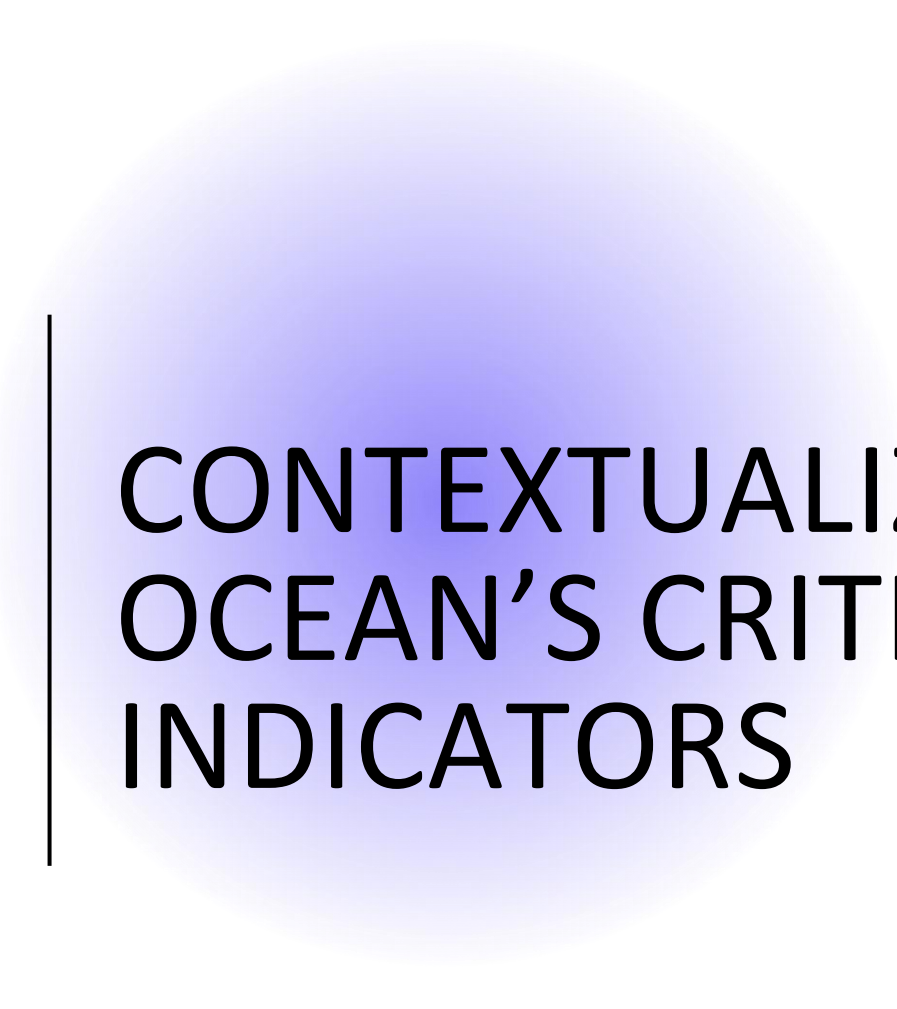


Presented by Dr. Baker Matovu

SYNTHESIZING THE PACIFIC OCEAN'S REMOTE-
SENSING ENVIRONMENTAL DATA INDICATORS
TO CULTIVATE BETTER SOCIOECOLOGICAL
SYSTEMS AND BLUE TRANSFORMATION
GOVERNANCE DECISIONS IN TAIWAN

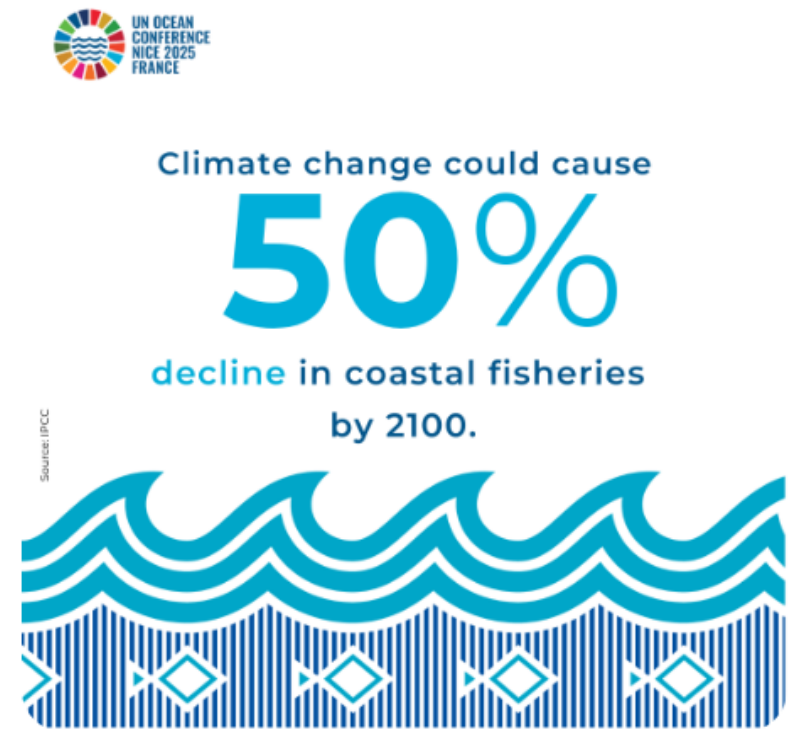
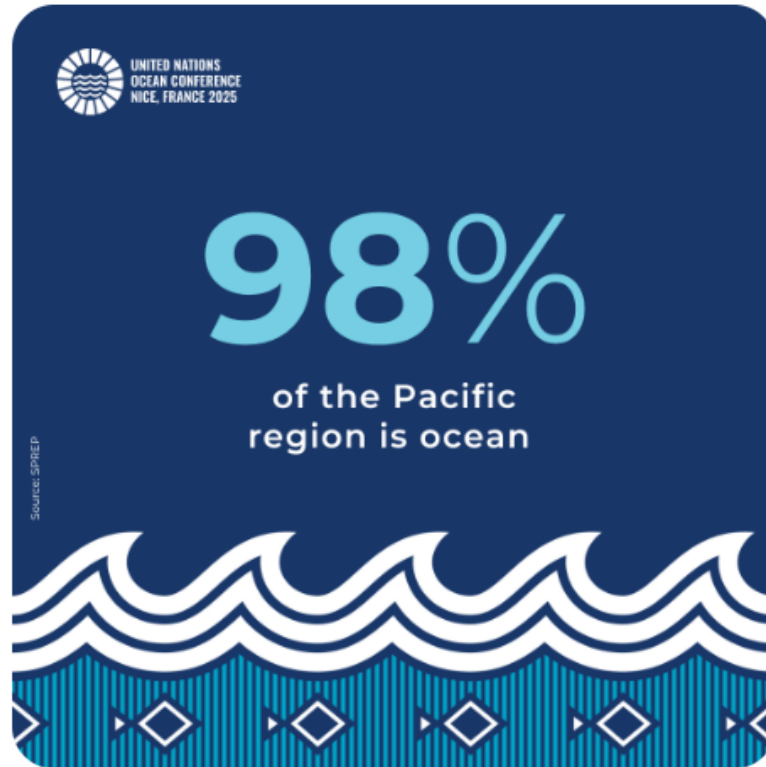
Chang Yung-Fa Foundation International Convention Center, Taipei, Taiwan

Thursday 3rd September 2026

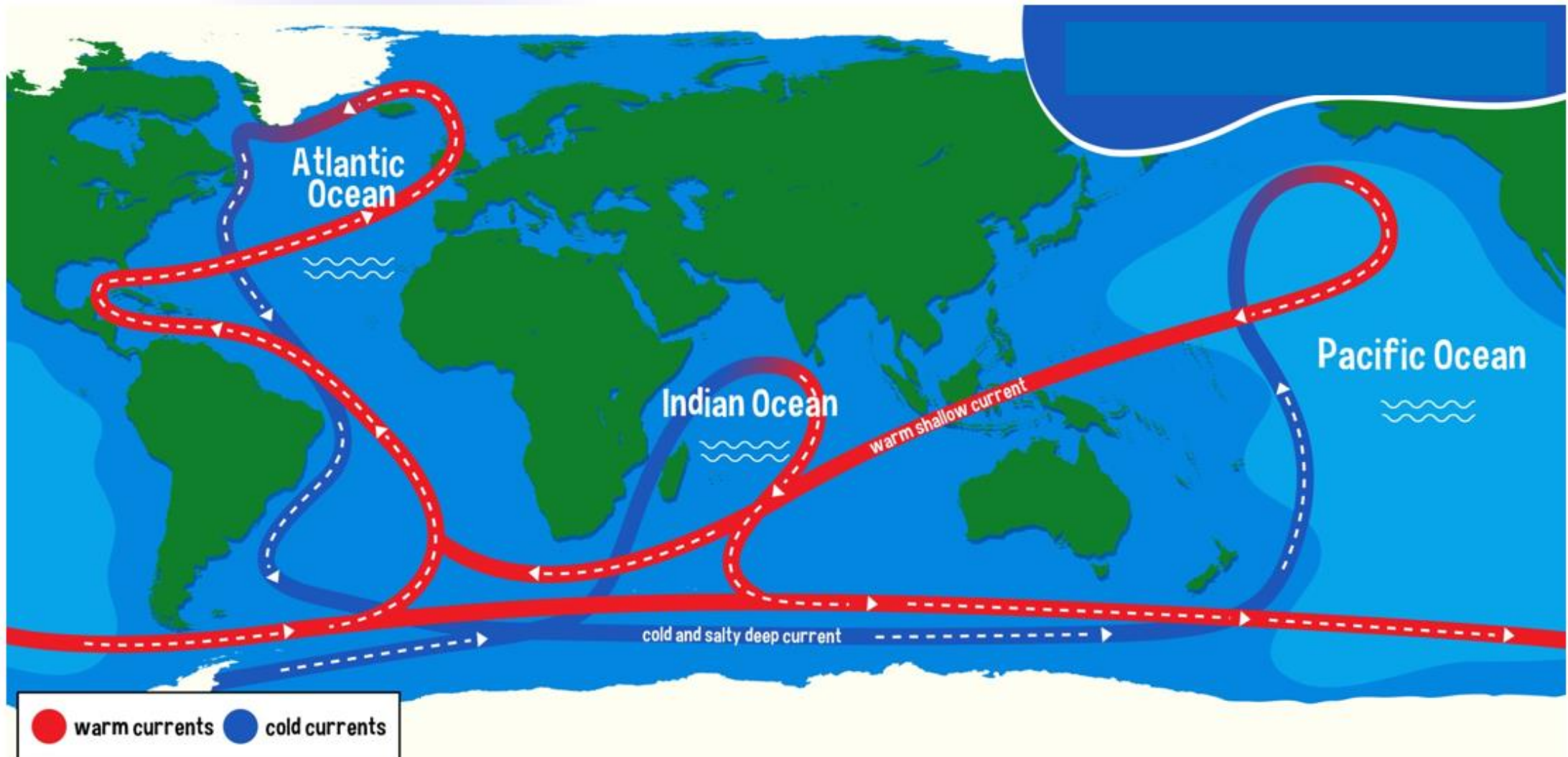


CONTEXTUALIZING THE PACIFIC OCEAN'S CRITICAL ENVIRONMENT INDICATORS

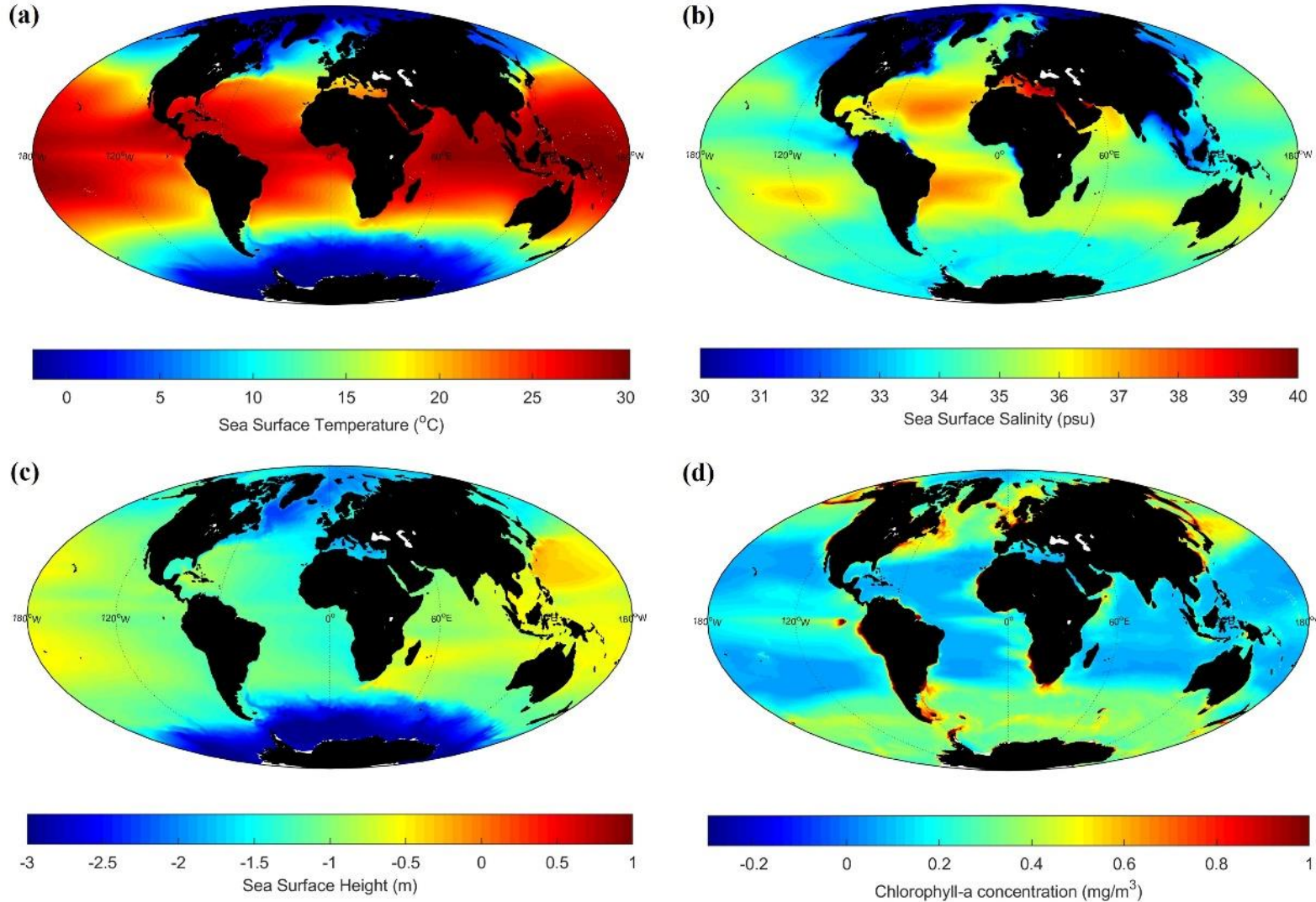
- ❑ The Pacific Ocean, as the largest and deepest of the five planetary ocean divisions, directly influences key planetary environmental dynamics and blue transformation targets (Korowi et al., 2026)
- ❑ Today's Pacific Ocean environmental and coastal-marine dynamics highlight future threats (United Nations Ocean Conference, 2025)



- ❑ The Pacific Ocean's **complex circulation system**, including surface and deep currents, is dramatically affecting **global climate**, **marine ecosystems**, **coastal populations** and **navigation**, especially in Southeast and East Asia (Lee et al., 2025).

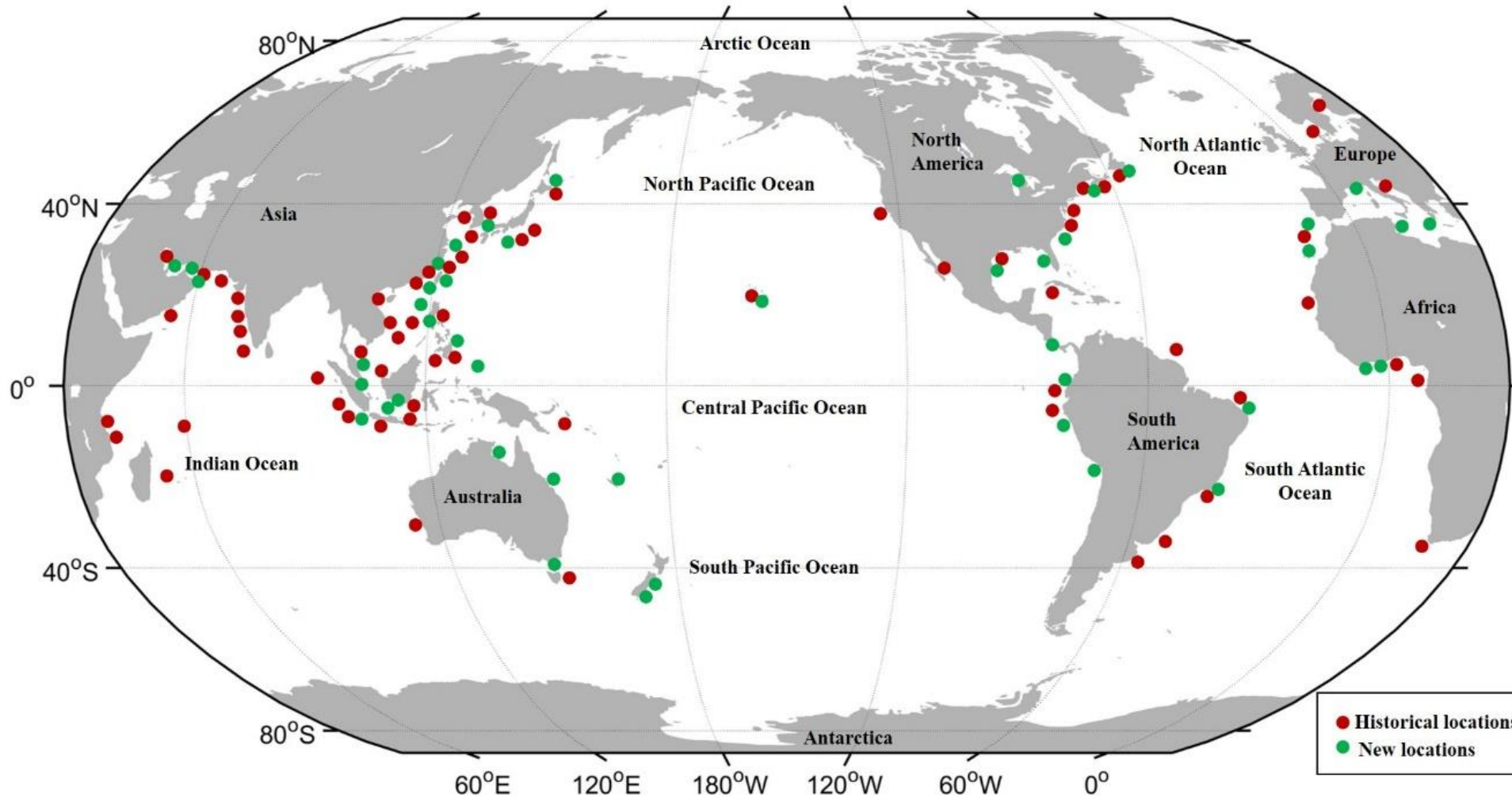


- ❑ Direct climate-related changes are observed through shifts in key marine environmental parameters, e.g., SST, SSS, SSH, and SSC (Matovu et al., 2025).



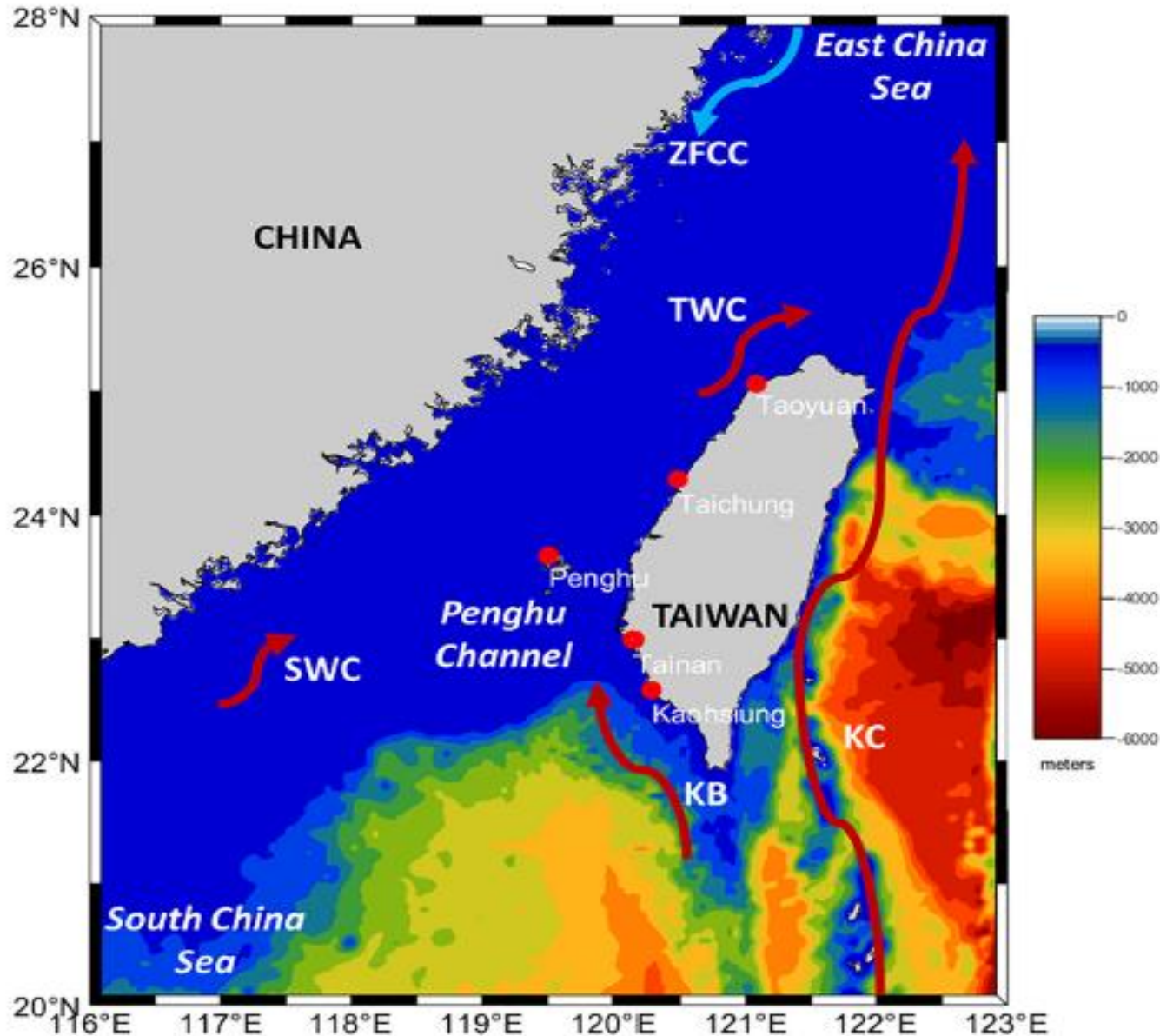
- ❑ Sustained SST increases of **1** to **1.5 $^{\circ}\text{C}$** in the last decade, with annual ranges of **30 $^{\circ}\text{C}$** .
- ❑ SSH ranges from **-0.5** to **1** m (a threat to coastal zones).
- ❑ **SSC declines** in key ecosystems or **migratory species zones** (Mammel et al., 2026; Matovu et al., 2025).

- ❑ Dynamism in the Pacific Ocean has directly **shifted the locations of key marine migratory fish species**, including moonfish, dolphins, tuna, and amberjack, especially in East Asia (Matovu et al., 2026; Mammel et al., 2026).





DIRECT IMPACTS AT TAIWAN'S COASTAL-MARINE INTERFACE

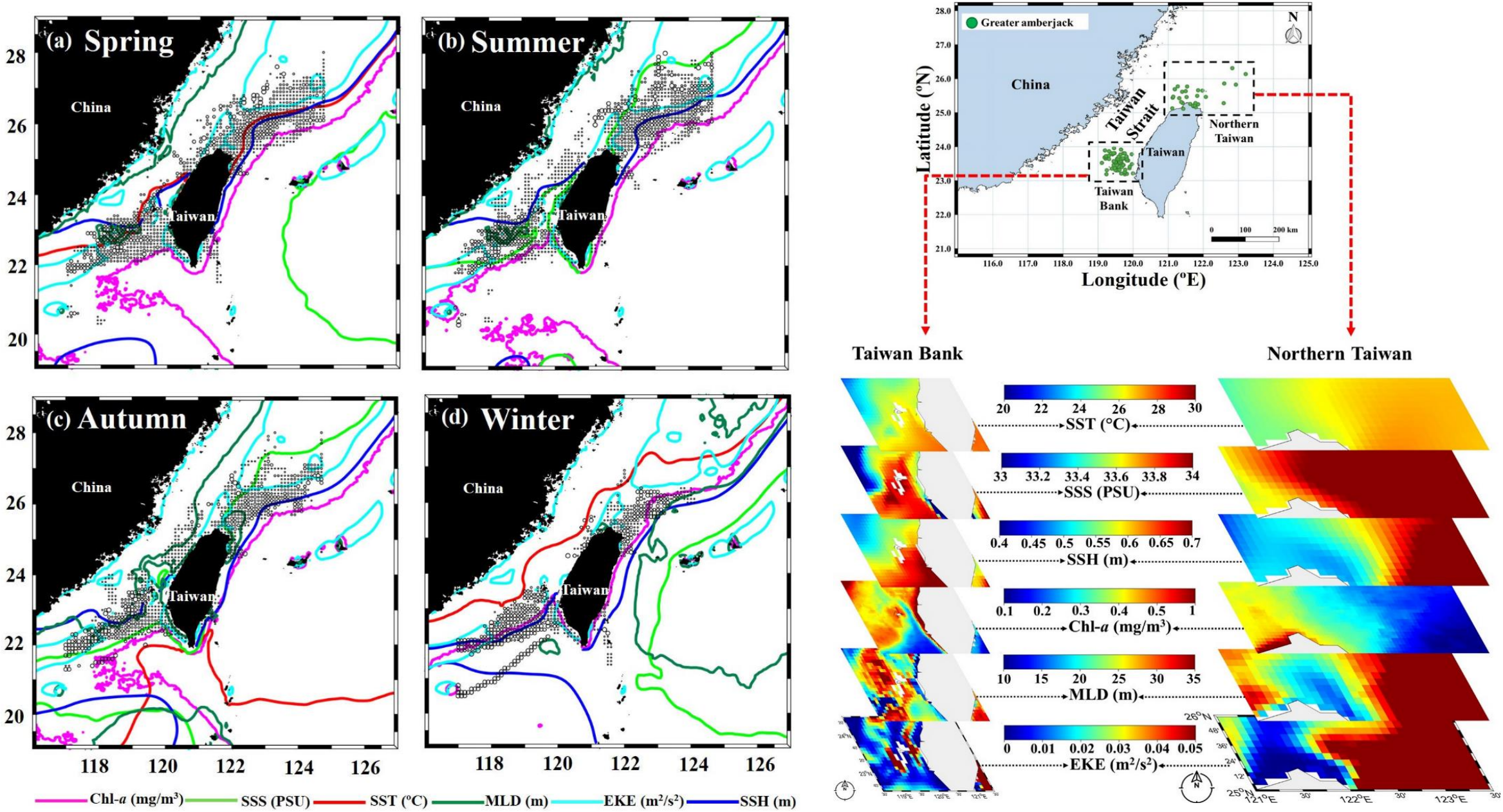


□ Taiwan's maritime zones are influenced by both warm and cold currents, including

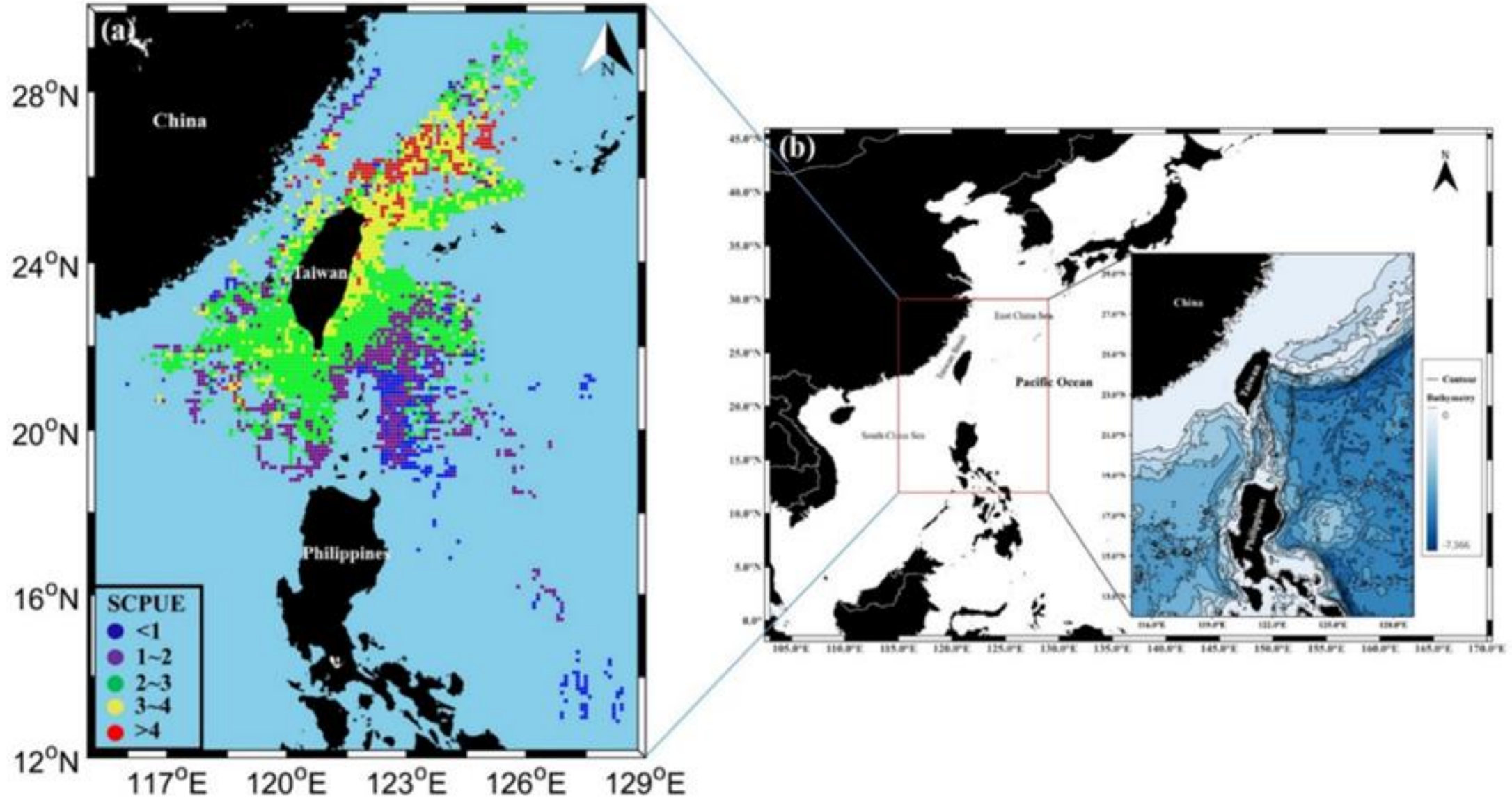
- (i) Kuroshio Branch Current (KBC) (warm).
- (ii) Kuroshio Current (KC) (warm)
- (iii) Taiwan Warm Current (TWC) across the Taiwan Strait
- (iv) South China Sea Current (SWC) (warm)
- (v) China Coastal Current (ZFCC) (cold).

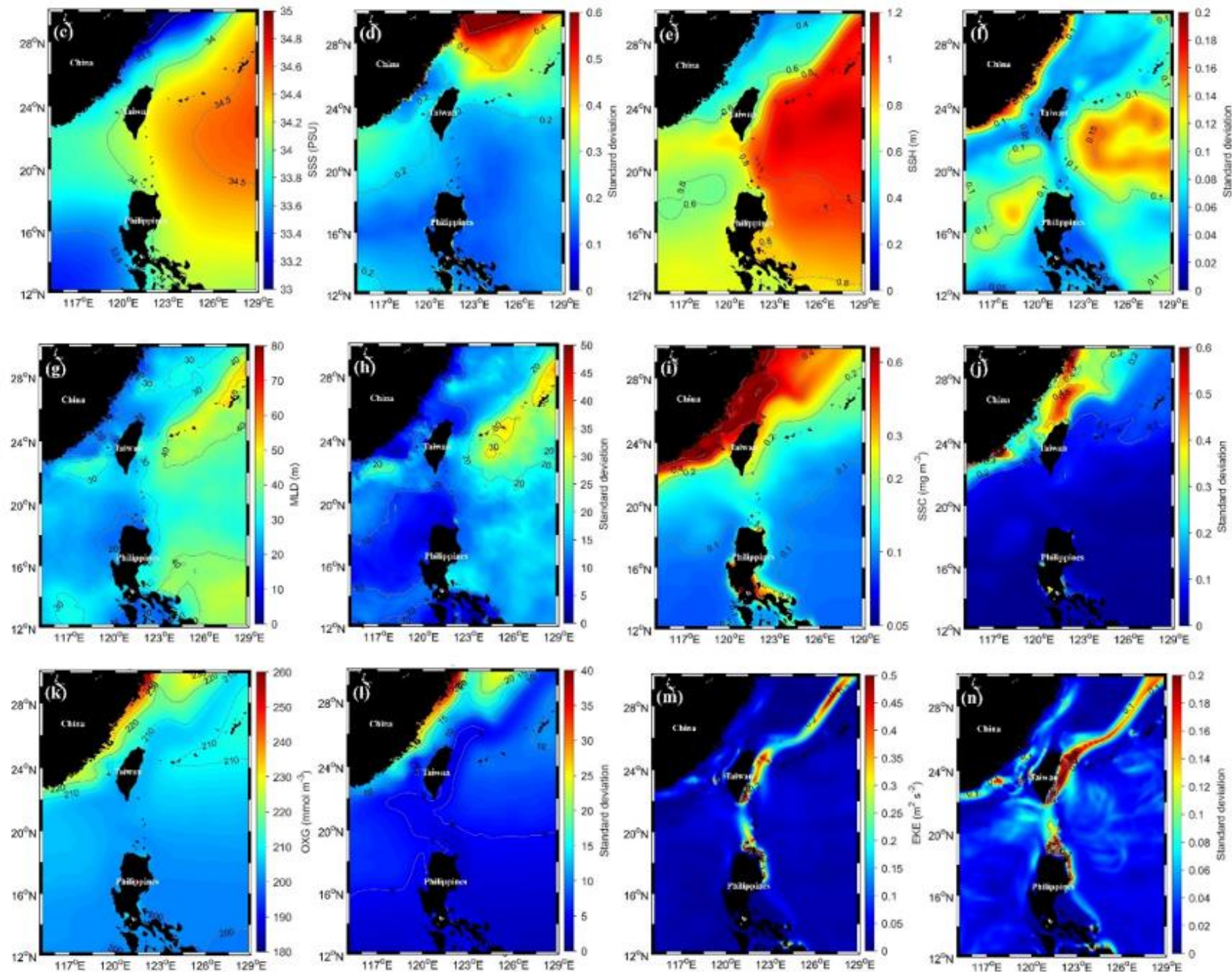
□ Shifting marine environment parameters associated with these currents are directly affecting key fishing and coastal ecosystem zones, e.g., in Penghu and Yunlin (Mammel et al., 2026; Matovu et al., 2025).

❑ Shifts are leading to seasonal changes in species locations, especially amberjack across Northern Taiwan and the Taiwan Bank (Mammel et al., 2026).



- ❑ Standardized CPUE (**SCPUE**) trends for species from 2015 to 2025, including dolphin fish and amberjack, are **changing, increasing fishing costs** and **lowering net catches or the livelihood economy** for nearshore communities (Mammel et al., 2026).



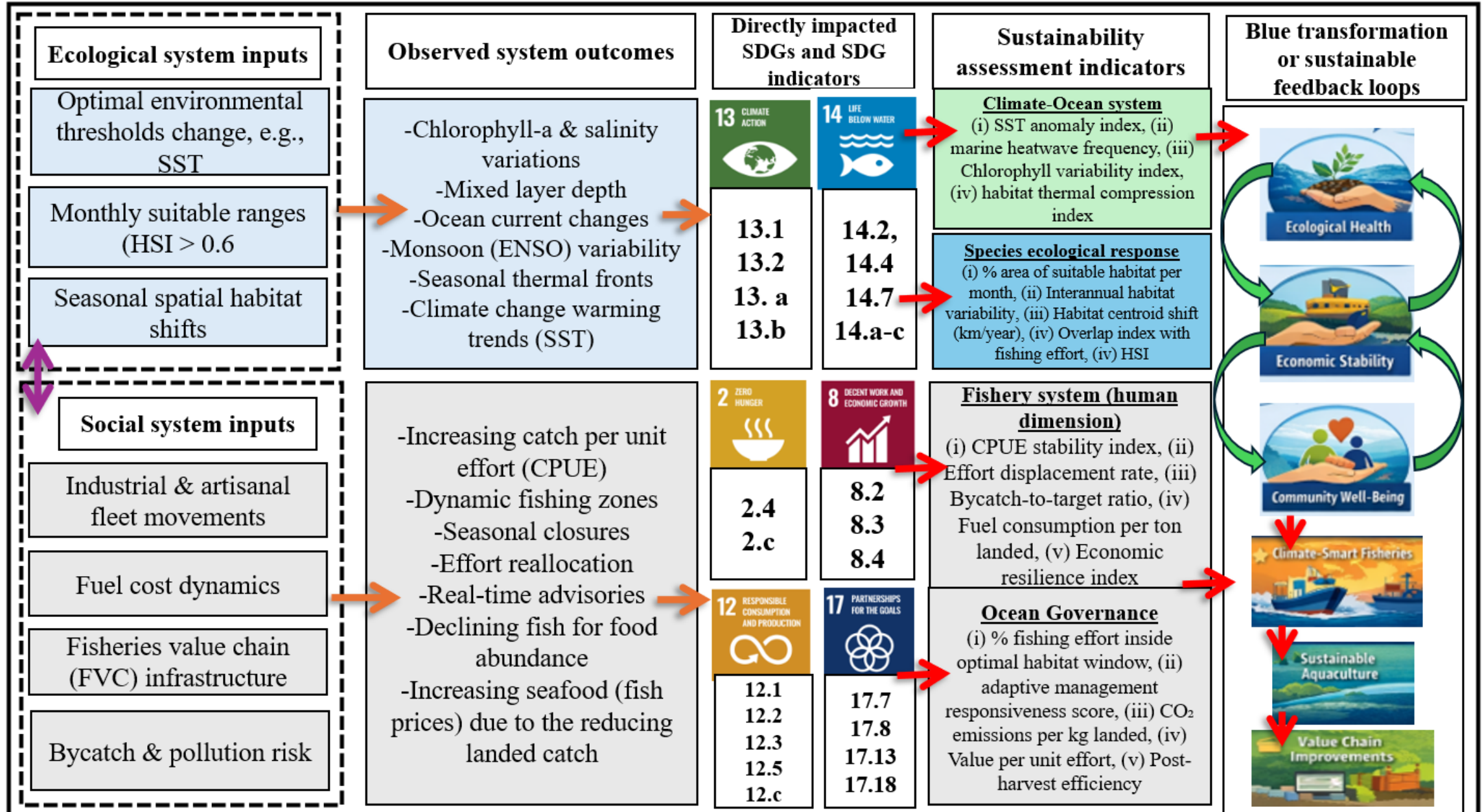


- ❑ **Changes in ocean indicators, including SST and DO, are extending into key traditional fish spawning or biodiversity-rich zones, including eastern and northern Taiwan** (Matovu et al., 2026; Mammel et al., 2026).
- ❑ This might lead to localized species declines or losses in socioeconomically and environmentally fragile zones, e.g., in Taitung.

GENERATING MEANING FROM
TAIWAN'S INDICATIVE MARINE OR
OCEAN CHANGING TRENDS

- ❑ Remote sensing data on the Pacific Ocean region's marine environmental indicators reveal **increasing vulnerabilities to SES**.
- ❑ Current & predicted trends reveal **heightened risks to coastal zones** in Taiwan, where several livelihoods depend on marine resources, e.g., fish.
- ❑ **Sustainability frameworks** aligned to blue transformation pathways **are needed**.
- ❑ An indicative SES framework to guide sustainability transformations and blue governance is developed (see **next slide**).

- ❑ Key insight: Sustainability must be framed from a **holistic systems thinking lens** to provide indicative outcomes and assessments aligned to SDGs and blue transformations



WHERE TO GO ON IN THE FUTURE

- ❑ Shifting Pacific Ocean indicators **signify transboundary marine resource vulnerabilities**
- ❑ Shared vulnerabilities, especially in Taiwan, imply that **research should extend from scholarly silos to transdisciplinary collaboration** between marine science and social science researchers
- ❑ A **systems thinking approach to marine-coastal integrated SES trends** will provide better blue transformation indicators and governance decisions in Taiwan.



THANK YOU