

Towards an International Seamount Science Program

Concept, Roadmap & Milestones



Presentation at: SCOR 2025 Annual Meeting, Santa Marta, Colombia
Date & Time: 10:20-11:00 am
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Overview

1. The Case for a Seamount Science Program

2. The Seamount Science Program

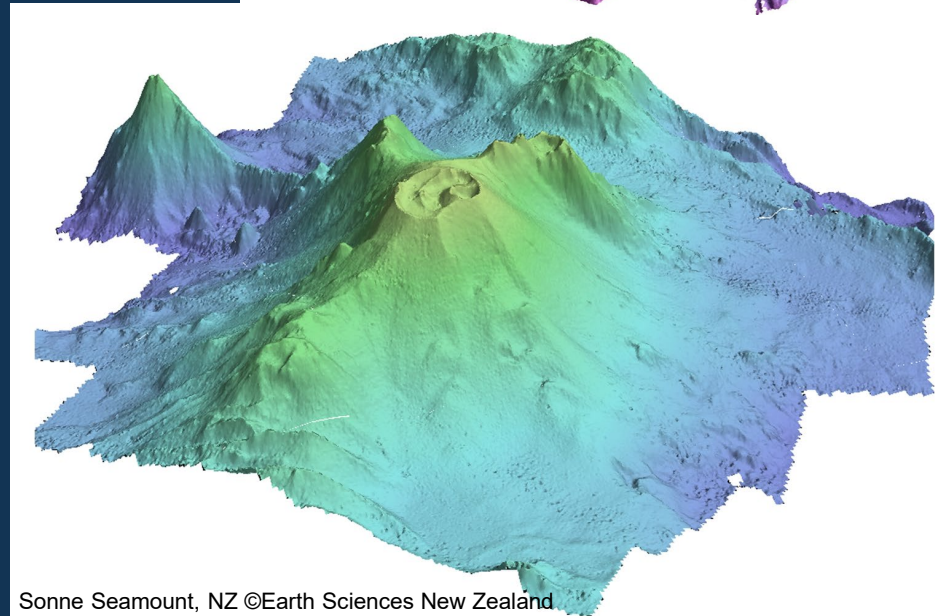
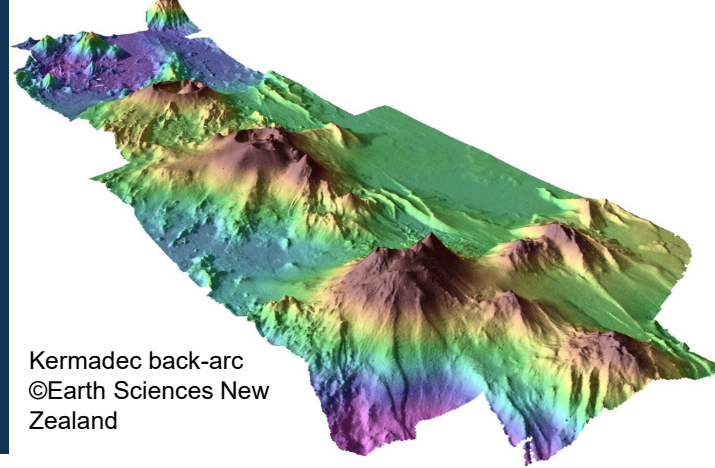
- a. Strategic Considerations
- b. Past & Present: Programs & Partnerships
- c. Overarching Goals & Outcomes
- d. UN Ocean Decade Program Engagement
- e. Roadmap: Milestones & Timelines





Defining Seamounts

- Seamounts are elevations of the seafloor with a limited extent across the summit
- Entirely submerged
- Traditionally defined as features with elevations $>1,000$ m
- Subtypes of 100–500 m and 500–1,000 m are typically referred to as knolls and hills

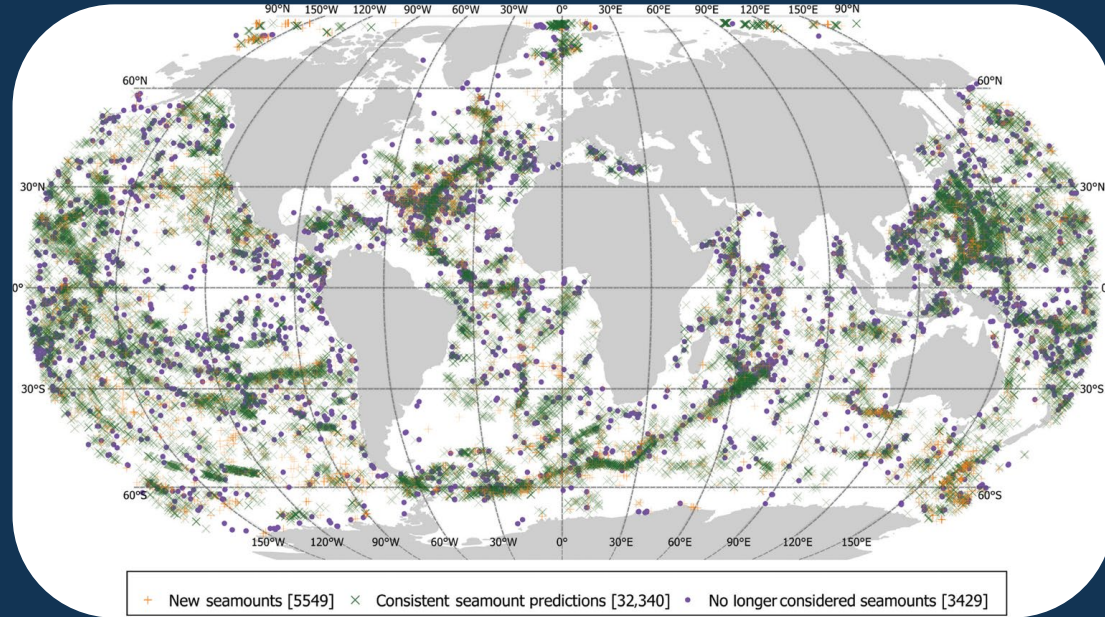




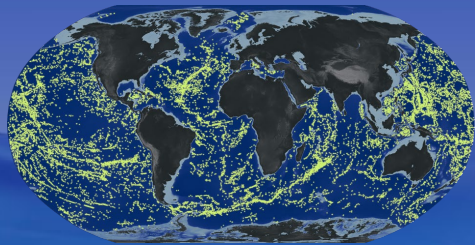
Seamounts are a major ecosystem

- Distribution of seamounts
- Current estimates of ~38,000 seamounts globally
- Seamount habitat ~17M km²
 - Cover ~5% of seafloor or ~21% with knolls
- Much greater area than many terrestrial biomes

(e.g., temperate broadleaf forest or wetlands)



Map of predicted seamounts Yesson et al. 2021 *UCL Open Environment* 58: 442-453.
<https://doi.org/10.14324/111.444/ucloe.000030>



Roles of Seamounts



Seamounts cover about **5-21% of the seafloor**, i.e., greater area than many terrestrial biomes.

...feature **boosted productivity**, e.g. Seamount-induced chlorophyll enhancement (SICE).

...act as **breeding grounds** for **fish stocks** supporting global fisheries. Act as **migration pathways** for large charismatic marine species.

...influence **global ocean processes**, i.e., nutrient cycling, carbon sequestration, ocean current dynamics.

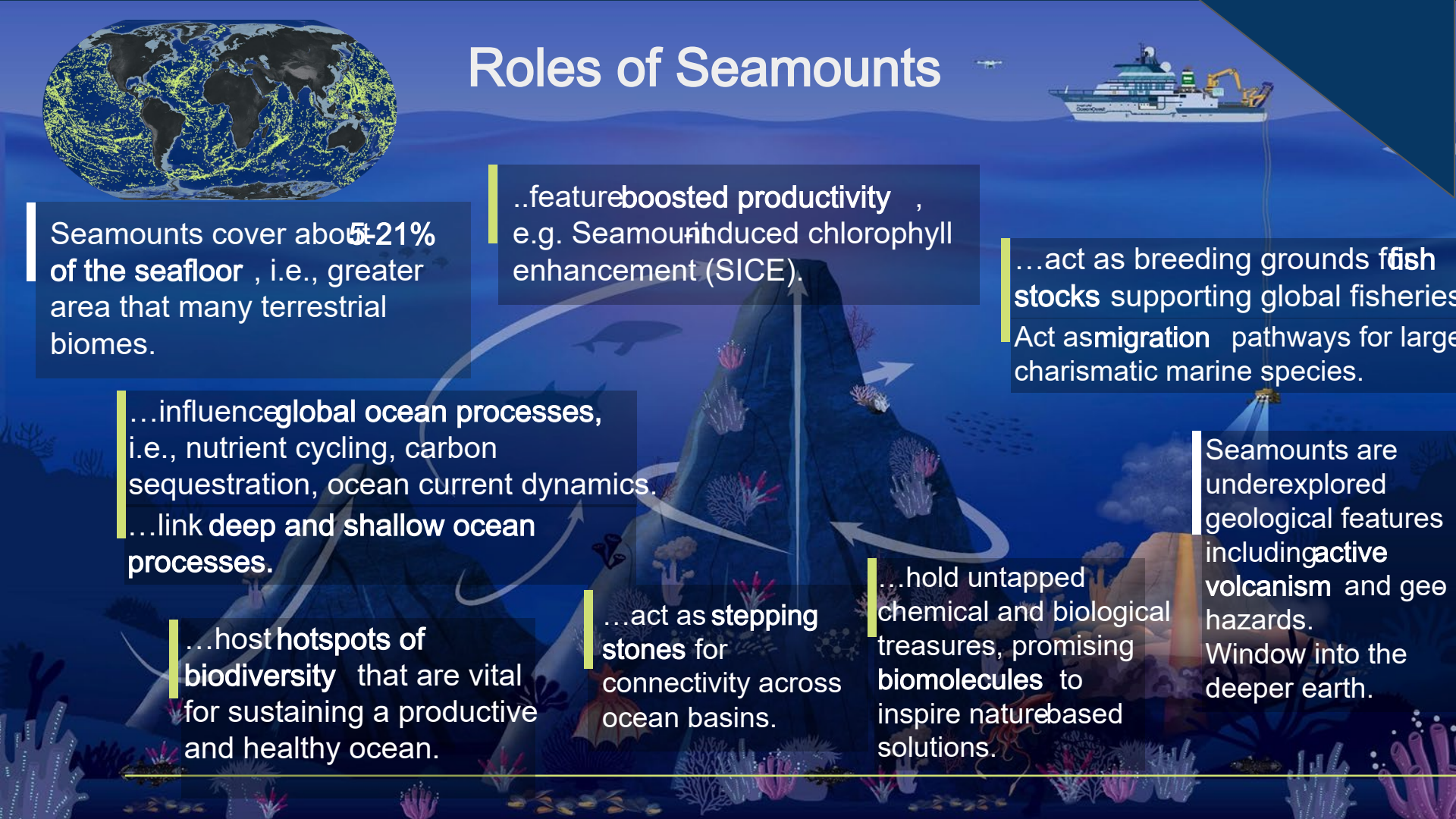
...link **deep and shallow ocean processes**.

...host **hotspots of biodiversity** that are vital for sustaining a productive and healthy ocean.

...act as **stepping stones** for connectivity across ocean basins.

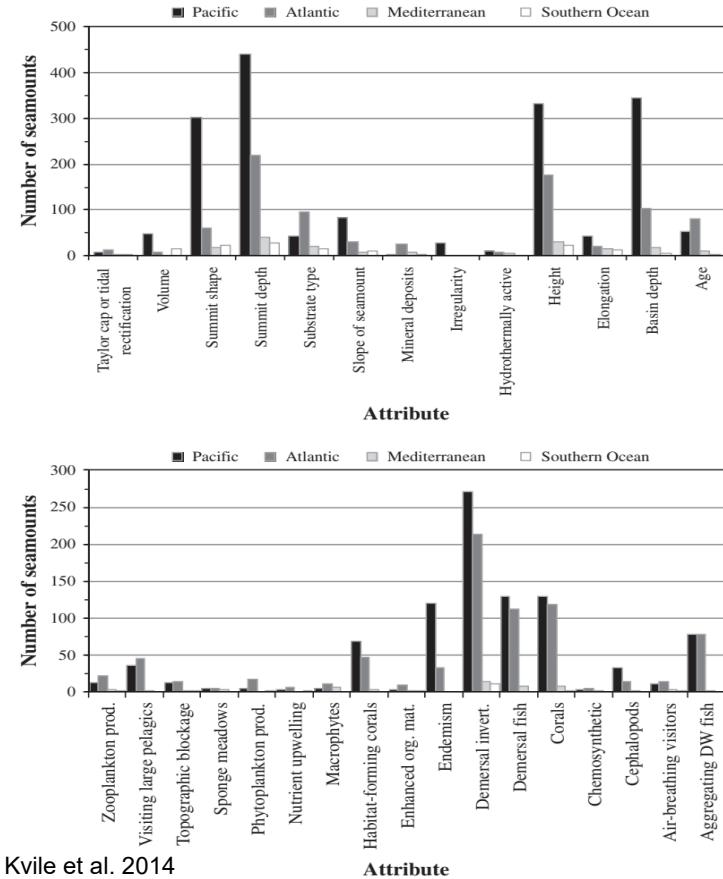
...hold **untapped chemical and biological treasures**, promising **biomolecules** to inspire nature-based solutions.

Seamounts are underexplored geological features including **active volcanism** and geohazards. Window into the deeper earth.



Seamounts are understudied

- Most data available is
 - Descriptive & opportunistic
 - Mostly focused on physical attributes
 - Regional biases
- There is a lack of wider understanding, for example:
 - Biodiversity inventories
 - Ecosystem function
 - Physical oceanography

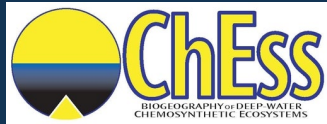


Kvile et al. 2014

A dedicated international seamount science program is proposed to streamline global research and grow holistic knowledge of seamounts.



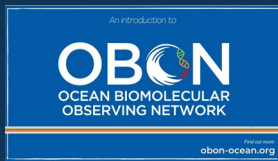
Learning and Building on Past Programs



interridge.org

- **Census of Marine Life 2005-2010**
 - **CenSeam:** Global Census of Marine Life on Seamounts
 - **ChEss:** Biogeography of Deep-Water Chemosynthetic Ecosystems
- **InterRidge** non-profit organization, 1990-2021 promoted collaboration in mid-ocean ridge research
- **Global Seamounts Project (GSP)** international scientific initiative to map, assess, and model seamount ecosystems (by Global-Oceans non-profit organization, dormant since 2018)

Connecting with Ongoing Programs



2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development

- Challenger 150 (C150)
- JETZON
- Ocean Census
- Seabed2030
- Marine Life 2030
- Ocean Biomolecular Observing Network (OBON)
- Digital Depth
- DOOS
- EAF-NANSEN
- Global Ocean Negative Carbon Emissions (Global-ONCE)
- FishMIP
- Global Subsea Floor Ecosystem & Sustainability (GSES)

➤ 19 members contributing to the new Planning Committee for the Program (to be launched beginning of November)



Proposed Seamount Program

CORE THEMES

Geological
Evolution and
Geodynamics

Oceanographic
Drivers and
Biogeochemical
Cycles

Biodiversity,
Biomolecules
and Ecosystem
Functioning

Societal
benefits,
Stewardship,
and Governance

Technological Innovation & Capacity Sharing

GOALS

Build a **Multidisciplinary, Integrative Research Framework** for seamounts:
To promote comprehensive and integrated sampling.

Embed **Global Data Standards**:
To enable global meta analysis.

OUTCOMES

Answer crucial **Science Gaps** in:
Geological evolution
Global ocean dynamics
Ecosystem functioning

Turn **Baseline Data Into Action** :
Transdisciplinary outputs
Modeling & Digital Twins
Science-to-policy pathways (BBNJ Linkage)



Strategic considerations for the Seamount Science Program



- Attract and mobilize diverse resources by spotlighting seamounts
- 10-years plan, operate 'beyond the Decade'
- Adopt and propagate global data standards
(OBIS, GBIF, Darwin Core and FAIR)
- Capacity sharing and support of ECOPs
- Formal endorsement goal: SCOR (Scientific Committee on Oceanic Research) and IOC-UNESCO (Intergovernmental Oceanographic Commission)



Roadmap & Milestones

August - December 2025

- Engaging with ongoing efforts



2021 United Nations Decade
of Ocean Science
2030 for Sustainable Development

- Establish a Planning Committee
- Finalizing Concept & Positioning
- Align work with SCOR and IOC-UNESCO secretariats, and with Mission Neptune
- Start drafting the Science Plan and Governance Structure

January - June 2026

- ☐ Seamount Science Session at the marine science meeting OSM 2026 Glasgow, UK
- ☐ Creating momentum at other international Ocean meetings
- Collaborative online writing efforts and finalizing documents by mid of 2026



July - December 2026

- ☐ Applying for formal international endorsement
- ☐ Expanding Partnerships

Early 2027

★ Kick-Off Event★

- ☐ Launch a Governance and Coordination Office
- ☐ Activate the Program



Thank you for your attention

Time for Q&A

More questions?

Would you like to get involved?

➤ Get in touch:

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