



Bridging Land and OceanAn initiative for coastal wetland carbon sequestration under the UN Ocean Decade Global ONCE Program

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News and Highlights

Bridging Land and Ocean—An initiative for coastal wetland carbon sequestration under the UN Ocean Decade Global ONCE Program

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On July 2nd, 2025, 32 scientists representing 15 countries gathered at Tartu, Estonia to make on-site endorsements for the Global ONCE (Ocean Negative Carbon Emissions) Program at the 12th INTECOL Wetlands Conference. This marks a significant milestone for ONCE in establishing a systematic framework for coastal wetland carbon sequestration research and global collaboration (Figs. 1, 2).

Coastal wetlands are critical transition zones linking terrestrial and marine ecosystems, yet they face severe degradation from anthropogenic land-based activities and sea level rise that propagate impacts to the ocean. As a UN Ocean Decade Program, the Global ONCE Program champions interdisciplinary and cross-regional collaboration to enhance carbon sequestration in the ocean and coastal wetlands through science and innovation. Aligned with the Tartu Declaration on Wetlands that includes resolutions to promote the rights of global wetlands (especially peatlands) and advance the discipline of wetland science based on facts, this initiative addresses key knowledge gaps in land-ocean interactions. The goal is to harness the full potential of coastal wetlands and ocean systems for climate mitigation, thereby laying a scientific foundation for international policy formulation and implementation.

This international cooperation initiative has been officially launched on the 12th INTECOL Wetlands Conference website (<https://intecolwetlands2025.ee/programme/>), where scientists worldwide can pledge their support through the online

platform.

1. Proposed Actions of the Global ONCE Program

1.1. Advance Science on Land-Ocean Synergies

(i) Fill critical knowledge gaps in land-ocean interactions to optimize environmental conditions for carbon sequestration in coastal wetlands (e.g., mangroves, salt marshes, seagrasses) and adjacent marine systems.

(ii) Quantify cross-boundary impacts of land-based pollution and habitat loss on wetland carbon sinks.

1.2. Establish a Global Coastal Wetland Carbon Sequestration Alliance

(i) Partner with Tartu Declaration signatories, UNEP, Ramsar Convention, and research institutions to create a knowledge-sharing network.

(ii) Launch a dedicated Global ONCE Working Group to: (1) assess carbon sequestration potential across wetland types, and (2) develop standardized protocols for monitoring degradation, restoration efficacy, quantifying carbon stocks in coastal wetlands and their carbon sequestration capacity.

1.3. Accelerate Equitable Technology Transfer

(i) With Developed Countries: Partner with the EU, U.S., and others to advance monitoring and modeling of blue carbon ecosystems, leveraging policy tools like the EU Nature Restoration Law.

(ii) Support for Developing Nations: Assist countries in Africa, Southeast Asia, and other regions facing coastal wetland

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degradation by: (1) Deploying expert teams to guide restoration projects. (2) Organizing training programs on carbon monitoring and assessment. (3) Providing low-cost, adaptive ecological restoration solutions (e.g., nature-based approaches).

1.4. Integrate Indigenous Knowledge & Socio-Economic Co-Benefits

(i) Engage local communities and Indigenous Peoples to combine traditional ecological knowledge (e.g., sustainable fishing, vegetation management) with modern science for culturally adaptive wetland management.

(ii) Incorporate socio-economic benefits into projects (e.g., eco-tourism, fisheries recovery, biomass use for paper industry) to ensure long-term sustainability.

1.5. Launch Cross-Border Demonstration Projects

(i) Select pilot sites in Belt and Road Initiative (BRI) countries (e.g., The Gambia, Vietnam) to establish cross-border carbon sequestration demonstration zones, with implementation guided by the action of “No. 66.8. Carbon Cycles in Huang-Bohai Sea Wetlands” as an endorsed project of the UN Decade of Ocean Science for Sustainable Development (Fig. 1).

(ii) Mobilize Global ONCE funding to help developing nations access international climate finance (e.g., Green Climate Fund) for wetland restoration.

1.6. Strengthen Policy Integration & Science Communication

(i) Advocate for integrating coastal wetland conservation into Nationally Determined Contributions (NDCs) and global climate frameworks (e.g., IPCC assessments).

(ii) Counter misinformation via multilingual science communication, highlighting wetlands as “climate regulators.”

2. Next Steps

(i) Formalize partnerships at COP15 (Ramsar Convention)

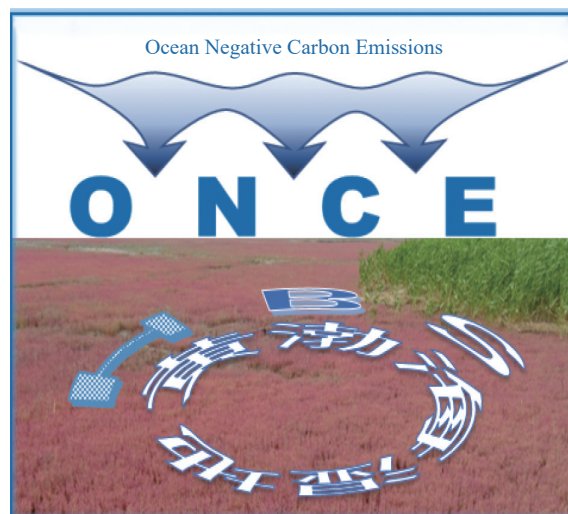


Fig. 1. Logo of Project No. 66.8: Carbon Cycles in Huang-Bohai Sea Wetlands under the ONCE Programme of the UN Decade for Ocean Science for Sustainable Development. The three interconnected arrows of the upper part symbolize the integration of ocean carbon sequestration mechanisms, including the Microbial Carbon Pump (MCP), Biological Pump (BP), and Carbonate Counter Pump (CCP). HBS is the short name of the project. The Chinese characters in the logo mean “Huang-Bohai Sea Wetlands,” indicating that the project focuses on the typical wetlands along the Bohai and Yellow Seas. The background shows *Suaeda salsa* (seepweed) and *Phragmites australis* (reeds), the dominant wetland vegetation in the area.

and COP30 (UNFCCC)

(ii) Develop a Roadmap for International Cooperation with Tartu Declaration signatories.

3. Summary

By synergizing Global ONCE and the Tartu Declaration, we unlock coastal wetlands’ unparalleled capacity as Earth’s natural carbon sinks. This collaboration offers a science-driven solution to global climate governance—turning the tide on degradation through unity, innovation, and shared commitment to our planet’s resilience. For more information, see <https://www.global-once.org/>.



Fig. 2. Academician Nian-zhi Jiao unveils the International Cooperation Initiative on Coastal Wetland-Based Ocean Negative Carbon Emissions during his keynote address at the 12th INTECOL Wetlands Conference. The event was held in Tartu, Estonia.