Japan Council, Japan Fisheries Resources Conservation Association (JFRCA), Marine Ecology Research Institute (MERI)

Reference: Marine Eco-label Japan Council website (<https://melj.jp/eng/>)

The Marine Eco-label Japan (MEL) was established in 2007 by the Japan Fisheries Association in line with a series of guidelines adopted by the Food and Agriculture Organization of the United Nations in 2005 for the sustainable use of marine products at the production stage (fisheries) and the processing and distribution stage. In 2016, the Marine Eco-Label Japan Council took over as the scheme owner with the mission of international standardization and taking into account the characteristics of the Japanese fisheries industry including aquaculture. JFRCA, as a certification body, accepts audits from applicants in accordance with the MEL scheme and certifies them through audits conducted by expert assessors. JFRCA is accredited by the Japan Accreditation Board for Conformity Assessment (JAB) as a certification body for MEL, and JAB is a member of the International Accreditation Forum, which accredits product certification bodies and inspection bodies according to ISO standards, making MEL an internationally recognized seafood ecolabel. The Marine Ecology Research Institute, which had applied to JAB as the second certification body for MEL, was accredited in December 2023. Thus, MEL certification activities will now be operated by a second organization together with JFRCA.



Marine Eco-label Japan logo



Practical use cases

# Blue Seafood Guide



Period: 2013–

Organization: Sailors for the Sea Japan

References: Blue Seafood Guide 2024 (Sailors for the Sea Japan)

(<https://sailorsforthesea.jp/common/data/blueseafodguide.pdf>) (in Japanese)

Fish stocks that have been drastically depleted are also known to recover through properly managed fisheries. The Blue Seafood Guide evaluates seafood available in Japan based on international standards for measuring the sustainability of fisheries, with its own additional methods, and recommends sustainable seafood as ‘Blue Seafood’.



Blue Seafood Guide 2024

On its website, the Blue Seafood Beauty Book not only lists blue seafood, but also introduces its beauty and health benefits and recommended recipes, which are also communicated on social networking sites. The book also recruits Blue Seafood Partners and actively works with more than 70 stakeholders, large and small, including local authorities, companies and schools. Regional editions of Blue Seafood, such as the Tokyo edition and the Hiroshima edition, are also published, based on detailed regional data, taking advantage of comprehensive agreements with local authorities. The program promotes sustainable and economic development of fisheries resources through preferential procurement of sustainable seafood.



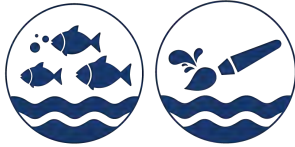
Blue Seafood Beauty book ⇨

⇨ Blue Seafood local book





# Sustainable, Healthy and “Umai” Nippon Seafood (SH“U”N) Project



Period: 2016–2022

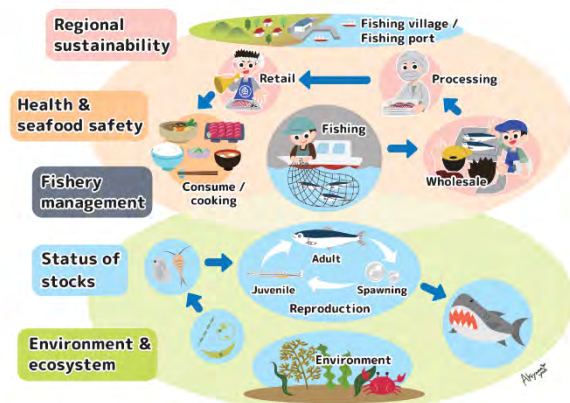
Organization: Japan Fisheries Research and Education Agency

Reference: SH“U”N Project website (<https://sh-u-n.fra.go.jp/>)

The Fisheries Research and Education Agency implemented the Sustainable, Healthy and “Umai” Nippon Seafood (SH“U”N) project from 2016 to 2022. This project provided scientific information in an easy-to-understand format, with the aim of supporting consumers' efforts to maintain the sustainability of resources through their own decisions. The SH“U”N project reported on the results of its activities to encourage people to rethink the connection between their tables and the sea and to continue eating sustainable seafood in the future.



SH“U”N Project website (<https://sh-u-n.fra.go.jp/>)



Conceptual diagram of the fisheries system in the SH“U”N project

# Indonesian coastal fishing village project under the Official Development Assistance, Japan



Period: 2017–

Organization: [Domestic] Japan Fisheries Research and Education Agency, the University of Tokyo, Hokkaido University  
 [International] North Pacific Marine Science Organization (PICES), Indonesian Agency for Technology Application and Evaluation (BPPT), Maine University, and others

Reference: Building capacity for coastal monitoring by local small-scale fishers (PICES)  
 (<https://meetings.pices.int/projects/FishGIS>)

Creating a phytoplankton-fishery observing program for sustaining local communities in Indonesian coastal waters (PICES) (<https://meetings.pices.int/projects/FishPhyO>)

The project co-designed and co-implemented a smartphone-based environmental and resource monitoring study with small-scale coastal fishermen in Indonesia. Photographs are taken by local fishermen with their smartphones on five topics: water quality, harmful plankton, fish catches, illegal fishing operations and marine plastic litter, and the geographical information and image data are transferred to BRIN and other government research institutions through a GIS application developed by the project. The results of the analysis are fed back to the community. In the third phase (FishPhyO project) starting in 2023, monitoring functions related to 'safe oceans', such as food safety and tsunami preparedness information, have been added, as well as simple resource analysis based on image data of catches.



User interface of the application.

Collection of real-time information on catch images, Illegal, Unreported and Unregulated fishing, marine litter, red tide outbreaks, human resource development, database development, and manual preparation

Source: 'Japan Fisheries Agency data'.

# Bioresources



Period: 2002–

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Reference: National BioResource Project (NBRP) website (Ministry of Education, Culture, Sports, Science and Technology (<https://nbrp.jp/en/about-en/>), Japan Agency for Marine-Earth Science and Technology (JAMSTEC) website, “Deep-sea bioresource provision project” (<https://www.jamstec.go.jp/cebn/bioresource/j/>) (in Japanese)

Bioresources refer to faunal, floral, and microbial strains, populations, tissues, cells and genetic materials as well as information on them as materials for research and development as the basis of life science research. From the perspective of comprehensively promoting life sciences, MEXT has been implementing the National BioResource Project (NBRP) since 2002 to develop a system for systematic collection, preservation and provision of bioresources, such as experimental animals, plants, and microorganisms, which are strategically important for Japan to maintain. The NBRP aims to improve the quality of bioresources and is developing value-added bioresources by analyzing genomic information and developing preservation technologies to meet the needs of the times. The NBRP is also strengthening the functions of its information centers, which provide information on the location of bioresources. Deep-sea bioresources are one example of marine bioresources. Microorganisms living in the extreme environment of the deep sea have unique survival strategies that differ from those of microorganisms on land. Deep-sea microorganisms are expected to be a source of various innovations, but because samples are extremely difficult to obtain, industrial use of deep-sea microorganisms has hardly progressed. To promote the industrial use of deep-sea bioresources, JAMSTEC has established an open innovation system in collaboration with industry, universities, and research institutions, and it is providing access to two external resources: deep-sea sediments and deep-sea microbial strains (MEXT).



Deep-sea microorganisms (strain A04V of the genus *Nautella*) that grow with a preference for D-amino acids (<https://www.jamstec.go.jp/cebn/bioresource/j/>) (in Japanese)

## Appropriate management of fisheries resources



Period: 2018–

Organization: Ministry of Agriculture, Forestry and Fisheries (MAFF; Fisheries Agency and Fisheries Research and Education Agency); Ministry of Education, Culture, Sports, Science and Technology; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of Foreign Affairs (MOFA).

Reference: Fisheries Agency website “Resource Management Room” (<https://www.jfa.maff.go.jp/j/suisin/>) (in Japanese)  
<https://www.jfa.maff.go.jp/j/suisin/attach/pdf/index-63.pdf> (in Japanese)

The Japanese fishing industry plays an extremely important role in providing a stable supply of fisheries products to the public, as well as contributing to the development of the fishing industry and fishing villages. To maintain and sustainably utilize limited fisheries resources, it is essential to appropriately manage them. Efforts for the appropriate management of Japan's fisheries resources include the development and expansion of a data collection system using research and fishing vessels (MAFF); the construction of Fisheries Research Vessel "Kaiyomaru", a replacement research vessel capable of the latest fisheries resource and marine research (Fisheries Agency); and development and implementation of a road map for the promotion of new resource management initiatives (existing Total Allowance Catch (TAC), Maximum Sustainable Yield-based TAC management for species, and implementation of individual quotas in offshore fisheries (ministerially licensed fisheries) that mainly catch TAC species). Other MAFF initiatives include a frontier fishing area development project to increase fisheries resources in Japan's Exclusive Economic Zone, promotion of resource management and wide-area fisheries environment development in response to the life history of aquatic organisms in conjunction with the "create and nurture fisheries (marine ranching and stock enhancement)". MAFF also leads discussions on conservation and management measures based on scientific evidence, such as the introduction of a management system for skipjack tuna at the Western and Central Pacific Tuna Commission (2022) and for Atlantic bluefin tuna at the International Commission for the Conservation of Atlantic Tunas (with MOFA). MAFF actively provides information on illegal, unreported and unregulated fishing vessels observed in the waters surrounding Japan to multilateral frameworks such as the Food and Agriculture Organization of the United Nations Agreement on Port State Measures to Prevent Illegal Fishing and relevant municipal fisheries management bodies.

# Building smart aquaculture systems in tuna farming operations



Period: 2018–

Organization: Sojitz Corporation, Sojitz Tuna Farm Takashima, Ltd.; Japan Agency for Marine-Earth Science and Technology

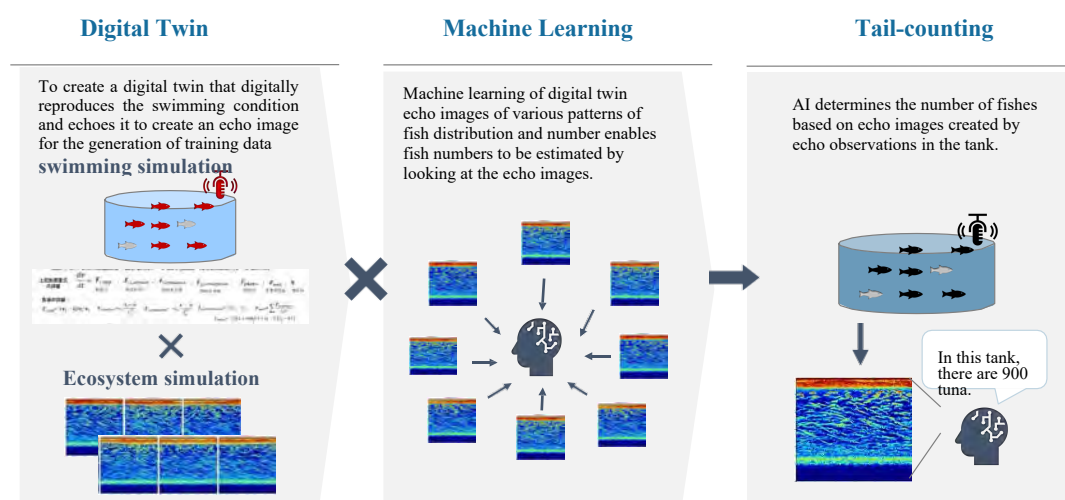
Reference: Sojitz Corporation website (Caravan/Special)

([https://www.sojitz.com/caravan/special/dx\\_2.html](https://www.sojitz.com/caravan/special/dx_2.html)) (in Japanese)

In the rearing environment in the tuna aquaculture business, construction is underway for a smart aquaculture system that actively incorporates information and communication technology. This project is engaged in research and development to improve the efficiency of aquaculture. We are conducting joint research with research institutions on automatic counting of the number of individuals (fish number counting technology) using image analysis, to improve the efficiency and accuracy of the work to ascertain the number of individuals in each farming operation. Other initiatives to build a smart aquaculture system include the prediction of red tide migration to reduce the risk of deaths in the aquaculture industry and the introduction of a data analysis platform.

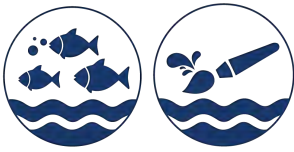
## / Tuna farming – counting the number of fish -

To count the number of tuna tails, we tried the digital twin approach, which reproduces the entire fish tank in a digital space.



In the past, we have carried out photographic tail-counting and sonar observations, but these have failed due to the limitations of underwater technology. We adopted this machine learning technology because of the nature of the search and the digital twin.

# Offshore wind power



Period: 2018–

Organization: Cabinet Office; Ministry of Economy, Trade and Industry (METI, Agency for Natural Resources and Energy); Ministry of Land, Infrastructure, Transport, and Tourism (MLIT); Ministry of the Environment (MOE)

Reference: MOE and MLIT “Get to know offshore wind power.”  
([https://www.enecho.meti.go.jp/category/saving\\_and\\_new/saiene/yojo\\_furyoku/dl/yojo\\_shirou.pdf](https://www.enecho.meti.go.jp/category/saving_and_new/saiene/yojo_furyoku/dl/yojo_shirou.pdf)) (in Japanese)

Offshore wind power, a powerful technology to achieve renewable generation of electricity, is essential for Japan to achieve carbon neutrality by 2050. Until now, Japan has been working on the introduction of this technology within its waters in accordance with the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities, which became law in November 2018. In recent years, there has been an increasing need for environmental improvements, including legislation to enable the deployment of offshore wind power in Japan’s Exclusive Economic Zone. Interim targets for increasing the development of offshore wind power are 10 gigawatts (GW) by 2030 and 30–45 GW by 2040, as set out in the Offshore Wind Industry Vision (Phase 1) (Cabinet Office, METI, MLIT). Information in the Environmental Assessment Database, which contains basic regional environmental information that can be used for environmental impact assessments and estimation of offshore wind power potential are provided by MOE and included in the Renewable Energy Information Provision System named REPOS. A shift is ongoing from the conventional "pull-type" approach of responding to requests from power sources on a case-by-case basis to a "push-type" approach, in which the potential of power sources, including renewable energy, is taken into account and grids are formed proactively and systematically by general transmission and distribution companies and electricity wide area operation promotion organizations (METI and others).



View of offshore wind turbines (Port of Akita)

# Ocean Energy

## Wave forces, tidal forces, currents

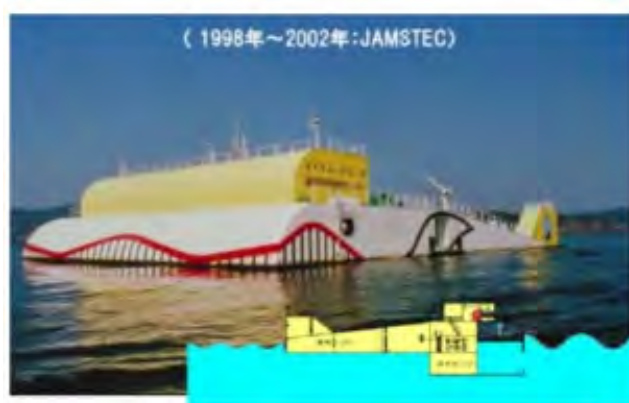


Period: 2012–

Organization: Cabinet Office; Ministry of Economy, Trade and Industry (Agency for Natural Resources and Energy); Ministry of the Environment (MOE); Ministry of Education, Culture, Sports, Science and Technology (Japan Agency for Marine-Earth Science and Technology: JAMSTEC)

Reference: Cabinet Office website “Special issue on promotion of the use of marine renewable energy sources.” ([https://www8.cao.go.jp/ocean/info/annual/h24\\_annual/pdf/h24\\_annual\\_1\\_3.pdf](https://www8.cao.go.jp/ocean/info/annual/h24_annual/pdf/h24_annual_1_3.pdf)) (in Japanese)

Renewable energy refers to energy from sources other than fossil fuels that can be used permanently, and renewable energy in the ocean includes power from waves, offshore wind, tides, tidal currents, ocean currents, and sea surface temperature differences. Efforts to use wave power as an energy source include the development of an offshore floating wave power generator (JAMSTEC), which generates electricity by converting the power of waves coming into the device into air vibrations and turning a turbine, and a method of generating electricity by converting the movement of a structure floating in the sea due to waves into rotational energy. Tidal energy technologies include using the periodic rise and fall of the sea surface due to tidal forces, closing dykes at high tide and using the potential energy stored in seawater to generate electricity. Technology that uses tidal currents and ocean currents as an energy source generates electricity by turning a propeller or turbine with the energy of these currents. Steady ocean currents, like the Kuroshio Current, flow continuously. MOE is demonstrating the commercial deployment of tidal current power generation. Technology that uses ocean temperature differences as an energy source utilizes the large temperature differences between the ocean surface and the deep sea to generate electricity by evaporating volatile substances such as ammonia by using the heat in surface seawater, turning a turbine with the gas, and condensing the gas to liquid form by cooling with the cold seawater from deeper layers.



Exterior view of the Mighty Whale floating wave power generator (JAMSTEC)

# Program for the development of technology to promote the utilization of marine resources



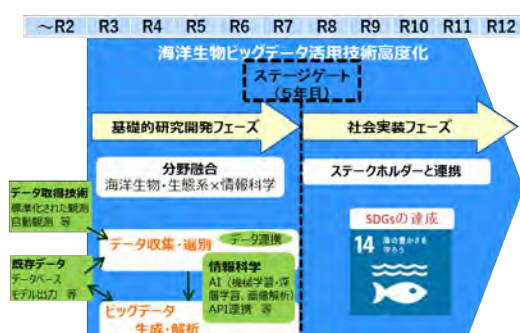
Period: 2011–

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT)

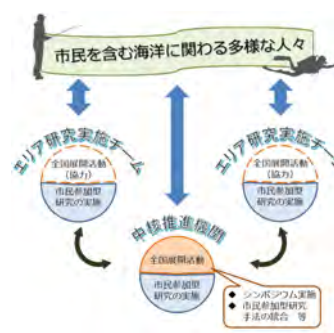
References (only in Japanese): [https://www.mext.go.jp/a\\_menu/kaihatu/kaiyou/jigyuu/1346443\\_00001.htm](https://www.mext.go.jp/a_menu/kaihatu/kaiyou/jigyuu/1346443_00001.htm)

[https://www.mext.go.jp/a\\_menu/kaihatu/kaiyou/jigyuu/1346443\\_00003.htm](https://www.mext.go.jp/a_menu/kaihatu/kaiyou/jigyuu/1346443_00003.htm)

This program conducts research and development to discover new knowledge from “big data” with the aim of understanding the complex and diverse ecosystems of marine organisms and thereby conserving and utilizing the marine ecosystems. This program is also designed to promote more activities of citizen sciences in the field of marine science and to facilitate research and development of specific methods to achieve our vision of creating “convergence knowledge (So-Go-Chi)” of marine science.



Advancement of Technologies for Utilizing Big Data of Marine Life



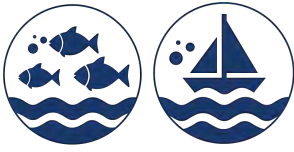
The Project for Methodization of Comprehensive marine “convergence knowledge (So-Go-Chi),” thorough Citizen Participation

(Note: Figures are only in Japanese)

Source: 'Ministry of Education, Culture, Sports, Science and Technology data'.



# Cooperation with ASEAN and Pacific Island countries



Period: 1967–

Organization: Ministry of Foreign Affairs (MOFA); Ministry of Defense; Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of the Environment (MOE); Cabinet Office

Reference: MOFA HP: 'ASEAN (Association of Southeast Asian Nations)'

(<https://www.mofa.go.jp/mofaj/area/asean/index.html>) (in Japanese)

The Association of Southeast Asian Nations (ASEAN) is a community of ten Southeast Asian countries (Indonesia, Cambodia, Singapore, Thailand, the Philippines, Brunei, Vietnam, Malaysia, Myanmar and Laos). As an island nation in the Pacific Ocean, Japan is involved in various international cooperation initiatives, including maritime security, with other Pacific island countries and ASEAN. Specific initiatives include strengthening multilateral cooperation (MOFA), such as the Enlarged ASEAN Defense Ministers' Meeting and the Western Pacific Naval Symposium, which form the basis for cooperation and exchange in the security and defense fields. Cooperation in policy formulation in ASEAN countries is based on the ASEAN Low Environmental Impact Strategy approved at the 17th Japan-ASEAN Transport Ministers' Meeting in 2018 (MLIT). Promoted projects include the following: provision of high-quality patrol vessels under the Japanese technology use condition (STEP) with funds from Overseas Development Assistance and the dispatch of experts to improve local ship maintenance and servicing capacity (MOFA and MLIT). The Cabinet Office has facilitated participation in the 7th and 8th Our Ocean Meetings hosted by Palau and the announcement of specific policies that contribute to the resolution of maritime issues. The Japan-ASEAN Integration Fund has assisted in establishing an ASEAN Regional Training Center for vessel transit support (VTS) and support for the establishment of a VTS Administration Center in the ASEAN region (MOFA). MOE has supported climate change adaptation efforts in some Pacific island countries, including improving methods for assessing climate change impacts of cyclone-related storm surges and high waves, and preparing flooding hazard maps for coastal areas. MOFA, the Ministry of Agriculture, Forestry and Fisheries, and MOE support Pacific island countries and others for island conservation and management and capacity building for fisheries resource management.



Deputy Defense Minister Miyazawa at the Enlarged ASEAN Defense Ministers' Meeting in November 2023.

# Ocean analysis and forecasting systems assimilating satellite data (1)

## Forecasting system of ocean conditions

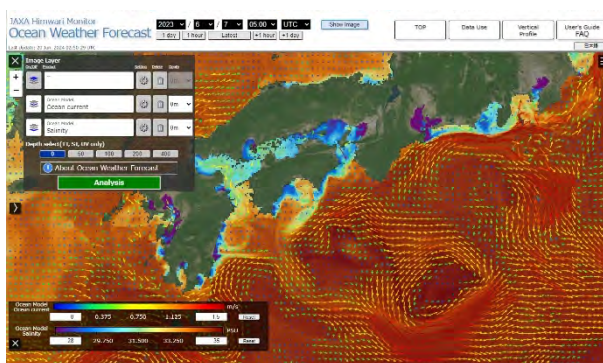


Period: August 2018–

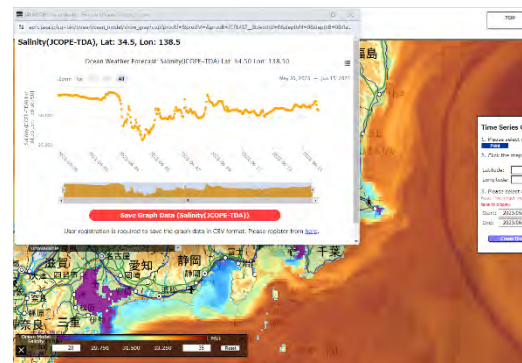
Organization: Japan Aerospace Exploration Agency (JAXA), Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Reference: 'JAXA Himawari Monitor: Ocean Weather Forecast' (JAXA Earth Observation Research Center). ([https://www.eorc.jaxa.jp/ptree/ocean\\_model/index.html](https://www.eorc.jaxa.jp/ptree/ocean_model/index.html))

Sea surface temperature data from multiple satellites, which are produced by JAXA, are assimilated into a high spatiotemporal resolution (approximately 3 km, hourly) regional ocean model around Japan, developed by JAMSTEC, to predict ocean conditions with lead times of approximately 10 days. The predicted conditions are routinely made available via the web. The dataset, which does not have missing data and includes the interior of the ocean, is contributing to fields such as fisheries, transport, and monitoring of marine conditions.



Example of a website that displays forecasted temperature, salinity, and ocean currents (Figure shows salinity and ocean current vectors at the sea surface on 7 June 2023 at 5:00 (UTC)).



Example of a website that displays forecasted ocean conditions. Any point can be used to display a time series and save the displayed data. Figure shows sea surface salinity for a point at 34.5°N, 138.5°E for the period from 30 May 2023 2:00 to 15 June 2023 2:00 (UTC). The effect of increased river runoff due to Typhoon No. 2 in 2023 is visible.

# Ocean analysis and forecasting systems assimilating satellite data (2)

## Ensemble ocean analysis system



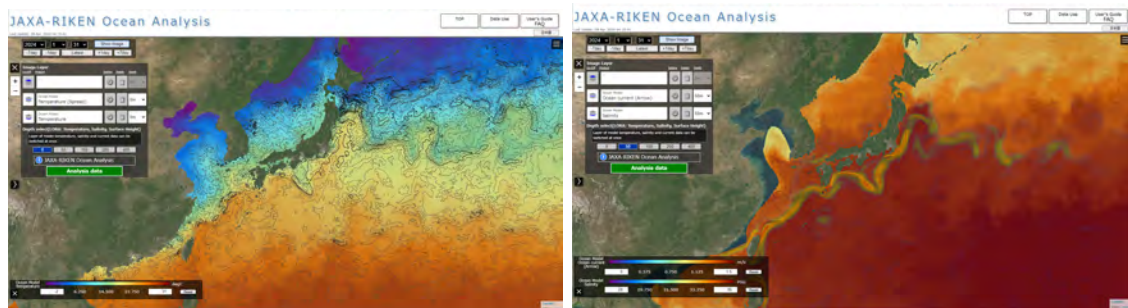
Period: 2015–

Organization: Japan Aerospace Exploration Agency (JAXA), RIKEN

Reference: JAXA-RIKEN Ocean Analysis (JAXA Earth Observation Research Center)

(<https://www.eorc.jaxa.jp/ptree/LORA/index.html>)

The ocean ensemble analysis product is produced by assimilating satellite and in-situ data provided by JAXA and other various institutes in Japan and abroad at a 1-day interval in a High-Resolution Regional Ocean Ensemble Data Assimilation System developed by RIKEN. The ensemble analysis product is a three-dimensional dataset that includes the interior of the ocean with no missing data. The unique features of the dataset are that; it is highly accurate especially in mid-latitude regions; the uncertainty of the analysis products is quantified based on the estimated spread of 128 ensemble members with equal likelihood; and the terms involved in the ocean heat and salinity budgets are stored in such a way that their fluxes are balanced. These features help us to consider whether the variability is certain or with some ambiguity and to quantify the causes of ocean variability, respectively.



Example of the Ensemble Ocean Analysis website (Figures show conditions on 31 May 2023 (UTC))

The left-hand figure shows the ensemble mean of sea surface temperature (SST, color) and the uncertainty (ensemble spread) of the SST (black contours). The right-hand figure shows the salinity (color) and ocean currents (array) at 50 m depth.

# “Kuroshio Oyashio Watch”, a forecast of ocean conditions off the coast of Japan



Period: 2015–

Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

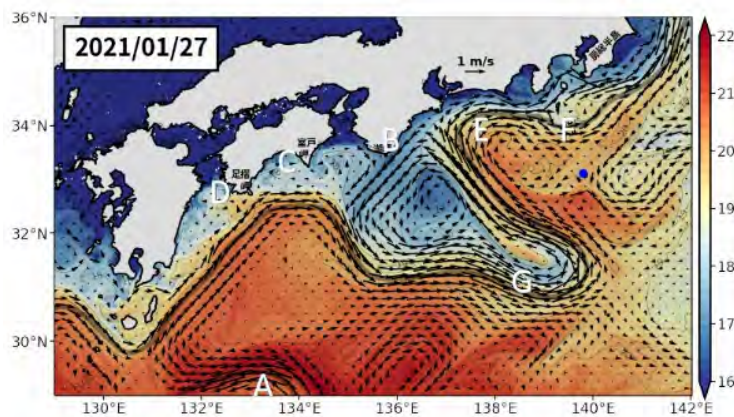
Reference: Kuroshio Oyashio Watch, an ocean forecasting and commentary website (JAMSTEC)

(<http://www.jamstec.go.jp/aplinfo/kowatch/>) (in Japanese)

The JAMSTEC Application Laboratory is developing an ocean variability forecasting system (Japan Coastal Ocean Predictability Experiment: JCOPE) to deepen understanding of the variations of the Kuroshio and Oyashio current paths and to predict oceanographic conditions in the coastal areas of Japan. The Kuroshio Oyashio Watch website provides the results of Oyashio and Kuroshio predictions based on the JCOPE and various related topics, together with easy-to-understand explanations and animations of ocean conditions. Both the Kuroshio long-term forecast that predicts the distribution of ocean currents and temperatures with lead times of up to two months and the higher-resolution, short-term forecasts of the Kuroshio with lead times no longer than 20 days are updated weekly.



Ocean Forecast  
Commentary  
Website  
Kuroshio Oyashio  
Watch webpage



Example of Kuroshio 'short term' forecast (predicted values for 27 January 2021). Arrows indicate direction of near-surface currents, colors indicate sea surface temperature (°C), bold black line is a contour of daily mean sea level of 0.3 m as an indicator of the axis of the strong currents associated with Kuroshio.

# Forecasting ocean conditions and supporting fisheries along the Kyushu coast



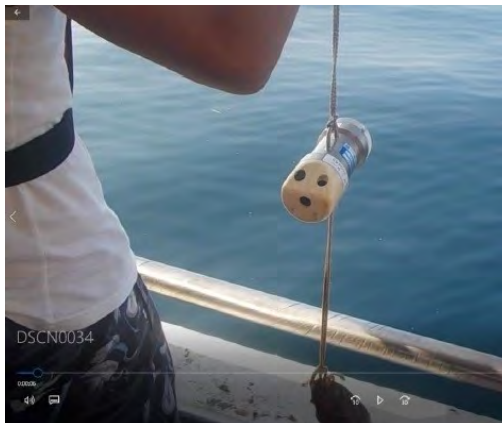
Period: 2017–

Organization: Kyushu University/Research Institute for Applied Mechanics, Nagasaki University, Fukuoka Prefecture, Saga Prefecture, Nagasaki Prefecture, JFE Advantech Corporation, Idea Corporation

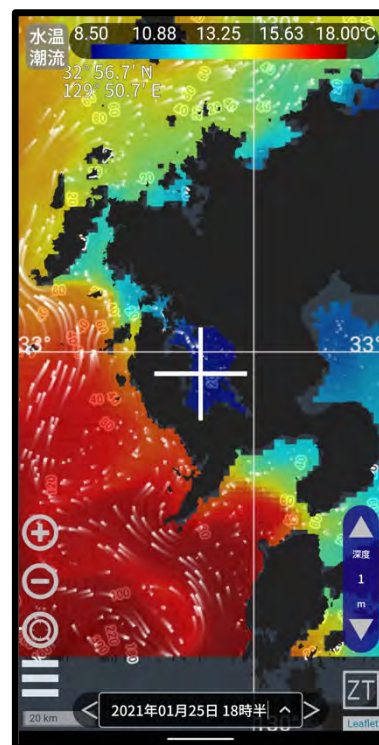
Reference: “DREAMS\_D Sea state forecast” Kyushu University Research Institute for Applied Mechanics (<https://dreams-d.riam.kyushu-u.ac.jp/vwp/>)

Japan's small-scale fisheries have suffered from problems of declining fisheries resources, soaring fuel prices, and a lack of successors. To turn around the stagnant condition of coastal fisheries, industry, government, academia, and the private sector are working together to make coastal fisheries more informed using information and communications technology (ICT) in the 'Fisheries Technology Development Project Using ICT' commissioned by the Fisheries Agency of Japan.

The coastal area has been a void of observations, but by assimilating observation data reported by fishermen, a high-resolution forecasting model of ocean conditions has been developed. Fishermen can receive the forecasted results of ocean conditions via apps such as smartphones and use the results to help them decide where to fish and when to go fishing. By making fishing grounds 'visible', the system also contributes to increased efficiency in the fishing industry by reducing fuel costs and working hours.



Smart Conductivity-Temperature-Depth (CTD) sensors for fishermen



Example of display of apps under development. Distribution of temperature (color) and currents (white arrows) at 1 m depth are shown on the screen.

# Research and development towards sustainable initiatives in the marginal seas of South and East Asia (SIMSEA)



Period: 2014–

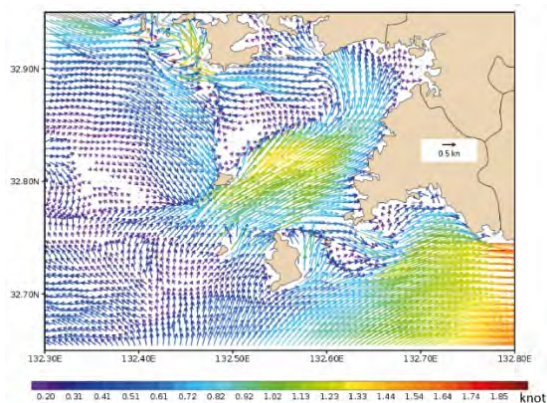
Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Sasakawa Peace Foundation  
Ocean Policy Research Institute

Reference: “Report on community development using the sea in Sukumo Bay 2, 3” “Application Lab., JAMSTEC)

1) <http://www.jamstec.go.jp/aplinfo/kowatch/?p=2306> (in Japanese)

2) <http://www.jamstec.go.jp/aplinfo/kowatch/?p=4548> (in Japanese)

To promote the interdisciplinary research program for the Sustainability Initiative in the Marginal Seas of South and East Asia (SIMSEA), which was launched in 2014 by the Regional Committee for Asia and the Pacific (RCAP) of the International Council for Science (ICSU), we have developed a system to forecast ocean conditions and conducted a research on changes in fish catches jointly with local stakeholders in Sukumo Bay, Kochi Prefecture. Forecast information on the sea conditions on the following day is now provided on an hourly basis through the JAMSTEC’s official website, and is used not only to increase sustainable efficiency of fisheries but also to deal with possible oil leaks from a stranded cargo ship in an unlikely event. This activity is strongly supported by local stakeholders.



System to forecast ocean conditions in Sukumo Bay  
(200 m resolution)

\* Hourly up to 1 day ahead now available



(Courtesy of the Mr. Tachida, Sukumo City)

Survey of stranded cargo ships

# Development of new technologies in the oceans



Period: Unknown

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT); Ministry of Economy, Trade and Industry; Ministry of Land, Infrastructure, Transport and Tourism (MLIT; Japan Coast Guard)

Reference: "i-Construction" (MLIT, <https://www.mlit.go.jp/tec/i-construction/index.html>) (in Japanese), "Deepening the maritime productivity revolution—i-Shipping · j-Ocean—"(MLIT, <https://www.mlit.go.jp/hakusyo/mlit/h29/hakusho/h30/html/n2010000.html>) (in Japanese)

At present, the development of new technologies, including Information and Communication Technologies (ICTs), is underway in a variety of fields. Examples include the following:

1. the maintenance and design of the Advanced Radar Satellite (ALOS-4),
2. the production and testing of proto-flight models,
3. the development of ground systems (MEXT),
4. bathymetric surveys using multibeam bathymetric equipment mounted on survey vessels and crustal structure surveys using sonic survey equipment (Japan Coast Guard),
5. low-level surveys of the outer edges of territorial waters and exclusive economic zones using airborne laser bathymetry on board aircraft,
6. low-tide line surveys to provide evidence of the outer edges of territorial waters and exclusive economic zones (Japan Coast Guard),
7. 'i-Construction' initiatives such as the implementation of various types of construction work using ICT,
8. the construction of platforms for utilizing 3D data and the study of remote-control technology for underwater construction machinery (MLIT),
9. the implementation of nine projects aimed at supporting the technological development of high value-added products and services that contribute to reducing costs and risks associated with offshore development facilities,
10. support for technological development in the offshore development sector, including the offshore wind power sector,
11. promotion of the maritime industry's market entry into the offshore development sector, as part of the "j-Ocean" initiative (MLIT).
12. the development of basic engine designs for hydrogen-fueled ships and ammonia-fueled ships in the Green Innovation Fund's "Development of Next-Generation Ships" project (MLIT);
13. the development of hardware measures using innovative energy-saving technologies in the "Subsidy for the Project to Promote Further Transport Efficiency by Using artificial intelligence and Internet of Things (Innovative Operational Efficiency Demonstration Project for Domestic Ships)" (MLIT),
14. the development of new technologies in the "j-Ocean" project (MEXT, MLIT),
15. the development of standard energy-saving vessels for coastal shipping (MEXT, MLIT),
16. a demonstration study (MLIT) to promote 'smart island' initiatives to solve issues in remote island regions through the implementation of new technologies such as ICT.



資料) 国土交通省

<https://www.mlit.go.jp/hakusyo/mlit/h29/hakusho/h30/html/n2010000.html> (in Japanese)

# Initiative for climate change and ocean acidification



Period: 2000–

Organizations: Ministry of Land, Infrastructure, Transport and Tourism (MLIT; Japan Meteorological Agency: JMA); Ministry of Agriculture, Forestry and Fisheries (MAFF; Fisheries Research and Education Agency (FRA)); Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology (JAMSTEC)); Ministry of the Environment

Reference: What is ocean acidification? JMA website

([https://www.data.jma.go.jp/kaiyou/db/mar\\_env/knowledge/oa/acidification.html](https://www.data.jma.go.jp/kaiyou/db/mar_env/knowledge/oa/acidification.html))

Carbon dioxide (CO<sub>2</sub>) is a major greenhouse gas, and the problem of ocean acidification, in which CO<sub>2</sub> released into the atmosphere is absorbed by the oceans, causing a drop in pH, is also a serious issue. Japan is taking various measures to combat climate change and ocean acidification.

Examples include the following:

1. fixed-line surveys of the seas around Japan by research vessels,
2. observations in the northwest Pacific Ocean by marine meteorological observation vessels and Argo floats,
3. accumulation and sharing of oceanographic data in the Japan Oceanographic Data Center (JODC) (MAFF (FRA); MEXT (JAMSTEC); MLIT),
4. development of new observation technologies, such as advanced climate change prediction technology using the "Earth Simulator" (MEXT (JAMSTEC)),
5. release of information on global ocean CO<sub>2</sub> absorption and ocean acidification (MEXT (JAMSTEC), MLIT),
6. practical application of surface gliders and unmanned autonomous submersibles,
7. development of new observation technologies using drifting observation floats and other equipment (MEXT, FRA, JAMSTEC, MLIT),
8. provision of information on future climate change and its impacts and advanced initiatives in the Climate Change Adaptation Information Platform (Ministry of the Environment),
9. promotion of upgrading port functions and formation of carbon neutral ports with consideration for decarbonization (MLIT),
10. expansion of blue carbon through the "Expansion of Blue Infrastructure in Minato to Nurture Life" project (MLIT),
11. participation in the Global Ocean Observation-Shaping Program (GO-SHIP) and the Argo Project,
12. sharing Earth observation data using the Global Earth Observation System of Systems (GEOSS) and the Data Integration and Analysis System (DIAS),
13. promoting the sharing of marine biodiversity information, (MLIT),
14. International contributions to improving scientific knowledge of the marine environment (MEXT, JAMSTEC, MLIT), including
  - a. sharing of Earth observation data through GEOSS and DIAS,
  - b. operation of the Ocean Biodiversity Information System (OBIS), and
  - c. collection of marine biological data and the provision of data to OBIS and others.



3D model of the Earth Simulator <https://www.jamstec.go.jp/es/jp/> (in Japanese)



# OneArgo: a global, full-depth, multidisciplinary integrated oceanographic array for beyond 2020

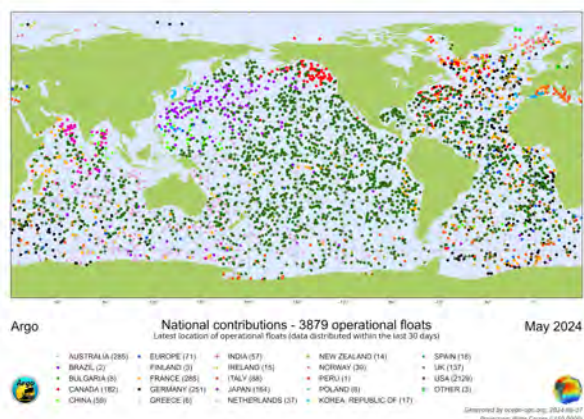


Period: 2021–2030

Organization: Argo Steering Team

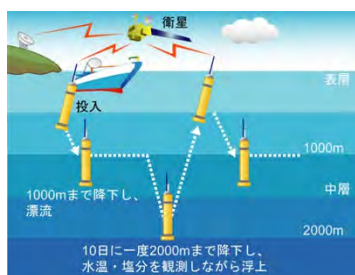
Reference: Argo Websites (<https://oceandecade.org/actions/oneargo-an-integrated-global-full-depth-and-multidisciplinary-ocean-observing-array-for-beyond-2020/>)

OneArgo aims to extend the Argo float observing network to a truly global and full depth range in the ocean, including the polar oceans, marginal seas to monitor and understand the physical and biogeochemical processes in the global ocean. The OneArgo operates innovative data quality control system, which enables us to provide automatically controlled data for operational uses in real-time and highly quality control data for research uses within 12 months, freely available by everyone. The OneArgo will provide further impacts on ocean and climate services, forecasting, and researches, by advancing to understand marine ecosystems, improving predictions of ocean productivity, and accurately monitoring the global energy budget and carbon cycle, it will enable ground-breaking progress towards carbon neutrality. The OneArgo project works under the 'UN Decade of Ocean Science' program "Ocean Observing CoDesign – Evolving ocean observing for a sustainable future".



Argo float deployment status by country

Japan is expected to work as a leader of the international collaboration in the Asian region, enhancing Argo float deployment and appropriate coordination of float deployment in each country, and promoting the quality control to be uniformly accurate data and developing new technologies. Furthermore, OneArgo will actively collaborate with researchers in other fields to create various products related to research and industry that utilize OneArgo data and contribute to research and social activities in Japan and other countries.



Schematic diagram of the operating cycle of an Argo float.



Argo float and young researchers on board the Hakuho Maru

# Promotion of ocean research (1)

## Strategic initiatives for ocean research



Period: 1972–

Organizations: Cabinet Office, Ministry of Foreign Affairs, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Ministry of Agriculture, Forestry and Fisheries (MAFF), Ministry of Economy, Trade and Industry (METI), Ministry of Land, Infrastructure and Transport (MLIT), Ministry of the Environment (MOE), Ministry of Defense

Reference: “JODC online data sharing system (J-DOSS)” (<https://www.jodc.go.jp/jodcweb/JDOSS/index.html>)

Through oceanographic surveys in the waters surrounding Japan, the relevant ministries are working to enhance information about seabed topography, the distribution of resources, including what is necessary for the comprehensive management of Japan's maritime areas from the strategic perspective of securing maritime interests and determining what contributes to boundary demarcation negotiations (the 534 oceanographic surveys conducted in FY2022) (Cabinet Office, Ministry of Foreign Affairs, MEXT, MAFF, METI, MLIT, MOE, and Ministry of Defense). Specific strategic initiatives include the following:

1. surveying seafloor topography using multibeam bathymetric equipment on board survey vessels and investigating crustal structure using sonic survey equipment (Japan Coast Guard),
2. long-term and continuous oceanographic observations in the northwest Pacific region with the aim of understanding changes in the ocean carbon cycle and heat transport processes, which have a significant impact on the progression of global warming,
3. providing the Japan Coast Guard with data on
  - a. sea surface temperature, sea surface wind speed, sea ice concentrations, and ocean color observed by the Global Change Observation Mission 1st - Water "SHIZUKU" (GCOM-W) and the Global Change Observation Mission 1st - Climate "SHIKISAI" (GCOM-C) (MEXT),
4. Providing data on
  - a. sea surface temperature and ocean color by SHIZUKU,
  - b. precipitation by satellite global precipitation map (GSMaP), and
  - c. sea surface temperature and ocean color by the geostationary meteorological satellite HIMAWARI

to, inter alia, domestic marine-related organizations (MEXT), Ocean Information Clearinghouse, Japan Ocean Data Center (JODC) online data provision system (J-DOSS), Ocean Biogeographic Information System (OBIS), the Global Earth Observation System (GEOSS) portal, and the Data Integration and Analysis System (DIAS) data overview and search system.

Responsibilities are as follows:

1. data provision to data sites, system linkage, regular data updates, development of ocean particle dynamics observation methods using the intelligent event vision sensor (EVS) and its implementation on floats (MEXT);
2. participation in the Northeast Asia Regional Global Ocean Observation System (NEAR-GOOS) under the Western Pacific Subcommittee of the Intergovernmental Oceanographic Commission and exchange and sharing of oceanographic analytical data (MLIT).



Unmanned submersible 'KAIKO'. Courtesy of JAMSTEC.

## Promotion of ocean research (2)

### Research to understand climate change and the marine environment and to reduce damage caused by natural disasters



Period: 2011–

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT), Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Ministry of the Environment (MOE; Nuclear Regulation Authority (NRA))

Reference: “Comprehensive information website on the water environment (MOE)” (<https://water-pub.env.go.jp/water-pub/mizu-site/>) (in Japanese)

In addition to strategic oceanographic research, Japan also conducts the following activities:

1. research to understand climate change and the marine environment and to mitigate damage caused by natural disasters,
2. high-precision, high-density observations in the Northwest Pacific Ocean that contribute to the International Ocean Carbon Observation and Coordination Program (IOCCP) and the Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP) (MLIT),
3. observations of temperature and salinity in the waters around Japan that contribute to the Argo Project (MEXT, MLIT),
4. marine environmental monitoring surveys of water quality, sediment quality, etc. (MOE), to understand the level of radioactivity in major fishing grounds located offshore of nuclear facilities (MOE (NRA)),
5. ocean surface current observations using marine shortwave radar in enclosed sea areas (MEXT, MLIT),
6. analysis of the behavior of drifting rubbish and prediction of where it will accumulate using the results of marine shortwave radar observations in enclosed marine areas (MLIT),
7. mobile seismic observations within the shallow area of the Nankai Trough plate boundary as a part of the Nankai Trough Earthquake Research Project that will contribute to disaster prevention measures,
8. clarification of evidence information and mechanisms of very large former earthquakes in the area adjacent to the Hyuga Sea off Tokai,
9. improvement of the three-dimensional model of the subsurface structure of the Nankai Trough (MEXT (JAMSTEC)),
10. observation of undersea crustal deformation in the landward areas of the Japan Trench and Nankai Trough by combining Global Navigation Satellite System (GNSS) and underwater acoustic ranging technology (MLIT),
11. preparation and provision of tsunami disaster prevention information maps based on forecasts of trench-type earthquakes around the Japan and Kuril Islands Trench (MLIT),
12. periodic surveys and observations of volcanoes in the Nanpo and Nansei Islands (MLIT (Japan Coast Guard)), and
13. seabed topography surveys (MLIT (Japan Coast Guard)).



Left: Change of seawater color at the Fukutokuoka site (photo taken 18 April 2022).

Right: The eruption of Nishinoshima Island (photo taken 25 January 2023). Courtesy of the Japan Coast Guard

# Promotion of basic science and Research & Development

## Promotion of basic science and research and development from a mid- to long-term perspective



Period: 1971–

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT (Japan Agency for Marine-Earth Science and Technology (JAMSTEC))), the University of Tokyo, Tokyo University of Marine Science and Technology, National Institute of Polar Research (NIPR))

Reference: JAMSTEC website (<https://www.jamstec.go.jp/e/>)

In Japan, research and development with a medium-to-long-term perspective and basic research essential for the advancement of marine science are promoted. From the perspective of open data and open science, systematic collection, organization, analysis, processing, storage, and publication are based on the following policies:

1. handling acquired data and samples (MEXT (JAMSTEC)),
2. publishing observation data obtained from joint-use research cruises,
3. assigning digital object identifiers (DOIs) to improve data access and promoting use of data, and databases (MEXT (JAMSTEC)),
4. developing and operating the Arctic Data Archive System (ADS) (MEXT (NIPR)),
5. assigning DOIs to data whose quality has been checked or has been used as evidence in papers (MEXT (JAMSTEC))

The Kochi Core Center is an international center for the storage and analysis of geological samples collected during the International Ocean Drilling Program (IODP) voyages, including those collected by the deep-sea exploration vessel Chikyu (MEXT (JAMSTEC)). The activities of the Kochi Core Center (MEXT (JAMSTEC)) have included real-time observations of slow-slip phenomena using three points installed deep beneath the seabed off the Kumano-nada coast and a long-term, in-hole observation device being developed for deployment west of the Nankai Trough (MEXT (JAMSTEC)). Human resources are developed in the following programs:

1. the JAMSTEC Young Research Fellow system, which invites applications from researchers without specifying a particular theme or field,
2. the active recruitment of foreign researchers (MEXT (JAMSTEC)), and
3. the Postdoctoral Fellow system, which aims to gather scientists from abroad suitable for an international joint research center (MEXT (JAMSTEC)).

The University of Tokyo is implementing the "Marine Interdisciplinary Education Program", a cross-departmental education program for graduate students (MEXT (the University of Tokyo)), and it is training scientists who can analyze big data related to the ocean and play a role in the development of marine industries using artificial intelligence (AI) technology through implementation of the 'Excellence Graduate School Program for Marine Industry AI Professional Development' (MEXT (Tokyo University of Marine Science and Technology)), and others.



D/V Chikyu (Courtesy by JAMSTEC)

# Promotion of research and development to be undertaken as a national initiative

## Promotion of research and development on key issues to be addressed as a national initiative



Period: 2000–

Organizations: Ministry of Education, Culture, Sports, Science and Technology (MEXT); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Cabinet Office; Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of the Environment (MOE).

Japan conducts research and development on the following topics:

1. climate change prediction and adaptation,
2. development of marine energy and mineral resources, and
3. conservation of marine ecosystems and natural disasters of marine origin.

Efforts in climate change prediction and adaptation include the following:

1. research and development of basic technologies for automatic and highly accurate understanding of the oceanic carbonic acid cycle (MEXT),
2. understanding of changes in the oceanic carbon cycle and heat transport processes (MEXT),
3. research focusing on black carbon transported from land and nutrients such as nitrogen and iron (MEXT),
4. development of an algorithm for identifying coastal red tides based on satellite data (MEXT),
5. observations of greenhouse gases on the island Minamitorishima and elsewhere (MLIT), and
6. preparation and publication of information on long-term changes in temperature, precipitation, and the number of days with extreme heat and heavy rain (MLIT).

Efforts related to the development of marine energy and mineral resources include the following:

- a. acquisition of high-resolution acoustic exploration data,
- b. analysis and evaluation of concentrated layers of rare-earth elements,
- c. data analysis and demonstration studies of long-term environmental baseline surveys using marine observation equipment,
- d. studies of the relation of biodegradable plastic to Strategic Innovation Promotion Program Phase 2: Innovative Deep-sea Resource Investigation Technology (Cabinet Office), and
- e. long-term exposure of cement and other materials and samples to deep-sea environments.

Efforts related to the conservation of marine ecosystems include the following:

- a. deciphering the genome of starfish that are causing the destruction of coral reefs (Cabinet Office),
- b. research and development of basic technology to automatically acquire marine organism genetic information (MEXT (JAMSTEC)),
- c. real-time collection of operational and fishing ground environmental information using information and communication technology and use of this information for resource assessment (MAFF), and
- d. monitoring surveys of benthic organisms, seaweed, reef-building corals, seabirds, other indicator organisms, surrounding vegetation, and the physical environment at Monitoring Site 1000 (MOE).

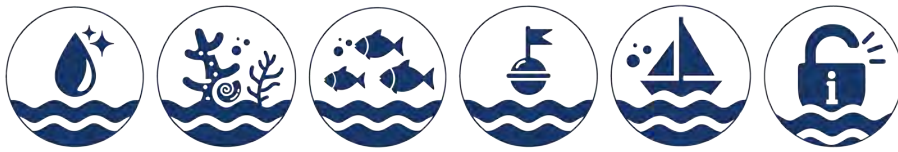
Efforts related to natural disasters of marine origin include the following:

- a. the development of a real-time tsunami prediction system using data from the DONET (MEXT) and
- b. the steady operation of the Japan Trench Seabed Earthquake and Tsunami Observation Network (S-net) and the DONET for the Nankai Trough Earthquake Countermeasures (MEXT), among others.



Monitoring Site 1000. Shorebird and plover surveys in the coastal zone

# Promotion of Arctic observation and research

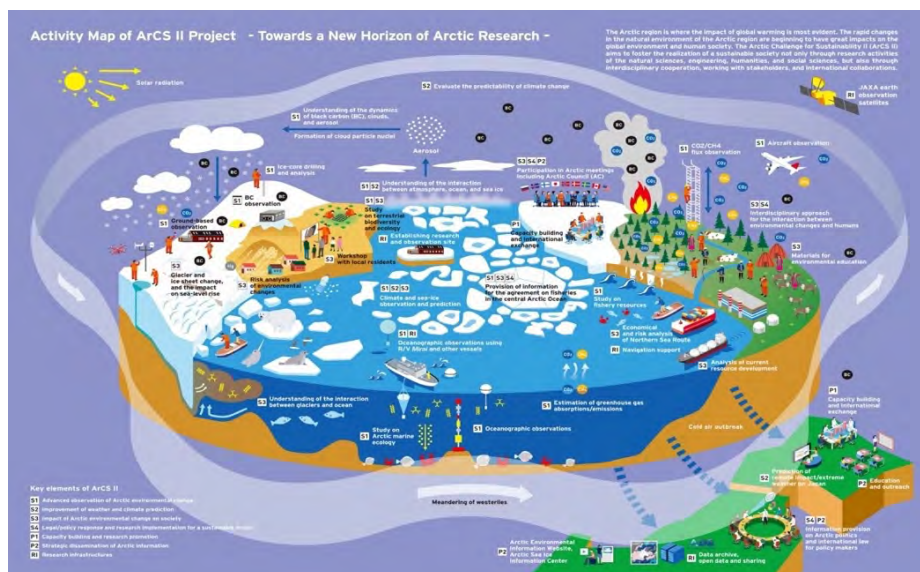


Period: 2011–

Organizations: Ministry of Education, Culture, Sports, Science and Technology (National Institute of Polar Research, Hokkaido University, Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and others)

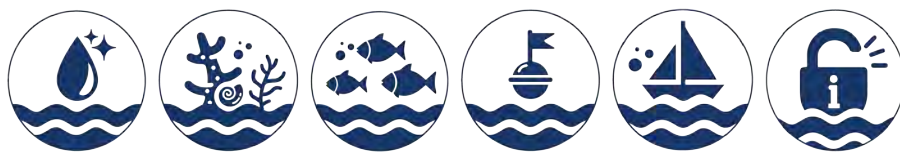
Reference: <https://www.nipr.ac.jp/arcs2/>

The Arctic is one of the regions in the Northern Hemisphere most vulnerable to the effects of global warming. In recent years, it has become clear that the state of the atmosphere and oceans in the Arctic significantly impacts the climate of Japan and other mid-latitude regions. In response to the New Growth Strategy "Environment and Energy Superpower Strategy through Green Innovation" approved by the Cabinet in June 2010 and the report "Basic Policy on Science and Technology" compiled by the Council for Science and Technology Policy in December 2010, the "Green Network of Excellence" (research in the field of Arctic climate change, "Comprehensive elucidation of the rapidly changing Arctic climate system and its holistic impacts" (2011–2015), was initiated in Japan as part of the GRENE project, an all-Japan initiative. This program was followed by the Arctic Challenge for Sustainability Project (ArCS [2015–2019] and ArCS II [2020–2024]) and the Arctic Research Acceleration Project (ArCS II [2020–2024]), which have been conducted with a comprehensive approach integrating natural science and social science. The aim is to conduct research and also to contribute to solving various social issues in the Arctic region. Data and outputs obtained from observations and simulations are made widely available free of charge through the Arctic Data Archive System (ADS).



Map of ArCS II project activities

## Promotion of observational research in the Antarctic region



Period: 1955–

Organizations: Ministry of Education, Culture, Sports, Science and Technology (MEXT; National Institute of Polar Research, Hokkaido University, Tokyo University of Marine Science and Technology and others); Ministry of Defense; Ministry of Internal Affairs and Communications (National Institute of Information and Communications Technology); Ministry of Land, Infrastructure, Transport and Tourism (Japan Coast Guard, Japan Meteorological Agency, Geographical Survey Institute); Ministry of the Environment; Ministry of Foreign Affairs; Cabinet Office (Science Council of Japan); Ministry of Finance; Ministry of Health, Labor and Welfare; Ministry of Agriculture, Forestry and Fisheries (Fisheries Agency); Ministry of Economy, Trade and Industry.

Reference: [https://www.mext.go.jp/a\\_menu/shinkou/nankyoku/index.htm](https://www.mext.go.jp/a_menu/shinkou/nankyoku/index.htm) (in Japanese)

Observation activities in the Antarctic region began when the first Japanese Antarctic Research Expedition (JARE) set sail in November 1956 on the research vessel Soya. JARE is a national project under the auspices of the Headquarters for the Integrated Promotion of Antarctic Regional Observation, headed by MEXT, in which many ministries, agencies, and organizations cooperate and share responsibility for research observations, transportation, and other activities. The government decided to participate in observing geophysical phenomena in the Antarctic region in response to this request. After the retirement of the Soya, the Fuji, Shirase (first generation), and Shirase (current) of the Ministry of Defense have been active as Antarctic research vessels, and together with the Umitaka Maru of the Tokyo University of Marine Science and Technology, they have conducted research on environmental changes in the waters surrounding Antarctica due to global warming and the response of marine life to these changes.



Shirase berthing at Showa Station, Antarctica

## Enhancement and strengthening of the common infrastructure of ocean science and technology



Period: 1971–

Organizations: Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology (JAMSTEC)), Ministry of Internal Affairs and Communications (MIC), Ministry of Land, Infrastructure and Transport (MLIT).

Reference: Japan Agency for Marine-Earth Science and Technology website (<https://www.jamstec.go.jp/e/>)

In Japan, efforts to enhance and strengthen the common infrastructure of marine science and technology are being actively undertaken. Specifically, MEXT (JAMSTEC) has built a prototype of an experimental device to measure the propagation time and reflectance from the seabed of electromagnetic waves in the visible light range, confirmed its functionality and performance, and verified its application using underwater platforms (MEXT (JAMSTEC)). The MEXT(JAMSTEC) has a Marine Science and Technology Strategy Department that integrates industry-academic collaboration functions and public relations functions, and it has been working with domestic and international partners to promote collaboration and cooperation, manage intellectual property, and convey results to society. The development and operation of the platform the following has included some activities:

1. construction of ships, the KAIMEI, YOKOSUKA, MIRAI, SHIRAHOMARU, SHINSEI MARU, and CHIKYU; the manned research submersible SHINKAI 6500; and the unmanned research vehicles URASIMA, JINBEI, Hyperdolphin, and KAIKO,
2. the construction and operation of the supercomputer Earth Simulator (MEXT (JAMSTEC)),
3. research to ensure the safety of maritime transport and to preserve the marine environment using test tanks (MLIT (Maritime Safety Research Institute)), and

MIC is promoting research and development towards the establishment of satellite communication technology that will contribute to the transmission of large volumes of marine data and make it possible to build secure satellite communication networks. In addition, with regard to the development and utilization of ocean big data, the Earth Simulator, which is the world's leading computer in the field of Earth sciences, is being utilized to the maximum extent to promote the use of information science in oceanographic sciences (MEXT) and to accumulate, integrate, and utilize global environmental big data (e.g., observation data, forecast data), (MIC). The Data Integration and Analysis System (DIAS) was developed as information infrastructure to contribute to the resolution of global-scale issues (MEXT) by accumulating, integrating, and analyzing big data on the global environment.



R/V KAIMEI (Courtesy by JAMSTEC)



# Northwest Pacific Tsunami Advisory Center



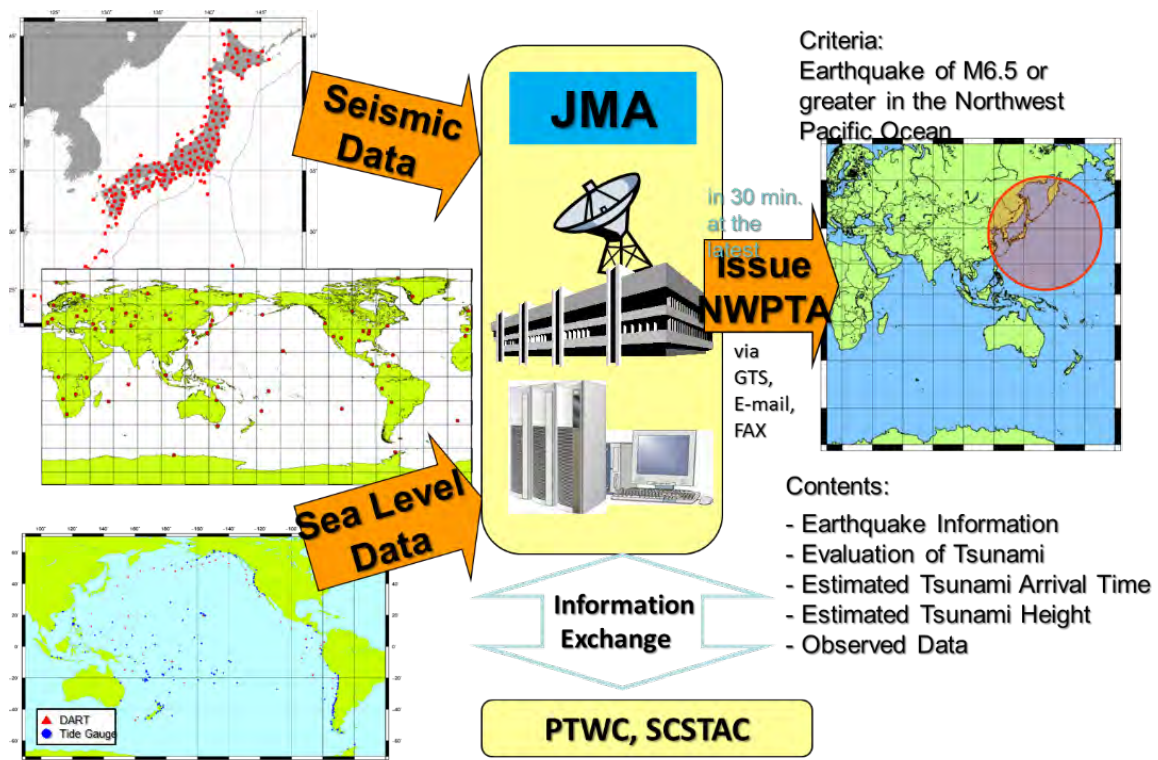
Period: 2005–

Organization: Japan Meteorological Agency

Reference: International tsunami monitoring system (Japan Meteorological Agency)

<https://www.data.jma.go.jp/eqev/data/nwptac/index.html> (in English)

After the 1960 Chilean earthquake, a tsunami caused by the massive earthquake propagated across the Pacific Ocean, killing many people in faraway Hawaii and Japan. Recognition of the lack of information exchange and sharing between countries that would have benefitted from a tsunami forecasting and warning system at the time led to development of a monitoring system in the mid-1960s under UNESCO's Intergovernmental Oceanographic Commission (IOC). The Japan Meteorological Agency (JMA) contributes to international tsunami monitoring through its operation of the Northwest Pacific Tsunami Advisory Center.



The process of providing 'Northwest Pacific Tsunami Advisory'.

# Monitoring of Waves on Land and Seafloor (MOWLAS)



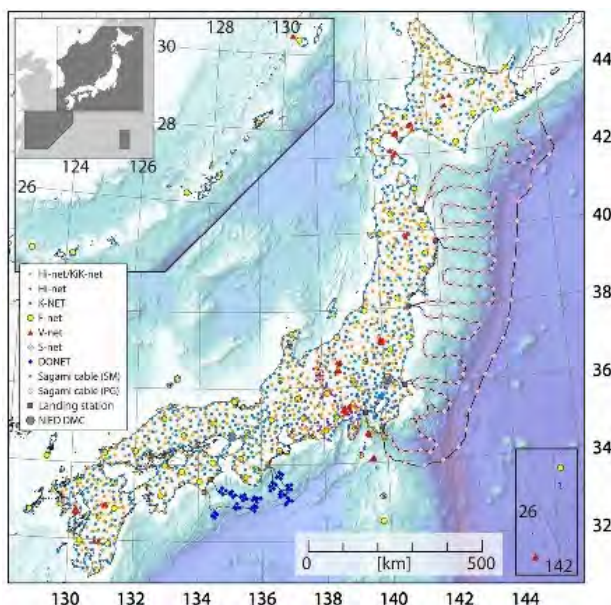
Period: 2017–

Organization: National Research Institute for Earth Science and Disaster Resilience (NIED)

Reference: Network Center for Earthquake, Tsunami and Volcano, National Research Institute for Earth Science and Disaster Resilience (<https://www.mowlas.bosai.go.jp/?LANG=en>)

Aoi S. et al, MOWLAS: NIED observation network for earthquake, tsunami and volcano. *Earth, Planets and Space*: 72, 126 (2020).

NIED integrated the onshore seismic observation networks established after the Great Hanshin-Awaji Earthquake in 1995 and the marine observation networks established after the Great East Japan Earthquake in 2011. The NIED started to operate the combined network in November 2017 as the Monitoring of Waves on Land and Seafloor (MOWLAS). The high-quality data obtained from the large-scale, dense observation network constitute an excellent research base and have contributed greatly to the generation of academic research results. They have been used for monitoring seismic activity, long-term evaluation of earthquake occurrence, and earthquake early warnings and tsunami warnings issued by the Japan Meteorological Agency. The data have also been used for social implementation of earthquake information in cooperation with private companies, for example, in controlling Shinkansen bullet trains. The MOWLAS observation data and recent breakthroughs in real-time data processing technology are making it possible to directly mitigate the damage caused by ongoing earthquakes.



Distribution of around 2100 stations in the Monitoring of Waves on Land and Seafloor (MOWLAS).

Source: Aoi S. et al, MOWLAS: NIED observation network for earthquake, tsunami and volcano. *Earth, Planets and Space*: 72, 126 (2020).

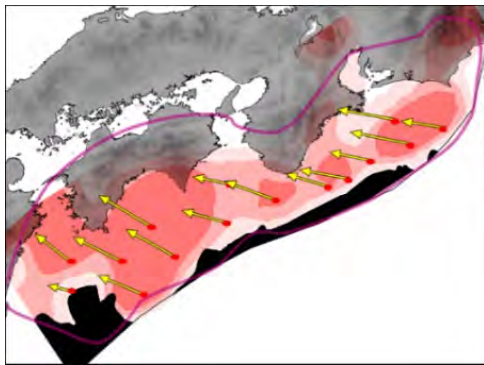
# Seafloor geodetic observation to elucidate the mechanism of major subduction-zone earthquakes



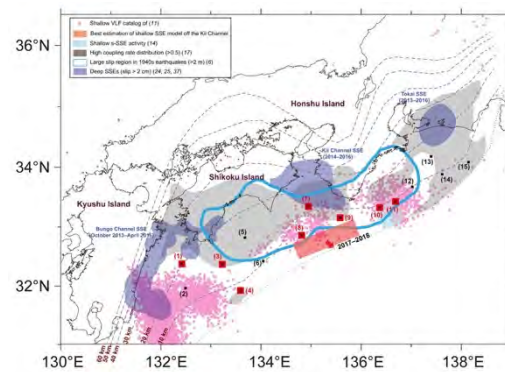
Period: 2000–

Organization: Japan Coast Guard, the University of Tokyo

The seafloor geodetic observation with the combination of the Global Navigation Satellite System (GNSS) and undersea acoustic ranging technology (GNSS-A) enables precise tracking of the movement of seafloor observation sites (seafloor crustal deformation) along the plate boundaries, i.e. the Japan Trench and the Nankai Trough. It contributes to elucidation of the mechanisms of large earthquakes.



Left: Strain accumulation model along the Nankai Trough <sup>1)</sup>



Right: Detected slow slip off the Kii Channel <sup>2)</sup>

Sources:

- 1) Yokota Y. et al., Seafloor geodetic constraints on interplate coupling of the Nankai Trough megathrust zone. *Nature*, 534, 374-377 (2016) doi:10.1038/nature17632.
- 2) Yokota Y. and Ishikawa T., Shallow slow slip events along the Nankai Trough detected by GNSS-A. *Science Advances*, 6, 3 (2020) doi:10.1126/sciadv.aay5786

# Contribution to coastal disaster risk reduction by provision of detailed information about ocean currents and temperatures



Period: 2020–

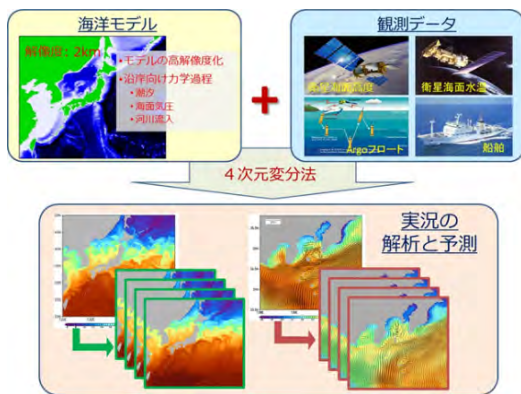
Organization: Japan Meteorological Agency

Reference: Actual surface water temperature and currents (Japan Meteorological Agency (JMA):

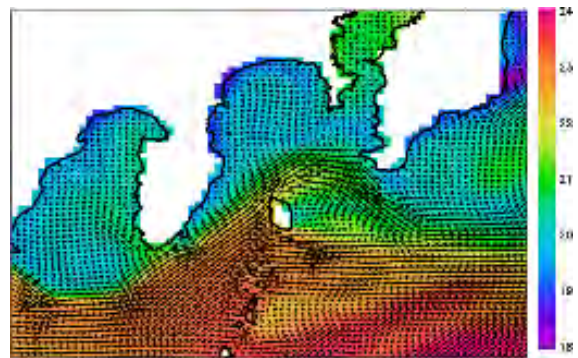
[https://www.data.jma.go.jp/gmd/kaikyou/kaikyou/tile/jp/index\\_subsantl.html](https://www.data.jma.go.jp/gmd/kaikyou/kaikyou/tile/jp/index_subsantl.html)) (in Japanese)

The JMA has developed the Japanese Coastal Ocean Monitoring and Forecasting System (MOVE-JPN system) to provide detailed information about ocean currents and temperatures in coastal areas. The MOVE-JPN system forecasts ocean currents and temperatures, which were previously forecasted on a 10-km grid, at a high resolution of 2 km. By forecasting ocean currents and temperatures in the coastal areas of Japan in greater detail, the MOVE-JPN system makes it possible to predict sea level variations along the coast precisely.

In conjunction with the operational launch of the MOVE-JPN system, information on unusual sea level events will be improved, and information will be provided for more detailed use of ocean current and temperature data.



Schematic diagram of the system  
(Figure in Japanese)



Sea surface temperature and current distribution can now be viewed in detail.

## Comprehensive safety and security measures for passenger ships



Period: 2022–

Organization: Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Reference: “Shiretoko Pleasure Boat Accident Countermeasures Study Committee” (Ministry of Land, Infrastructure, Transport and Tourism) ([https://www.mlit.go.jp/maritime/maritime\\_fr4\\_000036.html](https://www.mlit.go.jp/maritime/maritime_fr4_000036.html))

On 23 April 2022, the small passenger ship KAZU I sank off the Shiretoko Peninsula, Hokkaido, Japan. A total of 26 people—24 passengers and 2 crew members—were killed or missing in an accident of unprecedented severity in Japan. In response to this accident, MLIT established the Shiretoko Pleasure Boat Accident Countermeasures Study Committee, which consisted of experts in maritime legislation, marine engineering, and seafarer training, to comprehensively examine safety measures for passenger transport by small ships. The study committee has compiled a report titled 'Comprehensive Safety and Security Measures for Passenger Ships'. The recommendations in the report include strengthening the safety management systems of operators; improving the qualifications of seafarers; and strengthening vessel safety standards, audits, and disciplinary measures. In line with the report, MLIT has started to conduct unannounced and remote audits, set up a reporting desk, and share information obtained from audits and vessel inspections. In addition, in March 2023, the Cabinet approved a draft law to partially amend the Maritime Transport Law. The draft law includes amendments to laws necessary to strengthen the safety management system of operators, improve the quality of seafarers, and strengthen administrative penalties and punishments. The law was passed in April 2023, and efforts are being made to thoroughly implement safety and security measures.

# Safety and security measures in maritime transport



Period: Unknown

Organization: Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

References: Maritime safety information (Japan Coast Guard)” (<https://www6.kaiho.mlit.go.jp/>) (in Japanese)

Water Safety Guide (Japan Coast Guard) (<https://www6.kaiho.mlit.go.jp/watersafety>) (in Japanese)

Maritime Traffic Safety Act (1973) (<https://nippon.zaidan.info/seikabutsu/2001/00500/contents/00003.htm>)

Various measures are being taken by MLIT to ensure the safety and security of maritime shipping traffic include the following:

1. providing emergency information on its website on earthquakes and tsunamis, maritime safety information on maritime construction, maritime events, weather conditions, etc.,
2. maintaining and publishing the Water Safety Guide, a comprehensive safety information website that compiles the knowledge and skills necessary to enjoy marine leisure activities,
3. participating in the Waterfront Safety Network Conference (JBWSS) on the theme of water safety, and
4. providing guidance for users based on the diversified and increasingly active marine leisure situation and sponsoring awareness-raising activities related to safety measures in cooperation with mail order businesses and sales outlets.

The MLIT has implemented the following activities:

- producing and managing observation facilities and equipment such as drifting oceanographic weather buoys, coastal wave gauges, and tide gauges for observing waves and tides,
- providing information by the Marine Traffic Center and others to prevent large-scale marine accidents and providing necessary safety guidance for ships that navigate inappropriately in terms of navigational safety.

The MLIT services include the following:

- providing information on the status of the marine environment, including the status of vessel and ship positions,
- implementing measures to prevent collisions with bridges by using Automatic Identification Systems (AIS),
- distributing marine bulletins providing daily information on sea conditions,
- participating in the working group of the International Hydrographic Organization's Committee on hydrographic services and standards,
- providing basic information on navigation aid facilities (such as light buoys) in the Straits of Malacca and around Singapore,
- capacity-building for government officials from the three coastal states that maintain and manage navigational aids and facilities and the establishing cooperative relationships with user states and users,
- dispatching of experts and technical cooperation for joint hydrographic surveys in the shallow water areas of the southern part of Malaysian territorial waters in the separate navigation zone.



# Responding to natural disasters of marine origin



Period: 2011–

Organization: Ministry of Agriculture, Forestry and Fisheries (MAFF), Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology (JAMSTEC))

References: “Measures against natural disasters of marine origin” (Cabinet Office)

(<https://www.kantei.go.jp/jp/singi/kaiyou/sanyo/dai5/pdf/siryou2-2.pdf>) (in Japanese),

“Japan Trench Undersea Earthquake and Tsunami Observation Network (S-net)” (<https://www.seafloor.bosai.go.jp/S-net/>) (in Japanese), “Earthquake and tsunami observation and monitoring systems (DONET)”

(<https://www.seafloor.bosai.go.jp/DONET/>) (in Japanese)

Various efforts are being made in Japan to address natural disasters of marine origin. Efforts made by the Nankai Trough Earthquake Research Project include the following:

- analysis of seismic sediments and seismic data to understand marine seismic activity,
- development of seismic observation, upgrading of subsurface structure and fault models (MEXT),
- development of an immediate tsunami prediction system using the Data Observation and Monitoring System for Earthquakes and Tsunami (DONET) data,
- examination of possible tsunami scenarios and assessment of the tsunamis they may excite,
- examination of the accuracy of tsunami prediction using the system,
- study of possible tsunami scenarios and evaluation of tsunamis excited by them, verification of the accuracy of tsunami prediction by the system, and study of the possibility of tsunami prediction using high-frequency radar (MEXT (JAMSTEC)),
- continued operation of the Japan Trench Seabed Earthquake Tsunami Observation Network (S-net) and for Nankai Trough earthquake countermeasures (MEXT (JAMSTEC)),
- analytical research contributing to damage reduction from earthquake and tsunami disasters (MEXT (JAMSTEC)),
- scientific drilling surveys in the Nankai Trough and elsewhere using the deep Earth exploration vessel Chikyu (MEXT (JAMSTEC)),
- maintenance of coastal disaster prevention forests and improvement and earthquake resistance of coastal dykes,
- consolidation and closing of sluice gates and the like,
- promotion of the development of coastal protection facilities such as automation and remote operation (MAFF, MLIT),
- promotion of tsunami and storm surge countermeasures and measures to prevent deterioration of coastal protection facilities based on the "Five-year acceleration measures for disaster prevention/mitigation and national land resilience" (MAFF, MLIT), and
- study of the use of ICT to improve efficiency in maintenance and management of coastal protection facilities (MLIT).
- The MLIT supports
- designation of "expected storm surge inundation zones" by prefectures (MAFF, MLIT),
- preparation of tsunami disaster prevention information maps that predict tsunami behavior at ports and harbors (MLIT),
- publication of "Guidelines for the Formulation of Manuals for the Use of Ships during Disasters", and
- Impementation of information transmission training (MLIT).



台風通過後のフェリーターミナルにおける荷役の様子  
徳島小松島港

# Capacity building support

## Official Development Assistance and Maritime law enforcement capacity



Period: 1954–

Organizations: Ministry of Foreign Affairs (MOFA; Japan International Cooperation Agency (JICA)); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Cabinet Office; Ministry of Defense (MOD); Ministry of the Environment; Nippon Foundation; International Law Association

Reference: “Official Development Assistance” MOFA (<https://www.mofa.go.jp/mofaj/gaiko/oda/index.html>) (in Japanese)

Japan is expanding its role in cooperative developments while making strategic and effective use of official development assistance (ODA) to realize a free, prosperous, and stable international society and to ensure the security of sea lanes. Japan is making efforts that include supporting the strengthening of maritime law enforcement capabilities. Specifically, ODA is used to

1. support capacity building (MOFA),
2. support enhancement of maritime law enforcement capacity (MLIT),
3. support enhancement of law enforcement capacity of countries in Southeast Asia, South Asia, countries around Somalia, West Africa, and the Pacific, and
4. conduct maritime crime control training in Japan (MOFA, MLIT).

MOFA is also contributing to the improvement of the maritime law enforcement capacity of countries in the Indo-Pacific and elsewhere through the UNODC Global Maritime Crime Program (GMCP), and Japan is providing assistance to ASEAN countries located in strategic areas at key points of Japan's sea lanes through the Vientiane Vision 2.0. MOD has also worked cooperatively with international organizations and multilateral organizations. Those efforts have included the following:

1. support for capacity-building, joint training and exercises, and cooperation in defense equipment and technology based on the Vientiane Vision 2.0,
2. strengthening cooperation in a multilateral framework between Japan, the US, and Australia, and
3. the launch of Partners in the Blue Pacific, a framework for cooperation with Pacific Island countries.

Multilateral collaborations are also being developed. In addition, MOFA

1. exchanged views on measures to combat illegal, unreported, and unregulated fishing to protect the oceans and the environment,
2. organized the Asia Cup, a mock trial of international law, and
3. held a joint press conference.



Capacity-building support to Vietnam in the field of underwater disposal (MOD)



# Oceanographic Section Time-series Dataset for the 137°E Meridian



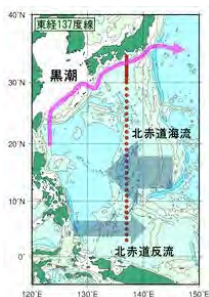
Period: 1967–

Organization: Japan Meteorological Agency (JMA)

Reference: “Oceanographic Section Time-series Dataset for the 137°E Meridian” (JMA)

([https://www.data.jma.go.jp/kaiyou/db/mar\\_env/results/OI/137E\\_OI\\_e.html](https://www.data.jma.go.jp/kaiyou/db/mar_env/results/OI/137E_OI_e.html))

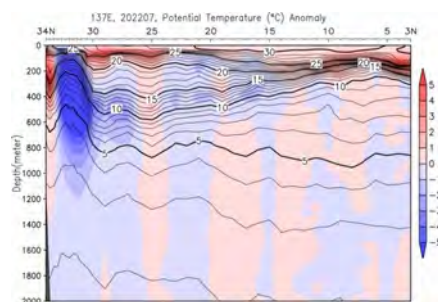
There are repeat hydrographic observations along 137°E meridian that have continued for more than 50 years since the JMA initiated them in 1967. The 137°E observations are the only repeat hydrographic sectional observations that have continued for such a long period of time anywhere in the world. All data since the start of the observations have been made publicly available and can be used by all researchers. They are therefore highly valued by marine-related organizations at home and abroad. To elucidate changes in the carbon cycle, which is essential for earth system model to predict global warming, observations of the carbonate parameters (total inorganic carbon, alkalinity, the hydrogen ion concentration index (pH)) and chlorofluorocarbon concentrations in seawater have also been carried out. In March 2024, the new research vessel Ryofu Maru IV of JMA was completed, and Ryofu Maru IV will contribute to the monitoring of climate change and global warming, as well as to the monitoring and prediction of other phenomena and extreme weather events.



Stations on the 137°E meridian



Research vessel Ryofu Maru IV



Vertical-section of water temperature along the 137°E meridian

# GEBCO Seabed 2030



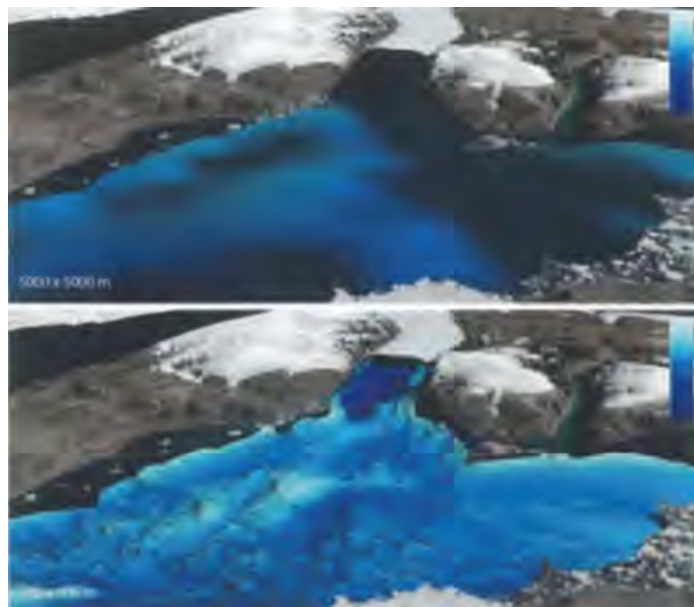
Period: 2017–

Organization: The Nippon Foundation

Reference: “The Nippon Foundation website”  
(<https://www.nippon-foundation.or.jp/who/news/pr/2020/20200621-45287.html>) (in Japanese)

The Nippon Foundation-GEBCO Seabed 2030 is an international project that the Nippon Foundation and GEBCO (General Bathymetric Chart of the Oceans) have been collaborating on since 2017. The goal is to produce a bathymetric map of the world's entire seafloor by 2030.

Seafloor topography data is useful in a wide range of areas including studies of tides and currents, predictions of tsunamis and sea level rise, provision of safe navigation of ships, and maritime rescue and monitoring of marine life. However, between the time the mapping of the world's seafloor topography began in 1903 and the time this project began in 2017, only 6% of the seafloor topography had been mapped. The project has established a system to collect bathymetric data from various entities around the world, which has greatly increased the coverage to 24.9% in 2023. The project will continue to work with various partners to produce a completed map of the world's seafloor



Bathymetry around a fjord  
(5000 m × 5000 m resolution (top) vs 100 m × 100 m resolution (bottom))

# Satellite observation of the marine environment and data dissemination (1)

Climate Change Observation Mission - Climate satellite "Shikisai" (GCOM-C)

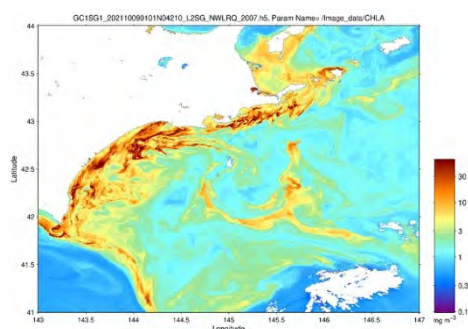


Period: December 2017 launched–

Organization: Japan Aerospace Exploration Agency (JAXA)

Reference: "SHIKISAI portal" (Satellite Applications and Operations Center, JAXA) (<https://shikisai.jaxa.jp/>)

The Second-generation GLocal Imager (SGLI) on board the satellite Shikisai can observe concentrations of chlorophyll-a, suspended solids, and colored dissolved organic matter as well as sea surface temperature, photosynthetically available radiation, floating algae, etc. by the 19 observation wavelengths and a spatial resolution of 250 m. The data obtained are made available to researchers and the public free of charge. The data facilitate monitoring of changes in phytoplankton distribution, eutrophication, and the distribution of high temperature areas due to climate change. The results have improved the accuracy of marine environmental predictions through comparison with and assimilation into numerical models.



Chlorophyll-a concentrations at 250-m resolution off the northeast coast of Hokkaido, Japan, on 9 October 2021, as observed by the SGLI on board Shikisai. Widespread red tides were reported in this area during this period, and the areas of high chlorophyll-a concentrations (dark red areas) in this figure likely correspond to the distribution of red tides.

Reference:

(<https://www.bro.or.jp/fisheries/organization/kokaku/notice/akashio.html>) (in Japanese)

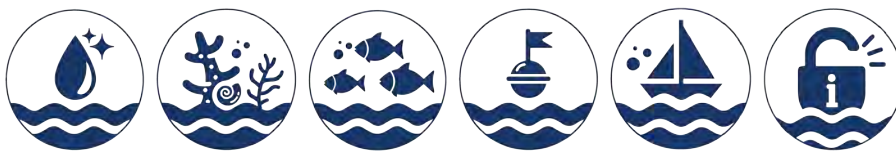


The movement of pumice rafts drifting on the sea surface between August and November 2021 estimated from near-infrared and neighbor channels of SGLI on board the Shikisai (<https://earth.jaxa.jp/karuishi/>) (in Japanese).

Pumice was observed in the vicinity of the Fukutoku-Okanoba submarine volcano (a), indicated by the red triangle in the figure, in mid-August, moving northwestwards (b) 40 days later and further moving to around the Okinawa islands (c) approximately 22 days later. Thereafter, the difference in observed reflectance from the surrounding waters gradually decreased until they could no longer be identified after they were identified around the Kuroshio Current (d).

# Satellite observation of the marine environment and data dissemination (2)

Global Change Observation Mission-Water "SHIZUKU" (GCOM-W) and the Advanced Microwave Scanning Radiometer (AMSR) series

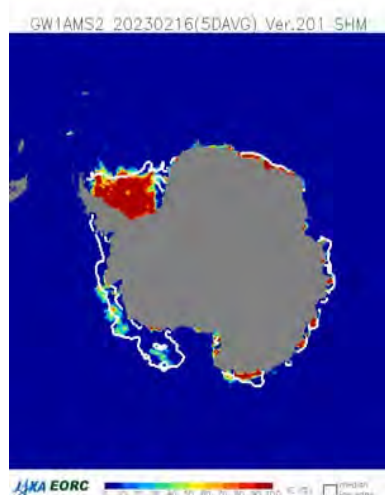


Period: June 2002–

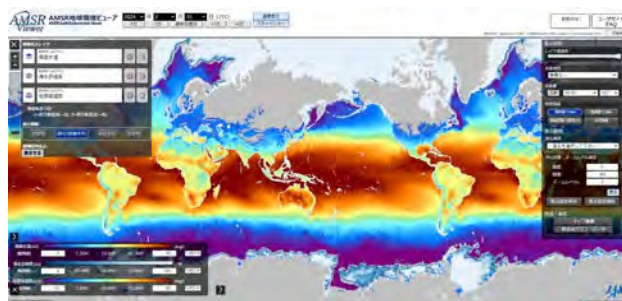
Organization: Japan Aerospace Exploration Agency (JAXA)

Reference: "Advanced Microwave Scanning Radiometer AMSR Series" (Earth Observation Research Center, JAXA)  
([https://www.eorc.jaxa.jp/AMSR/index\\_en.html](https://www.eorc.jaxa.jp/AMSR/index_en.html))

The Advanced Microwave Scanning Radiometer 2 (AMSR2) onboard the satellite SHIZUKU has continued observations as part of the AMSR series since its first generation in June 2002 as AMSR-E. AMSR2 features the world's highest spatial resolution microwave radiometer and the ability to observe the ground surface and sea surface covered by clouds. It can observe sea surface temperature, sea ice concentrations, precipitation, vertically accumulated water vapor, snow depth, and soil moisture content. The data obtained are made available free of charge to researchers and the public and are used by meteorological organizations around the world. They contribute to the monitoring of sea ice fluctuations due to climate change, monitoring of ocean conditions and fishing grounds, and the improvement of the accuracy of marine environmental forecasts through comparison with and assimilation into numerical models. AMSR3, the successor to AMSR2 (currently in operation), is under development for launch in JFY 2024.



Antarctic sea ice distribution on 16 February 2023 as captured by SHIZUKU. (White line: ice edge distribution in a normal year). On this day, the Antarctic sea ice extent, one of the key indicators of global warming, recorded the smallest value in the history of satellite observations (2.18 million square kilometers). Microwave radiation observations, which penetrate clouds and are observable day and night, contribute to the development of polar research, where in-situ observations are difficult, and provide a continuous monitoring of El Niño-La Niña events in cloud-prone tropical regions, making them an indispensable source of data for global climate change research and current operational applications.



Visualizing observation data from the AMSR series: display example of the AMSR Earth Environment Viewer. In addition to functions such as superimposition of multiple geophysical quantities, zoom-in/out, pixel data display and time series display, a new temporal average and anomaly display function was added in 2023.

# Observing Air-Sea Interactions Strategy (OASIS)



Period: 2021–2030

Lead organization: SCOR Working Group #162

- Developing an Observing Air-Sea Interactions Strategy (OASIS)

Reference: OASIS website (<https://airseaobs.org/>); OASIS page at the UN Decade of Ocean Science for Sustainable Development (<https://oceandecade.org/actions/observing-air-sea-interactions-strategy-oasis/>)

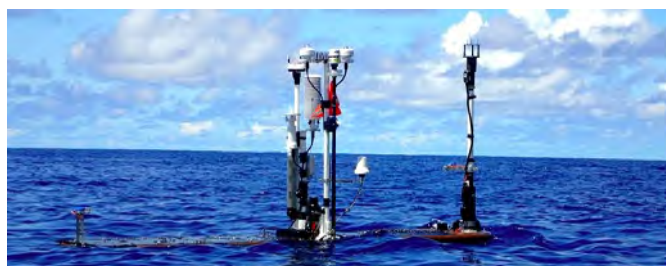
The exchanges of energy, water, and gases between the atmosphere and oceans affect life, including humans, by their impacts on global weather and climate. The interactions between the atmosphere and oceans, which are deeply involved in such exchanges, affect the global hydrological cycle, change the global distributions of precipitation and carbon dioxide, the movement of air and seawater, and the circulation of materials, including pollutants.

A detailed understanding of these exchanges, including the interactions between the atmosphere and ocean, is important information for policy makers, industry, and civil society. OASIS provides observation-based scientific knowledge to promote healthy oceans, blue economies, and sustainable food and energy as well as radically improve forecasts of weather, climate, and conditions in the ocean.

OASIS is conducting in-situ and satellite observations, numerical simulations, and theoretical studies under an international framework to further understand atmosphere-ocean interactions and the resulting conditions in the atmosphere and ocean. In particular, in-situ oceanographic observations to understand ocean conditions and their variabilities have so far been carried out in only a limited number of locations, and their extension has been strongly desired in terms of algorithm development for satellite observations, parameterization for numerical simulations, and case studies for theoretical research. Japan is contributing to the extension of observations based on the technology it has developed so far.



Atmospheric and oceanographic observations from moored buoys.



Atmospheric and oceanographic observations from small, offshore platforms.

# The 2nd Cooperative Study of the Kuroshio and its Adjacent Regions (CSK-2)



Period: 2022–2030

Lead organization: UNESCO Intergovernmental Oceanographic Commission (IOC) Sub-Commission for the West Pacific (WESTPAC), UNESCO IOC, UNESCO/BANGKOK branch

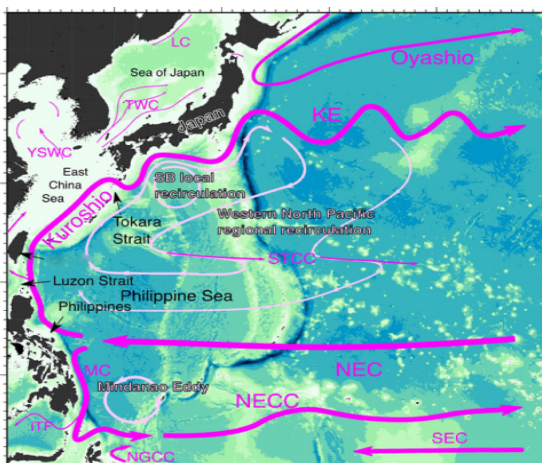
Participating organizations: Japan Agency for Marine-Earth Science and Technology (JAMSTEC); Ocean University of China; Atmosphere and Ocean Research Institute, University of Tokyo; etc.

Reference: UN Decade of Ocean Science for Sustainable Development CSK-2 website

(<https://oceandecade.org/actions/explore-the-strongest-ocean-current-in-the-western-pacific-the-2nd-cooperative-study-of-kuroshio-and-adjacent-regions-from-its-sciences-to-human-well-beings/>)

The Kuroshio is the strongest ocean current in the western Pacific Ocean and has significant environmental, social, and economic impacts on society. The 2nd Cooperative Study of the Kuroshio and its Adjacent Regions (CSK-2) is an international collaborative research project that will contribute to the development of knowledge and services to understand the changing conditions of the Kuroshio in the context of global warming and to meet society's needs for weather forecasting, climate prediction, and applications to management of fisheries and aquaculture.

Major part of the Kuroshio flows within Japan's Exclusive Economic Zone, and international leadership by Japanese oceanographers in strong collaboration with oceanographers in the region such as from China, Korea, Philippine, Russia, and Indonesia, is essential to advance oceanographic research on the Kuroshio, and researchers play important roles in CSK-2 by conducting observational studies, modeling, and data management.



Kuroshio Current and surrounding ocean currents. ITF = Indonesian Throughflow, KE = Kuroshio Extension, LC = Liman Current, MC = Mindanao Current, NEC = North Equatorial Current, NECC = North Equatorial Countercurrent, NGCC = New Guinea Coastal Current, SEC = South Equatorial Current, SECC = South Equatorial Countercurrent, TWC = Tsushima Warm Current, YSWC = Yellow Sea Warm Current

# One Ocean Network for Deep Observation



Period: 2021–2030

Lead organization: French Institute for Ocean Science (IFREMER)

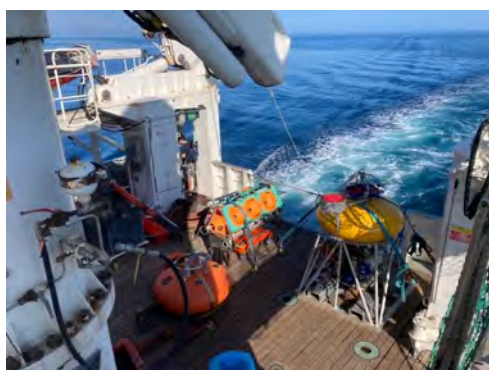
Participating organizations: Japan Agency for Marine–Earth Science and Technology (JAMSTEC), The European Multidisciplinary Seafloor and Water Column Observatory (EMSO) / European Research Infrastructure Consortium (ERIC), Ocean Network Canada (ONC)

Reference: UN Decade of Ocean Science for Sustainable Development Deep Observation website (<https://oceandecade.org/actions/one-ocean-network-for-deep-observation/>)

One Ocean Network for Deep Observation website (<https://www.onedeeпоcean.org/>)

Even though the deep sea is an invisible realm, it is affected by human activities in ways that increase the burden on the environment and ecosystems. To elucidate the unknown world of the deep sea, we need equipment with state-of-the-art technology and expertise in a variety of scientific fields. This program proposes a step-by-step change in deep-sea science by developing observational facilities and research techniques at various locations in the world's oceans; it will help us understand how deep-sea ecosystems function and how they are affected by climate change and human activities, and it will help protect people from natural disasters. Other initiatives related to the UN Decade of Ocean Science for Sustainable Development, such as the "Deep Ocean Observing Strategy" (DOOS), the "Challenger 150" of the "Deep Ocean Stewardship Initiative" (DOSI), the "Smart Cables", the "Partnership for Observation of the Global Ocean" (POGO), the International Argo Project of the "Global Ocean Observing System", are expected to have significant synergistic effects.

The IFREMER research team actively participates in cruises and field observations in the New Caledonia Marine Park area. It uses sophisticated equipment to take on the challenge of data acquisition. The data will be shared with the research team and made available to the local community.



Researchers from IFREMER, JAMSTEC, and IRD on R/V Antéa prepare a mooring system to observe the New Caledonian seamounts.



Observation equipment (eDNA Sampler) developed by JAMSTEC and attached to the mooring system.

# Operation of the Japan Oceanographic Data Center



Period: 1965–

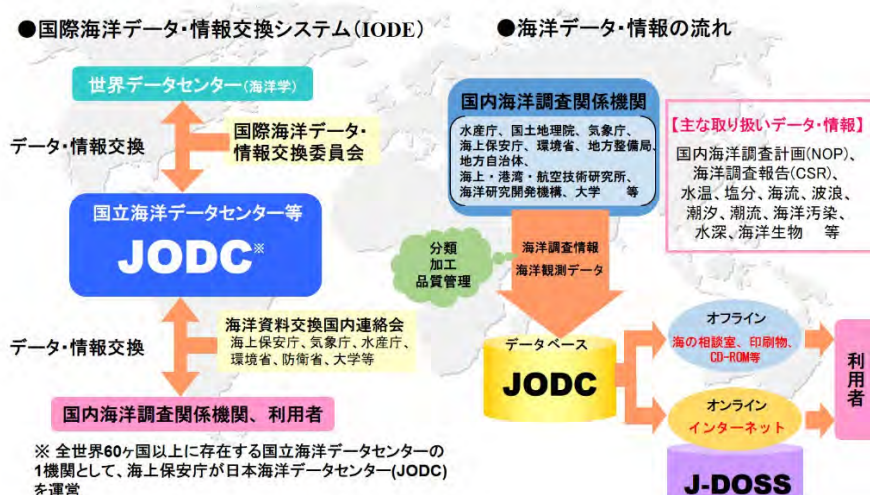
Organizations: Japan Coast Guard, Fisheries Agency, Geospatial Information Organization of Japan, Japan Meteorological Agency, Ministry of the Environment, Regional Development Bureau, local governments, National Maritime Research Institute, Japan Agency for Marine-Earth Science and Technology, Japan Agency for Marine-Earth Science and Technology, universities, etc.

Reference: Japan Oceanographic Data Center (Japan Coast Guard) (<https://www.jodc.go.jp/jodcweb/index.html>)

The Japan Oceanographic Data Center (JODC) is Japan's representative organization in the International Oceanographic Data and Information Exchange (IODE) system promoted by the UNESCO Intergovernmental Oceanographic Commission (IOC).

As Japan's comprehensive oceanographic data bank, JODC collects, manages, and provides oceanographic data generated by oceanographic research institutes in Japan in a centralized manner. JODC has contributed to global environmental research by managing ocean observation data produced in Japan for international collaborative research projects such as the World Ocean Circulation Experiment (WOCE) that aim to elucidate global warming issues.

In addition, to promote the development of IODE by improving the ocean data management capacity of countries participating in the IOC Western Pacific Subcommittee (WESTPAC) program, JODC has conducted ocean data management trainings and workshops for staff of ocean-related organizations in the region.



JODC Operational Flow. Reference: "Japan Oceanographic Data Center" (Japan Coast Guard, <https://www.jodc.go.jp/jodcweb/index.html>)



# Effective use and enhancement of the function of the MDA ocean status display system (Umi-Shiru)



Period: 2019–

Organizations: Cabinet Secretariat, Cabinet Office; Ministry of Education, Culture, Sports, Science and Technology, Japan Agency for Marine-Earth Science and Technology, National Institute of Polar Research; Ministry of Economy, Trade and Industry; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of the Environment; Ministry of Defense; National Institute for Earth Science and Disaster Prevention; Japan Aerospace Exploration Agency; etc.

Reference: Ocean Status Display System (Umi-Shiru) (<https://www.msil.go.jp/msil/htm/main.html?Lang=1>)

Umi-Shiru is an information service that aggregates various kinds of maritime information provided by relevant ministries and agencies under the overall coordination of the Cabinet Office for use in various fields such as maritime safety, natural disaster prevention, marine environmental protection, and promotion of marine industries; it enables such information to be overlaid on a map.



Umi-Shiru provides information not only about Japan's surrounding seas, but also on a wide range of topics, including satellite information and real-time information such as weather and oceanographic conditions. It is expected to be used for a variety of applications, including management of ship operations, fisheries, disaster prevention, and development of ocean resources.



## Utilization and conservation of ocean areas in coastal and remote island regions through “next-generation mobility” at the ocean



Period: 2020–

Organization: Ministry of Land, Infrastructure, Transport and Tourism; Cabinet Office; Fisheries Agency; Ministry of the Environment, and others

Reference: “Strategies for Social Implementation of Autonomous Unmanned Vehicles (AUVs) (Summary)” ([https://www8.cao.go.jp/ocean/policies/auv/auv\\_strategy/pdf/auv\\_overviews2312.pdf](https://www8.cao.go.jp/ocean/policies/auv/auv_strategy/pdf/auv_overviews2312.pdf))

In December 2023, Headquarter for Ocean Policy adopted the "Strategy for the Social Implementation of Autonomous Underwater Vehicles (AUVs)" (AUV Strategy). This strategy was formulated in response to the urgent need to reduce manpower and improve productivity in the development and utilization of the resources of the vast ocean, as well as to facilitate the domestic production and industrialization of AUVs, considering a decline of population and changes in the industrial structure due to the low birth rate and the disproportionate number of senior citizens. The goal is to promote government-led public-private partnerships to stimulate Japan's AUV industry and enable its overseas expansion by 2030.

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has identified Japan's coastal and remote island regions, which are facing labor shortages as the population declines and becomes older, as the main target of its efforts to contribute to the realization of the AUV strategy. The MLIT has promoted social implementation projects to address issues in the actual sea area utilizing "the next-generation mobility at the ocean," which includes not only AUVs but also ASVs (small unmanned boats) and ROVs (remotely operated vehicles), and conducted a total of 18 demonstration tests over the past three years through fiscal year 2023.



ASV Small unmanned boat



AUV Autonomous Underwater Vehicle



ROV Remotely operated vehicle

# Collection and dissemination of research data and efforts to effect behavioral change and build marine capacity at the Global Oceanographic Data Center (GODAC) (1)

## GODAC's Contribution to Ocean Data Innovation and Sustainability



Period: 2001–

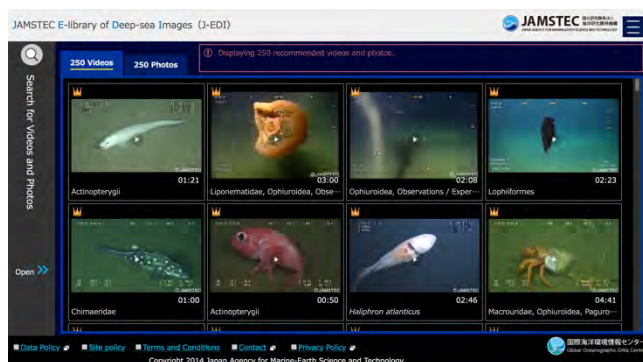
Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC)/Global Oceanographic Data Center (GODAC)

Reference: Global Oceanographic Data Center website (<https://www.jamstec.go.jp/godac/j/godac/en/index.html>)

To advance the development of marine science, we archive video and image data from deep-sea surveys conducted by submersible research vessels and distribute the data on the Internet for scientific and educational use.

In addition to JAMSTEC's survey data, we also collect and publish information on marine life in the seas around Japan that we obtain from various domestic organizations, and we contribute to the international sharing and exchange of marine biodiversity data as the Japan Node of the OBIS.

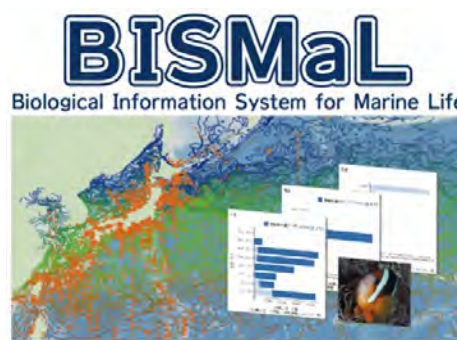
In the deep-sea debris database, we are contributing to the development of sustainable development goal 14.1 by publishing and using data for the development of the artificial intelligence needed to estimate the distribution and density of debris on the seafloor.



Deep-sea Video and Image Archives (J-EDI)



Deep-sea debris database



BISMAL

# Collection and dissemination of research data and efforts to effect behavioral change and build marine capacity at the Global Oceanographic Data Center (GODAC) (2)

Develop and expand marine education programs for young people who are the future of the ocean



Period: 2001–

Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC)/Global Oceanographic Data Center (GODAC)

Reference: Global Oceanographic Data Center website (<https://www.jamstec.go.jp/godac/j/godac/en/index.html>)

We have developed six educational programs to promote understanding of marine science, including marine debris, Okinawa's coastal waters, and marine biodiversity. Our goal is to change youth behavior through educational programs in which students explore answers to questions that lead to solutions to sustainable development goal (SDG) challenges. The program is also being used as a tool to develop new ways of thinking about the SDGs.

We are promoting these educational programs as marine education programs for young people visiting Okinawa on school trips from Japan and abroad, and for the discovery and development of future maritime talent through collaborations with various academic institutions and the tourism industry in the Okinawa region. These efforts are being extended overseas through the expansion of online support.

GODAC building



GODAC activities



## Educational and research facilities on the Japanese coast: Marine Biological Laboratory and Fisheries Research Station



Period: 1887–

Organization: National, public and private universities

References: Japanese Association for Marine Biology (<https://jambio.jp/en/>); Waterfront and lakefront experimental stations nationwide website (<https://www.research.kobe-u.ac.jp/rcis-curcis/station/search3.html>); National Conference of University Fisheries Experiment Directors website (<https://jikkensho.sakura.ne.jp/>)

The Japanese coast is home to the largest number of marine research facilities in the world. We continue to advance research in marine and fishery sciences by collecting data from daily ocean observations and periodic surveys of marine life. These activities lead to, inter alia, tracking global warming through fluctuations in water temperature, demonstrating biodiversity through the discovery of new species of marine life, and sounding the alarm on the ocean plastic problem through the study of marine debris.

The universities' marine biological laboratories and fisheries research stations are responsible for waterfront practice education. We also hold nature observation events, lectures, and exhibitions for the public; collaborate with local industries such as fisheries and tourism; and publish online illustrated books on marine life and marine education materials. In response to the extensive damage caused by the 2011 off the Pacific coast of Tohoku Earthquake and the 2024 Noto Peninsula Earthquake, we are also contributing to regional cooperation on disaster prevention.

Ocean institutions include the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), the Japan Fisheries Research and Education Agency (FRA), and prefectural fisheries research centers. In addition, there is the Japanese Association for Marine Biology (JAMBIO), in which 22 marine and fisheries laboratories in Japan participate. The website of JAMBIO presents examples of activities related to Sustainable Development Goal (SDG) 14 and the United Nations Decade of Ocean Science. For example, the Tateyama Marine Laboratory of Ochanomizu University has developed and provided sea urchin breeding kits for use in elementary, junior high, and high school classrooms. Niigata University's Sado Marine Biological Station partnered with Sado City to become an SDG partner; the goal is to achieve a society in harmony with nature on Sado Island. Kanazawa University's Noto Marine Laboratory offers on-demand marine education videos. The University of Tsukuba's Shimoda Marine Research Center is participating in the Ocean Acidification Research for Sustainability (OARS) project of the United Nations Decade of Ocean Science to study the effects of ocean acidification on marine ecosystems.



Waterfront training and related exhibits (Photo: from the university-affiliated marine biological laboratories in Sado City, Noto Town, Miura City, and Shimoda City)

# International Cooperation Efforts for a Maritime Order

Efforts toward an open and stable maritime order through international cooperation



Period: 1982– (Year of adoption of the UN Convention on the Law of the Sea)

Organization: Ministry of Foreign Affairs of Japan (MOFA); Ministry of Education, Culture, Sports, Science and Technology (MEXT); Ministry of Agriculture, Forestry and Fisheries (MAFF); Cabinet Office

Reference: International Legal Order of the Seas and the United Nations Convention on the Law of the Sea website (Ministry of Foreign Affairs of Japan) <https://www.mofa.go.jp/mofaj/gaiko/kaiyo/law.html> (in Japanese)

Japan relies on maritime transport for almost all of its imports of oil, other energy resources, and minerals. A "free, open and stable ocean" supported by a maritime order based on the rule of law rather than force is essential to the peace and prosperity not only of Japan but also of the international community as a whole. Japan has made efforts to promote such a maritime order. For example, the 4th Japan-China High-Level Maritime Consultations (held in October 2023), the 5th Japan-Philippines Maritime Consultations (held in March 2023), and the 16th Japan-France Comprehensive Maritime Dialogue (held in February 2023) were held by MOFA. In addition, a brochure and a video (in Japanese and English) summarizing the concept of the "Free and Open Indo-Pacific" (FOIP) and Japan's initiatives were posted on the MOFA website, and the Arctic Circle Japan Forum held in Tokyo in March 2023 included a session on the Arctic Circle Research Acceleration Project (ArCSII). MOFA held a session at the Arctic Circle Japan Forum in Tokyo to introduce Japan's Arctic policy initiatives, including science and technology cooperation and partnerships with society, and to disseminate information to the world. We are actively participating in the formation of international rules based on the "rule of law," including discussions at the First Meeting of the Conference of the Parties to the "Agreement to Prevent Unregulated High Seas Fishing in the Central Arctic Ocean," which has taken effect in June 2021, as well as on scientific research and monitoring plans (MEXT, MOFA; MAFF). Japan has presented specific measures on ocean issues at the "Our Ocean Meeting," an international conference for exchange among the government, the private sector, and scientists on ocean issues (Cabinet Office, MOFA, MAFF)



<https://www.mofa.go.jp/mofaj/files/000430631.pdf> (in Japanese)

# Information Collection and Disclosure



Period: 2018–

Organization: Cabinet Office, Ministry of Education, Culture, Sports, Science and Technology (MEXT, National Institute of Polar Research (NIPR)); Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of the Environment (MOE; National Institute for Environmental Studies); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of Defense; Japan Meteorological Agency; Japan Coast Guard

Reference: “Marine situational awareness (MDA) in Japan” website (Cabinet Office) <https://www8.cao.go.jp/ocean/policies/mda/mda.html> (in Japanese)

“Marine Status Display System (Umi Shiru)” website (<https://www.msil.go.jp/>) (in Japanese)

The effective and efficient collection of a wide variety of ocean-related information and conditions is called marine (maritime) domain awareness (MDA). The Fourth Basic Plan for Ocean Policy calls for further strengthening of MDA to effectively collect, aggregate, and share various kinds of ocean-related information that contributes to maritime security, marine environmental protection, promotion of marine industries, development of science and technology, and efficient assessment of ocean conditions. Major efforts include the following:

1. providing information on sea conditions for fisheries including that related to formation of fishing grounds using satellite information such as sea surface temperature and the distribution of phytoplankton (MAFF),
2. obtaining water temperatures for the construction of models of sea conditions on fishing grounds,
3. understanding the status of the red tide advection process,
4. estimating the location of fishing grounds predicted from water temperatures, and
5. monitoring foreign fishing vessels, including illegal, unreported, and unregulated fishing (MAFF),
6. understanding global greenhouse gas concentrations and predicting future climate change (MOE),
7. releasing quasi-real-time sea ice information for both the South and North Poles using data from the Global Change Observation Mission 1st - Water satellite through the Arctic Data Archive System (NIPR, MEXT)),
8. establishing and using Seafloor observation network for earthquakes and tsunamis along the Japan trench (S-net), Dense Ocean floor Networks system for Earthquake and Tsunamis (DONET), and Nankai trough seafloor observation network for earthquakes and tsunamis (N-net) (MEXT),
9. constructing and operating the "Oceanographic Information Display System (Umi-shiru)", which consolidates oceanographic information, including real-time information, and is operated and owned by related organizations (Cabinet Office, MLIT), and
10. constructing an integrated oceanographic observation network combining Argo floats, drifting floats, moored buoys, and ship observations, (MEXT, MLIT) with the "Data Integration and Analysis System" (MEXT), which is an information infrastructure that contributes to solving global problems such as climate change.



Marine Status Display System (Umi-Shiru)



# Oceanographic surveys and data sharing through international collaboration



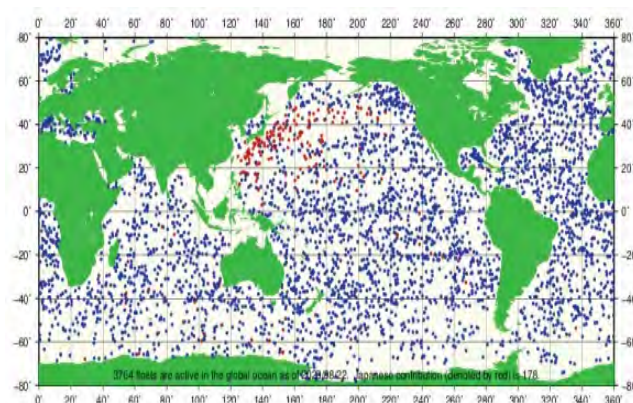
Period: 2018–

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT; Japan Agency for Marine-Earth Science and Technology (JAMSTEC)); Ministry of Agriculture, Forestry and Fisheries (MAFF); Fisheries Research and Education Organization); Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Reference: "Intergovernmental Oceanographic Commission (IOC) Subcommittee" in MEXT website (<https://www.mext.go.jp/unesco/002/006/002/011/1349711.htm>) (in Japanese)

To respond to various issues, such as the serious security situation surrounding the oceans, frequent maritime accidents, natural disasters of marine origin, and pollution of the marine environment, it is essential to conduct research and make observations in cooperation with other countries in order to realize an "open ocean". Efforts for oceanographic research and data release through international cooperation include the following:

1. discussions on the mid-term plan of the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and promotion of the "UN Decade of Ocean Sciences";
2. participation in the G7 Working Group on the Future of the Oceans (MEXT);
3. active contributions to the Argo Project;
4. participation in the G7 Working Group on the Future of the Oceans (MEXT);
5. collection and publication of information on the distribution of marine organisms as
  - a. the Japanese base of the Associate Data Unit (ADU) in the IOC's International Oceanographic Data and Information Exchange System (IODE) (MEXT),
  - b. the Japanese node of the Ocean Biodiversity Information System (OBIS) (JAMSTEC), and
  - c. a member of the North Pacific Marine Science Organization (PICES) (JAMSTEC);
6. participation in PICES (MAFF), the International Ocean Carbon Collaboration Program (IOCCP) under the IOC, and the Global Ocean Observations and Research Program (GO-SHIP) established under the Climate Variability and Predictability Research Program (CLIVAR) under the World Climate Research Program (WCRP) (GO-SHIP), and the Argo Project (MLIT); and
7. promotion of the "United Nations Decade of Ocean Science for Sustainable Development" (MEXT).



Global distribution of Argo floats (courtesy of Japan Metrological Agency)

# Marine Open Innovation Project (MaOI Project)



Period: 2018 (Preparation)– 2019 (Start)–

Organization: Shizuoka Prefecture, Marine Open Innovation Institute

Reference: "MaOI" website (<https://maoi-i.jp/>) (in Japanese)

Shizuoka Prefecture is home to a marine environment rich in biodiversity, including Suruga Bay, the deepest bay in Japan. Focusing on the potential of the ocean, considering especially Suruga Bay to be as testbed, the Prefecture is engaged in projects to create a global center for the blue economy that promotes marine-related industries and works to preserve the marine environment. The blue economy includes not only traditional marine industries such as shipping, marine transportation, and fisheries, but also new marine-related industries that are expected to develop in the future, such as biotechnology, robotics, and information and communication. In particular, in the field of biotechnology, the Marine Open Innovation Institute (MaOI Institute), which is the driving force behind the projects, has established a research institute to work on whole-genome sequencing of representative biological resources of Shizuoka Prefecture, such as Sakura shrimp and golden eye snapper. The institute will conduct advanced biological research on marine biological resources in cooperation with universities and other organizations to contribute to the realization of sustainable fisheries. In recent years, seaweed has attracted attention as a source of blue carbon, and we are also conducting genome analysis and biochemical research on seaweeds and working to develop technologies for restoration of seaweed beds. Additionally, the MaOI Institute has established a marine microorganism library of marine-derived lactic acid bacteria and yeast strains, and it is conducting research to elucidate the functions of the library strains to promote industrial applications. In addition to these biological efforts, the MaOI Institute operates and improves the Blue Innovation of Shizuoka Open Data Platform (BISHOP), a data platform that consolidates and centrally manages oceanographic data, water quality data, etc. BISHOP works to improve the quality of collected data and facilitates data visualization with applications that aim to disseminate information useful not only for industries but also to citizens' lives.

As a business support organization, MaOI has been conducting sharing advanced research-based findings with member companies, and the coordinators of MaOI actively visit marine-related companies to support new product development and problem solving. Depending on the case, they may be accompanied by researchers from MaOI or they may introduce academia and research institutions with the necessary knowledge to the companies for promoting collaboration and application of the knowledge and expertise of researchers to the industrial frontlines.

In May 2023, Blue Economy Suruga Bay International Roundtable meeting was held in Shizuoka City with experts from Japan and abroad joined and discussed about sustainable use of ocean and the actions that need to be taken now to ensure that people manage marine resources sustainable. Future events are planned to showcase and promote the efforts of ocean-related industries in Japan and abroad, and throughout these actions taken, MaOI will continuously promote the creation of a global center for the blue economy.



Suruga Bay is located in Shizuoka Prefecture at almost the center of the Japanese archipelago. It is situated directly to the south of UNESCO World Cultural Heritage Site Mount Fuji. The bay's total surface area is approximately 2,300 square kilometers. The north-to-south distance of about sixty kilometers, while the mouth of the bay, spanning from Omaezaki in the west to Irozaki at the tip of the Izu Peninsula in the east, measures roughly fifty-six kilometers. Notably, Suruga Bay reaches a maximum depth of 2,500 meters, distinguishing it as the deepest bay in Japan.

# Human resource development in ocean science (1)

## Sasakawa Scientific Research Grant

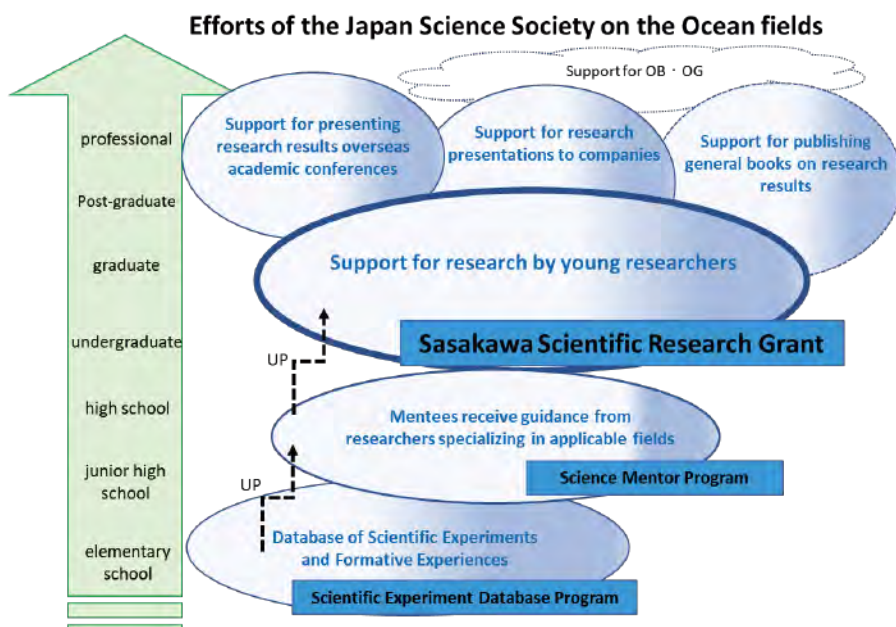


Period: 1988–

Organization: The Japan Science Society

Reference: Sasakawa Scientific Research Grant website (The Japan Science Society)  
(<https://www.jss.or.jp/ikusei/sasakawa/>) (in Japanese)

This program has been running nearly 40 years and is based on the policy of providing grants for research conducted by young researchers including graduate students with a wealth of novelty, originality, and budding talent, as well as generous grants for emergent basic research fields. In total, the program awards nearly 300 million yen annually to more than 300 young researchers. A special quota for "marine research" is included in each of the five areas of general scientific research and practical research to contribute to the advancement of research in marine science in Japan. We will continue to support grant recipients by presenting their research overseas, publishing their research in books for general public, and presenting their research to companies after the grant is awarded.



# Human resource development in ocean science (2)

## Science Mentor Program

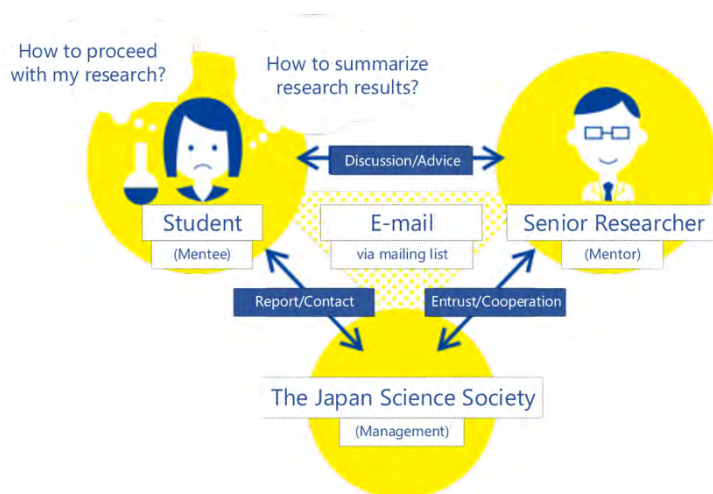


Period: 2013–

Organization: The Japan Science Society

Reference: “Science Mentor Program” webpage (The Japan Science Society) (<https://www.jss.or.jp/fukyu/mentor>) (in Japanese)

Junior and senior high school students (individuals and groups up to 3 students) from all over Japan who are interested in scientific research are invited to submit research plans of their choice. Students (mentees) who pass the document review and initial interview by expert committee members will prepare a research plan under the guidance of an expert researcher in the relevant field (university, research institute, etc.). Mentors provide research guidance for six months or longer (depending on the mentee's preference) to train mentees in the fundamentals of scientific research. Marine research plans are adopted each year.



# Human resource development in ocean science (3)

## Database of Science Experiments and Original Experiences



Period: 2002–

Organization: The Japan Science Society

Reference: "Database of Science Experiments and Original Experiences website (The Japan Science Society)

(<http://proto-ex.com/old-index.html>) (in Japanese)

Information on scientific phenomena in everyday life, nature, and culture will be provided via the web site in the form of "data and information of scientific experiments" and "column articles on childhood experiences which are still fresh in one's memory" to encourage interest in scientific exploration through self-initiated efforts by children and students. The web site also includes information about the ocean.



# UNESCO Associated School



Period: --

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Reference: UNESCO Associated Schools Network (ASPnet) in Japan official website (MEXT)

(<https://www.unesco-school.mext.go.jp/schools/en/>)

UNESCO Associated School (ASPnet school) is school that practices peace and international cooperation to realize the ideals of UNESCO expressed in the UNESCO Charter. Currently, there are more than 12,000 UNESCO Associated Schools in more than 180 countries and regions around the world, and there were 1,115 member schools in Japan as of March 2023, which was the largest number in the world. MEXT and the Japanese National Commission for UNESCO have positioned UNESCO Associated Schools as centers for the promotion of Education for Sustainable Development (ESD). Because ESD is key to the realization of all 17 Sustainable Development Goals (SDGs), UNESCO Associated Schools in Japan carry out various activities including ocean literacy and education not only through SDG 4 (education), but also through SDG 6 (water), SDG 13 (climate change), SDG 14 (marine resources), and SDG 15 (terrestrial resources). In addition, the National Conference for the ASPnet has been held annually since 2009 to promote ESD in school education and share best practices, including examples of student and teacher exchanges between schools in Japan and overseas.



Study at the Port of Miike, a component of the World Heritage Site "Industrial Revolution of Meiji Japan: Iron and Steel Making, Shipbuilding, and Coal Industry"



Tidal flat observations

# Ocean Education Pioneer School Program



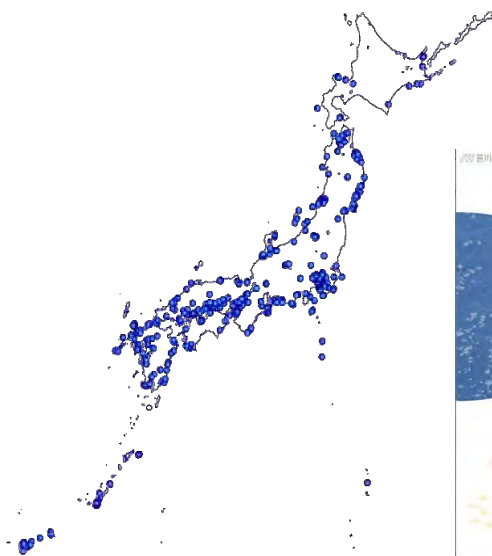
Period: 2016–

Organization: The Nippon Foundation, Ocean Policy Research Institute of the Sasakawa Peace Foundation

Reference: Ocean Education Pioneer School Program website (<https://www.spf.org/pioneerschool/>) (in Japanese)

The Ocean Education Pioneer Schools Program (PSP) supports the activities of schools and teachers who want to engage in "ocean learning" that has the potential to facilitate future learning, in which children can become more familiar with the ocean, deepen their understanding of the ocean, and protect the ocean by themselves.

Co-sponsored by the Nippon Foundation and Ocean Policy Research Institute of the Sasakawa Peace Foundation, PSP has provided grants to 516 schools (1296 cases in total) for ocean education initiatives between FY2016 and FY2023, and it also provides opportunities for teachers and students to exchange presentations.



Map of PSP schools which received grants between FY2016 and FY2023



Ocean Education Pioneer School Program website (<https://www.spf.org/pioneerschool/>) (in Japanese)

# Education and Human Resource Development in ocean science (1)

## Human Resource Development for Research and Development



Period: 2019–

Organization: Ministry of Education, Culture, Sports, Science and Technology (MEXT; The University of Tokyo, National Institute of Polar Research (NIPR), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Tokyo University of Marine Science and Technology, others)

References: “Efforts to develop human resources” (JAMSTEC)

([https://www.jamstec.go.jp/j/about/hr\\_development/](https://www.jamstec.go.jp/j/about/hr_development/)) (in Japanese)

“Ocean Interdisciplinary Education Program” (The University of Tokyo)

(<https://www.oa.u-tokyo.ac.jp/program/education.html>) (in Japanese)

To solve global environmental problems and ensure sustainable use and development of the oceans, it is essential to develop human resources with specialized knowledge and skills. Efforts to develop human resources in marine science and technology include the Young Research Fellow (JAMSTEC), a postdoctoral fellowship program designed to attract excellent recent PhDs from overseas. Programs such as, the "Ocean Interdisciplinary Education Program," an interdepartmental education program for graduate students (The University of Tokyo); the "Graduate School Program for Excellence in Marine Industry AI Professional Development; and the "Graduate School Program for Excellence in Marine Industry AI Professional Development" (MEXT, Tokyo University of Marine Science and Technology) aim to develop experts who can play leading roles in the development of the marine industry. The Arctic Challenge for Sustainability II (ArCS II) provides funds for young researchers to travel to Arctic-related international conferences, and MEXT and NIPR offer programs to strengthen overseas exchanges and research capabilities to promote human exchanges with overseas countries. In terms of human resource development, which is the foundation for marine development, the "Ocean Entrepreneurship Training Seminar" (Tokyo University of Marine Science and Technology) offers special lectures for students interested in creating and promoting new marine industry businesses, starting businesses, and establishing NPOs, as well as writing proposals for business plan competitions. The "Marine Entrepreneurship Theory II" (MEXT) provides opportunities for students to talk with venture company founders and others.



The Graduates of the 9th Ocean Interdisciplinary Education Program and Professors



# Education and Human Resource Development in ocean science (2)

## Human Resource Development for the Marine Industry



Period: 2017–

Organization: Ministry of Land, Infrastructure, Transport and Tourism (MLIT), The Nippon Foundation, others

Reference: "Maritime Report 2023" (MLIT) (<https://www.mlit.go.jp/maritime/content/001621454.pdf>) (in Japanese)

To develop Japan's maritime industry, it is essential to secure persons with specialized knowledge and skills. The "Umi to Nihon PROJECT" (Nippon Foundation) is an initiative to develop human resources in the shipbuilding and marine industries. Under the Umi to Nihon PROJECT, local elementary and junior high school students are invited to visit shipyards and marine industry facilities (MLIT, The Nippon Foundation). In addition, the Technical Skills Training Centers, which operate at six locations nationwide, provide training for newly hired personnel and training for technicians. MLIT supports efforts to train and secure seafarers include promoting reforms in the way seafarers work through the establishment of a system to ensure proper labor management, to establish a "Study Group from Women's Perspective to Promote Women Seafarers" composed of academic experts, to establish a "Seafarers' Training Center" composed of experienced seafarers and women seafarers, and to train seafarer instructors affiliated with seafarer training institutions in the Philippines, Indonesia, and Vietnam, which account for the majority of seafarers in Japan's ocean-going merchant fleet, as well as to provide classroom and onboard training tailored to practical work content. MLIT efforts to develop and secure leaders in marine construction include the following: a tour of "Construction Projects with Leader Development Activities (Trial)" for elementary school through university students (); promotion of efforts to secure vacations at port construction and construction sites (MLIT); and "Promotion of Young Engineers (Trial)," in which engineers with extensive field experience are placed in the field training programs to transfer their technical knowledge to next generations.



Activities to foster future marine engineers for students from elementary school to university.

# Education and Human Resource Development in ocean science (3)

## Human Resource Development in the Fisheries Industry



Period: 2018–

Organization: Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Reference: “2022 Fisheries White Paper” (Fisheries Agency)

(<https://www.jfa.maff.go.jp/j/kikaku/wpaper/R4/attach/pdf/230602-7.pdf>) (in Japanese)

Marine products are widely consumed by the public as daily food and have supported healthy lifestyles of people as a source of protein and calories. It is essential to maintain and develop domestic production to ensure a stable food supply. The number of people working in the fishing industry in Japan has been steadily decreasing due to the aging and shrinking of the population. The development of human resources to take on this role is therefore an urgent need. Various efforts are being made to develop and secure human resources for the fisheries industry. For example, MAFF supports career counseling sessions and long-term training in the fisheries industry for those who want to work in the industry, including those who have no experience in the fisheries industry. MAFF is responsible for the accreditation of the curriculum of the Fisheries College by the National Institution for Academic Degrees and University Reform; the accreditation of the curriculum by the Japan Accreditation Board for Engineering Education; and registration of the curriculum, facilities, and instructors as a maritime engineer training facility. MAFF has accredited eight training ships, 14 water and lake laboratories, and four fisheries laboratories (as of March 2023) to promote the shared use of marine training facilities beyond universities, while MEXT is promoting the implementation of practical training that takes advantage of regional characteristics. MEXT also has been developing cutting-edge technology that promotes the sustainable growth of local industries. MAFF provides training to develop capacity and expertise of women in fishing villages and supports the efforts of women's groups in fishing villages to revitalize their communities through entrepreneurial economic activities that include processing and sales of fish and the promotion of sea foods (MEXT, MAFF).



Mackerel being processed using a newly introduced three-ply grinder (courtesy: Nakaminato Fisheries Cooperative Women's Club).

# Education and Human Resource Development in ocean science (4)

## Maritime Education



Period: 2017–

Organization: Cabinet Office; Ministry of Education, Culture, Sports, Science and Technology (MEXT); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of Agriculture, Forestry and Fisheries (MAFF)

Reference: “Maritime Report 2023” (MLIT) (<https://www.mlit.go.jp/maritime/content/001621455.pdf>) (in Japanese)

It is essential to train personnel with specialized knowledge and skills who will contribute to the development of Japan's maritime industry. In particular, to ensure a stable supply of the next generation of mariners, it is important to promote maritime education at the elementary and junior high school levels to deepen children's understanding of the maritime industry and to stimulate their interest in it as a future career. To this end, the course of study for elementary and junior high schools, which was revised in March 2017, includes an enhanced description of the importance of Japan's oceans and maritime affairs, and classes based on the new course of study began in April 2020. Efforts related to maritime education include the following: holding the Nippon Learning Sea Platform Meeting (Cabinet Office, MEXT, and MLIT); promoting awareness of the "Maritime Education Program" created in response to the courses of study and online lesson videos based on the program among elementary school teachers nationwide; creating a public relations video on maritime education (MLIT); promoting the "Maritime Education Platform" (MLIT); disseminating the marine education program prepared by the MLIT to the chief instructors in charge of social studies at the boards of education in each prefecture and designated city (MEXT); cooperating with universities that have signed comprehensive cooperation agreements with other universities to host interns, appoint teachers to cooperative graduate schools, and provide other forms of university education (Fisheries Research and Education Agency (MAFF)). MLIT is conducting programs for elementary and junior high school students to experience shipboard life and visit maritime facilities; holding seaside nature schools for children and parents in cooperation with local governments, educational institutions, nonprofit organizations and other local entities; and providing opportunities to learn about maritime careers and understand the importance of marine transport and shipbuilding in supporting Japanese industry. MLIT and maritime career education seminars (Japan Maritime Public Relations Association, Regional Transportation Bureaus, Boards of Education, MLIT) introduce maritime careers and promote understanding and interest in the importance of marine transport, shipbuilding, and other industries that support Japan's maritime industry.



Fisheries guidance at a fisheries high school

# Activities of Early Career Ocean Professional Japan (ECOP Japan)



Period: 2021–

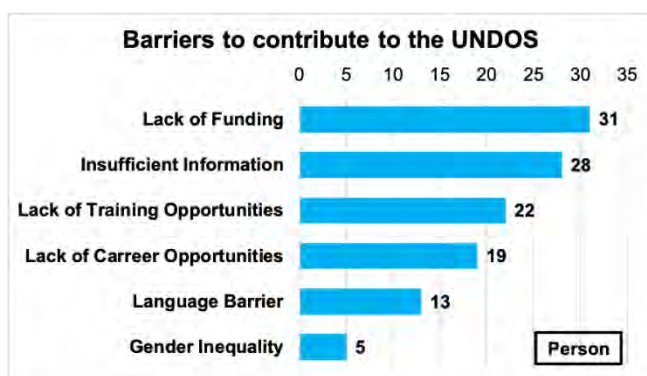
Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Ocean Policy Research Institute (OPRI) of the Sasakawa Peace Foundation

Reference: Early Career Ocean Professionals (ECOP) Japan website (<https://www.ecopdecade.org/japan/>)

As part of the United Nations Decade of Ocean Science for Sustainable Development (UNDOS), a program for Early Career Ocean Professionals (ECOP) working in various fields and sectors related to the ocean was established in 2021. In that program, ECOP Japan is carrying out several activities such as holding symposiums, producing video letters introducing ECOP's works in Japan, and disseminating related information through the website. In 2023, a questionnaire survey was conducted to identify the issues facing Japan's ECOPs and their expectations for the UNDOS. In the future, ECOP Japan will continue to showcase the activities of Japan's ECOPs across disciplines and provide opportunities and information (events, employment, grants, etc.) that will help address those challenges. The goal is to revitalize Japan's ECOPs to support the future of the ocean sector.



Logo of ECOP Japan



Barriers for Japan's ECOPs in contributing to the UNDOS (Part of the 2023 Questionnaire Survey)

# Project for Women in Ocean



Period: Unknown

Organization: Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Fisheries Agency; Japan Coast Guard

Reference: MLIT website ([https://www.mlit.go.jp/maritime/maritime\\_tk5\\_000060.html](https://www.mlit.go.jp/maritime/maritime_tk5_000060.html)) (in Japanese), Fisheries Agency website (<https://www.jfa.maff.go.jp/j/kenkyu/suisanjoshi/181213.html>) (in Japanese), Japan Coast Guard website ([https://www.kaiho.mlit.go.jp/school/elements/sub\\_women/women.html](https://www.kaiho.mlit.go.jp/school/elements/sub_women/women.html)) (in Japanese),

The percentage of women in Japan's maritime-related workplaces is low, especially in jobs that require work at sea. MLIT's "Shine! Funejo★" and the Fisheries Agency's "Treasure of the Sea! Fisheries Women's Vigor Project" are examples of programs designed to support the expansion of the work areas of women. In addition, actions to increase the number of female managers in the Japan Coast Guard and the Japan Agency for Marine-Earth Science and Technology promote the employment and active roles of women.



MLIT case study



Fisheries Agency website



Japan Coast Guard Academy Website

# Social Cooperation Course

## Marine Digital Engineering



Period: 2022–

Organization: University of Tokyo, MTI, Japan Marine United Corp., Mitsubishi Shipbuilding Corp., Furuno Electric Corp., Japan Radio Corp., BEMAC Corp., Nippon Kaiji Kyokai

Reference: Maritime and Ocean Digital Engineering, The University of Tokyo website (<https://mode.k.u-tokyo.ac.jp/>)

Japan's maritime industry is a key player in the global maritime industry but is facing urgent issues that include "developing new technologies and their social implementation in the context of the global trend toward decarbonization", "introducing automated ships to improve safety and work styles to maintain shipping services", and "ensuring overwhelming productivity in increasingly sophisticated ship design and manufacturing processes". In order to address these issues, seven Japanese maritime industry players: MTI Corporation of the NYK Group, Japan Marine United Corporation, Mitsubishi Shipbuilding Corporation of the Mitsubishi Heavy Industries Group, Furuno Electric Corporation, Japan Radio Corporation, BEMAC Corporation, and Nippon Kaiji Kyokai (and its subsidiary NAPA, Ltd.), established an affiliated course at the Graduate School of Frontier Sciences, The University of Tokyo, to build a common infrastructure for simulation to realize sustainable maritime logistics, and develop technologies and to nurture human resources in the maritime field by utilizing digital engineering. The center will form a broad network with other universities and research institutes in Japan and abroad, as well as with experts in other industries, such as automotive, aerospace, and aviation, who are leaders in the use of digital engineering. These highly skilled personnel are expected to play an active role in fields that promote the industrial use of the ocean, such as offshore wind power generation and undersea resource development. On 3 April 2023, JRCS Corporation, Mitsui O.S.K. Lines, Ltd., Shin Kurushima Sanoyas Shipbuilding, Tsuneishi Shipbuilding, Terasaki Electric Industry, and Nabtesco Corporation joined the program.



Symposium commemorating the establishment of the course (courtesy of Maritime Economics News)

## Attractive marine content and leisure



Period: Unknown

Organization: Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of the Environment

Reference: "Maritime report 2023" (MLIT) (<https://www.mlit.go.jp/maritime/content/001621455.pdf>) (in Japanese)

As a maritime nation, Japan receives many benefits from the oceans, including fisheries, mineral resources, and marine transport. However, people do not have a sufficient understanding of the ocean and are not necessarily familiar with it because they have few opportunities to interact with the ocean in their daily lives. It is very important to deepen the public's understanding and interest in the ocean, pass on its benefits to future generations, and create opportunities for many people to become familiar with the ocean in order to preserve the marine environment and develop fisheries and maritime industries in a sustainable way. With respect to marine tourism and leisure, MLIT supports the creation of stay-and-go type contents using marine leisure and other resources. This effort is led by a regional tourism development corporation (Destination Marketing/Management Organization: DMO) that aims to improve the appeal of tourist attractions by utilizing regional marine resources. MLIT will support the establishment of "sea stations" as land-sea interface points and the promotion of marine recreation. MAFF will promote consultations among related parties to establish rules for the use of the sea surface and the effective dissemination of rules and manners, the compilation of fishing gear and methods that can be used for recreational fishing in each prefecture, and the dissemination of rules for users of coastal areas via the Fisheries Agency's website.



Life jackets protect lives (leaflet cover) (courtesy: MLIT)

# Creation of a Plan for the Future of Coastal Shipping and Maritime Transportation Base



Period: 2017-

Organization: Ministry of Land, Infrastructure, Transport and Tourism (MLIT),

Reference: MLIT websites "Coastal Shipping Future Creation Plan" (<https://www.mlit.go.jp/common/001190904.pdf>) and "The Role of the Port" ([https://www.mlit.go.jp/kowan/part/part\\_02.html](https://www.mlit.go.jp/kowan/part/part_02.html)) (both in Japanese)

The domestic shipping industry is categorized as "coastal shipping". Maritime transport has long been an essential part of people's lives and economic activities. At present, 40% of domestic logistics (in terms of ton kilometers) is supported by marine transport, and it can be said that the stability of life and economic growth would not be possible without marine transport. To maintain coastal shipping, which plays such an important role in society, it is necessary to address various structural issues, such as the aging of vessels, the aging of seafarers, and the fragile management base of 99.7% of companies, which are small-to-medium-size enterprises. In addition, for coastal shipping to grow as an industry that provides safe and quality transport services on a sustainable basis, it must evolve into a "robust" industry through more efficient transport and a stronger business base, thereby paving the way for the future of coastal shipping. To this end, the "Coastal Shipping Future Creation Plan" was compiled in 2017 by the Committee on Future Directions for the Revitalization of Coastal Shipping. In addition, to ensure both safety and efficiency in coastal shipping, efforts are being made to develop ports and special marine transport bases that will serve as hubs for this activity.

**「内航未来創造プラン」で定めた将来像・具体的施策**

■ 内航海運が今後も産業基礎物資の輸送やモーダルシフトを担う基幹的輸送インフラとして機能する必要があること、社会全体で生産性向上が求められていることから、現下の内航海運を巡る諸課題の早期解決のために、まず、内航海運が目指すべき将来像を明確化した上で対策を講じる必要がある。このため、目指すべき将来像として「**安定的輸送の確保**」と「**生産性向上**」の2点を軸として位置づけ。

■ それぞれの実現に向け、「**内航海運事業者の事業基盤の強化**」、「**先進的な船舶等の開発・普及**」、「**船員の安定的・効果的な確保・育成**」等の具体的施策を盛り込むとともに、それぞれの施策についてスケジュールを明示。

**『 たくましく 日本を支え 進化する 』**

目指すべき将来像

生産性向上      安定的輸送の確保      行政・業界・全ての関係者が変革し、未来創造

＜将来像の実現のための具体的施策＞

<p><b>1. 内航海運事業者の事業基盤の強化</b></p> <ul style="list-style-type: none"> <li>○船舶管理会社の活用促進                     <ul style="list-style-type: none"> <li>・「国土交通大臣登録船舶管理事業者」（仮称）登録制度の創設（H30-）</li> </ul> </li> <li>○荷主・海運事業者等間の連携による取組強化                     <ul style="list-style-type: none"> <li>・「安定・効率輸送協議会」（仮称）の設置（H29-）</li> </ul> </li> <li>○新たな輸送需要の掘り起こし                     <ul style="list-style-type: none"> <li>・「海運モーダルシフト推進協議会」（仮称）の設置（H29-）</li> <li>・モーダルシフト船の運航情報等の一括検索システムの構築（H29-）</li> </ul> </li> <li>○港湾インフラの改善・港湾における物流ネットワーク機能の強化等</li> </ul>	<p><b>2. 先進的な船舶等の開発・普及</b></p> <ul style="list-style-type: none"> <li>○IoT技術を活用した船舶の開発・普及～内航分野のi-Shippingの具体化～                     <ul style="list-style-type: none"> <li>・自動運航船（Auto-Shipping）の開発（H37日途）</li> </ul> </li> <li>○円滑な代替建造の支援                     <ul style="list-style-type: none"> <li>・（独）鉄道建設・運輸施設整備支援機構の船舶共有建造制度による優遇措置の拡充（H30～）</li> </ul> </li> <li>○船舶の省エネ化・省CO2化の推進                     <ul style="list-style-type: none"> <li>・内航船「省エネ格付け」制度の創設・普及（H29～暫定移行、H31～本格導入）</li> <li>・代替燃料の普及促進に向けた取組（「先進船舶」としてのLNG燃料船の普及促進）</li> </ul> </li> <li>○造船業の生産性向上</li> </ul>	<p><b>3. 船員の安定的・効果的な確保・育成</b></p> <ul style="list-style-type: none"> <li>○高等海技教育の実現に向けた船員の教育体制の抜本的改革                     <ul style="list-style-type: none"> <li>・（独）海技教育機構の4級海技士養成課程における教育改革（養成定員拡大等）</li> </ul> </li> <li>○船員のための魅力ある職場づくり                     <ul style="list-style-type: none"> <li>・499総トン以下の船舶の居住区域を拡大しても従前の配乗基準を適用するための検討、安全基準の緩和（H29-）</li> <li>・船内で調理できる者の人材の確保</li> <li>・船員派遣業の許可基準の見直し（H29-）等</li> </ul> </li> <li>○働き方改革による生産性向上                     <ul style="list-style-type: none"> <li>・船員配乗のあり方の検討（H29-）等</li> </ul> </li> </ul>
<p><b>4. その他の課題への対応</b></p> <ul style="list-style-type: none"> <li>○内航海運暫定措置事業の現状と今後の見通し等を踏まえた対応</li> <li>○船舶の燃料油に含まれる硫黄分の濃度規制への対応</li> <li>○海事思想の普及</li> </ul>		



# Public Awareness



Period: 2000's–

Organization: Cabinet Office; Ministry of Education, Culture, Sports, Science and Technology (MEXT; University of Marine Science and Technology); Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Ministry of Foreign Affairs (MOFA); Tokyo University of Marine Science and Technology

Reference: "C to Sea Project Umi CoCo" website (MLIT), (<https://c2sea.jp/>) (in Japanese)

The C to Sea Project Umi CoCo is engaged in various educational activities to deepen the public's understanding and interest in the ocean and to provide opportunities for more people to become familiar with it. For example, as part of the "Ocean Day", a national holiday, commemorations held by the Tokyo University of Marine Science and Technology, MEXT holds events and hands-on classes related to research and education, as well as hands-on voyages on research and survey vessels. In addition, the Prime Minister's Award for Distinguished Contributions to Promotion of a Maritime Nation is awarded to individuals or groups who have outstanding achievements in a wide range of ocean-related fields. The aim is to promote public understanding and interest in the ocean by honoring these persons and widely publicizing their achievements. MLIT holds events throughout Japan to promote public understanding and interest in the oceans and the maritime industry on the occasion of "Ocean Day" and "Ocean Month" in July each year. July is also "Coastal Protection Month." MLIT holds an online event every November to promote and raise awareness of coastal protection and maritime safety on "Lighthouse Day" as well as to raise awareness of tsunami disaster prevention with the United Nations Disaster Management Agency and MOFA. In addition, as part of the "C to Sea Project," MLIT launched the "Umi-Coco" portal and other initiatives, improved the "Kids' Page"; held "SUBSEA TECH JAPAN," a specialized exhibition on marine industrial technology. The Cabinet Office also presented a poster on the government's various marine policies at the "Ocean and Industry Innovation Convention (Umicon)" organized by the Yokohama UMI Council, an event related to the marine industry.



Maritime Tourism Site



A PDF version of this case study collection is available here.

[https://oceandecade.jp/en/refs/activity\\_2/](https://oceandecade.jp/en/refs/activity_2/)

This case study collection was made possible by a grant from the Nippon Foundation.

Japan's Initiatives for UN Decade of Ocean Science II

Issued June 2024

June 23, 2024 1st Edition

Issued by Japan National Decade Committee for the UN Decade of Ocean Science

Edited by Japan Society of Ocean Policy and Ocean Policy Research Institute, Sasakawa Peace Foundation

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2030 United Nations Decade  
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