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Agenda 4.3.2- UN24: Explore the strongest ocean current in the Western Pacific: the 2nd Cooperative Study of Kuroshio and Adjacent Regions (CSK-2)

PROGRESS REPORT

UN24: Explore the Strongest Ocean Current in the Western Pacific: the 2nd Cooperative Study of Kuroshio and Adjacent Regions (CSK-2)

(April 2022 – March 2025)

Unedited text for further inputs and comments

In accordance with the Terms of Reference of the IOC Sub-Commission for the Western Pacific (WESTPAC), the report is provided to facilitate the consideration by the Sub-Commission on the progress made of the WESTPAC-led UN Ocean Decade Action – *Explore the Strongest Ocean Current in the Western Pacific (CSK-2)*

The report presents a summary of the activities and results of the Decade Action since its inception in 2022. A tentative workplan is also proposed for the next intersessional period (2026-2027). Member States are invited to consider how to engage their interested institutions and relevant stakeholders in the collective effort.

1. Background and Rationale

1. The Kuroshio is one of the world's major ocean currents and the strongest current in the Pacific. It originates from the North Equatorial Current in the east coast of Philippines, flows through the east coast of Taiwan, enters the East China Sea, flows across the Tokara strait and enters the western North Pacific Ocean, and then flows toward northeast along the coast of Japan.

2. Known as the Black Current or Black Stream, the Kuroshio is named for the dark/deep blue of its water, as the area of the current has relatively fewer phytoplankton and sunlight is able to penetrate deep water. As a result, the waters appear dark blue compared to nearby ocean.

3. The Kuroshio holds important economic, social, and cultural significance to most of Asian countries. It is a warm current as it originates in the tropics, transporting a large amount of heart and salt northward toward polar region. The heat transported by these ocean currents affects the regional climate of East Asia and also the basin-scale climate of the Pacific Rim region via atmospheric and oceanic teleconnection. The recent study also shows that the area downstream of the Kuroshio—the Kuroshio Extension, is one of the major net carbon dioxide sinks for the Earth's atmosphere, however, researchers are still exploring why the Kuroshio Extension is one of the regions with the largest net CO2 absorption.

4. The Kuroshio and its extension area also serve as important spawning and nursery grounds, and migration routes for many economically and ecologically important fish species, though he surface waters of the Kuroshio are nutrient poor. The reason for rich fish stocks being found in nutrient poor waters has been a compelling question.

5. The IOC started with the Cooperative Study of the Kuroshio and Adjacent Regions (CSK) in 1965 as its first major project in the region. During 1965-1979, a number of CSK activities have been carried out mainly by Asian countries. The first CSK not only substantially increased the knowledge on oceanography and fisheries in the Kuroshio and adjacent regions, but also greatly enhanced institutional research capacity of many countries in the region. The CSK laid down a solid foundation for international marine scientific research in the Western Pacific region, and provided the impetus for the establishment of an intergovernmental body for developing and coordinating ocean research in the region, i.e., the IOC Working Group for the Western Pacific established in 1977 at the 10th Session of the IOC Assembly in Paris, which later evolved as the present IOC Sub-Commission for the Western Pacific.

6. Following the termination of the CSK in 1979, interested Member States continued to conduct scientific studies of the Kuroshio and its adjacent regions, mainly unilaterally or bilaterally, with substantial scientific knowledge generated. However, most of efforts look into either limited geographical areas or specific scientific aspects of the transboundary current . The lack of integrated and coordinated approach indeed resulted in a limited understanding on the whole Kuroshio system, its variability, and impacts on marine environment and socioeconomic development of countries along the current in the changing climate.

7. WESTPAC responded to the demand of its Member States for an integrated study of Kuroshio, and set up an open-ended Intersessional Working Group in 2017 to conduct a feasibility study of the 2nd Cooperative Study of Kuroshio and Adjacent regions (CSK-2). Based on the IWG's review on Half-Century of Scientific Advancements Since the Cooperative Study of the Kuroshio and Adjacent Regions (CSK) Programme – Need for a new Kuroshio Research, and a draft Science Action Plan, the Sub-Commission established the CSK-2 as its regional programme in 2021 at its 13th Session.

8. The CSK-2 aims to enable ocean research communities and other relevant ocean stakeholders to co-design and co-implement integrated and multidisciplinary investigations, research and analysis on the Kuroshio and its adjacent regions, in order to improve regional weather forecasts and climate predictions, and inform fisheries and aquaculture management.

9. The CSK-2 development is expected to span over ten years in line with the UN Decade of Ocean Science for Sustainable Development (2021-2030).

2. Project objectives and expected outputs/outcomes

10. In response to the demands of these countries adjacent to the Kuroshio and the UN Decade of Ocean Science for Sustainable Development (2021-2030), the IOC Sub-Commission for the Western Pacific established the CSK-2 as a large scale multidisciplinary and multinational research programme. There are two major high-level objectives formulated for its initial development, which are:

Objective 1: to understand the Kuroshio and its impact on global and regional weather and climate, with a societal outcome to achieve improved regional weather forecasts and climate predictions;

Objective 2: to understand the Kuroshio in relation to its marine ecosystem, with a societal outcome to achieve better management of regional fisheries and aquaculture along the Kuroshio and in its adjacent regions.

11. To achieve the two objectives will rest on multifaceted science disciplines, including enhanced ocean–atmosphere, biological and biogeochemical observations, establishment and analysis of in situ and satellite datasets, model development, intake of local and indigenous knowledge. It will also involve science-innovation and science-policy interfaces, as well as capacity development and transfer of marine technology among participating countries and their institutions.

12. The establishment of a multinational and multidisciplinary framework for cooperation among countries and their institutions is essential for the CSK-2 to identify, generate and use required knowledge to achieve its societal outcomes. Therefore, the well-coordinated implementation of multidisciplinary projects, multi-sourced data and information management and efficient exchange and outreach among relevant stakeholders, communities and public will constitute important cornerstones of the cooperation framework.

The above sections reproduces the full text from the IOC Sub-Commission for the Western Pacific. (n.d.). 2nd Cooperative Study of the Kuroshio and its Adjacent Regions (CSK-2). Retrieved January 9, 2025, from https://ioc-westpac.org/csk2/
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3. Activities conducted and progress made since its inception

13. The CSK-2 was established as a WESTPAC program at the 13th WESTPAC intergovernmental meeting in April 2021. The Sub-Commission formed an CSK-2 International Steering Group, comprising 16 nominated members from 8 Member States, to provide guidance and oversight on the development and implementation of the CSK-2 programmed.

14. The first ISG meeting was held remotely on July 21, 2021, with Kentaro Ando and Xiaopei Lin, selected as co-chairs. On November 26, 2021, during the first UN Ocean Decade Regional Conference hosted by the Government of Thailand, the incubator for CSK-2 was held, and it was agreed to submit the program as a UN Decade Action Programme. The second ISG meeting was held remotely on December 8, 2021, to discuss the Science Action Plan (SAP) and Data and Information Management Plan (DIMP). In January 2022, an application for program registration was submitted via the WESTPAC Office. Concurrently, drafts of the SAP and DIMP were prepared by the respective Task Forces. In April 2022, the program was informed that its registration had been approved, officially making CSK-2 a UN Ocean Decade Action Programme.

15. On July 22, 2022, a special ISG meeting was held remotely to approve the finalized SAP (https://ioc-westpac.org/CSK-2/CSK2-SAP-27%20Jul%202022%20Final%20Version.pdf) and

DIMP (https://ioc-westpac.org/CSK-2/CSK2-DMIP-20Jul2022.pdf). During this meeting, it was also decided to issue a call for projects under CSK-2. Between October and December 2022, the first call for projects was conducted, receiving 12 proposals. Simultaneously, preparations for the 1st International Symposium on Kuroshio Science began. The symposium and the 3rd ISG meeting were held in Bangkok on February 20, 2023, during which 11 project proposals were selected. At this meeting, the Laoshan Laboratory in China applied to serve as the supporting office.

16. A second call for the new projects was issued in October-November 2023, followed by the 4th ISG meeting held in Qingdao, China, on December 4-6, 2023. During this ISG meeting, three projects were proposed, with two were approved. It was concluded that one proposal required revisions, and its approval was deferred to the next meeting.

17. On April 24, 2024, a workshop on CSK-2 was held during the 2nd UN Decade Regional Conference in Bangkok, focusing on potential collaborations with stakeholders. On August 29-30, 2024, the Head of the Secretariat of the WESTPAC Office and the Chair of WESTPAC visited Qingdao to evaluate the Laoshan Laboratory as a supporting office. The evaluation results are documented **in the Annex 1**. In parallel, WPI-AIMEC (Advanced Institute for Marine Ecosystem Change) took the lead in the preparation for the 2nd International Symposium on Kuroshio Science (CSK-2), which was held on November 13 and 14, 2024, followed by the 5th ISG meeting on November 15, 2024. At this meeting, the progress of 13 projects was reviewed, and the previously deferred proposal was conditionally approved pending minor revisions (INF-002). The CSK-2 program is now set to be implemented through 14 projects. In addition, one task team has been established to advance data sharing and another to identify research gaps.

4. Key achievements and outputs generated since its inception

18. As of November 2024, 13 project studies have been conducted, as listed in the table below. Data Nodes have also been constructed within several of these projects, with the data availability also presented in the table.

NO.	PROJECT NAME, Name of PI, and affiliation	DATA SITE
1	Observations in the origin region of the Kuroshio - Akira Nagano (JAMSTEC)	https://www.jamstec.go.jp/ipobs/PhBuoy/
2	Kuroshio Extension Observatory (KEO) - Meghan Cronin	www.pmel.noaa.gov/ocs/data-overview https://www.jamstec.go.jp/egcr/e/oal/oceansites_keo/index.html
3	Time series observations of Kuroshio variability in the East China Sea - Hanna Na (Seoul National University)	Not publicly available now
4	Climatic hotspot2 project - Masami Nonaka (JAMSTEC)	https://www.jamstec.go.jp/apl/hotspot2/data-link.html
5	Physical and Biogeochemical Dynamics in the Kuroshio-Oyashio Extension Regions and their impacts on Climate and Fisheries - Zhaohui Chen (OUC)	http://oda-koer.com
6	Dynamical and ecological interaction between the Kuroshio and coastal circulation - Kiyoshi TANAKA (AORI)	https://www.jamstec.go.jp/jcope/vwp/suruga/ https://www.jamstec.go.jp/jcope/vwp/sukumo/
7	Subthermocline currents and eddies in the NEC-Kuroshio-MC region - Fan Wang (IOCAS)	http://npoce.org.cn/dateAcc.aspx
8	Kuroshio Edge Exchange and the Shelf Ecosystem (KEES) - Feng Zhou (SIO)	N/A
9	The Role of Ocean Dynamic for Fish Recruitment Process in the Coral Triangle Region - Augy Syahailatua (BRIN)	National Scientific Repository - BRIN
10	Ecosystem Approach to Fisheries Management Along the Northern Pacific Seaboard, Philippines - Angel B. Encarnacion	N/A
11	Banggai Upwelling Dynamics and Ecosystem Experiment (BUDEE) - Agus S. Atmadipoera (IPB)	N/A
12	Ocean circulation at the Pacific Entrance of the Indonesian Throughflow – Dongliang Yuan (FIO)	https://www.nsfcodc.cn/
13	Amami-Kuroshio project: Baseline assessment of subtropical environment of Amami Islands along the Kuroshio and its influence to the biosphere and humanosphere - Yusuke Yokoyama (AORI)	N/A

5. Stakeholder engagement, including Early Career Ocean Professionals

19. CSK-2 has prioritized the engagement of Early Career Ocean Professionals (ECOPs), with the 4th ISG meeting including a dedicated session on ECOPs. This session found that many ECOPs in the region were not familiar with CSK-2. Therefore, it was decided to organize a relatively larger ECOP session at the 2nd International Kuroshio Science Symposium, scheduled before the 5th ISG meeting, to promote Kuroshio research and gather opinions. A summary of their feedback is attached to this report as **Annex 2**.

20. In addition, at the UN Ocean Decade Regional Conference in April 2024, discussions were held with weather-related government offices and fisheries officials from China and the Philippines as a way to strengthen stakeholder collaboration. As a result, it was agreed that both researchers and stakeholders need a unifying catchphrase to align their efforts in the same direction. An example of this phrase was “What is the future of the Kuroshio ecosystem and the ecosystem service? (from Prof. Saito's slide).

21. The workshop with OceanPredict reaffirmed the importance of data sharing. In the workshop with PICES, both WESTPAC and PICES, despite their different origins, were able to share a common understanding of the need to utilize the unique strength of intergovernmental meetings.

6. Workplan for 2026-2027 (Please provide concise information in the attached table)

22. Following 2025, the task will be identifying research gaps as determined at the 5th ISG meeting and supporting the development of the data portal in Laoshan Laboratory. The 14 projects will continue in line with their respective research tasks. The ISG will meet three times, including at the 3rd UN Ocean Decade Regional Conference in 2027, to review project progress and promote mutual use of data. At the 3rd UN Ocean Decade Regional Conference, stakeholders will also be invited to develop a joint research plan for the period beyond the UN Ocean Decade.

7. Perspectives and recommended actions to be considered by the 15th Intergovernmental Session, Tokyo, Japan, 11-13 March 2025

23. CSK-2 will plan to develop an improved management system to support cross-cutting Kuroshio research. It is important to identify the current research gaps across 14 projects and develop strategies to address these gaps. Therefore, it is necessary to engage more experts in the CSK-2 programs. Our major stakeholders are expected to be operational and fishery agencies in governments, so cooperating and engaging operational agencies in each member state would be crucial. Furthermore, based on the evaluation results, it is recommended that the Sub-Commission endorse the establishment of a CSK-2 Support Office, hosted by the Laoshan Laboratory in Qingdao. This Support Office will provide administrative and technical support for the CSK-2 development, under the strategic and technical guidance of the WESTPAC Office and ISG.

8. Workplan and budget estimation for 2026-2027

Project/Programme	Activities	Objectives to be achieved	Expected outputs	Date and Place	Funding Required, US$	
					IOC (in-cash)	Other in-kind sources
CSK-2	6th ISG meeting	Exchange scientific information Discuss way forward	Papers and reports	Fall, 2025	0	50K
CSK-2 projects	Cruises and researches	Their own science	Papers, data, and reports	Intersessional periods	0	Covered by major host institutes
CSK-2	Results analysys task force meetings	Find the scientific gaps and points to collaborate	Reports	Intersessional periods	0	0
CSK-2	Data portal support team meetings	Support Laoshan to develop data portal	Data portal site	Intersessional period	0	Covered by Laoshan
CSK-2	Official Establishment of the Support Office for CSK-2 at Laoshan	Support WESTPAC office and ISG activities	Reports	March 2025	0	Covered by Laoshan
CSK-2	7th ISG meeting	Exchange scientific information Discuss way forward	Papers and reports	Fall, 2026	0	50K US$
CSK-2	8th ISG meeting	Exchange scientific information Discuss way forward	Papers and reports	April, 2027	5K	20K US$
CSK-2	CSK-2 workshop	Engagement of Stakeholders	Codesing of the CSK-2 and beyond	April, 2027	5K	15K US$

Annex 1: Evaluation Report

1. Background

The Kuroshio is one of the world's major ocean currents and the strongest current in the Pacific. The Kuroshio holds significant economic, social, and cultural importance to many Asian countries.

The Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO) started with the Cooperative Study of the Kuroshio and Adjacent Regions (CSK) in 1965 as its first major project in the region. During 1965-1979, a number of CSK activities have been carried out mainly by Asian countries. The first CSK not only substantially increased the knowledge on oceanography and fisheries in the Kuroshio and adjacent regions, but also greatly enhanced institutional research capacity of many countries in the region.

Half a century later, in response to Member States' demand for an integrated study of Kuroshio, the IOC Sub-Commission for the Western Pacific (WESTPAC) established the 2nd Cooperative Study of the Kuroshio and Adjacent Regions (CSK-2) as a regional program in April 2021 at its 13th Session. In May 2022, the IOC Sub-Commission for the Western Pacific officially registered the CSK-2 as a Decade Program (UN24), contributing to the vision of the UN Decade of Ocean Science for Sustainable Development (2021-2030): the Science We Need for the Ocean We Want.

CSK-2 aims to enable ocean research communities and other relevant ocean stakeholders to co-design and co-implement integrated and multidisciplinary investigations, research and analysis on the Kuroshio and its adjacent regions, in order to improve regional weather forecasts and climate predictions, and inform fisheries and aquaculture management.

The CSK-2 Science Action Plan guides the development of CSK-2 development, supported by contributions from Member States, their research institutions, and various partners and stakeholders. An International Steering Group (ISG) was established in 2022 with a mandate to oversee, make recommendations to the IOC Sub-Commission for the Western Pacific on, the program development and implementation. While the WESTPAC Office (also the Decade Coordination Office for the region) acts as the

primary coordination unit for the CSK-2, decentralized CSK-2 Program Support Office(s) will be established, as needed, to provide technical, logistical and financial support to the program implementation.

Since its inception, the CSK-2 program was developed rapidly with 12 projects involving 8 countries initiated. Due to the ever-increasing interests, the Sub-Commission and the ISG for CSK-2 encouraged its Member States and their institutions to consider hosting the CSK-2 Program Support Office, with draft Terms of Reference attached as the Annex??? to this Report.

In response to this call, the Laoshan Laboratory, Qingdao, China expressed its willingness to host a CSK-2 Support Office at the 4th Session of ISG (December 2023, Qingdao, China). In this regard, the IOC Sub-Commission decided to conduct a detailed evaluation on its capacity and skills to fulfill the envisaged role.

2. Evaluation Scope and methodology

A fact-finding mission was conducted on 29-30 August 2024, by a small team consisting of Kentaro Ando, Co-Chair of the ISG/CSK-2 and Wenxi Zhu, Head of the WESTPAC Office. During the two days' mission, the team visited the lab's relevant facilities, and had several meetings with the Lab's leadership including its director, Prof Lixin Wu, Assistant Director, Kehou Pan, technical staff Ms Lin Wang, Xiongpei Liu, and relevant scientists.

The Lab's staff made presentations about the Lab, its research focus, and international engagement, followed by Q/A sessions. In short, the evaluation focused on the institution's ability to fulfill the role as a CSK-2 Program Support Office based on the generic criteria including:

a) The roles and responsibilities of the host institution that would be responsible for the establishment and operation of the Support Office;
b) The capacity, experience and expertise of the Institution, at the regional or global level, to comply with the work proposed;
c) The relevance of the lead institution's programs and activities to achieving the objectives of CSK-2 and IOC Sub-Commission for the Western Pacific;
d) The required human and financial resources for the Support Office, the available and projected resources to ensure its establishment and operation,

and the quality of mechanisms and capacities, as well as context-specific opportunities and risks for ensuring sustainable institutional capacity and viability;

e) The governance and coordination arrangements for the Office including liaison and engagement with national, regional and international stakeholders and actors;

3. Preliminary result

3.1 The roles and responsibilities of the host institution that would be responsible for the establishment and operation of the Support Office

The team recognized that the laboratory has been conducted various scientific research and internation cooperative programmes. The Laoshan Laboratory (Formerly known as the Qingdao National Laboratory for Marine Science and Technology-QNLM), located in the Oceantec Valley, Qingdao, is a national ocean research institution approved by the Central Government of China. To build itself into a world class research institution, Laoshan Laboratory mobilizes global high-quality marine science and technology innovation resources, carries out strategic, forward-looking, systematic and cutting-edge research, strives to make breakthroughs in ocean science and technology, accelerates marine science and technology innovation. **Laoshan Lab has been well supported by a number of ocean stakeholders from home and abroad. Many educational and research institutions in Qingdao have officially joined the Laoshan Lab, together with their top experts, research teams, instrument and apparatus, research fund and logistic services.**

3.2 The capacity, experience and expertise of the Institution, at the regional or global level, to comply with the work proposed

From the comprehensive presentation conducted on the afternoon, August 29th, the team recognized that the Laoshan Lab has developed and deployed deep Argo float for observation. The modelling it conducted at both global and local scales was also well recognized for a high potential to contribute to CSK-2 science. For instance, the high-resolution model serves as an effective tool for examining ocean changes under global warming in the Kuroshio and its adjacent regions, as well as their impacts on regional climate and weather.

The Laoshan Laboratory also conduct marine ecosystem (biology and biogeochemical oceanography) studies. It was found that the decline of coastal biological resources and frequent ecological disasters essentially reflected an imbalance in the structure and function of nearshore ecosystems. Key research in Laoshan Laboratory includes optimizing marine ecosystem dynamics models and implementing integrated governance of watersheds, estuaries, and nearshore ecosystems. This involves developing diagnostic and conservation technologies for nearshore ecosystem health, elucidating the mechanisms by which multiple pressures affect nearshore ecosystems, and providing a scientific basis for adaptive management strategies that integrate land and sea ecosystems.

The Laoshan Laboratory has been developing technologies for observing and detecting extreme environment ecosystems and life support systems, conducting research on the state and the evolution mechanisms of unique ecosystems under extreme conditions in deep-sea and polar regions. The Laoshan Laboratory provides technological support in deep-sea and polar regions and is advancing the protection and utilization of deep-sea and polar biological resources.

Focusing on areas where ecological disasters such as red and green tides which frequently occur recently, key technologies and theories were developed for monitoring, prediction, and prevention of marine ecological disasters. These provide good knowledge of marine biodiversity, their spatial-temporal distribution, and potential risks of major causative organisms, and meanwhile contribute to the development of rapid detection methods and early warning indicators for typical red tide organisms in China's nearshore areas.

3.3 <u>The relevance of the lead institution's programme and activities</u>

The capacity for international cooperation of the Laoshan Lab was also reviewed. Dr. Wenju Cai used to serve as a WCRP/CLIVAR Pacific Panel member and later co-chaired the Panel, playing an instrumental role in the international climate variability research such as ENSO. Dr. Xiaopei Lin had been the member of the same panel, leading the international observation in the Kuroshio Extension Region in the context of WCRP/CLIVAR. Dr. Zhimin Jian was a member of PAGES and had contributed to the IODP programme. Dr. Jiabiao Li is the co-chair of InterRidge. He was the IODP Science Evaluation Panel member, InterMargins academic committee member. Dr. Zhaohui Chen has been ractively engaged in the international Argo project so UN

Decade Action Programme. He contributed to Deep Argo in the One Argo Programme, and he is currently promoting the technological development of deep profiling float (Xuwanwu) and constructing the regional network of Deep Argo in the western Pacific. Drs. Zhaohui Chen and Xiaopei Lin in the laboratory are the active members of CSK-2 programme, and it is expected to cooperate with the support office from their scientific perspectives. In addition to these researchers mentioned above, there are other eight famous scientists in the Laoshan Laboratory.

3.4 The required human and financial resources, and available and projected resources, and the quality of mechanisms and capacities, and context-specific opportunities and risks

The human resources have been increased due to the rising amount of support works for CSK-2. One qualified staff is positioned to lead the support works, and have the role to communicate with the director who oversee all of collaborative works at Laoshan Laboratory. The capacity of the staff is high enough to coordinate internally in Laoshan Laboratory and has capacity to manage the other members well. Among two staffs, one has conducted the ISG-3 and ISG-4 well and has been on the track record on the supporting works. The other was recently joined, but has well been developing the capacity with strong willingness to the support works. The evaluation team was also informed that one more staff will be added soon from Ocean University of China. Currently, the CSK-2 result analysis task force has been performed by support office staff. The result analysis mainly focuses on the initiatives of CSK-2, collecting all the data and generate information from it. The office has successfully organize CSK-2 regular meetings for 27 times, including minutes, tentative agenda, concept notes, invitation letters, spreadsheets and other related documents.

The team also recognized that the financial resources has been provided to conduct some certain level of supporting works up to now (August 2024), and is promised to be provided about 600,000 RMB annually when officially signed between the IOC/WESTPAC office and the Laoshan Lab.

Considering the situation, the team recognized that the function of the support office has been well strengthened and succeeded to reduce the risk to face insufficient situation for its expected functions.

3.5 The governance and coordination arrangements

The office positions under Department of Cooperation and Planning in the Laoshan Laboratory. The department responsible for domestic and international cooperation and strategic planning within the Laoshan Laboratory. The domestic cooperation mainly focuses on the cooperation with research institutions and universities within China, setting up branches at different provinces. The international cooperation mainly focuses on building up the collaborative network globally. The China - Porterhouses Speaking countries mainly focuses on Climate Change and Ocean Circulation, Ocean Ecosystems and Fisheries Resources, Marine Geology, Marine Energy and Marine Technology and Equipment. All the international affairs staff are fluent in English and have at least 3-year experiences on international works.

The team recognized that it was suitable for the support office to position internally under this department, but emphasized the support office shall be accountable to the WESTPAC Office and the CSK-2 International Steering Group.

4. Recommendation

The evaluation reveals that the Laoshan Laboratory has a certain level of capacity to host the CSK-2 Support Office. This was demonstrated by the strong commitment of its leadership to providing human resources, office space and financial support; Additionally, since mid 2023, two dedicated staff from the Laoshan Laboratory have been actively engaged in organizing CSK-2 meetings, maintaining close communications, engaging relevant stakeholders, preparing and providing tremendous logistic support to the ISC meetings and

Developing a dynamic and effect international project requires project staff to take a lead in driving and coordinating wide efforts. There is still room for staff to enhance their technical and operational capacity, particularly in ocean science expertise and knowledge, data analysis and research, project management, and problem-solving. Enhancing these capacities and skills will be essential for ensuring the successful coordination and implementation of CSK-2.

Annex:

Draft Terms of Reference of the CSK-2 Program Support Office

The CSK-2 Support Office will be hosted by one or more existing institutions. Financing for the Office will be provided by the host institution. The Support Office is legally separated from the UNESCO and the IOC, and operated under the responsibility of the host institution, but should be accountable to the WESTPAC Office and CSK2-ISG.

It will provide technical, logistical and financial support to relevant CSK-2 Actions in close consultation with the WESTPAC Office. Specifically, the Support Office will perform the following functions:

i. Provide technical, logistical and financial support to, and monitor the progress of relevant CSK-2 Actions in consultation with the WESTPAC Office (also Decade Coordination Office);
ii. Coordinate and assist in the development of the CSK-2 documents and guidelines;
iii. Co-organize and participate in the annual ISG meetings, international scientific symposia and other CSK-2 related activities and events;
iv. Serve as a CSK-2 data portal to ensure that CSK-2 data and information will be properly handled, documented, made accessible, and preserved for long-term use ;
v. Promote collaboration among relevant countries and their institutions in the developments and implementation of CSK-2, and cooperation with relevant national/international programs, projects, other relevant entities and stakeholder groups in order to advance the CSK-2 implementation.
vi. Raise awareness and visibility of the CSK-2 amongst diverse stakeholder groups, coordinate communication and outreach activities, mobilize resources and engage stakeholders to promote CSK-2 literacy and its implementation;
vii. Develop CSK-2 promotional materials, including audio and video documents;
viii. Collect information on CSK-2 and share it with the WESTPAC Office for posting on the WESTPAC Website and dissemination to IOC and other relevant organizations.

Composition

The CSK-2 Program Support Office shall consist of 1 executive director and 2-3 program and administrative staff.

Annex 2: ECOP discussion summary

The Early Career Ocean Professional (ECOP) session was organized to share research contributions during the CSK-2 symposium. Additionally, the ECOP discussions during the International Steering Group (ISG) meeting aimed to enhance ECOP activities within the CSK-2 framework. The summary is provided below.

1. The ECOP session included

- Conveners: Three conveners representing China, Japan, and Korea.
- Presentations: Eight presentations by ECOPs from seven different countries.
- Topics: A balance of research topics, with four presentations focused on Physical Oceanography and four on Biogeochemistry.
- Diversity: The session featured a diverse group of participants, with five male and three female presenters.

2. Key Suggestions

The session highlighted the following recommendations to enhance the engagement and impact of ECOPs in CSK-2

- Foster Discussion: Allocate more time for open discussions in a relaxed environment to friendship, encourage collaboration, and idea-sharing.
- Link Research to CSK-2 Goals: Emphasize how ECOP research can contribute to the objectives of the CSK-2 program.
- Expand Participation: Encourage more ECOPs to join, combining efforts with senior scientists to strengthen CSK-2 projects.
- Interdisciplinary Approaches: Motivate ECOPs to explore beyond their expertise and engage in interdisciplinary research.
- UN Ocean Decade Involvement: Promote active participation in other UN Ocean Decade programs to expand networking opportunities.
- Future Career Aspirations: Inspire ECOPs to envision their ideal career paths and work towards achieving those goals.
- Increase Invitations: Actively invite more ECOPs to participate in CSK-2 events and activities.
- Support Mechanisms: Provide practical support, such as travel grants, to enable greater ECOP participation.
- Collaboration opportunity: Develop and share clear frameworks for collaboration within the CSK-2 community.
- CSK-2 Benefits: Clarify the benefits ECOPs can gain from CSK-2 and identify the support needed to maximize their impact.
- Broaden the ECOP Definition: Define ECOPs based on their actions and contributions, rather than strictly by age.

3. Proposed Actions

To implement the suggestions effectively, the following actionable steps were proposed:

- Mentored Working Groups: Establish working groups led by senior scientists to guide ECOPs step-by-step toward achieving defined goals.
- ECOP Symposium: Organize a dedicated symposium for ECOPs to showcase their research and strengthen their networks.
- Integrate ECOPs into CSK-2: Develop programs that align ECOP initiatives with the overarching goals of CSK-2.

Benefits of Being an ECOP:

- Gain insights into ongoing research related to the Kuroshio.
- Build connections with international ECOPs, enhancing opportunities for future collaborative research.
- Understand how international cooperation is organized, fostering the skills to lead future international collaborations.

Support Desired for ECOPs:

- Financial support for participation in international conferences and meetings (e.g., travel grants).
- Access to mentoring programs involving senior researchers to guide their research and career development.
- Platforms for presenting and publishing research.