



ISA-CHINA JOINT TRAINING  
AND RESEARCH CENTRE

中国-国际海底管理局  
联合培训和研究中心

# ANNUAL REPORT 2025

2025  
年年度报告

DECEMBER 2025  
2025年12月





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### Artwork and design

This annual report was designed by Anica Novak.

### Photography

Front cover courtesy of National Deep Sea Centre of China.

For additional information or feedback on this annual report, please write to us at [jtrc@isa.org.jm](mailto:jtrc@isa.org.jm).

## 致谢

中国-国际海底管理局联合培训研究中心2025年年度报告由中国国家深海基地管理中心在国际海底管理局秘书处的支持下编写。特别感谢国际海底管理局秘书处宣传组的编辑、绘图和制作工作。

### 美工与设计

本年度报告由Anica Novak设计。

### 图片

封面照片由中国国家深海基地管理中心提供。

有关本年度报告的更多信息或反馈, 请致信我[jtrc@isa.org.jm](mailto:jtrc@isa.org.jm)。

## Acronyms

<b>CODF</b>	China Ocean Development Foundation
<b>COMRA</b>	China Ocean Mineral Resource R&D Association
<b>ISA</b>	International Seabed Authority
<b>JTRC</b>	Joint Training and Research Centre
<b>LTC</b>	Legal and Technical Commission
<b>LDC</b>	least developed country
<b>LLDC</b>	landlocked developing country
<b>MNR</b>	Ministry of Natural Resources of China
<b>NDSC</b>	National Deep Sea Center of China
<b>OSER</b>	Office of Stewardship, Environment and Mineral Resources
<b>REMP</b>	Regional Environmental Management Plan
<b>SIDS</b>	small island developing States
<b>SIO</b>	Second Institute of Oceanography, MNR

## 缩写

中国海洋发展基金会
中国大洋矿产资源研究开发协会
国际海底管理局
中国-国际海底管理局联合培训和研究中心
法律与技术委员会
最不发达国家
内陆最不发达国家
中国自然资源部
中国国家深海基地管理中心
国际海底管理局监管、环境与矿产资源办公室
区域环境管理计划
小岛屿发展中国家
自然资源部第二海洋研究所

# FOREWORD

Dear colleagues,

It is with great pleasure that I present the Annual Report 2025 of the ISA-China Joint Training and Research Centre (JTRC), a cornerstone partnership between the International Seabed Authority (ISA) and the Government of the People's Republic of China. Since its establishment in 2020, the ISA-China JTRC has embodied our shared vision of advancing marine scientific research and strengthening the participation of developing States in the exploration and sustainable use of the resources of the Area, the common heritage of humankind.

In 2025, the ISA-China JTRC consolidated its reputation as a vibrant hub for international cooperation, scientific excellence and capacity development. The third training workshop on the development of a regional environmental management plan for the Area of the Indian Ocean, with a focus on the Mid-Ocean Ridges and Central Indian Ocean Basin, held in Qingdao between 27 April 2025 and 1 May 2025, brought together 22 participants from 17 developing countries. Through intensive lectures, case studies and field visits, participants deepened their understanding of marine spatial planning and the environmental stewardship that underpins all ISA activities. Notably, women accounted for nearly 60 per cent of participants, which is a testament to our ongoing commitment to gender equality in ocean science. The launch of the ISA-China JTRC's first joint research project, focusing on biodiversity in deep-sea habitats of the Northwest Pacific, marked another milestone. This initiative not only strengthens scientific collaboration between China and small island developing States but also contributes valuable data to ISA's DeepData

repository and supports the development of regional environmental management plans.

These achievements reflect the sustained efforts of the Ministry of Natural Resources of China, the China Oceanic Development Foundation, the National Deep Sea Center and the dedicated experts and staff of both the JTRC and the ISA. Their collective work gives tangible expression to the goals set out in the [Capacity Development Strategy](#) and the [Action Plan for Marine Scientific Research in support of the UN Decade of Ocean Science for Sustainable Development](#).

Looking ahead, the JTRC's planned 2026 workshop on cumulative impacts and its growing research portfolio will continue to expand opportunities for developing States to engage in deep-sea science and innovation. I am confident that the JTRC will remain an exemplary model of multilateral cooperation, scientific excellence and inclusivity in action.

Together, we are shaping a future where knowledge, technology and shared responsibility guide the stewardship of the deep ocean for the benefit of all humankind.

**Leticia Carvalho**  
Madam Secretary-General  
International Seabed Authority





# 前言

尊敬的各位同仁：

我怀着十分喜悦的心情，向大家呈交中国-国际海底管理局联合培训和研究中心（以下简称中国-海管局联合中心）2025年度报告。该中心是国际海底管理局（ISA）与中华人民共和国政府合作的核心基石。自2020年成立以来，中国-海管局联合中心始终践行双方的共同愿景，致力于推进海洋科学研究，助力发展中国家参与“区域”这一人类共同继承财产的资源勘探与可持续利用事业。

2025年，中国-海管局联合中心进一步巩固了其作为国际合作、顶尖科研与能力建设活力枢纽的良好声誉。今年4月27日至5月1日，联合中心第三期培训班-2025印度洋区域环境管理计划培训班在青岛成功举办，本次培训聚焦印度洋中脊及中印度洋海盆区域，吸引了来自17个发展中国家的22名学员参与。通过理论授课、案例研讨与实地考察相结合的方式，学员们深化了对海洋空间规划的理解，也进一步掌握了支撑国际海底管理局各项工作的环境管理核心理念与方法。值得特别关注的是，女性学员占比近60%，这充分彰显了我们在海洋科学领域践行性别平等理念的坚定决心与实际行动。

中国-海管局联合中心首个联合研究项目-“西北太平洋深海生境生物多样性研究”的正式启动，成为中心发展进程中的又一里程碑。该项目不仅有效深化了中国与小岛屿发展中国家的科研协作，更向国际海底管理局深海数据平台（DeepData）贡献了宝贵数据资源，为区域环境管理规划的制定提供了有力支撑。

这些成就的取得，离不开中国自然资源部、中国海洋发展基金会、国家深海基地管理中心的持续投入与不懈努力，更凝聚着中国-海管局联合中心与国际海底管理局全体专家及工作人员的心血与智慧。各方的协同发力，切实将海管局《能力建设战略》及《海洋科学研究行动计划》的相关目标落到了实处，为联合国“海洋科学促进可持续发展十年”倡议注入了坚实动力。

展望未来，中国-海管局联合中心计划于2026年举办“累积影响”专题培训班，并持续拓展科研项目布局，这将为发展中国家参与深海科学研究与创新创造更多机遇。我坚信，中国-海管局联合中心将持续发挥示范引领作用，成为多边合作、科研卓越与包容性实践的典范标杆。

让我们携手共进，为深海治理勾勒未来蓝图，以知识为引领、以技术为支撑、以责任为纽带，守护好这片深海家园，为全人类的福祉贡献力量。

莱蒂西亚·卡瓦略  
国际海底管理局秘书长



# 01.

## HIGHLIGHTS OF ACTIVITIES IN 2025

## 2025 本年度主要工作

### 1.1. The fifth meeting of the Steering Committee

The fifth meeting of the Steering Committee of the International Seabed Authority (ISA) - China Joint Training and Research Centre (JTRC) was held on 20 November 2024. During the meeting, the members welcomed the newly appointed Director of the JTRC and the new members of the Steering Committee. The Steering Committee reviewed and approved the JTRC Annual Report 2023-2024, noting the successful organization of the JTRC's first in-person training workshop, held in Qingdao in 2023, and the effective preparations for international joint research in 2024. The Steering Committee

### 1.1 指导委员会第五次会议

2024年11月20日,中国-国际海底管理局联合培训和研究中心(简称“联合中心”)指导委员会第五次会议召开。会议期间,指导委员会成员对联合中心新任主任及指导委员会新成员表示欢迎,审议并通过了《中国-海管局联合中心2023-2024年度报告》,肯定了2023年在青岛成功举办的中心首次线下培训班,以及2024年国际联合科研筹备工作取得的成效。会议同时审议并通过了2025年4月下旬在中国青岛举办的区域环境管理规划(REMP)培训班工作计划。该培训班旨在增进发展中国家学员对国际海底管



Fig 1. The fifth meeting of the Steering Committee

图1 指导委员会第五次会议

## The ISA-China JTRC Steering Committee

**Mr. José Dallo Moros**  
Director,  
OSER,  
ISA (Chair)



**何塞·达洛先生**  
海管局环境资源  
管理办公室主任（  
主席）

**Dr. Georgy Cherkashov**  
Research Director,  
The All-Russia Scientific  
Research Institute for  
Geology and Mineral  
Resources of the Ocean,  
Russian Federation



**格里高利·戚卡谢  
夫博士**  
俄罗斯联邦全俄海  
洋地质矿产资源科  
学研究所研究主任

**Mr. Pan Xinchun**  
Vice President and  
Secretary-General,  
CODF



**潘新春先生**  
中国海洋发展基金  
会副理事长、秘书长

**Mr. Zhang Chunlei**  
then-Director-  
General, NDSC



**张春雷先生**  
国家深海基地管理中  
心主任

## 中国-海管局联合中心指导委员会委员

**Dr. Suzan Mohamed  
El-Gharabawy**  
Deputy Director,  
the National Institute  
of Oceanography and  
Fisheries of Egypt



**苏珊·穆罕默德·艾伊-  
格拉巴威博士**  
埃及国家海洋与渔业  
研究所副主席

**Ms. Chen Danhong**  
Director-General,  
Department of  
International Cooperation,  
MNR



**陈丹红女士**  
自然资源部国际合作  
司司长

**Ms. Tang Dongmei**  
Deputy Director-  
General, CDOAA



**唐冬梅女士**  
中国大洋事务管理局  
副局长

also reviewed and approved the workplan for the training workshop on regional environmental management plans (REMP) to be held in late April 2025 in Qingdao, China. The workshop will aim to increase the knowledge of participants from developing countries about the ISA's processes for the establishment of REMPs and to enhance their capacity in deep-sea marine spatial planning and environmental management. Finally, the Steering Committee reviewed and approved the organizational framework for JTRC's scientific research activities and the related workplan for 2025-2026. It agreed to promote international joint research in two priority areas: "Scientific biological data analysis and management in deep-sea habitats" and "Historical data scientific analysis, new data-processing and machine learning techniques for DeepData."

理局 (ISA) 区域环境管理规划制定流程的了解, 提升其在深海海洋空间规划与环境管理领域的专业能力。最后, 会议审议并通过了联合中心科研活动组织架构及2025-2026年科研工作计划, 明确将围绕两大重点领域推进国际联合研究: 一是“深海生境科学生物数据分析与管理”, 二是“DeepData平台的历史数据科学分析、新数据处理及机器学习技术应用”。



## 1.2 2025 Training workshop

### 1.2.1 Preparations

On 16 December 2024, the ISA Secretariat issued a notice inviting nominations for the 2025 JTRC training workshop. By 24 January 2025, a total of 67 applications had been received from participants from 23 countries, including 63 international and four Chinese candidates. On 24 March 2025, China and the ISA jointly reviewed the applications and finalized the list of selected participants in accordance with the established criteria.

### 1.2.2 Opening ceremony

The 2025 JTRC training workshop was officially opened in Qingdao on the morning of 23 April 2025. The opening ceremony was attended by experts from the ISA Secretariat and the Legal and Technical Commission (LTC), Chinese and international lecturers and 22 participants, including 17 international and five domestic participants from 16 developing countries including Argentina, Chile, Cook Islands, Egypt, Fiji, Ghana, Indonesia, Kenya, Kiribati, Mauritius, Nigeria, Oman, Papua New Guinea, Saudi Arabia, Thailand and Tonga.

## 1.2 联合中心2025年培训班

### 1.2.1 筹备工作

2024年12月16日,海管局秘书处发布公告,启动2025年中国-海管局联合中心培训班学员招募工作。截至2025年1月24日,中国-海管局联合中心第三期培训班共收到来自23个国家的67名国际学员的报名申请,其中外方人员63人、中方人员4人。2025年3月24日,中方与海管局共同确认形成了学员建议名单。

### 1.2.2 开班仪式

2025年4月23日上午,中国-国际海底管理局联合培训和研究中心(简称中国-海管局联合中心)2025年培训班在青岛正式开班。国际海底管理局 (ISA) 秘书处及法律技术委员会 (LTC) 专家、中外授课教师代表,以及来自阿根廷、智利、库克群岛、埃及、斐济、加纳、印度尼西亚、肯尼亚、基里巴斯、毛里求斯、尼日利亚、阿曼、巴布亚新几内亚、沙特阿拉伯、泰国、汤加等16个发展中国家的22名学员(其中国际学员17名、国内学员5名)出席开幕式。



Fig 2. Group photo of participants at the opening ceremony

图 2. 开班仪式全体参会人员合影



The workshop was opened remotely by José Dallo Moros, Director of the ISA's Office of Stewardship, Environment and Mineral Resources (OSER). Opening remarks were also delivered by Dr. Li Xiangyang, Deputy Director of the China Deep Ocean Affairs Administration (CDOAA), Mr. Pan Xinchun, Vice-President and Secretary-General of the China Oceanic Development Foundation (CODF) and Mr. Zhang Chunlei, Director of the National Deep Sea Center (NDSC). Leaders from relevant local institutions, including the Qingdao municipal government, also addressed the participants. The opening ceremony was co-chaired by Dr. Xu Xuewei, Deputy Director, NDSC, and Co-Chair of the training workshop.

Dr. Li Xiangyang, Deputy Director, CDOAA, emphasized that China actively participates in and supports the work of the ISA, playing a constructive role in exploration activities, environmental management and the development of the Mining Code and other related regulations. He reaffirmed that China attaches great importance to assisting developing countries in enhancing their capacity to participate effectively in international seabed affairs and cultivating expertise in deep-sea research. Dr. Li noted that since the establishment of the JTRC, China and the ISA have worked closely together to promote regular training and scientific research activities. In conclusion, he expressed confidence that both sides would continue to strengthen cooperation and further improve the cooperation mechanism to contribute to the sustainable development of deep-sea resources. He also expressed hope that participants would not only acquire new knowledge and skills, but also gain a deeper appreciation of Chinese culture in the new era.

Mr. José Dallo Moros, Director, OSER, ISA, delivered a video message in which he expressed appreciation for the support of the Ministry of Natural Resources of China (MNR), the sponsorship of the CODF and the hospitality extended by all partners. He also acknowledged the NDSC's key role in organizing the training workshops and providing logistical support. Mr. Dallo highlighted the notable diversity among the participants, who included representatives from small island developing States and least developed countries, with women accounting for 50 per cent of the total. He emphasized that this diversity reflected significant progress towards gender equality and inclusiveness. He further underlined the importance of targeted training in

国际海底管理局监管、环境与矿产资源办公室 (OSER) 主任何塞·达洛·莫罗斯以视频方式致辞并宣布培训班开班。中国大洋事务管理局 (CDOAA) 副局长李向阳博士、中国海洋发展基金会 (CODF) 副理事长兼秘书长潘新春先生、国家深海基地管理中心 (NDSC) 主任张春雷先生分别致辞。青岛市政府等当地相关机构负责人也向学员们表达了问候与祝愿。开幕式由国家深海基地管理中心副主任、培训班联合主席许学伟博士主持。

中国大洋事务管理局副局长李向阳博士强调中国积极参与并支持国际海底管理局各项工作,在矿区勘探、环境管理及规章制定中发挥建设性作用。中国高度重视协助发展中国家提升国际海底事务参与能力,培养深海人才。李向阳博士指出,自联合中心成立以来,中方与海管局紧密合作,推动常态化培训和科研活动。展望未来,双方将加强协作,完善合作机制,为深海资源可持续发展贡献力量,并期望学员收获知识技能、了解新时代中国文化。

何塞·莫罗斯先生通过视频致辞,感谢中国自然资源部支持、海洋基金会赞助及各方接待,特别肯定深海中心在培训与后勤保障中的关键作用。达洛先生强调,本次培训的亮点:涵盖小岛屿发展中国家和最不发达国家代表,女性学员占比达50%,彰显多样性与性别平等成果。他重申培训在深海治理和全球能力建设中的重要意义,预祝学员满载而归。

潘新春代表海洋基金会祝贺培训班开班,强调深海蕴藏丰富矿产资源,是全人类共同遗产。他指出深海生态极为脆弱,提出三点建议:避免悬浮颗粒扩散、重金属释放和热液喷口区特有物种灭绝。他表示海洋基金会作为联合中心理事单位,将持续支持国际海底管理局工作,推动国际海底资源的开发、保护与可持续发展,并为学员授课介绍中国海洋产业发展成就。

培训班联合主席贝基·希钦博士致辞,肯定培训班在性别平衡和国际化方面取得的进展,展现了中心促进合作与拥抱多样性的成果。她阐述核心议题——国家管辖范围以外区域的海洋空间规划,强调这对国际海底管理局履行环境保护职责至关重要。她强调培训将聚焦区域规划工作,传授数据收集、分析和制图等实用技能,她鼓励学员积极参与讨论。

deep-sea governance and global capacity-building and wished all participants a fruitful and rewarding learning experience.

Mr. Pan Xinchun, Vice-President and Secretary-General of the CODF, emphasized that the deep sea holds abundant mineral resources and constitutes the common heritage of humankind. He underscored that deep-sea ecosystems are extremely fragile and proposed three possible mitigation measures: minimizing the spread of suspended particles, reducing the release of heavy metals and preventing the extinction of unique species in hydrothermal vent areas. Speaking on behalf of the CODF, Mr. Pan affirmed that, as a governing body of the JTRC, the CODF will continue to support the work of the ISA and promote the exploration, protection and sustainable use of international seabed resources. He added that CODF specialists would continue to contribute by delivering expert lectures to participants on China's achievements in marine industry development.

Dr. Becky Hitchin, Co-Chair of the training workshop, acknowledged the strong gender balance and broad geographic representation among the participants, noting that this reflected the JTRC's commitment to promoting cooperation and embracing diversity. She welcomed the theme of the 2025 workshop, marine spatial planning in areas beyond national jurisdiction, emphasizing its significance for the ISA in fulfilling its environmental protection responsibilities. Dr. Hitchin highlighted that the five-day training would focus not only on theoretical understanding but also on the development of practical skills in data-collection, analysis and spatial mapping. She encouraged participants to take an active part in the discussions and exchange of experiences throughout the workshop.

In his welcoming remarks, Mr. Zhang Chunlei, Director of the NDSC, the host institution of the JTRC, noted that the JTRC has successfully held two training workshops, benefiting 80 participants from 35 developing countries. He expressed the hope that the participants from 17 countries attending the 2025 workshop would not only deepen their knowledge but also learn from one another, build lasting friendships and experience the rich cultural heritage of Qingdao.

张春雷主任代表中国-海管局联合中心的挂靠机构中国国家深海基地管理中心致欢迎辞。他回顾了联合中心已成功举办两期培训班,惠及35个发展中国家的80名学员。期待参加本期培训班的17个国家的22名学员学有所获、交流互鉴、增进友谊,并体验青岛文化魅力。



Fig 3. Speakers delivering opening remarks

图3. 开幕式嘉宾致辞

## 1.2.3 Training content

The 2025 edition of the training workshop focused on ISA's REMPs. The programme covered not only the mandate of ISA and its institutional framework but also the fundamentals of deep-sea ecosystems, spatial management tools and data analysis methods, as well as spatial and non-spatial management measures within the framework of REMPs. The schedule is provided in Annex 1.

More than 10 experts from organizations and institutions such as the ISA OSER, the LTC, the China Ocean Mineral Resources R&D Association (COMRA), the CODF and the Second Institute of Oceanography (SIO), MNR, delivered lectures both in-person and online.

## 1.2.3 理论授课

为期5天的培训班以“区域环境管理计划”为主题,培训内容涉及区域环境管理计划概念、流程与战略定位,深海生态系统科学基础、空间管理工具与数据方法、环境影响评估与非空间管理措施、深海领域国际制度框架与管理机构职能等,详细日程见附件1。来自海管局监管、环境与矿产资源办公室、法律与技术委员会、中国大洋协会、中国海洋发展基金会、自然资源部海洋二所等组织和机构的10余名专家通过线下和线上形式开展理论授课。







Dongsheng Zhang

Second Institute of Oceanography,  
Ministry of Natural Resources  
Apr. 23<sup>rd</sup> 2025



Fig 4. Training workshop lectures

图7 理论授课培训



### 1.2.4 Participation in the REMP workshop

The JTRC training workshop was held back-to-back with the ISA workshop on the development of the REMP for the Indian Ocean. Participants in the JTRC workshop were given the opportunity to attend the first day of the event, where they learned about standardized procedures for environmental baseline data-collection and gained insights into the risk assessment models used by ISA contractors. They were also briefed by experts from the ISA's LTC on the latest developments in the negotiation of the Mining Code. They attended presentations showcasing cutting-edge research on hydrothermal vent ecosystems in the Indian Ocean conducted by multinational scientific teams. Through this engagement, the JTRC participants gained a deeper understanding of how to balance marine environmental protection with resource exploration and exploitation in a sustainable manner.

### 1.2.4 REMP研讨会

本次培训活动与2025年区域环境管理计划国际研讨会衔接举办。培训班学员获邀参与研讨会首日活动，系统学习了环境基线数据采集的标准化流程，深入了解了国际海底管理局承包者所采用的风险评估模型，并听取了国际海底管理局法律技术委员会专家关于《采矿规章》谈判最新进展的专题介绍。此外，学员们还参与了多国科研团队开展的印度洋热液喷口生态系统前沿研究成果分享会。通过此次交流，培训学员进一步深化了对如何以可持续方式平衡海洋环境保护与资源勘探开发的理解。



### 1.2.5 Site visits

As part of the training programme, participants undertook a field visit to the NDSC, where they gained a detailed understanding of China's latest advances in deep-sea exploration, including technology research and development and scientific expeditions.

Dr. Gao Xiang, Executive Director of the JTRC, introduced the technical features of the Jiaolong manned submersible and presented the results of its deployment, as well as a demonstration of the manned submersible training system simulator.

### 1.2.5 现场考察

培训期间,学员们实地考察国家深海基地管理中心,深入了解中国在深海探测、深海装备研发应用与深海科学研究中的最新进展。联合中心执行主任高翔博士系统介绍了蛟龙号载人潜水器技术特点,展示了载人潜水器应用成果及模拟训练系统等设施。

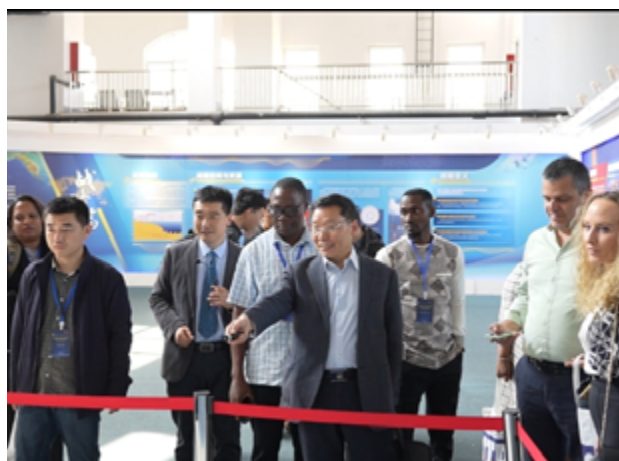


Fig 5. Field visit by trainees to the NDSC

图5. 学员在深海中心现场考察

### 1.2.6 Group presentation

On the final day of the workshop, participants presented their group assignments before a panel of experts, focusing on the design criteria for marine spatial planning. The panel, composed of Dr. Malcolm Clark, Dr. Becky Hitchin, Professor Georgy Cherkashov, Professor Pedro Madureira and Director Liu Feng, evaluated the presentations based on scientific quality, teamwork and presentation skills. Each group selected one or more design criteria for REMP and presented their analysis, including the implementation challenges. The panel concluded that all groups had met the required standards and commended the participants for the originality and creativity of their approaches.

### 1.2.6 分组报告

培训班最后一天,学员们向专家评审团汇报了小组作业,内容聚焦海洋空间规划设计标准。评审专家组由Malcolm Clark博士、Becky Hitchin博士、Pedro Madureira教授和刘峰主任组成,从科学性、团队协作、展示能力等方面对汇报进行了综合评审。各小组均选取一项或多项区域环境管理规划(REMP)设计标准,深入分析其核心内涵及实施挑战并作详细阐述。评审团一致认为所有小组均达到既定要求,高度赞扬学员们的研究思路具有创新性与创造性。



Fig 6. Group photo of participants at the 2025 JTRC training workshop

图6. 各小组成员合影留念



### 1.2.7 Closing ceremony

The closing ceremony of the 2025 JTRC training workshop provided an opportunity to reflect on the achievements and overall significance of the programme. Speakers highlighted the pivotal role of the workshop in advancing knowledge of deep-sea resource assessment and environmental protection, while fostering international cooperation and capacity-building. The ISA representative underscored the ISA's crucial mission in global deep-sea governance and commended China's active contribution to strengthening the capacity of developing States. The Chinese representative reaffirmed China's commitment to supporting global deep-sea governance through continued collaboration within the framework of the JTRC. In their closing remarks, the lecturers and participants acknowledged that the workshop, by combining theoretical instruction with practical exercises, had significantly enhanced participants' knowledge and skills in regional environmental management planning and marine spatial planning, while also promoting cultural exchange and international collaboration.

Mr. Lü Bin, President, CODF, Mr. José Dallo Moros, Director, OSER, ISA, Mr. Liu Feng, Deputy Chair, COMRA, Mr. Zhang Chunlei, Director, NDSC, and other Chinese and international leaders delivered remarks at the closing ceremony. President Lü Bin noted that "this training workshop is not only a continuation of the previous two sessions but also a new starting point." He reaffirmed the CODF's continued support for the JTRC activities and invited participants to engage in other international projects of the CODF. Director José Dallo Moros expressed his appreciation for the guidance and support from COMRA, the generous sponsorship of the CODF, and the strong organizational support from the NDSC. He emphasized that "the training workshops and other activities organized by the JTRC have broadened the scope and impact of the ISA's capacity-building work and stand as a best practice model for cooperation between China and the ISA in the promotion of marine scientific research." Deputy Chair Liu Feng remarked, "The training workshop has built a bridge of cooperation for all of us. I hope that, wherever the participants return, they will continue to contribute their knowledge and expertise to advancing the deep-sea causes in a fair, equitable and sustainable

### 1.2.7 结业仪式

2025年中国-海管局联合中心培训班结业仪式总结了本次培训的成果与意义。各方致辞强调了培训班在传播深海资源管理与生态保护知识、促进国际合作和能力建设方面的重要作用。海管局代表回顾其在全球深海治理中的使命，并高度评价中国的支持发展中国家能力建设方面的积极作用。中国代表重申了中国通过联合培训中心支持全球深海治理的承诺。授课教师和学员代表一致认为，培训班通过理论与实践相结合的方式，提升了学员在区域环境管理计划和海洋空间规划方面的知识与技能，同时促进了多国间的文化交流与合作。

结业仪式上，中国海洋发展基金会理事长吕滨先生、海管局监管、环境与矿产资源办公室主任何塞先生、中国大洋协会副理事长刘峰先生、深海中心主任张春雷先生等中外方领导出席并致辞。吕滨理事长表示：“本次培训班不仅是前两期培训班的延续，更是新的起点。海洋基金会将继续支持联合培训与研究的活动，并欢迎学员们参与基金会的其他国际项目。”何塞主任对中国大洋事务管理局的指导和支持、海洋发展基金会的慷慨资助以及深海中心的组织和付出表示感谢，并表示：联合中心组织的培训班等系列活动，拓展了国际海底管理局能力建设工作的广度与深度，是中国和海管局在推动海洋科学研究方面的最佳实践典范。”刘峰副理事长指出：“培训班为我们架起了合作的桥梁，希望学员们无论回到哪里都能够继续贡献智慧和力量，推动深海海底事业朝着更加公平、合理和可持续的方向发展。”深海中心张春雷主任祝贺全部学员完成培训任务，希望学员们利用所学知识为深化全球深海领域国际合作、推动发展中国家能力建设与海洋可持续发展贡献力量。最后，中外方领导和海管司法技委专家共同为本期培训班学员颁发了结业证书。

三位学员代表分别发言表达了对培训班的深刻感受。来自埃及的Mohamed Nassar先生感谢主办方和授课教师的精心安排，分享自己在区域环境管理计划和深海资源管理方面获得的知识提升，认为培训班不仅为学员们搭建了宝贵的国际交流平台，更拓展了视野并增强了对深海治理的责任感，承诺将所学知识带回埃及并为本国深海资源管理和生态保护贡献力量。库克群岛的Tanga Morris女士在发言中强



manner.” Director Zhang Chunlei congratulated all participants on completing the training. He encouraged them to apply the knowledge and skills gained to enhance international cooperation in the deep-sea domain, strengthen the capacity of developing States, and promote the sustainable use and protection of the marine environment. Finally, Chinese and international leaders, together with experts from the ISA’s LTC, jointly presented certificates of completion to all participants of the 2025 training workshop.

Three participants delivered statements reflecting on the outcomes of the training workshop. Mr. Mohamed Nassar (Egypt) expressed his sincere appreciation to the organizers and lecturers for their thoughtful arrangements and noted the significant improvement in his understanding of REMPs and deep-sea resource management. He emphasized that the workshop had provided a valuable platform for international exchange, broadened participants’ perspectives and strengthened their sense of responsibility towards deep-sea governance. He pledged to apply the knowledge gained to support Egypt’s efforts in deep-sea resource management and marine environmental protection. Ms. Tanga Morris (Cook Islands) highlighted the value of the workshop in fostering intercultural understanding and international cooperation. She observed that participants from diverse backgrounds had formed lasting friendships by sharing their experiences and challenges in deep-sea governance. She affirmed her intention to apply the lessons learned to advance deep-sea resource management in the Cook Islands. Ms. Abbie Akinyi Allela (Kenya) commended the variety of teaching methods used throughout the training. She noted that the combination of theoretical lectures, practical case studies and group discussions had greatly enhanced the learning experience for all participants. She underscored the critical role of REMPs in ensuring the sustainable use and long-term protection of deep-sea resources.

调了培训班在促进国际文化交流方面的价值，她特别提到来自不同国家的学员们在培训期间建立了深厚友谊，彼此分享了各自国家在深海治理方面的经验与挑战，表示将把培训收获运用于推动库克群岛的深海资源管理工作。肯尼亚的Abbie Akinyi Allela女士则从教学方法角度给予了高度评价，认为培训班通过理论讲授、实践案例和小组讨论等多元化方式有效提升了学员的实际应用能力，并着重强调了区域环境管理规划 (REMP) 在保障深海资源可持续利用与长期保护中的关键作用。





Fig 7. The closing ceremony

图7. 结业仪式

### 1.2.8 Feedback and evaluation

Following the completion of the training workshop, the JTRC conducted a questionnaire survey among all 22 participants to collect feedback on various aspects, including the quality of the training, the professionalism of the experts, the relevance of the programme to their professional development and the extent to which it enhanced their countries' participation in deep-sea affairs. A total of 19 responses were received, with women accounting for more than half. The participants represented a wide range of public research institutions and universities, and their professional backgrounds were multidisciplinary, encompassing areas such as deep-sea geology, marine ecology and environmental management.

All participants commended the diversity and

### 1.2.8 培训反馈与评价

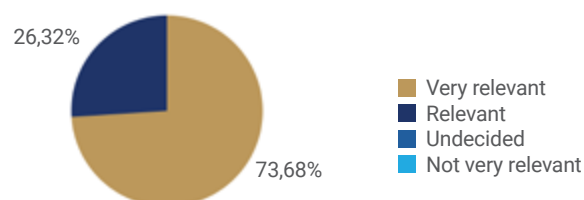
培训结束后,联合中心对22名学员进行了问卷调查,就培训质量、专家专业水平、课程内容与个人职业发展的相关性,以及对本国参与深海事务的助力程度等多个方面收集反馈意见。本次调查共回收有效问卷19份,其中女性学员占比超半数。参与调查的学员来自各类公立研究机构及高校,专业背景涵盖多学科领域,包括深海地质学、海洋生态学、环境管理等。

全体学员对课程的多样性与系统性给予高度评价,认为培训班为拓宽国际视野、了解海洋前沿技术、拓展专业人脉网络搭建了优质平台。学员反馈,本次培训显著提升了他们对现代深海技术应用的相关知识储备,同时强化了理论与实践操作技能。大家强调,培训班为个人职业

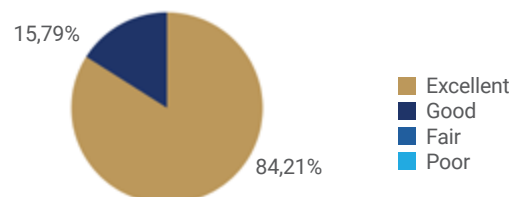
structure of the programme, noting that it had provided an excellent platform to broaden their horizons, gain insights into the latest marine technologies and expand their professional networks. Respondents reported that the training had significantly advanced their knowledge of the application of modern deep-sea technologies, while simultaneously improving their theoretical and practical skills. They emphasized that the workshop had created valuable opportunities for career development, international exchange and professional networking. All participants expressed their appreciation for the course content, the expertise of the lecturers and the overall organization and logistical support. The feedback demonstrated that this training workshop achieved positive results in course design, teaching quality, and international representation, and made a meaningful contribution to the professional development of participants and to capacity-building efforts in developing countries in the field of deep-sea governance.

发展、国际交流合作及专业人脉拓展创造了宝贵机遇,并对课程内容、授课专家的专业水平以及整体组织协调与后勤保障工作表示由衷感谢。反馈评价表明,本期培训班在课程设计、教学质量和国际代表性等方面取得了良好成效,为参训学员的专业成长和发展中国家深海治理能力建设作出了积极贡献。

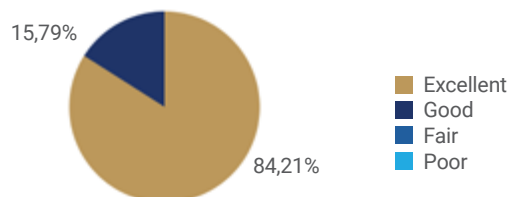
Please rate the relevance of the topics covered in the training workshop for your career path



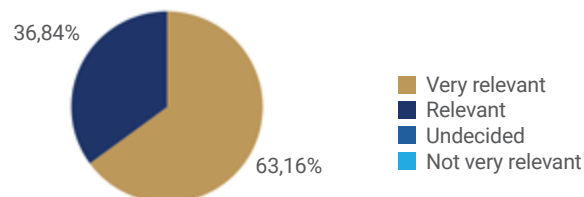
How would you rate the support provided by ISA Secretariat and the JRTC before the training workshop?



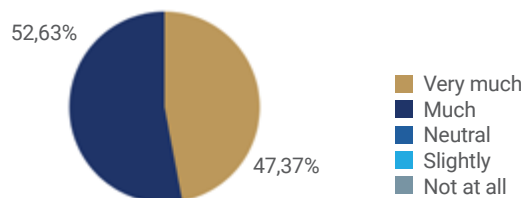
What was your perception of the organisational part of your training experience (application, information flow and communication, technical arrangements for workshop)?



How relevant was the content presented to your workshop?



To what extent did your training/experience contribute to your theoretical expertise in your field of work?



How do you evaluate this training workshop?

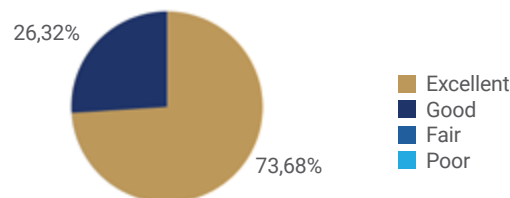


Fig 8. Summary of participants' feedback of 2025 JTRC training workshop

图8. 2025年JTRC培训班参与者反馈总结



## 1.3 Joint research activities 2025

In 2025, the JTRC announced [a call for international joint research project proposals](#) in two thematic areas: “Scientific biological data analysis and management in deep-sea habitats” and “Historical data scientific analysis, new data-processing and machine learning techniques for DeepData.” A total budget allocated for the projects amounted to RMB 783,000.

## 1.3 研究工作

2025年，联合中心在两个方向推进国际联合研究项目：“深海生境科学生物信息学分析与管理”和“ISA深海数据库(DeepData)历史数据科学分析、数据处理与机器学习技术”，总预算为人民币78.3万元。

### Call for project proposals under the ISA-China Joint Training and Research Centre

Project proposals are invited on the following two distinct topics:

#### Topic 1. Scientific biological data analysis and management in deep-sea habitats

Key activities envisioned under this topic include

- conducting a scientific review of biological data contained in **ISA's DeepData database**, as well as a compilation of biological data publicly available from global taxonomic databases and published peer-reviewed literature for the Northwest Pacific or the Indian Ocean<sup>[1]</sup>
- developing species identification tools, such as a regional species checklist and/or catalogues for the Northwest Pacific or the Indian Ocean
- assessing biodiversity metrics for the Northwest Pacific or the Indian Ocean and validating existing habitat suitability models using newly collected data.

The expected outcomes include

- technical and scientific knowledge products describing results of biological data analysis and synthesis, including bio-geographic distribution and biodiversity indices, and assessment of needs and priorities for taxonomic descriptions and data standardization in the study region(s)
- regional species checklists to aid in species identification and descriptions in selected regions in the Area and available for future taxonomic projects and collaborations.

#### Topic 2. Historical data scientific analysis, new data processing and machine learning techniques for DeepData

Key activities envisioned under this topic include

- cleaning and validation of historic data in the DeepData in collaboration with the data team of the Authority. A sample of the historical environmental data for the analysis is available [here](#).
- developing statistical models or artificial intelligence approaches to analyse clean data sets of DeepData and extract meaningful insights
- digitization of **reporting templates** of DeepData: converting existing VBS scripting used in Excel macros into modern web-based JavaScript applications.

[1] ISA. DeepData Database.

Figure 9. Call for Application

图9. 项目征集公告



On 22 September 2025, the JTRC conducted an online expert review of the 2025 joint research projects. Based on the comprehensive evaluation of the expert panel, the project entitled “Synthesis and analysis of biodiversity data in deep-sea habitats of the Northwest Pacific,” jointly submitted by the SIO MNR and the Seabed Minerals Authority of the Cook Islands, received a score of 91.5 points out of 100. The expert panel endorsed the launch of the project. Detailed information is provided in Annex 2.

2025年9月22日,中国-海管局联合中心对2025年联合研究项目进行了线上专家评审。根据专家组的综合评价,由中国自然资源部第二海洋研究所(SIO)与库克群岛海底矿产管理局(SBMA)联合申请的“西北太平洋深海栖息地生物多样性数据综合与分析(SADiNP)”项目获得91.5分(满分100分)。专家组同意启动该项目。详细情况见附件2。

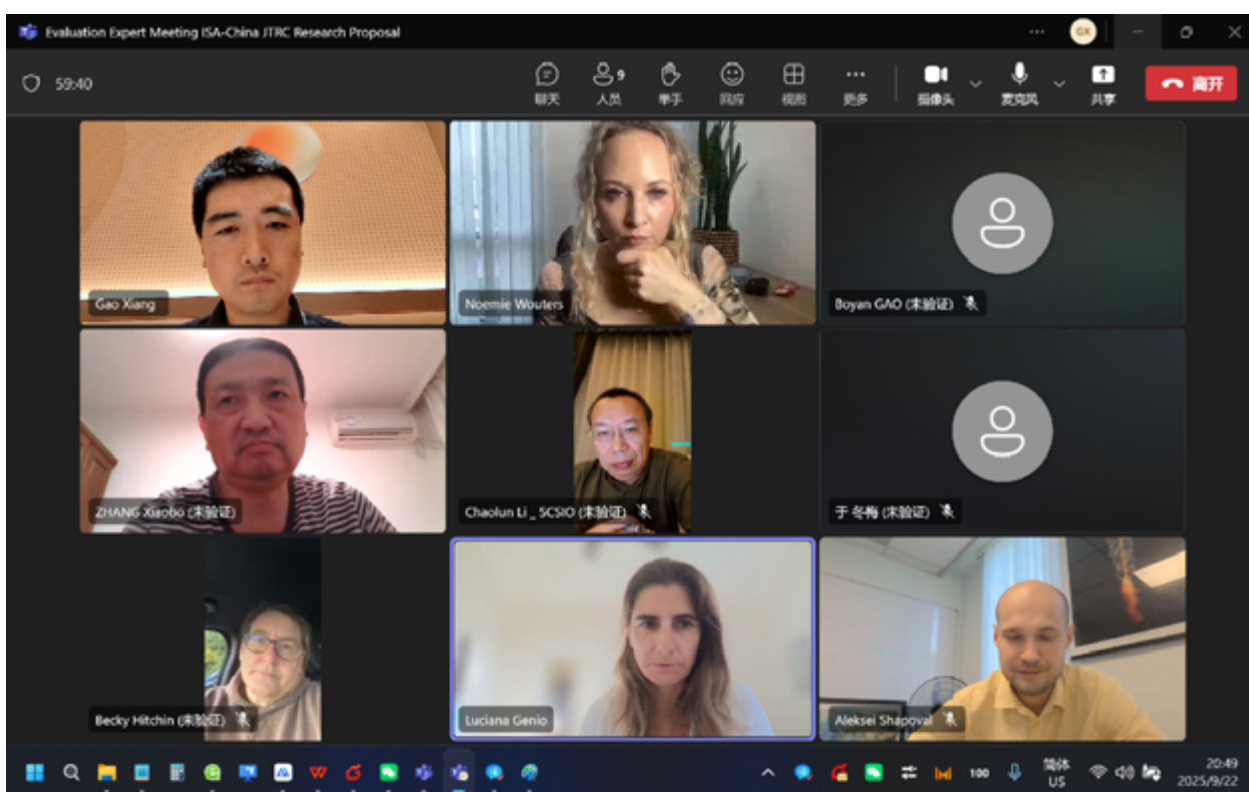


Figure 10. Expert Evaluation Meeting

图10. 专家评审会



## 02.

### FINANCE AND RESOURCES

In 2025, the JTRC spent approximately USD239,000 in total.

Chinese partners jointly spent RMB1.15 million (approximately US\$164,000), of which the MNR funded RMB300,000, the CODF funded RMB750,000. These funds were primarily used to organize and run the JTRC training workshops, deliver lectures, prepare documentation and cover personnel expenses. The NDSC provided in-kind support valued at approximately RMB100,000, mainly for the on-site operational training.

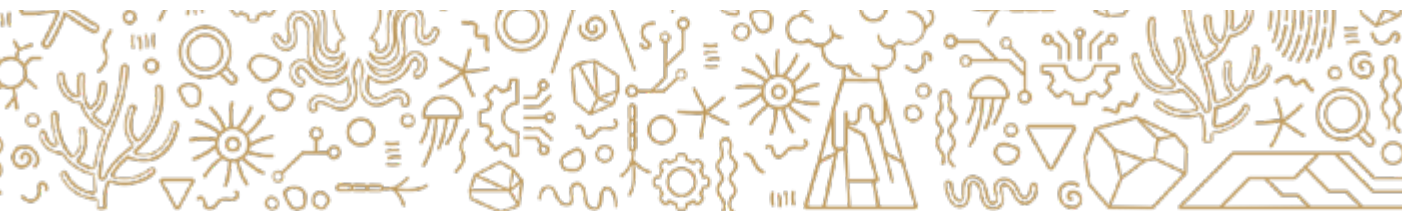
The JTRC also received approximately USD75,000 in support from the ISA, including in-kind contributions valued at USD60,000 for staff time dedicated to JTRC activities and approximately USD15,000 for expert travel expenses. The in-kind support covered programme development and associated documentation, including issuing announcements, selecting participants, coordinating with the international lecturers and providing practical logistical support during the training workshops held in Qingdao.

### 经费使用情况

2025年,中国-海管局联合中心共计使用经费约23.9万美元。

中方合作伙伴共支出人民币约115万元(约合美元16.4万元),其中自然资源部资助经费人民币30万元,中国海洋发展基金会资助经费人民币75万元,主要用于联合中心培训班组织实施、教师授课、文档准备以及人员经费。国家深海基地管理中心对培训和研究工作的实物支持,包括现场操作实践培训相关费用等约合人民币10万元。

中国-海管局联合中心也得到来自海管局总计约7.5万美元的支持,其中包括相当于6万美元的实物捐助,用于支付海管局工作人员实施联合中心活动的工作时间以及约1.5万美元的专家差旅费。该实物支持涵盖项目方案制定及相关文件编制工作,具体包括发布通知、学员遴选、协调国际授课教师,以及为在青岛举办的培训班提供实际后勤保障等。



## 03.

## WORKPLAN 2026

## 3.1. 2026 Training workshop

The JTRC will hold the 2026 training workshop with the theme of "Cumulative Impact", continuing to carry out training activities for participants from developing countries. The training content will include:

- Environmental and mineralogical characteristics of the deep-sea and anthropogenic activities in the Area
- Core concepts and scientific approaches for cumulative impact assessment
- Data sources and data requirements for cumulative impact assessment
- Introduction to qualitative and quantitative modelling for cumulative impact assessment
- Good practices of cumulative impact assessments in national and international context
- The global policy and regulatory context for developing and implementing CIAs, etc.

The training workshop will combine theoretical teaching, introduction to different methodologies, data processing, modelling and the global policy context. The learning will be enhanced by interactive discussions with the speakers and among the trainees, as well as case studies and group assignment on a topic to be determined. Through the training workshop, the trainees will be familiar with the ecosystems and services of deep-sea ecosystems, anthropogenic activities in the Area and the definition and concepts of cumulative impacts, their significance, the methodologies for assessment across different industries, data needs and processing for modelling, as well as their importance in a global policy context. Furthermore, the trainees will have some hands-on experience in conducting data analysis and modelling approaches.

## 2026年工作计划

## 3.1 2026年培训班

2026年,中国-海管局联合中心将以“累计影响”为主题,举办新一期培训班,继续面向发展中国家学员开展培训活动,培训内容包括:

- 深海环境与矿物学特征及“区域”内人类活动
- 累积影响评估的核心概念与科学方法
- 累积影响评估的数据来源与数据要求
- 累积影响评估的定性与定量建模入门
- 国家及国际层面累积影响评估的良好实践
- 累积影响评估制定与实施的全球政策法规背景

本次培训班将整合理论教学、各类方法介绍、数据处理、建模操作及全球政策背景解读。通过与授课专家的互动研讨、学员间的交流探讨,以及案例分析和待定主题的小组作业,将进一步强化学习效果。通过培训,学员将熟悉深海生态系统及其服务功能、“区域”内人类活动、累积影响的定义与核心概念、累积影响的重要性、跨行业评估方法学、建模所需的数据要求与处理流程,以及其在全球政策背景下的重要意义。此外,学员还将获得数据分析与建模方法的实操经验。



## 3.2 Joint research activities

In 2026, the JTRC will focus on the successful implementation of its first approved project, “Synthesis and analysis of biodiversity data in deep-sea habitats of the Northwest Pacific,” launched in 2025. In parallel, the JTRC will prepare a second call for project proposals, accompanied by a more targeted and proactive communication and outreach campaign, to initiate project approval and research activities as early as possible.

## 3.2 联合研究活动

2026 年,中国-海管局联合中心将重点推进 2025 年启动的首个获批项目“西北太平洋深海生境生物多样性数据综合分析”的顺利实施。同时,联合中心将筹备第二轮项目申报工作,同步开展更具针对性、更主动的沟通推广,尽早启动项目审批及研究工作

## 3.3 Side event during the thirty-first session of the ISA

The ISA-China JTRC plans to co-organize a side event with the ISA-Egypt JTRC during the thirty-first session of the ISA in 2026, to showcase to the international community the significant contributions and investment of the ISA's network of joint centres in strengthening capacity-building for developing States in the Area.

## 3.3 海管局第31届会议期间举办边会

中国-海管局联合中心计划在海管局2026年第31届会议期间与埃及-海管局联合中心共同举办边会,向国际社会介绍海管局的联合中心网络在提升发展中国家“区域”内能力建设方面做出的突出贡献及投入。





# ANNEX

## 附件

# ANNEX 1

## 2025 Training workshop

## 2025 Training Workshop on Regional Environmental Management Plans in the Area

**Advancing Marine Spatial Planning in Areas Beyond National Jurisdiction for Sustainable Deep-Sea Stewardship: Best Practices and Key Insights from REMP Process**

23-27 April 2025 Qingdao, China		
Date	Time	Activities
Day 1 Wednesday, 23/4/2025	8:30-9:00	Registration
	9:00-9:30	<b>Agenda item 1. Opening ceremony of the training workshop</b> <b>Moderator:</b> Dr. Xu Xuewei, Deputy Director, NDSC, Co-Chair Centre (ISA-China JTRC), Director of National Deep Sea Centre <ul style="list-style-type: none"> <li>• Video remarks by Mr. José Dallo Moros, Director, OSER, ISA</li> <li>• Welcome remarks by Mr. Pan Xinchun, Vice-President and Secretary-General, CODF</li> <li>• Welcome remarks by Dr. Li Xiangyang, Deputy Director, CDOAA</li> <li>• Welcome remarks by a representative of the Qingdao Municipal Marine Development Bureau</li> <li>• Welcome remarks by a representative of the ODCC</li> <li>• Welcome remarks by Dr. Becky Hitchin, LTC member, Co-Chair</li> <li>• Welcome remarks by Mr. Zhang Chunlei, Director of ISA- China JTRC, Director of NDSC</li> </ul>
	9:30-9:35	Group photo
	9:35-10:00	Coffee break
	10:00-10:25	<b>Agenda item 2. Presentation and introduction</b> <b>Subject:</b> Introduction to the ISA mandate and the status of exploration activities in the Area <b>Speakers:</b> Dr. Pedro Madureira, University of Evora, former LTC member
	10:25-10:50	<b>Subject:</b> International cooperation practice in marine spatial planning <b>Speakers:</b> Mr. Pan Xinchun, Vice-President and Secretary-General, CODF
	10:50-11:15	<b>Subject:</b> Introduction to REMPs in the Area: policy context, objectives, measures and procedures for development and implementation of REMPs <b>Speakers:</b> Prof. Malcolm Clark, LTC member
	11:15-11:45	<b>Subject:</b> Introduction to training workshop arrangement <b>Speakers:</b> Dr. Noémie Wouters, ISA Programme Coordinator (Marine Scientific Research) and Dr. Gao Xiang, Executive Director of JTRC
	11:45-13:30	Lunch break
	13:30-15:00	<b>Agenda item 3. Concept, tools and methodologies for spatial planning</b> <b>Subject:</b> Concepts and scientific approaches to spatial planning <b>Speakers:</b> Dr. DeLand Sarah and Dr. Jesse Cleary, Duke University <b>Subject:</b> Plenary, Q&A for each presentation
	15:00-16:00	<b>(Agenda item 3 continued)</b> <b>Demonstration:</b> Data analysis to support spatial planning in the REMP process <b>Subject:</b> Geospatial data and global data sources <b>Speakers:</b> Dr. DeLand Sarah and Dr. Jesse Cleary, Duke University



附件1

联合中心2025年培训班

2025年区域环境管理计划培训班

推进国家管辖范围以外区域的海洋空间规划以实现可持续的  
深海管理:来自区域环境管理计划进程的最佳实践和重要启示

2025年4月23日至27日 中国·青岛		
日期	时间	活动
第一天 23/4/2025 星期三	8:30-9:00	报到注册
	9:00-9:30	<b>议题1. 培训班开幕式:</b> <ul style="list-style-type: none"><li>• <b>主持人:</b>深海中心副主任、培训班联合主席许学伟研究员</li><li>• 国际海底管理局监管、环境与矿产资源办公室何塞·莫罗斯主任</li><li>• 视频致辞</li><li>• 中国大洋事务管理局副局长李向阳博士致辞</li><li>• 中国海洋发展基金会副理事长、秘书长潘新春先生致辞</li><li>• 青岛市海洋发展局代表致辞</li><li>• “海洋十年”国际合作中心代表致辞</li><li>• 培训班联合主席Becky Hitchin博士致辞</li><li>• 中国-海管局联合中心主任, 深海中心主任张春雷先生致辞</li></ul>
	9:30-9:35	集体合影
	9:35-10:00	茶歇
	10:00-10:25	<b>议题2. 报告与介绍</b> <b>主 题:</b> 国际海底管理局任务简介及该区域勘探活动的现状 <b>主讲人:</b> Pedro Madureira博士, 葡萄牙埃武拉大学, 前海管局法技委委员
	10:25-10:50	<b>主 题:</b> 海洋空间规划的国际合作实践 <b>主讲人:</b> 潘新春先生, 中国海洋发展基金会副理事长、秘书长
	10:50-11:15	<b>主 题:</b> 区域环境管理计划介绍:区域环境管理计划政策背景、实施的目标、措施和程序 <b>主讲人:</b> Malcolm Clark教授, 海管局法技委委员
	11:15-11:45	<b>主 题:</b> 介绍培训班工作安排 <b>主讲人:</b> Noémie Wouters博士, 海管局海洋科学研究协调员;和高翔博士, 联合中心执行主任
	11:45-13:30	午休
	13:00-13:45	<b>议题3.空间规划的概念、工具和方法</b> <b>主 题:</b> 空间规划的概念和科学方法 <b>主讲人:</b> Sarah DeLand博士, 杜克大学;Jesse Cleary博士, 杜克大学 <b>主 题:</b> 全体会议/问答环节
	14:00-15:00	<b>(继续议题3)</b> <b>示 范:</b> 以数据分析支持区域环境管理计划过程中的空间规划 <b>主 题:</b> 地理空间数据和全球数据源 <b>主讲人:</b> Sarah DeLand博士, 杜克大学;Jesse Cleary博士, 杜克大学

<b>Day 1</b> Wednesday, 23/4/2025	16:00-16:30	Coffee break
	16:30-17:30	<b>Subject:</b> Biological data standardization and analysis to advance deep-sea taxonomy and biodiversity assessment in the Area <b>Speakers:</b> Prof. Zhang Dongsheng (virtual), SIO, MNR, China
	17:30-20:00	Dinner
<b>Day 2</b> Thursday, 24/4/2025	9:00-9:30	<b>(Agenda item 3 continued)</b> <b>Case study:</b> Environmental management plan for the Clarion-Clipperton Zone <b>Moderator:</b> Dr. Pedro Madureira, University of Evora, former LTC member, Dr. John Parianos, Knowledge Management Director, Seabed Minerals Authority of Cook Islands
	9:30-9:50	<b>Subject:</b> Ecosystems and biodiversity in the Clarion-Clipperton Zone <b>Speakers:</b> Dr. Ellen Pape (virtual), Ghent University
	9:50-10:30	<b>Subject:</b> Resources and exploration activities in the Clarion-Clipperton Zone <b>Speakers:</b> Prof. Li Xiaohu, expert of COMRA
	10:30-11:00	Coffee break
	11:00-11:30	<b>(Agenda item 3 continued)</b> <b>Case study:</b> Environmental management plan for the Clarion-Clipperton Zone <b>Subject:</b> Scientific criteria and design of areas of particular environmental interest networks <b>Speakers:</b> Prof. Malcolm Clark, LTC member
	11:30-12:30	<b>Subject:</b> Habitat modelling in the Clarion-Clipperton Zone <b>Speakers:</b> Dr. Kirsty McQuaid (virtual), Nelson Mandela University <b>Discussion</b>
	12:30-13:30	Lunch break
	13.30-14:00	<b>(Agenda item 3 continued)</b> <b>Subject:</b> Potential environmental impacts from exploitation nodules (30 mins) <b>Speakers:</b> Dr. Becky Hitchin, LTC member
	14:00-15:00	<b>Discussion</b> Representatives from other United Nations organizations (virtual) Other area-based management examples/approaches Introduction to the Indian Ocean region and its resources (REMP participants)
	15:00-15:30	Coffee break
	15.30-17:00	<b>(Agenda item 3 continued)</b> Further reading materials and group discussion
<b>Day 3</b> Friday, 25/4/2025	9:00-9:30	<b>(Agenda item 3 continued)</b> <b>Case study:</b> Oceanographic and geological setting of the Mid-Atlantic Ridge <b>Moderator:</b> Dr. Pedro Madureira, University of Evora, Portugal, former LTC member
	9:30-10:00	<b>Subject:</b> Ecosystems and biodiversity in the Mid-Atlantic Ridge <b>Speakers:</b> Dr. Ana Colaço (virtual), University of the Azores

第1天 23/4/2025 星期三	16:00-16:30	茶歇
	16:30-17:30	<b>主题:</b> 生物数据标准化和分析,推进"区域"内深海生物多样性分类评估 <b>主讲人:</b> 张东声研究员(线上),中国自然资源部第二海洋研究所
	17:30-20:00	晚餐
第2天 24/4/2025 星期四	9:00-9:30	<b>(继续议题3)</b> <b>案例研习:</b> 克拉里昂-克利珀顿区环境管理计划 <b>发言人:</b> Pedro Madureira博士,葡萄牙埃武拉大学,前海管局法技委委员; John Parianos博士,库克群岛海底矿产管理局知识管理主任
	9:30-9:50	<b>主题:</b> 克拉里昂-克利珀顿区的生态系统和生物多样性 <b>主讲人:</b> Ellen Pape博士(线上),比利时根特大学
	9:50-10:30	<b>主题:</b> 克拉里昂-克利珀顿区的资源和勘探活动 <b>主讲人:</b> 李小虎研究员,中国大洋矿产资源研究开发协会专家
	10:30-11:00	茶歇
	11:00-11:30	<b>(继续议题3)</b> <b>案例研究:</b> 克拉里昂-克利珀顿区环境管理计划 <b>主题:</b> 保护区网络的科学标准与设计 <b>主讲人:</b> Malcolm Clark教授,海管局法技委委员
	11:30-12:30	<b>主题:</b> 克拉里昂-克利珀顿区生境建模研究 <b>主讲人:</b> Kirsty McQuaid博士(线上),纳尔逊·曼德拉大学 <b>讨论</b>
	12:30-13:30	午休
	13:30-14:00	<b>(继续议题3)</b> <b>主题:</b> 结核潜在环境影响 <b>主讲人:</b> Becky Hitchin博士,海管局法技委委员
	14:00-15:00	<b>讨论</b> 其他联合国组织的代表(线上) 其他基于区域的管理实例/方法 印度地区及其资源介绍(REMP参与者)
	15:00-15:30	茶歇
	15:30-17:00	<b>(继续议题3)</b> 进一步阅读材料并小组讨论
第3天 25/4/2025 星期五	9:00-9:30	<b>(继续议题3)</b> <b>案例研究:</b> 中大西洋洋脊的海洋和地质环境 <b>主持人:</b> Pedro Madureira博士,葡萄牙埃武拉大学,前海管局法技委委员
	9:30-10:00	<b>主题:</b> 中大西洋洋脊的生态系统和生物多样性 <b>主讲人:</b> Ana Colaço(线上),亚速尔大学



Day 3 Friday, 25/4/2025	10:00-10:30	<b>Subject:</b> Potential environmental impacts of exploitation activities in the Area on hydrothermal systems <b>Speakers:</b> Dr. Livia Ermakova (virtual), FSBI VNIIOkeanogeologia
	10:30-11:00	<b>Case study:</b> Mid-Atlantic Ridge <b>Subject:</b> Scientific criteria and design of areas of particular environmental interest <b>Speakers:</b> Dr. Pedro Madureira, University of Evora, former LTC member
	11:00-13:30	Lunch
	13:30-14:30	<b>Agenda item 4. Area-based management in areas beyond national jurisdiction</b> <b>Subject:</b> Resources and exploration activities in the MAR <b>Speakers:</b> Georgy Cherkashov, LTC member
	14:30-15:30	<b>Subject:</b> Dealing with uncertainties <b>Speakers:</b> Dr. Becky Hitchin, LTC member Further reading materials and group discussion
	15:30-16:00	Coffee break
	16:00-16:30	<b>Subject:</b> Cumulative impacts and non-spatial management <b>Speakers:</b> Dr. Jeffrey Dambacher and Dr. Piers Duncan, CSIRO
	16:30-17:30	<b>Preparation of group assignment</b>
Day 4 Saturday, 26/4/2025	8:30-11:00	<b>Agenda item 5. Group presentation:</b> Comparison between ISA approaches and spatial planning in national contexts and other industries <ul style="list-style-type: none"> <li>Each group will give a presentation for a maximum of 20 minutes</li> <li>Each group will receive feedback from Co-Chairs</li> </ul>
	11:00-11:30	Lunch break, leave for NDSC
	13:30-14:30	<b>Agenda item 6. Site visit to the NDSC</b>
	14:30-15:30	<b>Agenda item 7. Closing ceremony of the training workshop</b> <ul style="list-style-type: none"> <li>Closing remarks by Mr. José Dallo Moros, Director, OSER, ISA</li> <li>Closing remarks by Mr. Lv Bin, President, CODF</li> <li>Closing remarks by Mr. Zhang Chunlei, Director of NDSC, Director of ISA- China JTRC</li> <li>Closing remarks by lecturers</li> <li>Closing remarks by trainees</li> </ul>
	15:30-16:00	Award certificates to trainees by the ISA and Chinese representatives
	16:00-16:15	Group photo
	16:15-20:00	Back to the hotel
Day 5 Sunday, 27/4/2025	9:00-16:00	<b>Agenda item 8.</b> Trainees join the REMP workshop for the Indian Ocean to gain experience in an expert workshop

第3天 25/4/2025 星期五	10:00-10:30	<b>主题:</b> 热液系统开采活动的潜在环境影响 <b>主讲人:</b> Livia Ermakova博士(线上), 俄罗斯联邦国家预算机构全俄海洋地质科学研究所
	10:30-11:00	<b>案例研究:</b> 中大西洋洋脊 <b>主题:</b> 具有特殊环境意义地点的科学标准和设计 <b>主讲人:</b> Pedro Madureira博士, 葡萄牙埃武拉大学, 前海管局法技委委员
	11:00-13:30	午餐
	13:30-14:30	<b>议题4.国家管辖范围以外区域的区域管理</b> <b>主题:</b> 大西洋中脊资源与勘探活动 <b>主讲人:</b> Georgy Cherkashov, 海管局法技委委员
	14:30-15:30	<b>主题:</b> 不确定性因素的处理策略 <b>主讲人:</b> Becky Hitchin博士, 海管局法技委委员 进一步阅读材料并小组讨论
	15:30-16:00	茶歇
	16:00-16:30	<b>主题:</b> 累积影响和非空间管理 <b>主讲人:</b> Jeffrey Dambacher博士和Piers Duncan博士, 澳大利亚联邦科学与工业研究组织
	16:30-17:30	<b>准备小组作业</b>
第4天 26/4/2025 星期六	8:30-11:00	<b>议题5.小组汇报:</b> 比较海管局方法与国家或其他行业的空间规划 <ul style="list-style-type: none"> <li>每个小组20分钟报告</li> <li>报告结束后, 由专家进行点评反馈</li> </ul>
	11:00-11:30	午餐, 前往深海中心
	13:30-14:30	<b>议题6.现场参观:</b> 深海中心
	14:30-15:30	<b>议题7.举办培训班结业仪式</b> <ul style="list-style-type: none"> <li>海管局环境管理和矿产资源办公室主任何塞·达洛先生致辞</li> <li>中国海洋发展基金会理事长吕滨先生致辞</li> <li>国家深海基地管理中心、联合中心主任张春雷主任致辞</li> <li>培训班授课教师代表致辞</li> <li>培训班学员代表致辞</li> </ul>
	15:30-16:00	海管局代表和中方代表为学员颁发课程结业证书
	16:00-16:15	合影留念
	16:15-20:00	返回酒店
第5天 27/4/2025 星期日	9:00-16:00	议题8. 学员将参加印度洋区域环境管理计划研讨会以积累经验

# ANNEX 2

## Research activities in 2025

## Evaluation of research proposals received under the ISA-China Joint Training and Research Centre

### I. INTRODUCTION

1. The International Seabed Authority-China Joint Training and Research Centre (ISA-China JTRC) was established in 2020 as the first joint national training and research centre of its kind. The JTRC supports the ISA in fulfilling its responsibilities in marine scientific research (MSR) and capacity development, as provided under Section 3 of the United Nations Convention on the Law of the Sea, which encourages the establishment of “national and regional marine scientific and technological centres.”

2. Within this framework, the ISA-China JTRC’s activities contribute directly to the implementation of the [Capacity Development Strategy](#) and the [Action Plan for Marine Scientific Research in support of the UN Decade of Ocean Science for Sustainable Development](#) (MSR Action Plan), which serve as a framework for the global deep-sea research agenda.

3. In the domain of capacity development, more than 100 participants from developing States have benefited from workshops organized under the umbrella of ISA-China JTRC. These have included training on data management, marine science and technology and methodologies for developing REMPs at the science-policy interface.

4. To fulfil its second core responsibility of facilitating collaborative research programmes, ISA-China JTRC launched its first call for research project proposals in 2025. The objective was to bring together research teams from China and developing countries, particularly, least developed countries (LDCs), landlocked developing countries (LLDCs) and small island developing States (SIDS), to conduct joint deep-sea research projects and empower the next generation of scientists to work with data from the Area.

### II. CONTEXT OF THE CALL FOR PROPOSALS

1. The call for proposals was open from February to April 2025 on the ISA website and disseminated via social media. Two thematic areas were identified, aligned with the MSR Action Plan:

1. Scientific biological data analysis and management in deep-sea habitats
2. Historical data analysis, new data-processing methods and machine learning techniques for DeepData

2. As only one proposal was received during the initial call, the deadline was extended. Distribution channels were expanded to target specific Chinese and international scientific research institutions and networks. Efforts included proactive outreach to junior researchers and early-career scientists in Mozambique, the Petroleum Agency of South Africa and Sol Plaatje University, among others.

3. Despite these efforts, only one research proposal was ultimately received, jointly submitted by the Seabed Mineral Authority of the Cook Islands and the SIO, MNR, China. The proposal, Synthesis and analysis of biodiversity data in deep-sea habitats of the Northwest Pacific, focuses on the North-West Pacific.

### III. EVALUATION PROCESS

The following three-step process was followed to evaluate the proposal.

1. On 22 September 2025, the ISA-China JTRC Secretariat convened an expert review panel composed



## 附件2

### 2025年联合研究活动

### 中国-国际海底管理局联合培训和研究中心研究提案评审报告

#### 1. 引言

1. 中国-国际海底管理局联合培训和研究中心 (ISA-China JTRC) 成立于2020年, 是首个此类国家级联合培训与研究中心。该中心依据《联合国海洋法公约》第三节有关鼓励“建立国家和区域海洋科技中心”的规定, 支持国际海底管理局履行其在海洋科学研究及能力建设方面的职责。

2. 在这一框架下, 中国-国际海底管理局联合培训和研究中心的各项活动直接助力《国际海底管理局能力发展战略》及《支持联合国海洋科学促进可持续发展十年的海洋科学研究行动计划》(MSR 行动计划) 的实施, 上述文件构成了全球深海研究议程的核心框架。

3. 在能力建设领域, 已有100余名来自发展中国家的人员通过中国-国际海底管理局联合培训和研究中心主办的研讨会受益。培训内容包括数据管理、海洋科技, 以及在科学与政策衔接层面制定区域环境管理计划的方法学等。

4. 为履行其第二项核心职责——推动合作研究计划, 中国-国际海底管理局联合培训和研究中心于2025年启动首次研究项目提案征集。此举旨在汇聚中国与发展中国家 (尤其是最不发达国家、内陆发展中国家及小岛屿发展中国家) 的研究团队, 开展联合深海研究项目, 并助力培养下一代科学家运用国际海底区域数据开展工作的能力。

#### 2. 项目提案征集背景

1. 本次提案征集于2025年2月至4月通过国际海底管理局官网开放, 并借助社交媒体进行宣传。征集围绕两个主题领域展开, 与《海洋科学研究行动计划》保持一致:

主题1: 深海生境的生物科学数据分析与管理

主题2: DeepData的历史数据分析、新数据处理及机器学习技术

2. 因首轮征集仅收到1份提案, 故延长了截止日期, 并扩大宣传范围, 定向覆盖特定中外科研机构及网络。相关工作包括主动联络莫桑比克的青年研究人员与早期职业科学家、南非石油管理局及索尔·普拉杰大学等机构。

3. 尽管做出上述努力, 最终仅收到1份研究提案, 由库克群岛海底矿产管理局与中国第二海洋研究所联合提交。该提案聚焦西北太平洋, 题为“西北太平洋深海栖息地生物多样性数据综合与分析 (SADiNP)”。

#### 3. 评审过程

本次提案评审遵循以下三个步骤:

1. 2025年9月22日, 中国-国际海底管理局联合培训和研究中心秘书处组建了由4位特邀专家组成的评审专家组, 专家们通过线上会议对提交提案进行评审:

of four invited experts, who met online to review and evaluate the submitted proposal:

- Dr. Becky Hitchin, marine biologist, member of the ISA LTC, and lecturer in previous ISA-China JTRC training workshops, including the upcoming 2026 session.
- Mr. Aleksei Shapov, MSc, environmental studies and natural resources management, Senior Policy Officer and the supervisor of ISA's data team, ISA Secretariat
- Dr. Li Chaolun, Director and Research Fellow, South China Sea Institute of Oceanology, Chinese Academy of Sciences
- Professor Zhang Xiaobo, Zhejiang University, China

2. The experts used the evaluation matrix approved by the ISA-China Steering Committee. Criteria within each domain were weighted; pooled expert assessments are presented below.

Evaluation criteria breakdown	Points	Panel member 1	Panel member 2	Panel member 3	Panel member 4	Average score
Reinforcement of the science-policy interface, 30 points						
Alignment with the research priorities of the ISA MSR Plan	0-15	13	15	15	15	14.5
Contribution to advancing knowledge gaps identified through the REMP process	0-15	14	14	14	14	14
Qualifications and experience of the proposer, 20 points						
Academic qualifications of the consortium partners	0-5	5	5	5	5	5
Relevant project experience of the consortium in the past five years	0-5	5	5	5	5	5
Track record of scientific publications related to the research topic	0-5	5	5	5	4	4.75
Project management skills and experience of the project coordinator	0-5	5	5	5	5	5
Scientific, technical and capacity development value, 30 points						
Feasibility of the proposed methodology from a technical perspective	0-4	4	3	4	4	3.75
Possible connection to JTRC training components	0-4	4	4	4	3	3.75
The type and number of knowledge products proposed as outputs	0-4	3	4	4	3	3.5

- 丽贝卡·卡特-希钦博士, 海洋生物学家, 国际海底管理局法律和技术委员会委员
- 阿列克谢·沙波瓦先生, 环境研究与自然资源管理硕士, 国际海底管理局秘书处高级政策官员、数据团队主管。
- 李超伦主任, 中国科学院南海海洋研究所所长、研究员。
- 张晓波教授, 浙江大学(中国)教授。

2. 专家们采用经中国-海管局联合中心指导委员会批准的评审原则开展工作, 每个领域下的评审标准均设有权重, 专家综合评估结果详见下表。

评估标准详细内容	分值	评委1	评委2	评委3	评委4	平均分
科学与政策的衔接程度, 共30分						
与国际海底管理局 (ISA) 海洋科学行动计划研究优先事项的一致性	0-15	13	15	15	15	14.5
对填补REMP过程识别的知识空白的贡献度	0-15	14	14	14	14	14
提案团队的资质与经验, 共20分						
团队伙伴的学术资质	0-5	5	5	5	5	5
团队在过去五年的相关项目经验	0-5	5	5	5	5	5
与研究主题相关的科学出版物记录	0-5	5	5	5	4	4.75
项目协调员的项目管理技能和经验	0-5	5	5	5	5	5
科学技术及能力建设价值, 共30分						
从技术角度看拟议方法的可行性	0-4	4	3	4	4	3.75
与联合培训和研究中心 (JTRC) 培训内容的潜在关联性	0-4	4	4	4	3	3.75
拟产出知识产品的类型与数量	0-4	3	4	4	3	3.5

Participation of junior researchers	0-4	4	4	4	4	4
Participation of women scientists	0-4	4	4	4	4	4
Number of developing countries participating. Extra points for the participation of LDC, LLDC or SIDS	0-4	4	4	4	3	3.75
Scientific novelty of the research proposal	0-6	3	5	5	5	4.5
Budget adequacy and feasibility, 20 points						
Evaluation of the financial proposal	0-20	15	15	16	18	16
Total Score	100	88	92	94	92	91.5

3. Finally, the experts engaged in in-depth discussions on the scientific and technical aspects of the application to identify opportunities for improvement and formulate recommendations to strengthen the science-policy interface.

## IV. RECOMMENDATION TO THE STEERING COMMITTEE

Based on their review and despite receiving only one application, the experts unanimously recommended approval of the proposal, subject to the comments provided in their assessments. The project received an average score of 91.5 points.

The reviewers recognized the unique opportunity for Chinese researchers to collaborate with experts from the Cook Islands. This cooperation aligns well with the [Memorandum of Understanding on the Blue Partnership in Seabed Minerals Affairs](#) between the two countries. The research also provides added value in the context of developing the REMP for the Northwest Pacific.

Overall, the experts emphasized the importance of strengthening the science-policy interface and ensuring that capacity development objectives are fully integrated into project implementation.

In addition, the following recommendations were formulated:

- When reporting on the project results, clarify the specific connections with the research priority of the ISA MSR Action Plan and demonstrate the relevance of the research outcomes for the REMP process.
- During implementation, build on the project team's qualifications, promote leadership opportunities for young researchers, including women experts and expand partnerships to include experts from LDCs, LLDCs or SIDS where possible.
- Document and analyse any uncertainties encountered during project implementation to inform adaptive management and continuous improvement of methodologies.



初级研究人员参与情况	0-4	4	4	4	4	4
女性科学家参与情况	0-4	4	4	4	4	4
参与的发展中国家数量(若有最不发达国家、内陆发展中国家或小岛屿发展中国家可额外加分)	0-4	4	4	4	3	3.75
研究提案的科学创新性	0-6	3	5	5	5	4.5
预算的合理性与可行性,共20分						
财务方案评估	0-20	15	15	16	18	16
总分	100	88	92	94	92	91.5

3.最后,专家们围绕提案的科学与技术层面进行深入研讨,梳理可改进方向,并制定了旨在强化科学与政策衔接的建议。

## 4.向指导委员会提出的建议

基于评审结果,尽管仅收到一份申请,专家们仍一致建议批准该提案,但需结合其评估意见进行完善。该项目平均得分为91.5分。

评审专家认可此次合作的独特价值:中国研究人员与库克群岛专家的协作,与两国《关于海底矿产事务蓝色伙伴关系的谅解备忘录》高度契合。同时,该研究为西北太平洋区域环境管理计划(REMP)的制定提供了附加价值。

总体而言,专家们强调,必须强化科学与政策的衔接,并确保能力建设目标全面融入项目实施过程。

此外,专家们还提出以下建议:

- 项目成果报告中,需明确阐述与《国际海底管理局海洋科学研究行动计划》优先研究方向的具体关联,并说明研究成果对区域环境管理计划(REMP)进程的相关性。
- 项目实施期间,应依托团队现有资质,为青年研究人员(包括女性专家)提供更多领导机会;在可能的情况下,扩大合作范围,吸纳最不发达国家(LDC)、内陆发展中国家(LLDC)或小岛屿发展中国家(SIDS)的专家参与。
- 记录并分析项目实施中出现的各类不确定性,为适应性管理及方法的持续改进提供依据。

- As co-creation lies at the heart of the project, attribute outputs equitably among consortium countries. Regarding research methods, ensure robust quality control, particularly for potential errors (i.e., those linked to AI-based data extraction processes). In this context, collaboration with the ISA Secretariat's data team and environmental coordinator is advised to avoid duplication of efforts.

- In terms of project management, exercise careful resource planning, as the project is ambitious and resources are limited. For example, expanding the data set through bibliographic reviews is a cornerstone activity, while developing the species checklist is a key milestone. These must be balanced with innovation, such as AI-driven data-processing.

- Finally, establish a robust archive management system to ensure proper tracking of research plans, technical documentation and data records and to facilitate the evaluation of project impact and the uptake of results.

## V. NEXT STEPS

Should the Steering Committee endorse the recommendation, the ISA-China JTRC Secretariat shall undertake the following steps:

- Convene the experts' evaluations and recommendations to the research proposal consortium.
- The hosting institutions of the JTRC, National Deep Sea Center of China, sign an agreement with the leading institutions within the research consortium.
- Allocate research funds to the leading institutions within the research consortium, in line with the agreed budget.

鉴于联合共创是项目核心,需在参与国之间公平分配成果归属。研究方法方面,应确保严格的质量控制,尤其要关注潜在误差(例如基于人工智能的数据提取过程中可能出现的问题)。在此背景下,建议与海管局秘书处的数据团队及环境协调员开展合作,以避免工作重复。

项目管理层面,需审慎规划资源。鉴于项目目标宏大而资源有限,例如通过文献综述扩充数据集是核心任务,物种清单编制是关键节点,这些工作必须与人工智能驱动的数据处理等创新性内容统筹平衡。

最后,应建立完善的档案管理系统,确保对研究计划、技术文档和数据记录的有效追踪,同时为项目影响评估及成果应用提供便利。

## 5.后续工作

若指导委员会批准上述建议,中国-国际海底管理局联合培训和研究中心秘书处将采取以下措施:

- 向联合研究团队提交专家评审意见及建议。
- JTRC的主办机构中国国家深海基地管理中心与联合研究团队的牵头机构签订一份协议。
- 按照商定预算,向联合研究团队的牵头机构拨付研究资金。









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