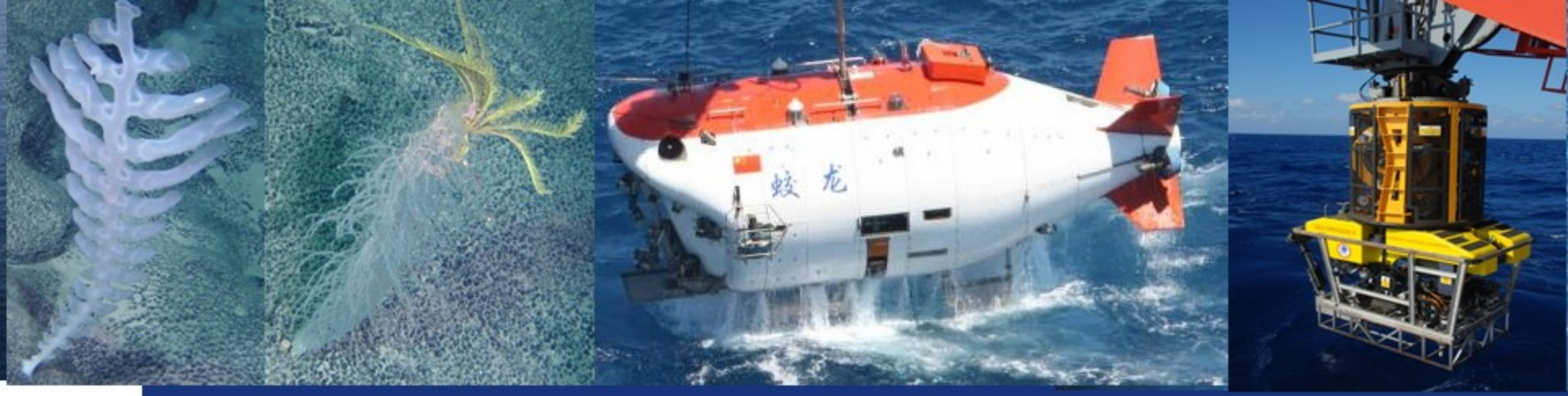


Megafauna Community Structure , Distribution and Impact Factors on the Caiwei Seamount

Wang Chun-Sheng
Second Institute of Oceanography, SOA, China

Qingdao, May 28, 2018

OUTLINE

1. Background
2. Diversity and Community structure
3. Major factors affecting the distribution of megafauna
4. Future plan
5. Conclusion

1. Background

What's the megafauna?

Animals large enough (larger than 2 cm) to be determined in photographs, proposed as key taxon for environmental impact assessment in deep-sea mining.

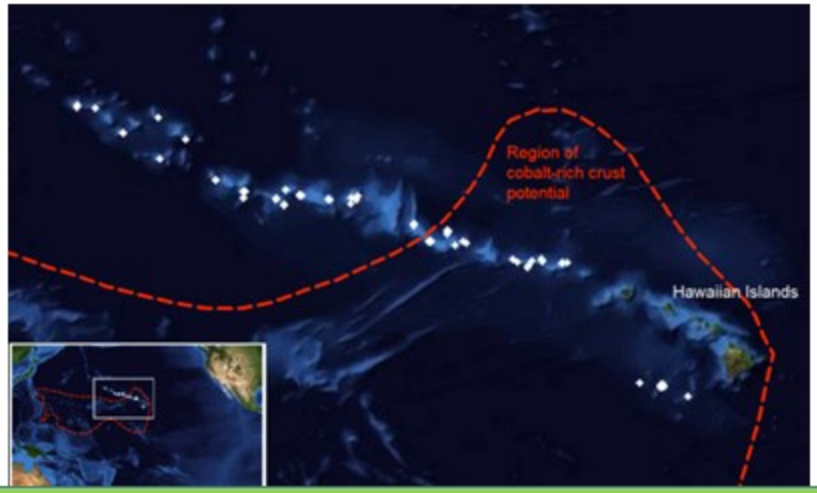
（ISBA/19/LTC/8）

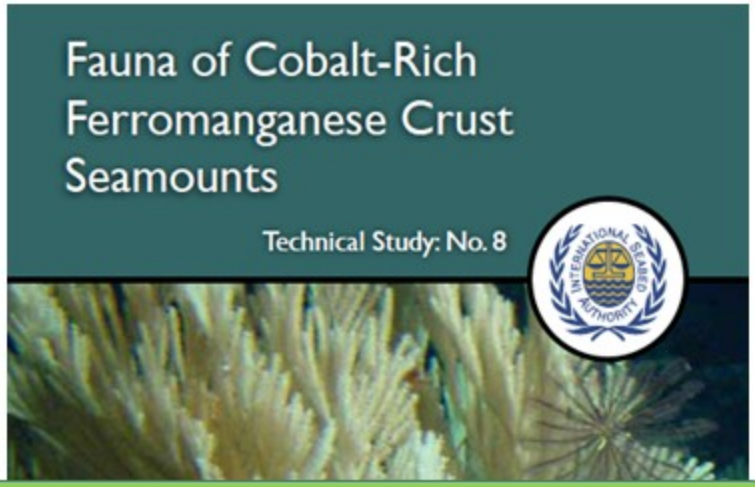
1. Background

Major factors affecting seamount biological communities include primary productivity of the overlying water; the hydrodynamic regime; the chemical nature of the water column; the geomorphology, geological origin of the seamounts (Clark et al., 2010), and distance from shore (O'Hara et al., 2010).

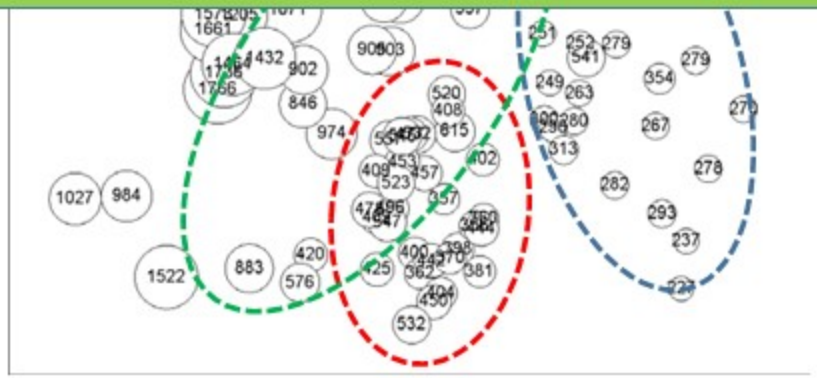
Most environmental factors are closely related to depth, therefore, depth is often regard as a key index (Rogers et al., 2007; Chivers et al., 2013; Davis et al., 2015; Ramos et al., 2016).

1. Background





In three zones, cnidarian species are different from each other, especially corals, were commonly the characterizing species in these faunal assemblages.



Three depth zones:

- **200-350m**
- **360-600m**
- **750-1800m**

The main determinant of community composition was depth

1. Background

Hydrobiologia (2015) 761:161–180
DOI 10.1007/s10750-015-2327-9

BIOLOGY OF THE ROSS SEA

Seamount biodiversity: high variability both within and between seamounts in the Ross Sea region of Antarctica

Malcolm R. Clark · David A. Bowden

300-2200m

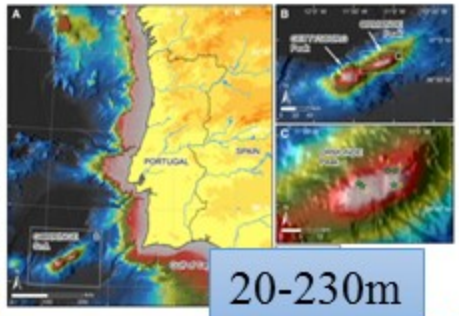
Marine Ecology. ISSN 0173-9565

ORIGINAL ARTICLE

Patterns in megabenthic assemblages on a seamount summit (Ormonde Peak, Gorringe Bank, Northeast Atlantic)

Manuela Ramos[1,2], Iacopo Bertocci[1], Fernando Tempera[2], Gonçalo Calado[3], Mónica Albuquerque[4] & Pedro Duarte[5]

1 CIMAR – Interdisciplinary Centre of Marine and Environmental Research, Porto, Portugal
2 MARE – Marine and Environmental Sciences Centre, Department of Oceanography and Fisheries, Horta, Azores, Portugal
3 Departamento de Ciências da Vida, Universidade Lusófona de Humanidades e Tecnologias, Campo Grande, Lisbon, Portugal
4 Instituto Português de Malacologia (IPM) ZooMarine, Albufeira, Portugal
5 Norwegian Polar Institute, Fram Centre, Tromsø, Norway

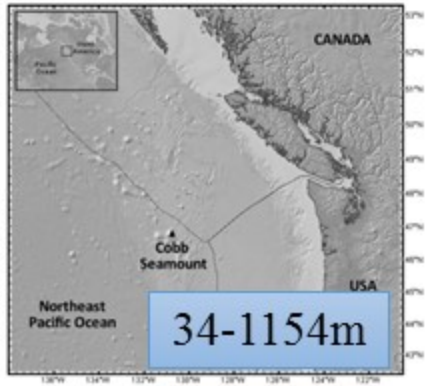


20-230m

The depth of seamount summit is only dozens of meters to hundreds of meters

RESEARCH ARTICLE

The Structure and Distribution of Benthic Communities on a Shallow Seamount (Cobb Seamount, Northeast Pacific Ocean)



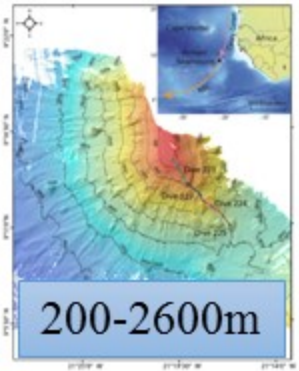
34-1154m

SCIENTIFIC REPORTS

OPEN

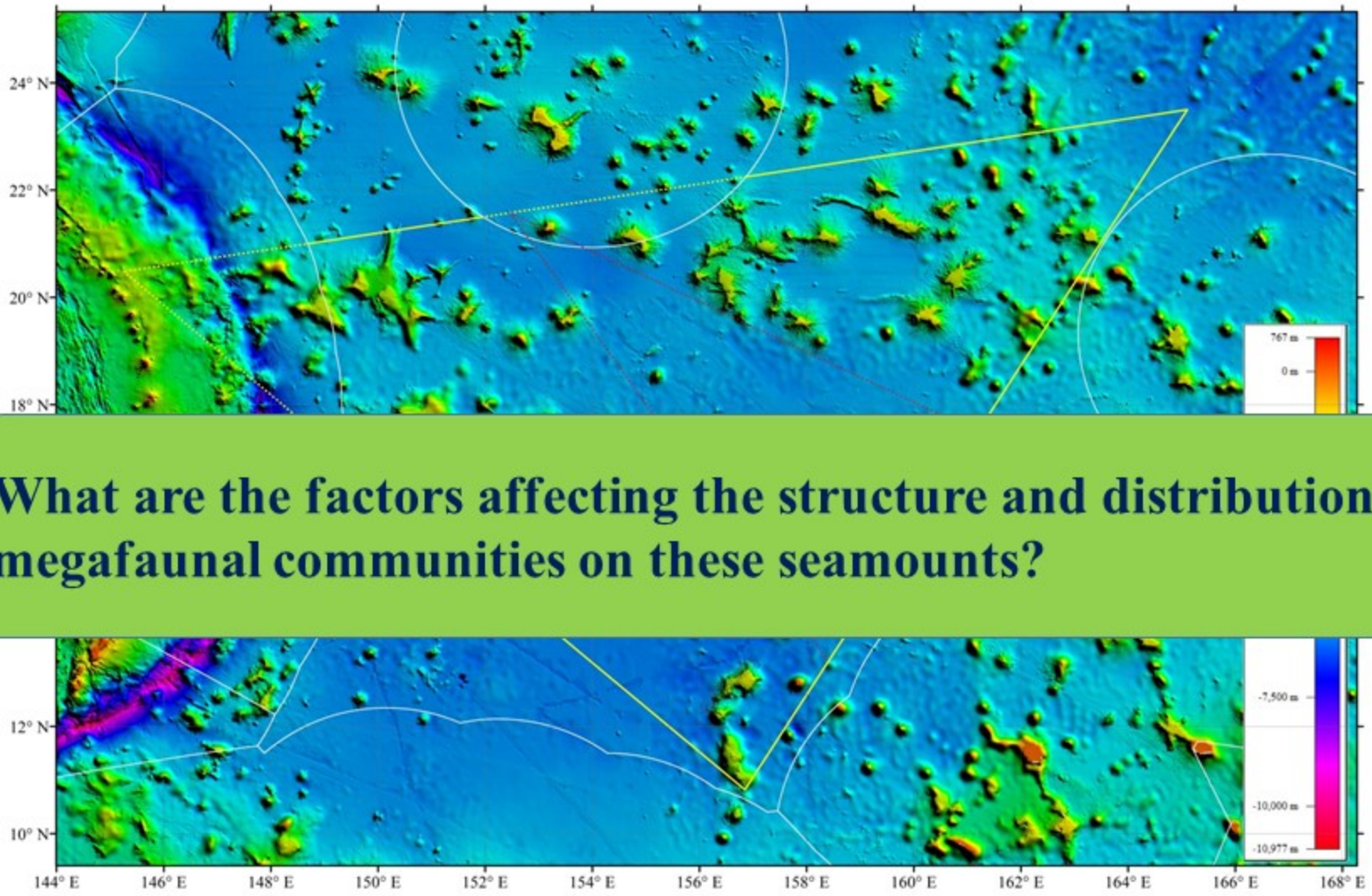
Species replacement dominates megabenthos bet… remote seamount

Lissette Victorero[1,2], Katleen Robert[3], Laura F… Veerle A. I. Huvenne[1]



200-2600m

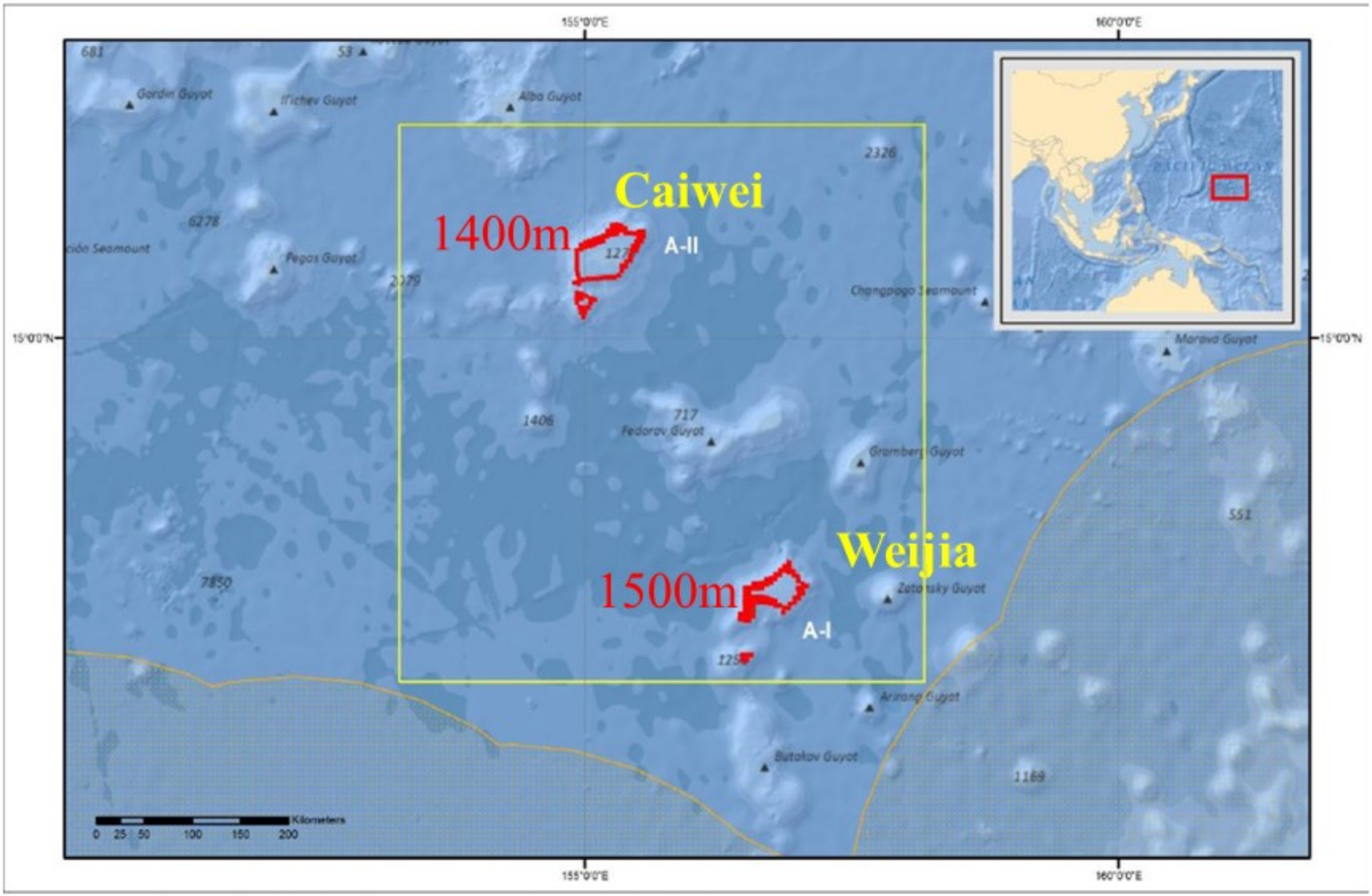
1. Background



What are the factors affecting the structure and distribution of megafaunal communities on these seamounts?

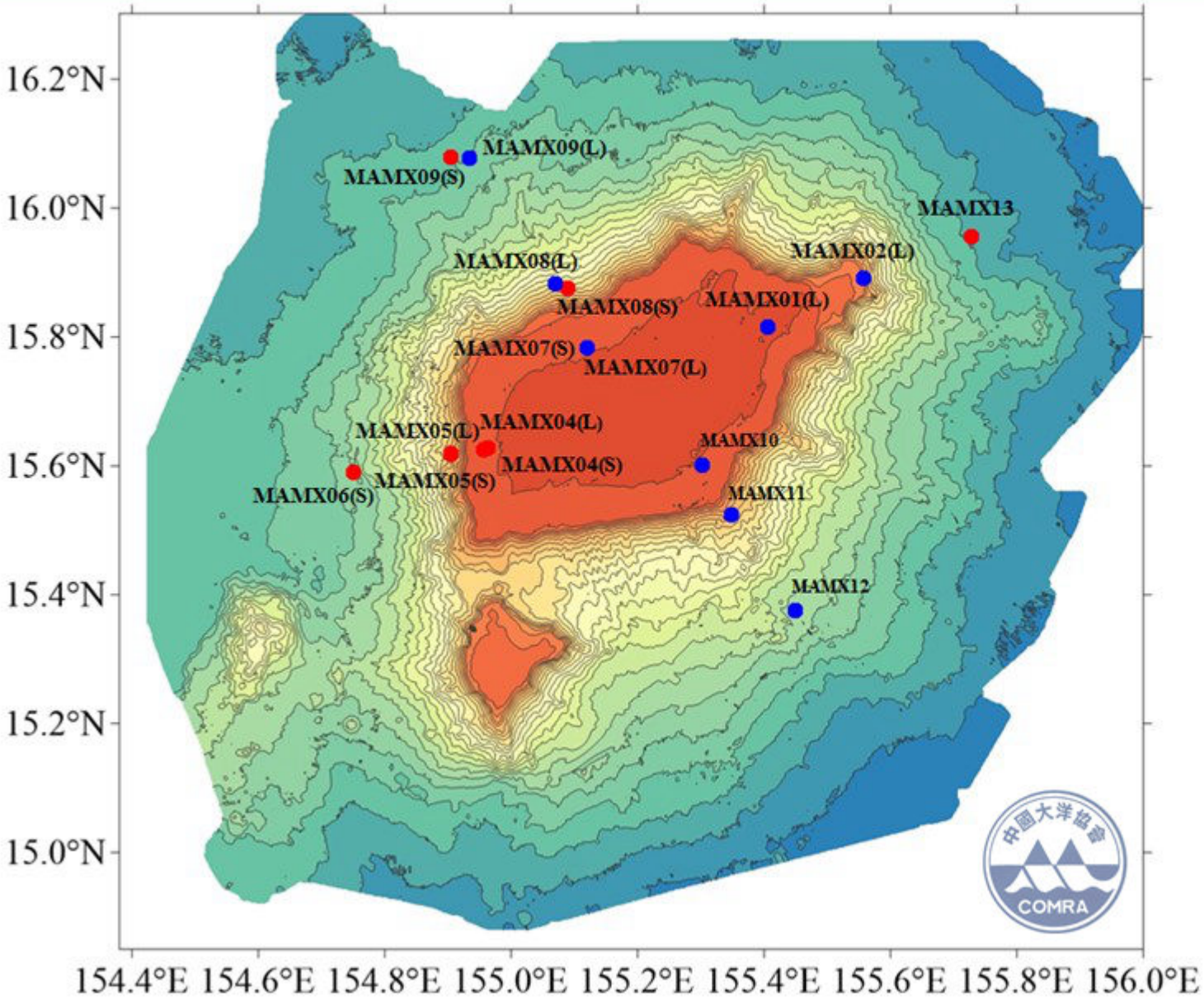
The water depth of seamount summit is greater than 1200m

1. Background



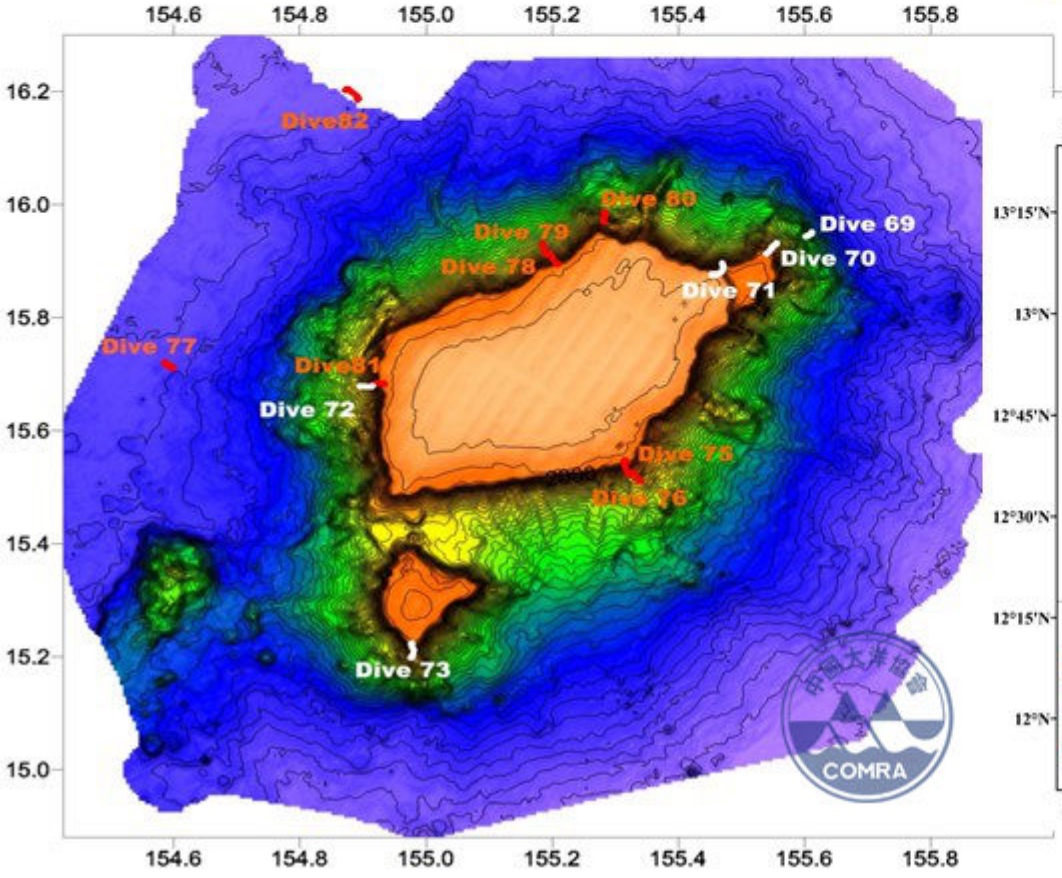
Since 2012, COMRA has conducted environmental surveys in the contract area

1. Background

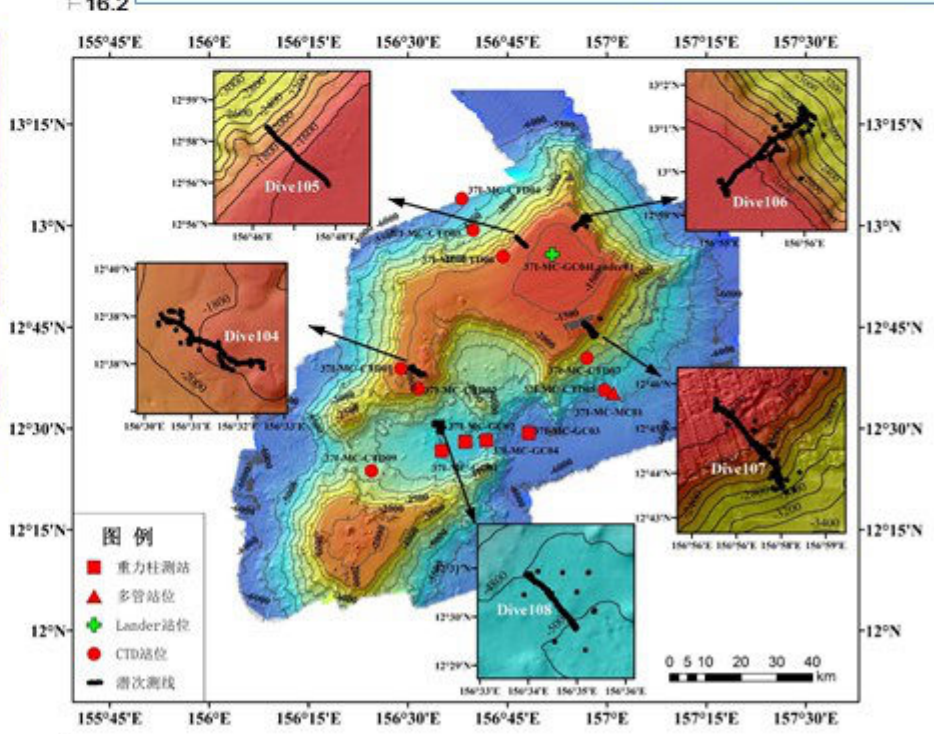


1. Background

Thirteen dives by *Jiaolong* submersible on the Caiwei Guyot



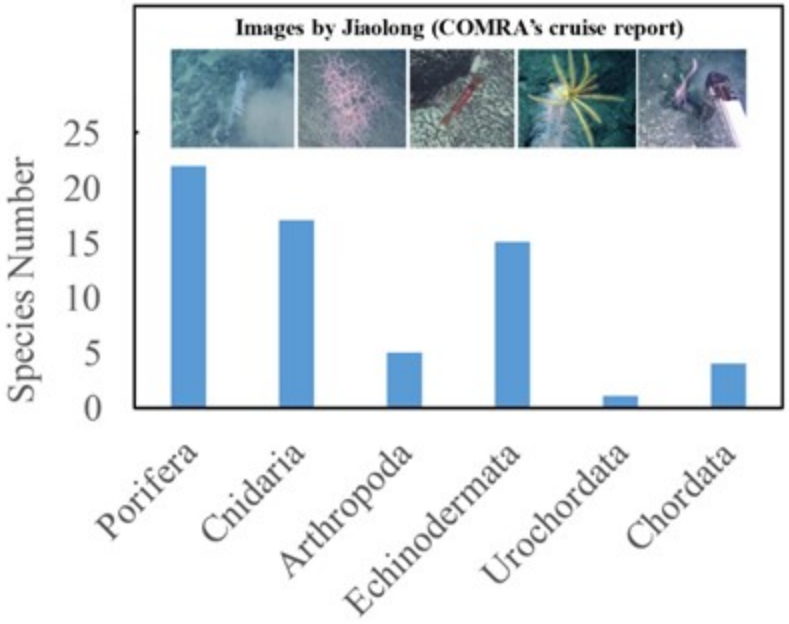
Five dives on the Weijia Guyot

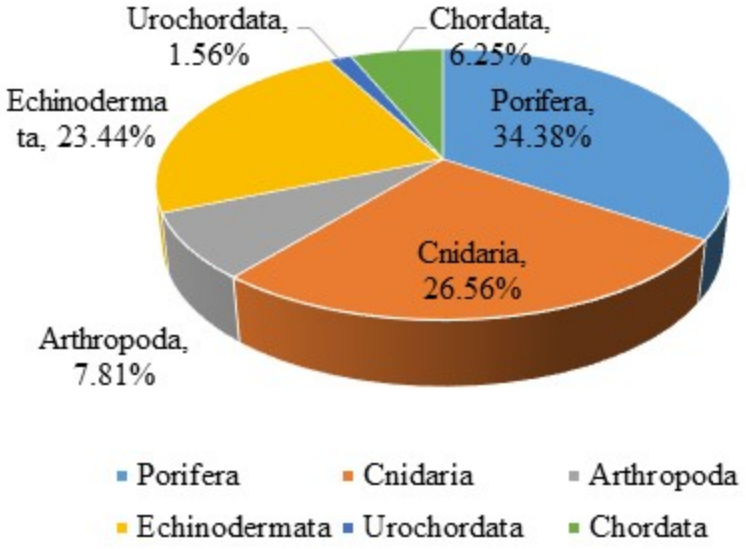


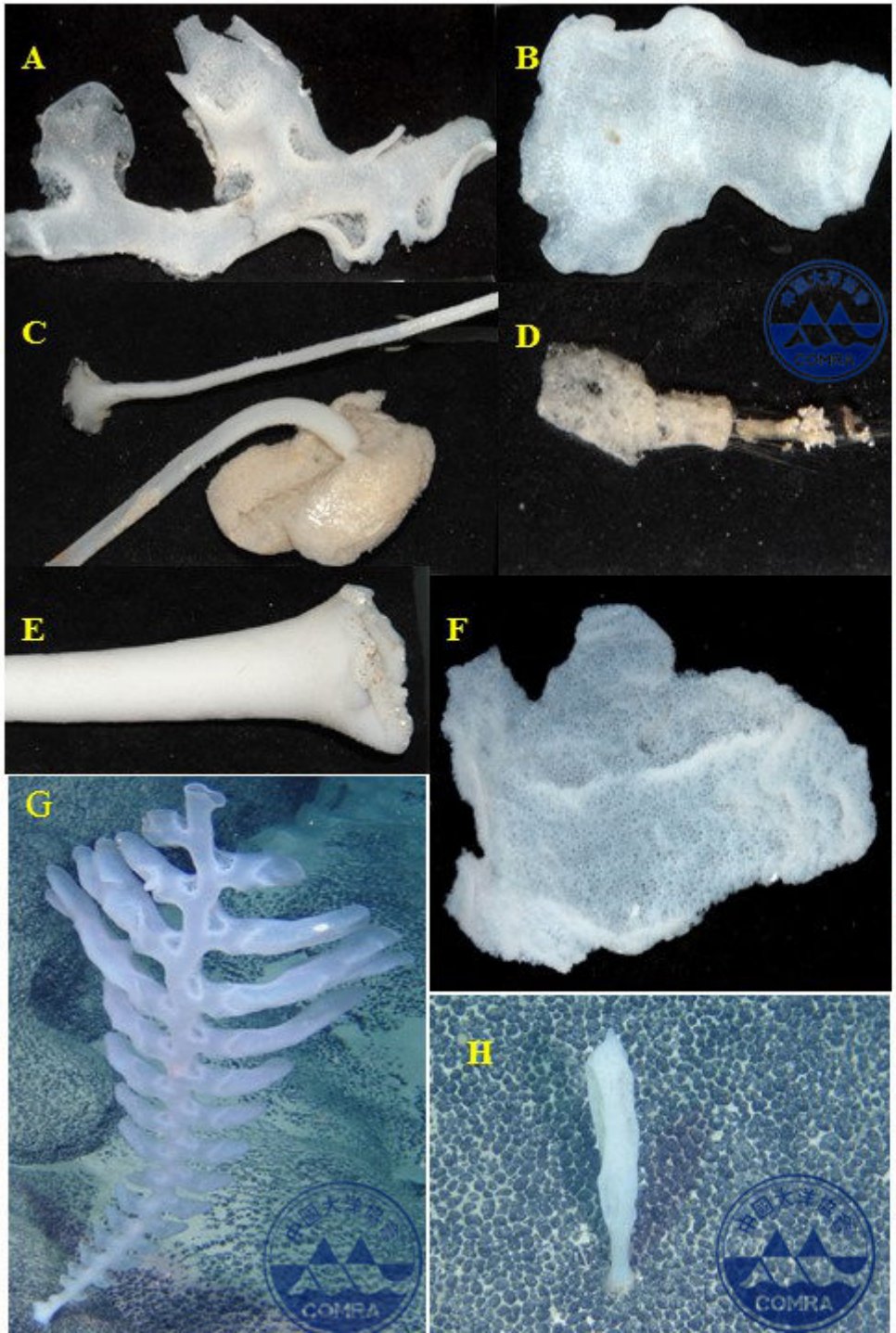
2. Diversity and community structure

Diversity (based on specimens collected by *Jiaolong*)

6 Phyla, 38 families, 64 species, dominated by poriferan, cnidarian and echinoderm.



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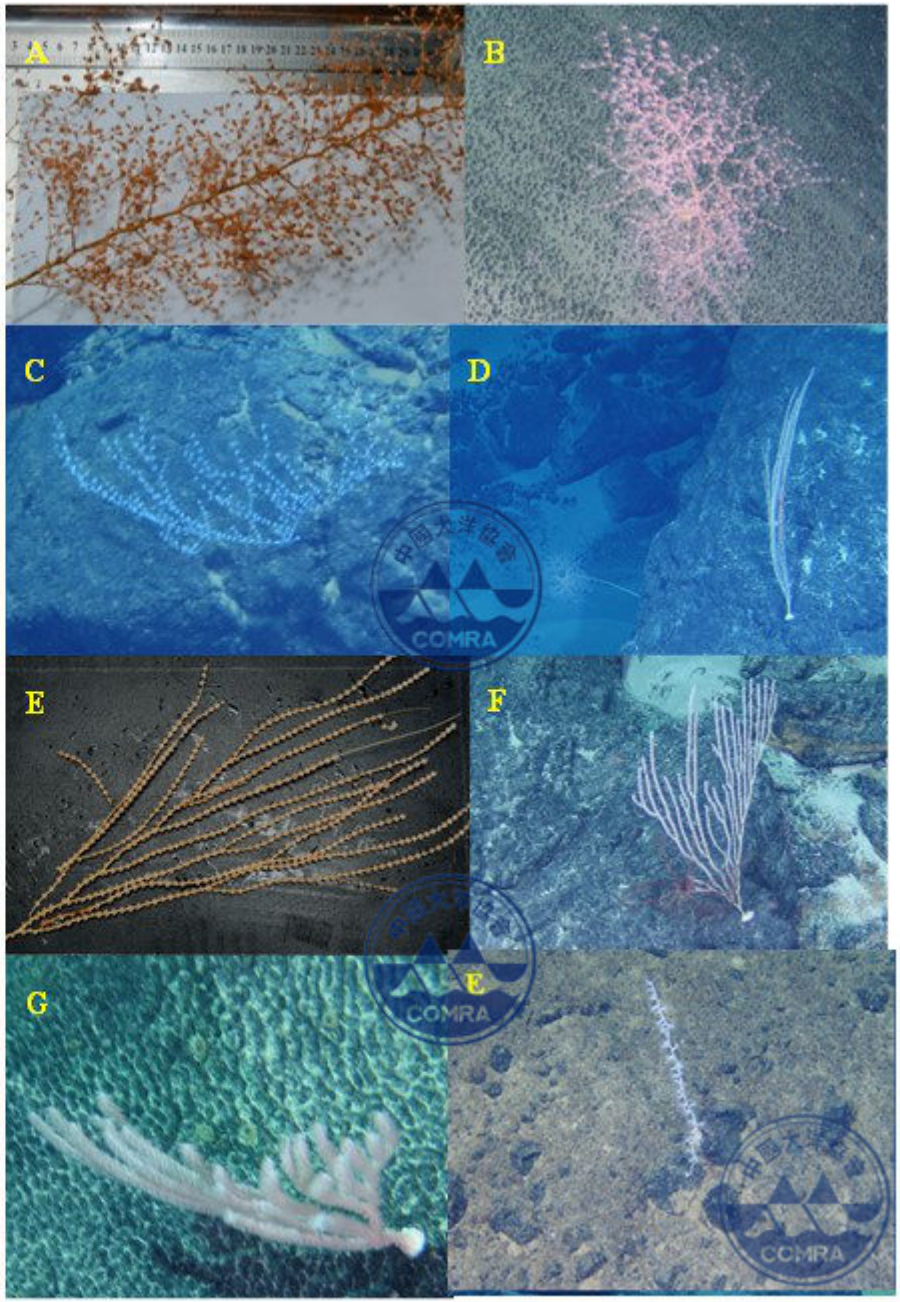
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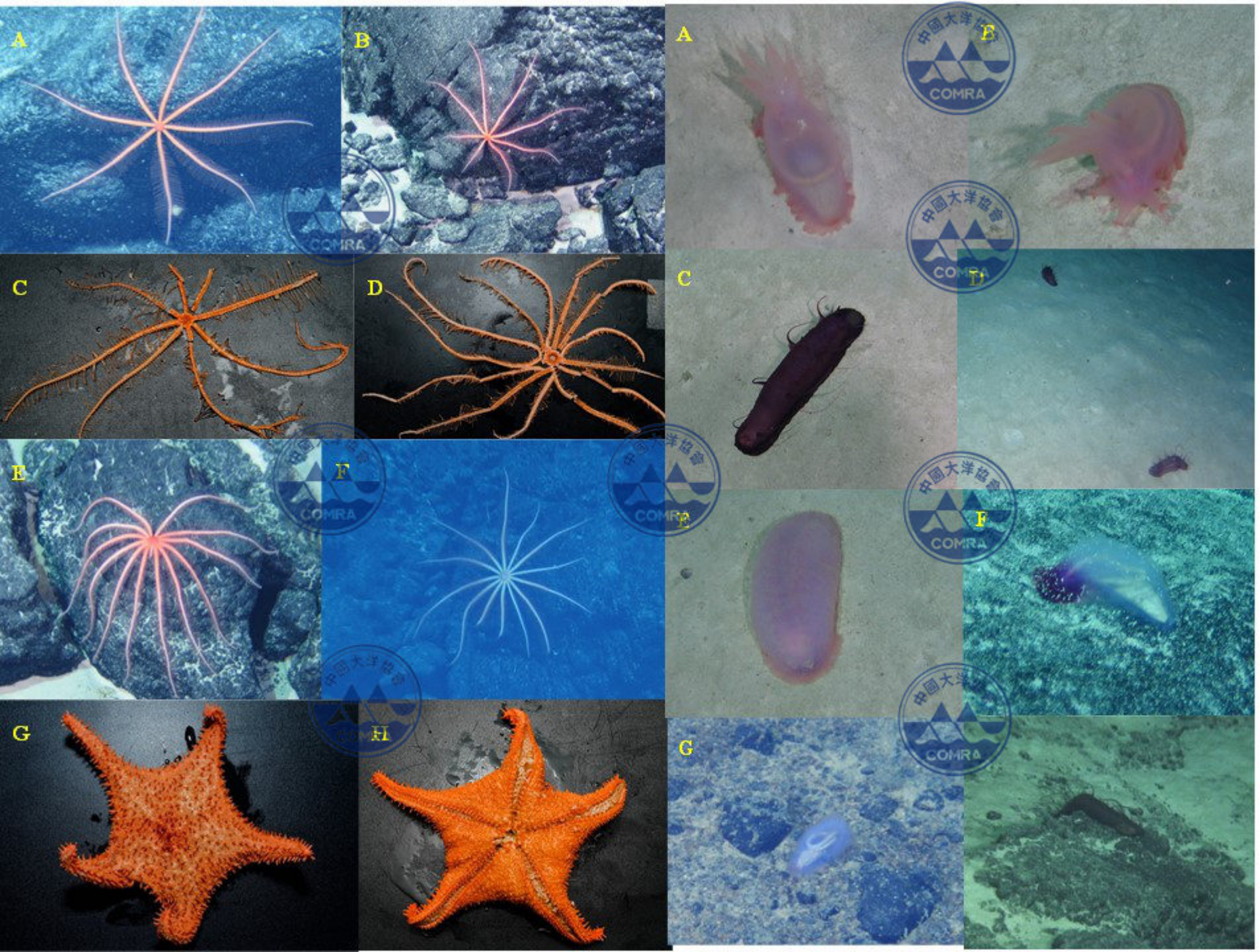
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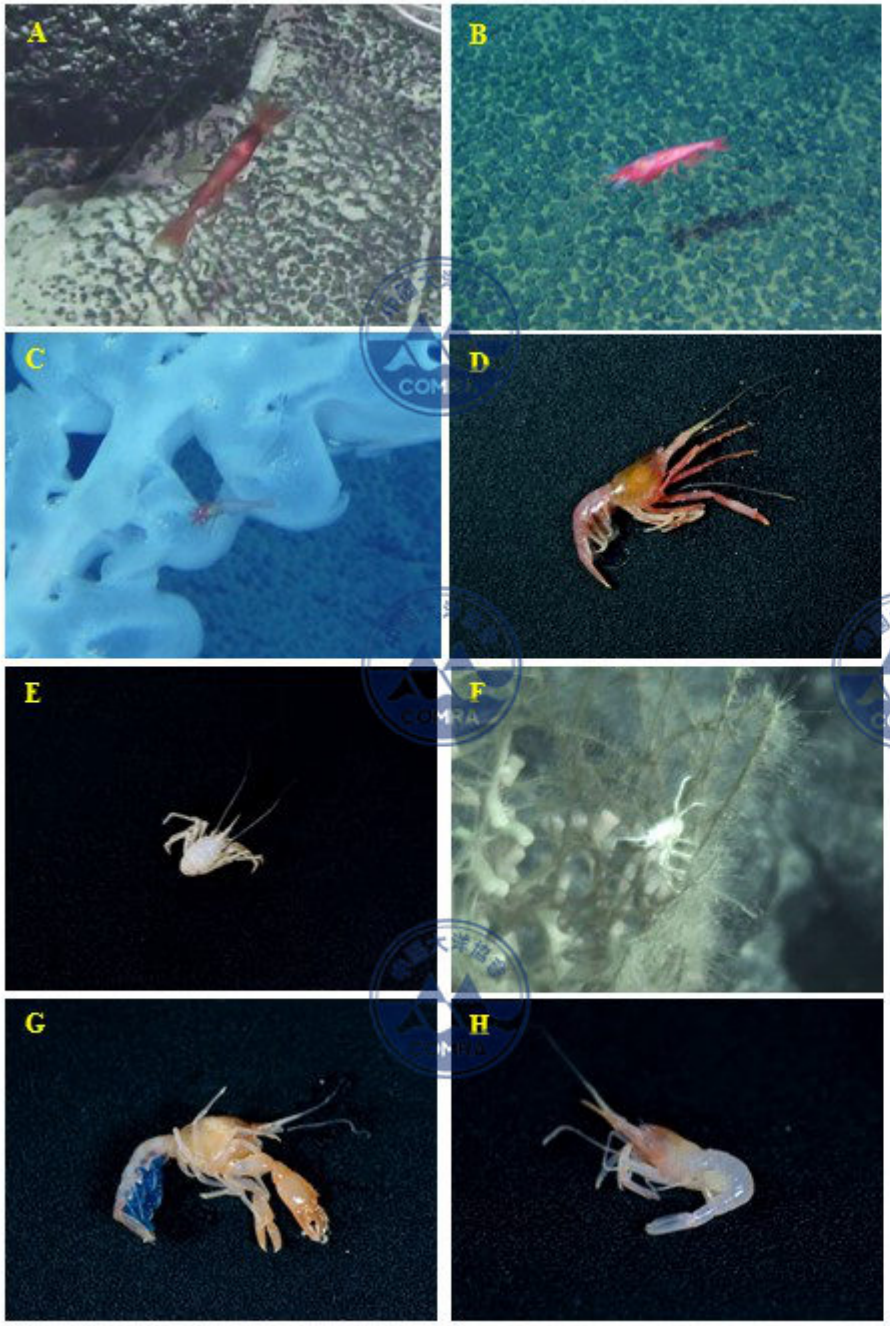
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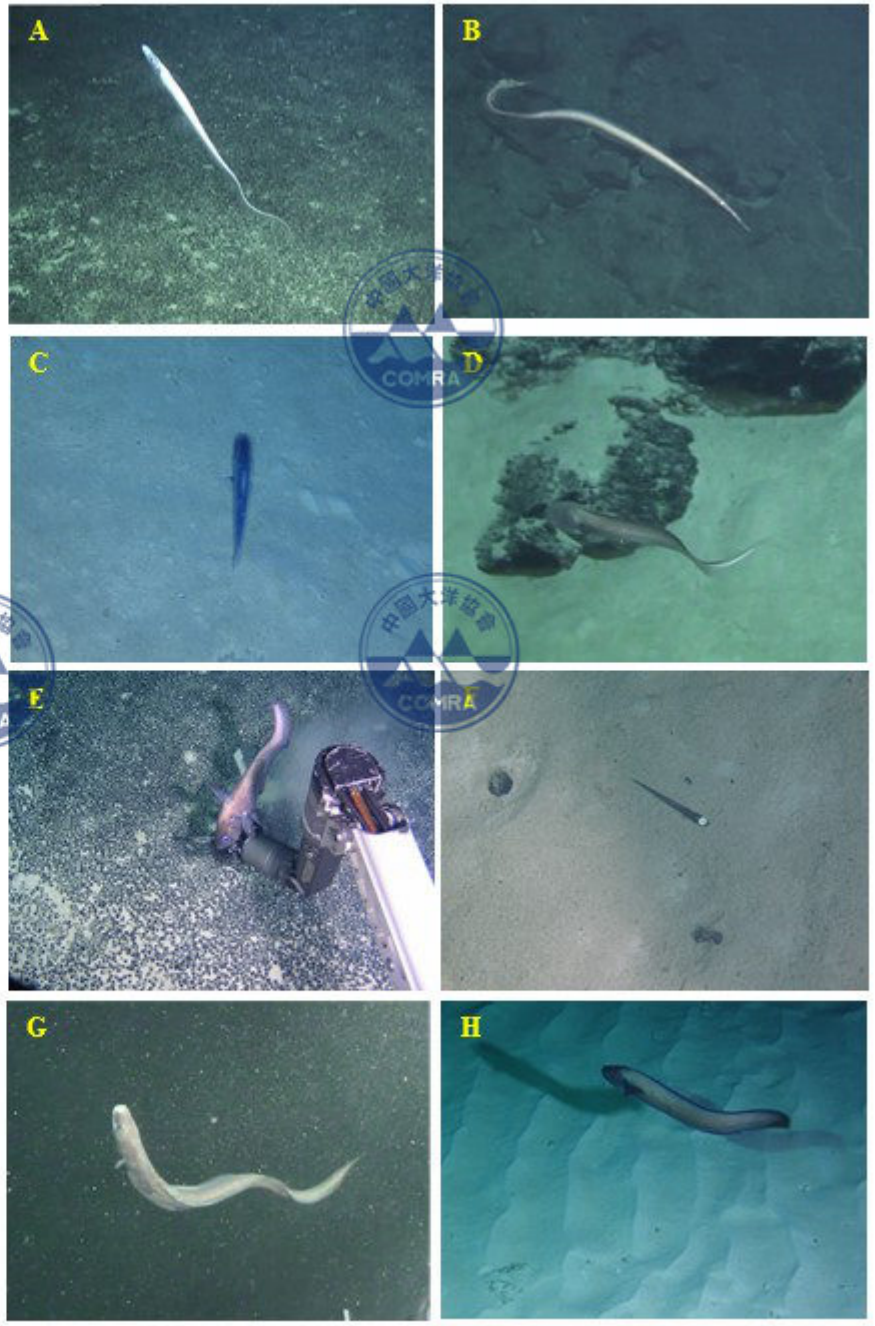
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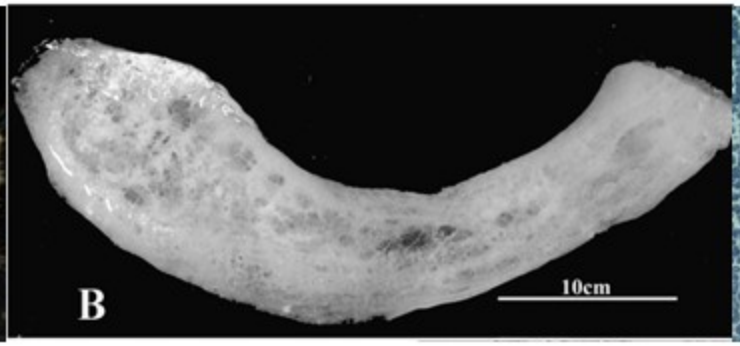
2. Diversity and community structure

6 new species

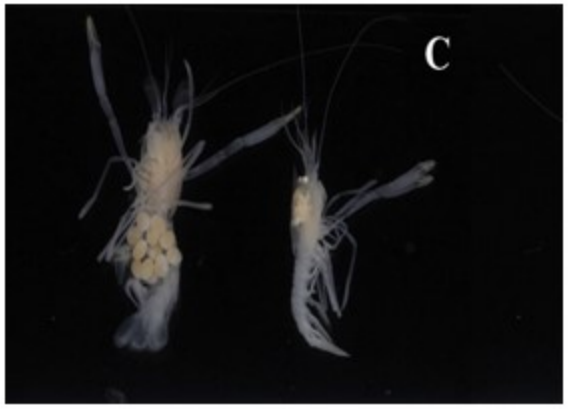
Platylistrum subviridum sp. nov.
(Wang et al., 2016)



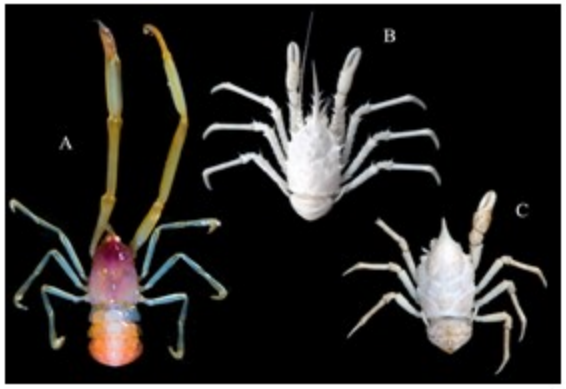
Poliopogon canaliculatus sp. nov.
(Wang et al., 2016)

Semperella retrospinella sp. nov.
(Wang et al., 2016)

Paralebbeus jiaolongi n. sp.
Xu et al., 2016



Spongicoloides weijiaensis n. sp.
Xu et al., 2017

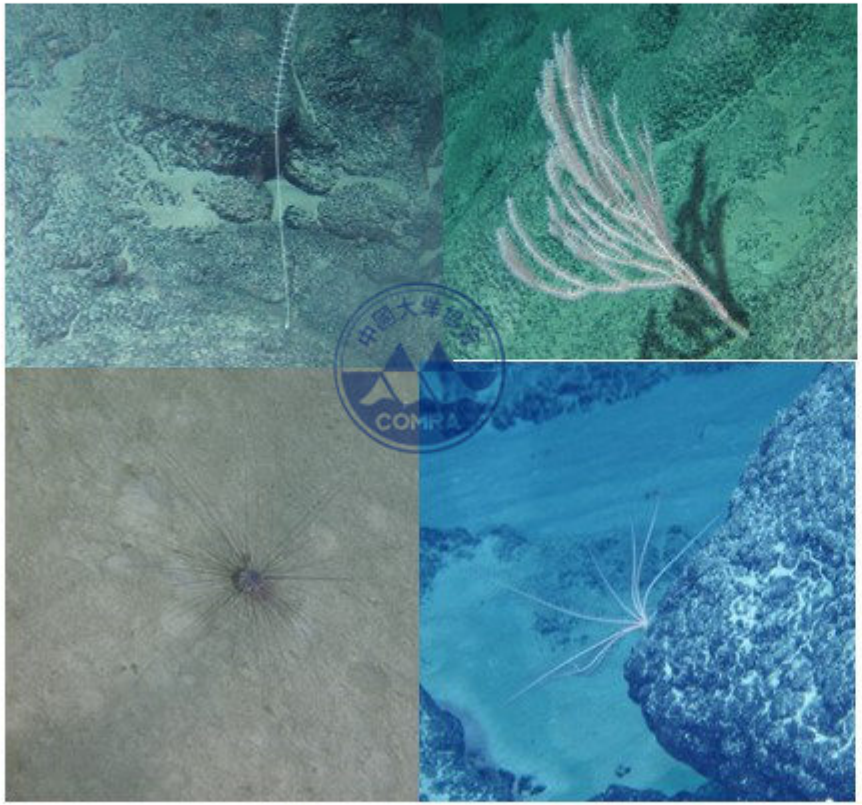


Uroptychus inaequipes sp. nov.
Dong et al., 2017

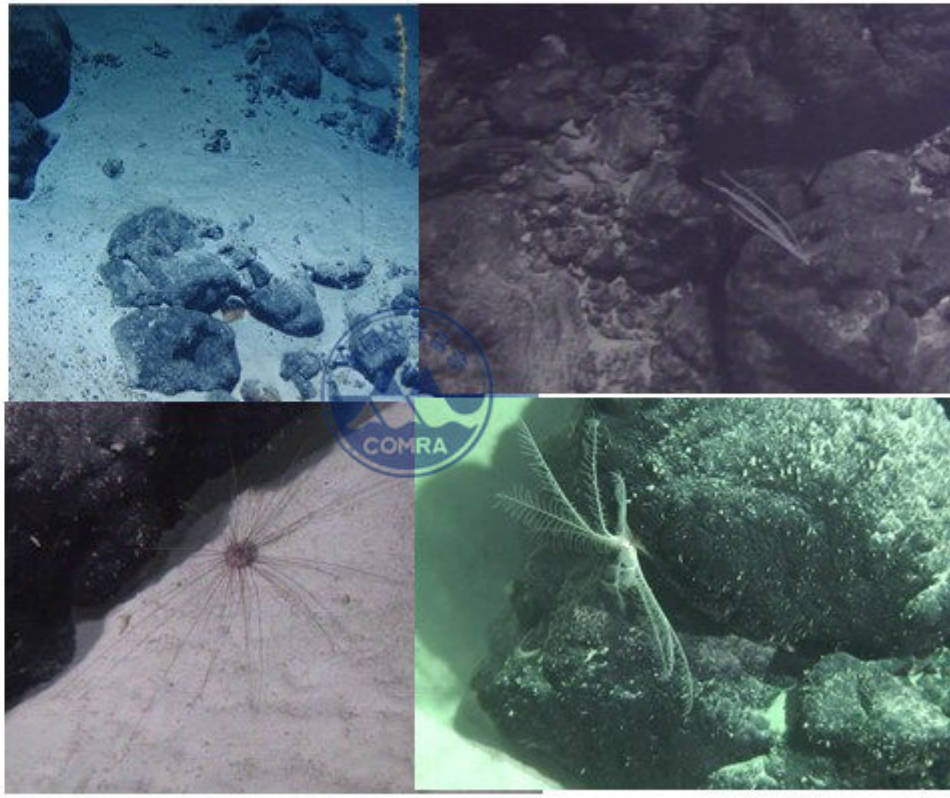
3. Major factors affecting the distribution of megafauna

(1) Water Depth

Megafaunal assemblages are similar between summit and slope.



Summit (1500m)

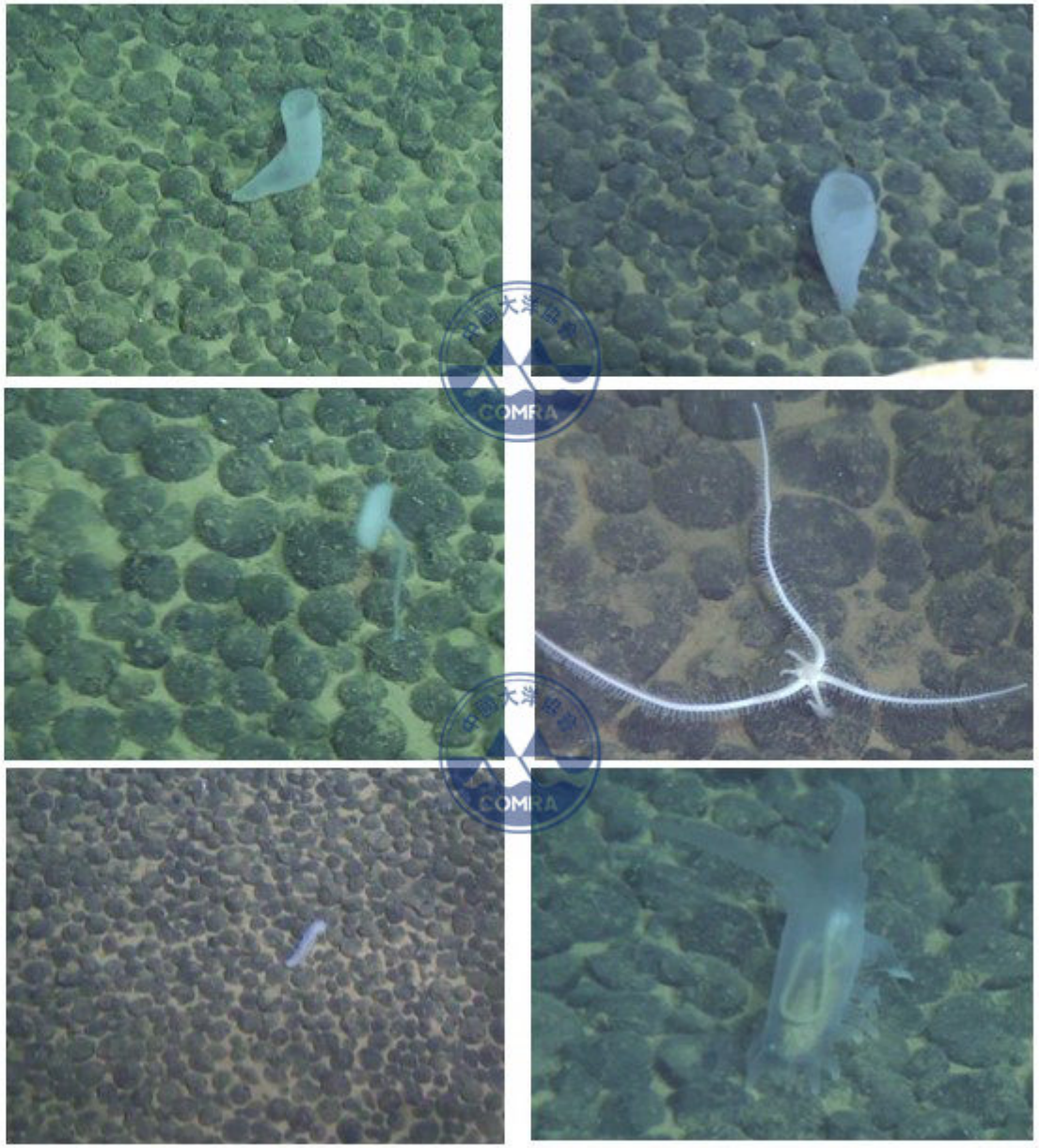


Slope (3000m)

3. Major factors affecting the distribution of megafauna

(1) Water depth

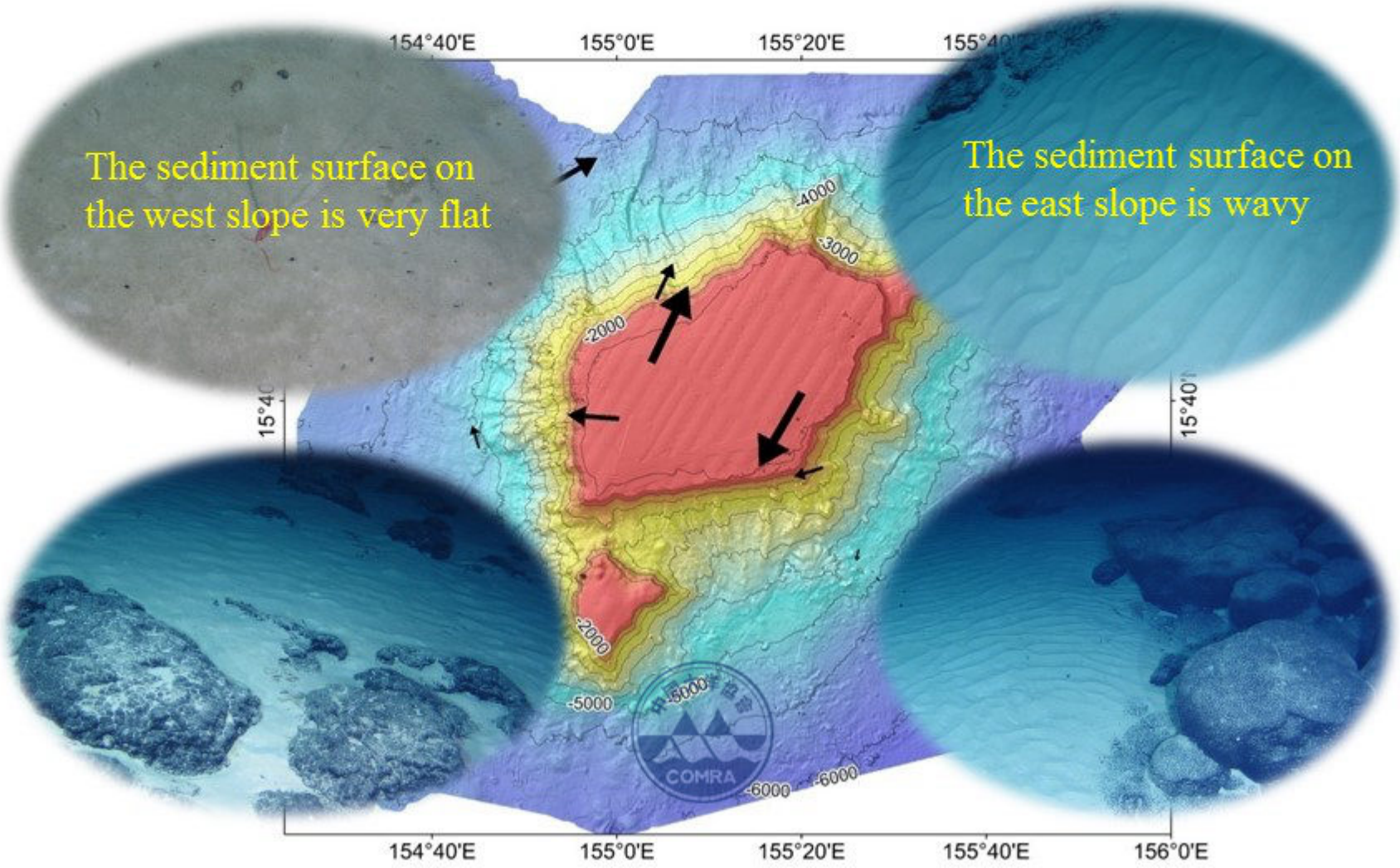
Megafaunal assemblages on the base mainly consist of sea cucumber, star fish, brittle star and small sponges, and are different from summit and slope, with lower density and smaller body size.



Base (5500m)

3. Major factors affecting the distribution of megafauna

(2) Bottom Current & Sediment Environment

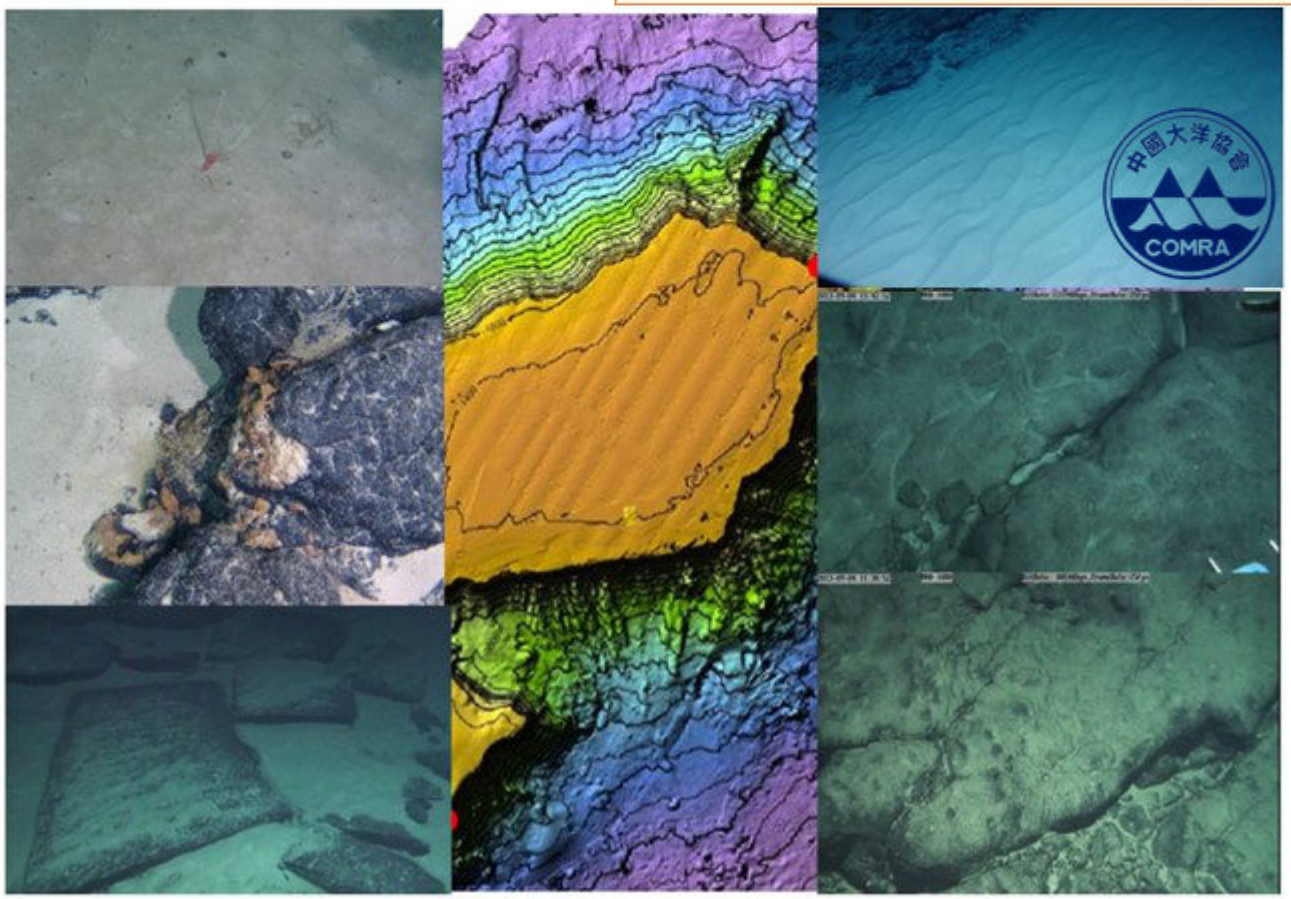


3. Environmental factors influencing megafauna distribution

(2) Bottom Current & Sediment Environment

West slope above 2500m
bottom current weak, higher coverage of sediment, higher diversity of habitat.

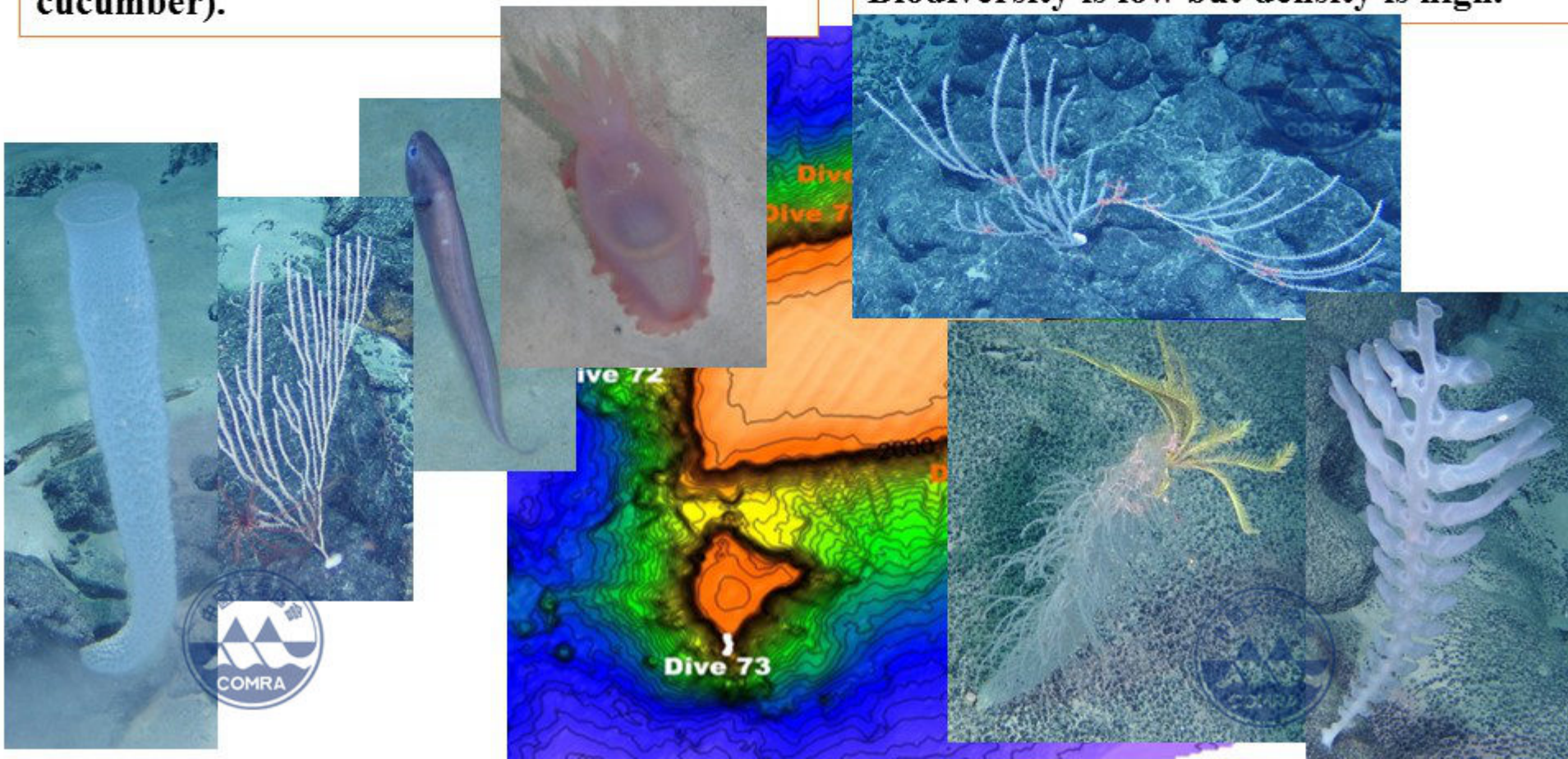
East slope above 2500m
strong bottom current washing the seabed, the substratum is mostly covered by crust and rock.



Differences in biodiversity and density due to differences in Bottom Current & Sediment Environment

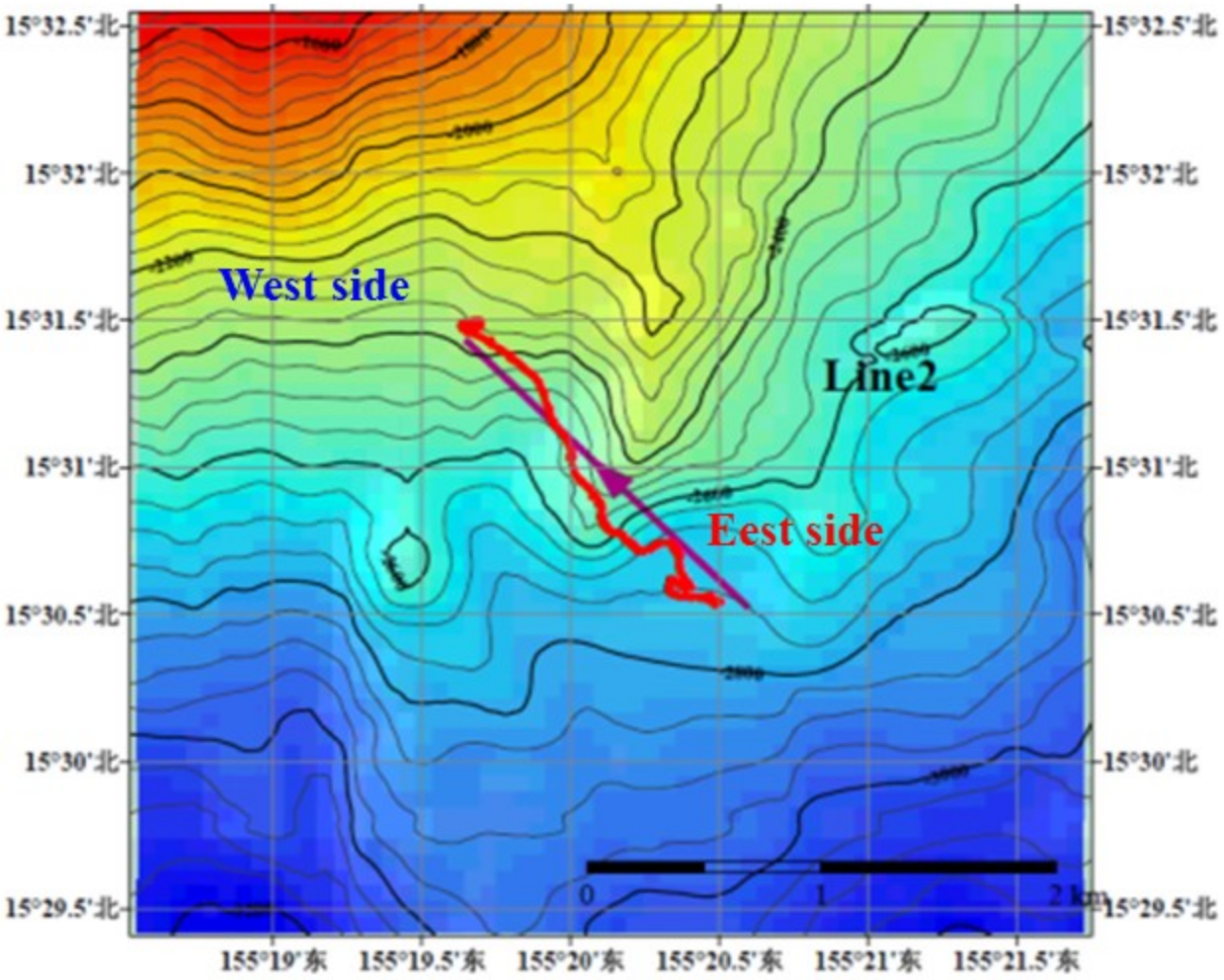
West slope:
Higher biodiversity and lower density, There are representative species in both sessile animals (sponges and corals) and the movable animals (sediment feeder sea cucumber).

East slope:
Hard substratum is favorable habitat for sessile animals. megafauna is dominated by sessile animals such as sponges, corals and sea lilies
Biodiversity is low but density is high.



3. Major factors affecting the distribution of megafauna

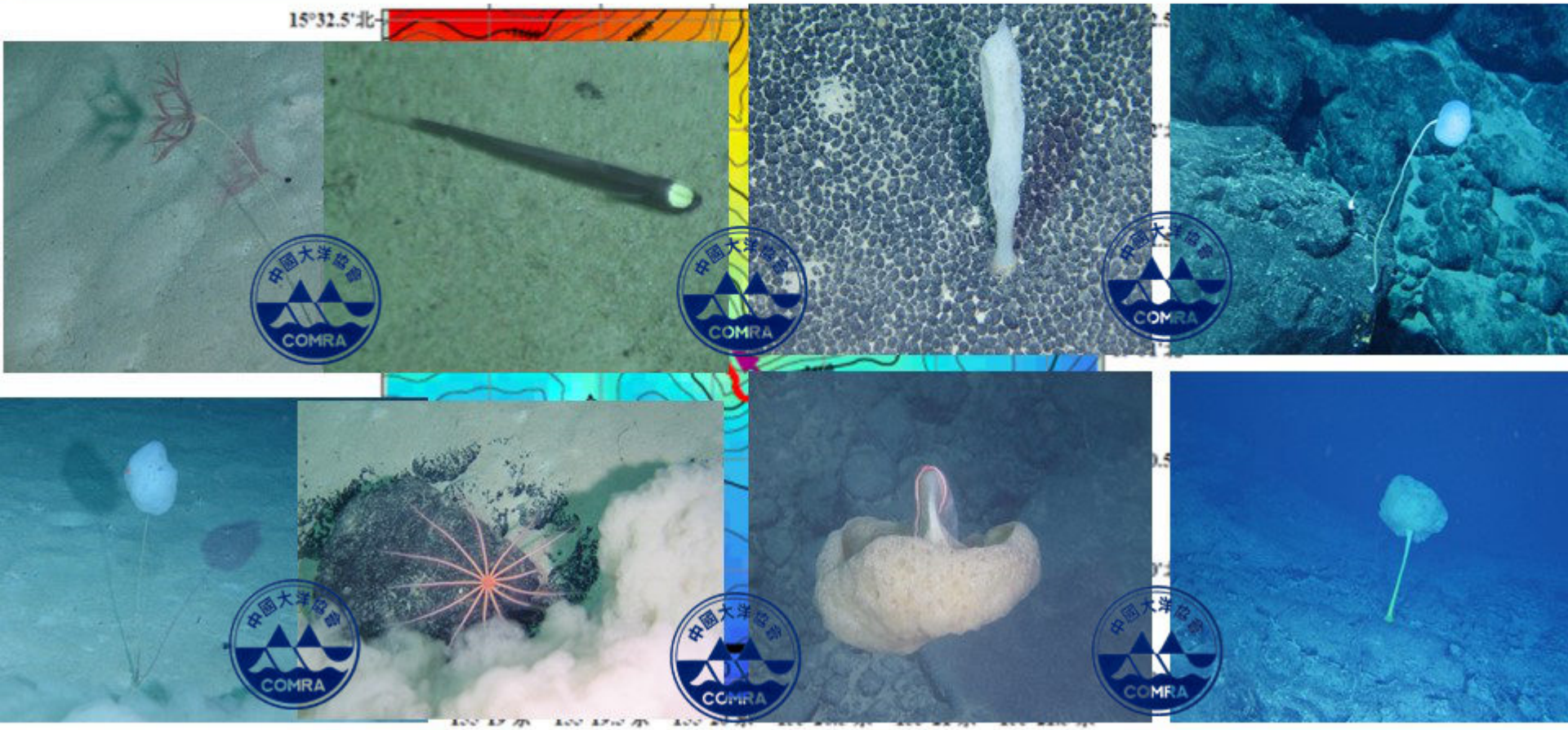
within small scales (e.g., on both sides of the ridge) the bottom current and sedimentary environment has a significant impact on the megafauna community and distribution.



3. Major factors affecting the distribution of megafauna

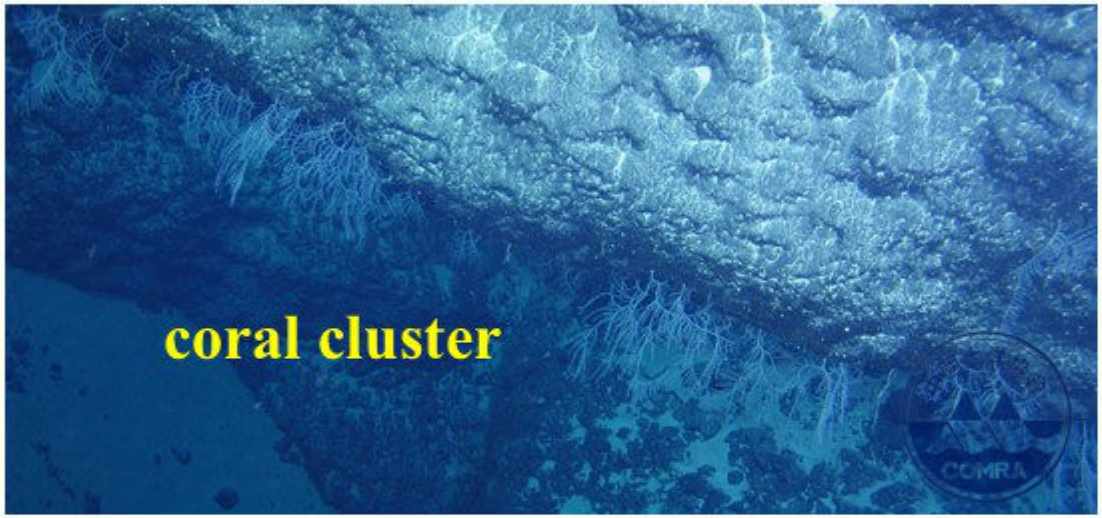
West side of the ridge:
due to weak bottom current, with high sediment coverage, megafauna mainly consists of fish, star fish and sea cucumber, sponge appears sporadically

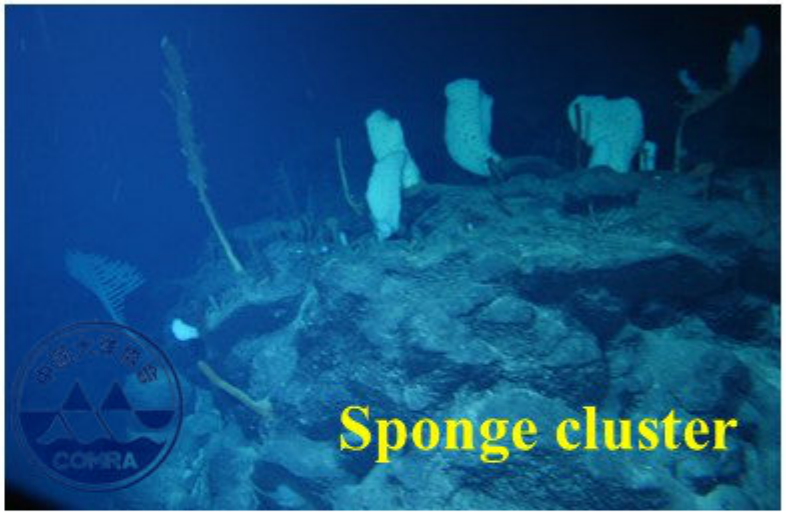
East side of the ridge :
bottom current washing the seabed, the substratum is mostly covered by crust, nodules and rock. Megafauna is dominated by sponges.

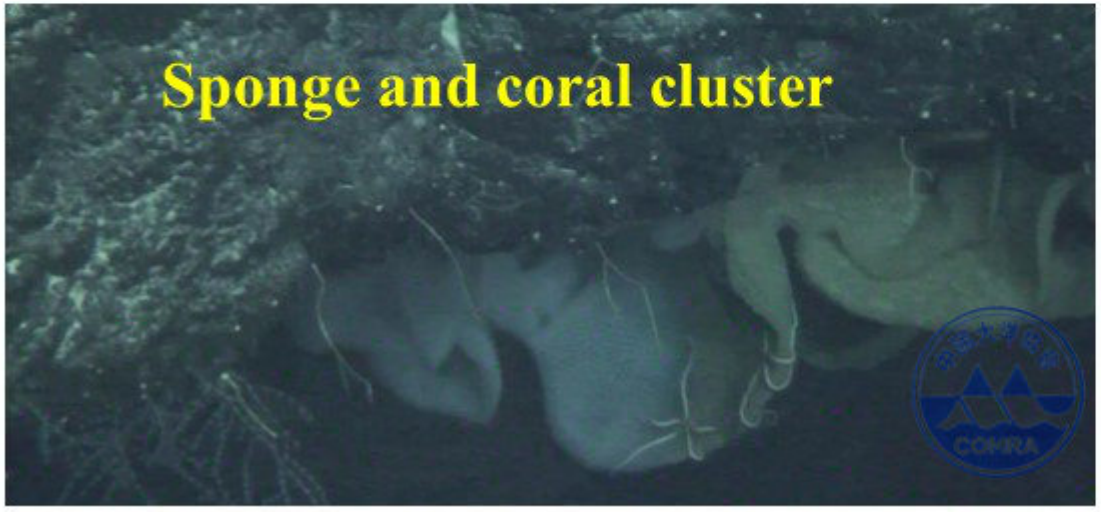


3. Major factors affecting the distribution of megafauna

(3) Topography (complicated terrain *vs* strong current)



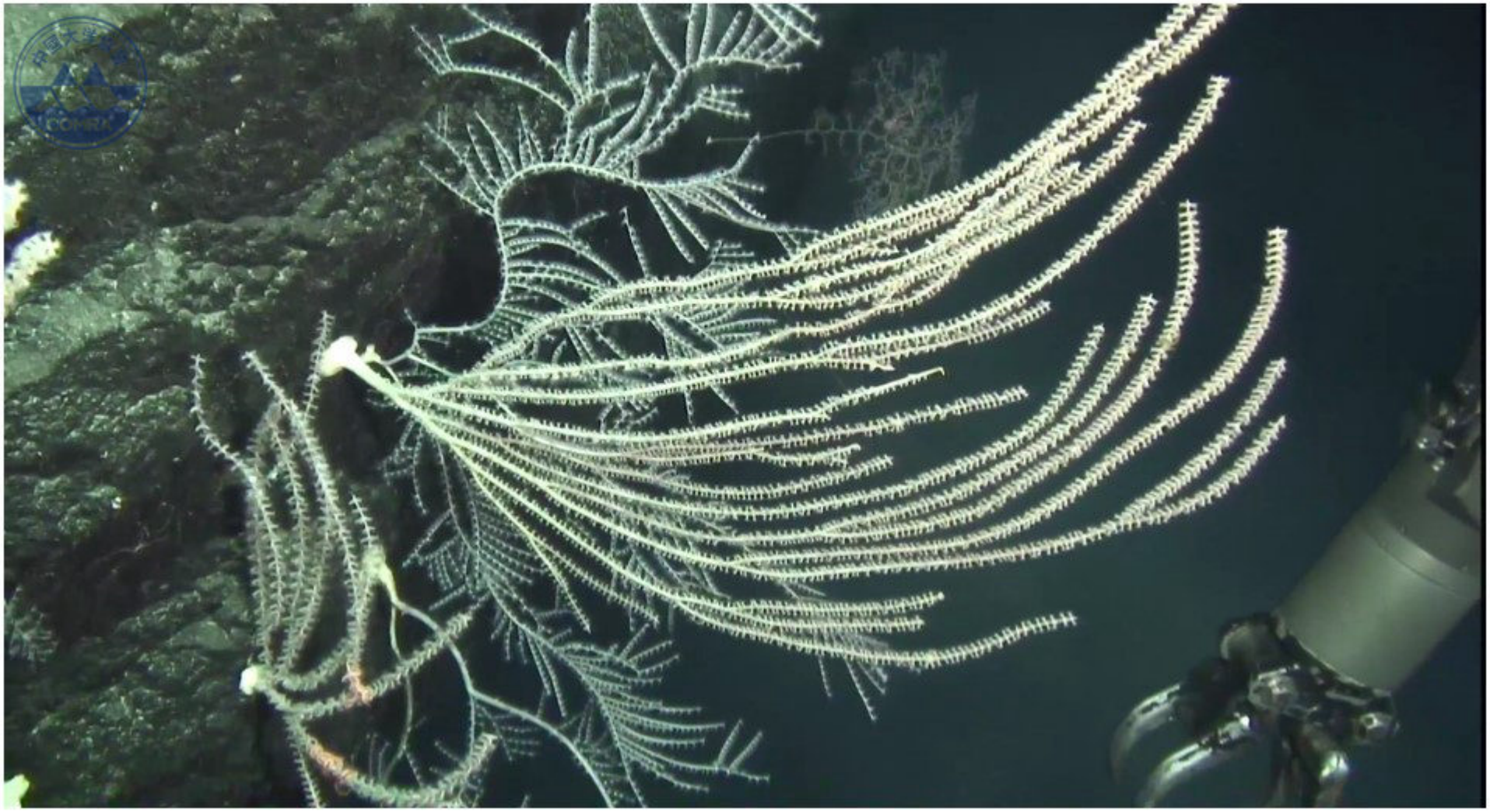




High density of corals and sponges were generally observed on steep cliff

3. Major factors affecting the distribution of megafauna

Due to strong current around steep cliff brings more suspended particles, which is the major food source of these filter feeders, forming coral or sponge cluster.

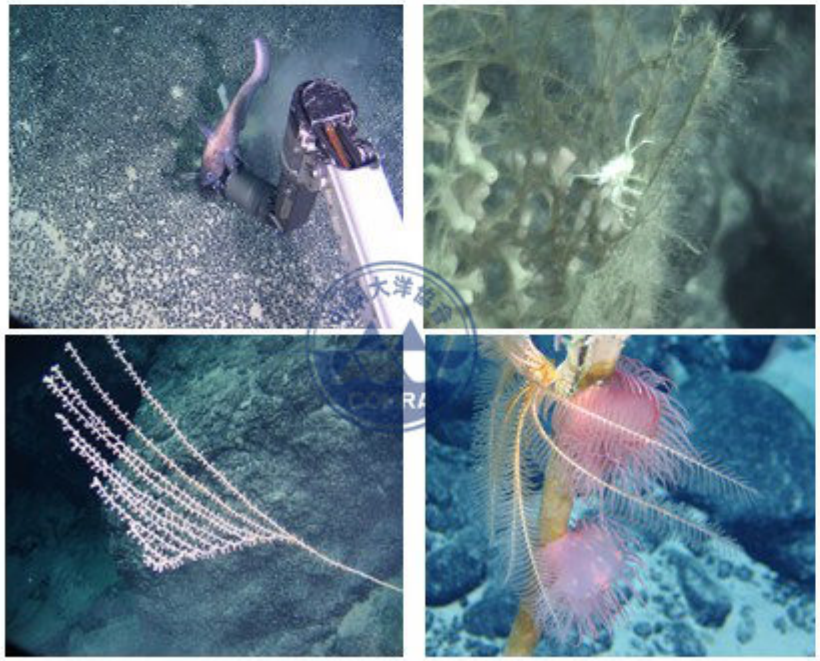


4. Future plan

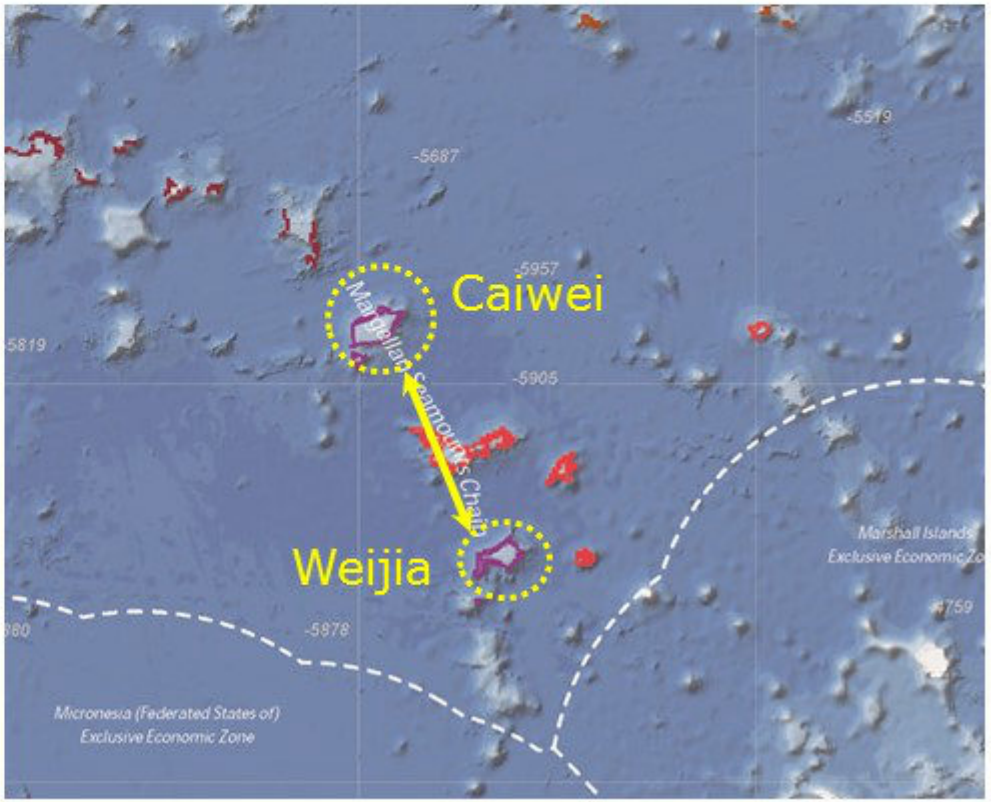
A comparative study on megafauna between Caiwei & Weijia Seamounts.

- ☐ **Community structure**
- ☐ **Biodiversity**
- ☐ **Genetic connectivity**

→ Connect or isolate?



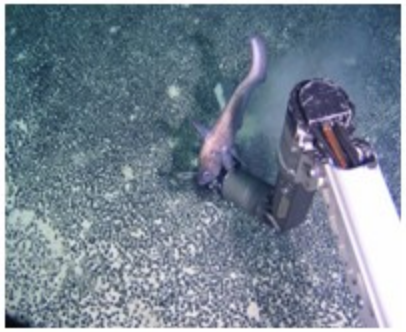
Images by *Jiaolong*, COMRA



5. Conclusion

- **The megafauna community is dominated by poriferan, cnidarian and echinoderm;**
- **Megafaunal assemblages are similar between the summit and slope of Caiwei seamount, but they are significantly different from megafaunal assemblages of the base;**
- **Bottom current and sedimentary environment appeared to play important role in controlling megafauna distribution;**
- **High density of corals and sponges were generally observed on steep cliff.**






Images by *Jiaolong*, COMRA

Thanks for your attention!