

Ocean Negative Carbon Emissions



Global Ocean Negative Carbon Emissions Global ONCE

What is Global ONCE?

Global ONCE is a research programme endorsed in June 2022 under the UN Decade for Ocean Science for Sustainable Development (2021 – 2030) chaired by Prof. Nianzhi Jiao from Xiamen University, China, and with 79 partners from 33 countries. The objective of Global ONCE is to provide data, knowledge and best practices in the application of ONCE approaches towards achieving the global strategy of carbon neutrality by mid century.

Why Global ONCE?

Current international pledges for emission reductions are very likely insufficient to limit temperature increase to less than 2°C by the end of the century, so further interventions that will increase the uptake of CO₂ from the atmosphere will be needed.

The ocean is the largest active carbon reservoir on the Earth, storing an amount of carbon about 20 times that of the land and 50 times that of the atmosphere, and thus possesses huge potential for CO₂ negative emissions. All the mechanisms for carbon sequestration in the ocean [Biological Carbon Pump (BCP), Carbonate Counter Pump (CCP), Microbial Carbon Pump (MCP), Solubility Carbon Pump (SCP)] are considered to be integrated as BCP-CCP-MCP-SCP (BCMS) for maximum potential of carbon sink and sustainable development.

What does Global ONCE deliver?

Global ONCE facilitates the application of ONCE approaches, including coastal and estuarine ecosystem resilience, ocean alkalinity enhancement, artificial up-welling to enhance seaweed cultivation, reduction in land-sourced chemical fertilization to increase the microbial carbon sink in estuaries, and other biogeochemical engineering solutions with co-benefits of addressing ocean acidification, deoxygenation and hypoxia.

Global ONCE generates and disseminates best practices and standards to ensure ONCE applications are legal, quantifiable, verifiable and socially acceptable, and with no or minimal adverse impact to the ocean environment.

What are the Outcomes of Global ONCE?

By 2030, Global ONCE commits to deliver the following outcomes:



A network of coastal and ocean study sites and experimental infrastructure



Science, technology and governance frameworks set up for assessment, implementation and monitoring of adaptation and mitigation approaches



Improved technical and personnel capacity and ocean literacy



Enhanced ocean-climate mitigation and adaptation strategies, policies and governance

www.global-once.org

Are there any funding opportunities to advance ONCE approaches?

Global ONCE is developing an International Cooperation Fund, to be launched in late 2024, to support collaborative interdisciplinary research to fill the gaps in knowledge, capacity, governance and literacy in scaling up of ONCE approaches.

Priority areas for collaborative research

Thematic priorities

- Microbial, chemical and physical processes which enable the ocean to take up and store CO₂
- Methods and models to monitor and evaluate the efficiency of ONCE approaches
- Ecological and technical engineering solutions to scale up ONCE approaches
- Social science and governance/legal frameworks needed to put ONCE approaches into practice
- Model-data integration, data sharing, interoperability standards, and key ocean variables

Other Priorities

- Delivery of nutrients in mariculture areas with upwelling technologies
- Waste water treatment effluent alkalinity enhancement
- Microalgal biomass production and CO₂ sequestration using ocean based floating photobioreactors
- Sensor development
- Numerical modelling
- Observation and simulation experimental facilities
- Expert exchange programmes

How Global ONCE is managed?

Global ONCE has set up an implementation mechanism to facilitate and strengthen coordinated, synergistic and collaborative implementation of the Global-ONCE science plan towards its outcomes. The functional bodies include the Executive Committee (EC), the Management Committee (MC), the International Advisory Committee (IAC) and the International Programme Office (IPO). Working Groups on specific topics led by the EC will help fulfil the mission of advancing ocean negative carbon emissions research and network building.

Global ONCE is in the process of developing standards of behavior, policies, procedures and practices to fulfil its commitments to the values of professional integrity, respect, fairness, and sustainability.

How to participate in Global ONCE?

Global ONCE accepts participation by projects, activities and contributions endorsed by the UN Ocean Decade to contribute to the objectives of Global ONCE. Research institutes, universities, industries and scientists are also welcome to participate with voluntary contributions.

We are currently seeking outstanding Scientific Researchers and Secretariat Specialists of Global-ONCE. Welcome to contact us and submit your CV.

For Global ONCE Science Plan, please contact:

Professor Nianzhi Jiao

Email: Jiao@xmu.edu.cn

For General Information, please contact:

Professor Chuanlun Zhang

Email: globalONCE@xmu.edu.cn

For Job Application, please contact:

cnirhr@xmu.edu.cn

www.global-once.org

