



COMRA's experiences with PMN reference zones

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COMRA

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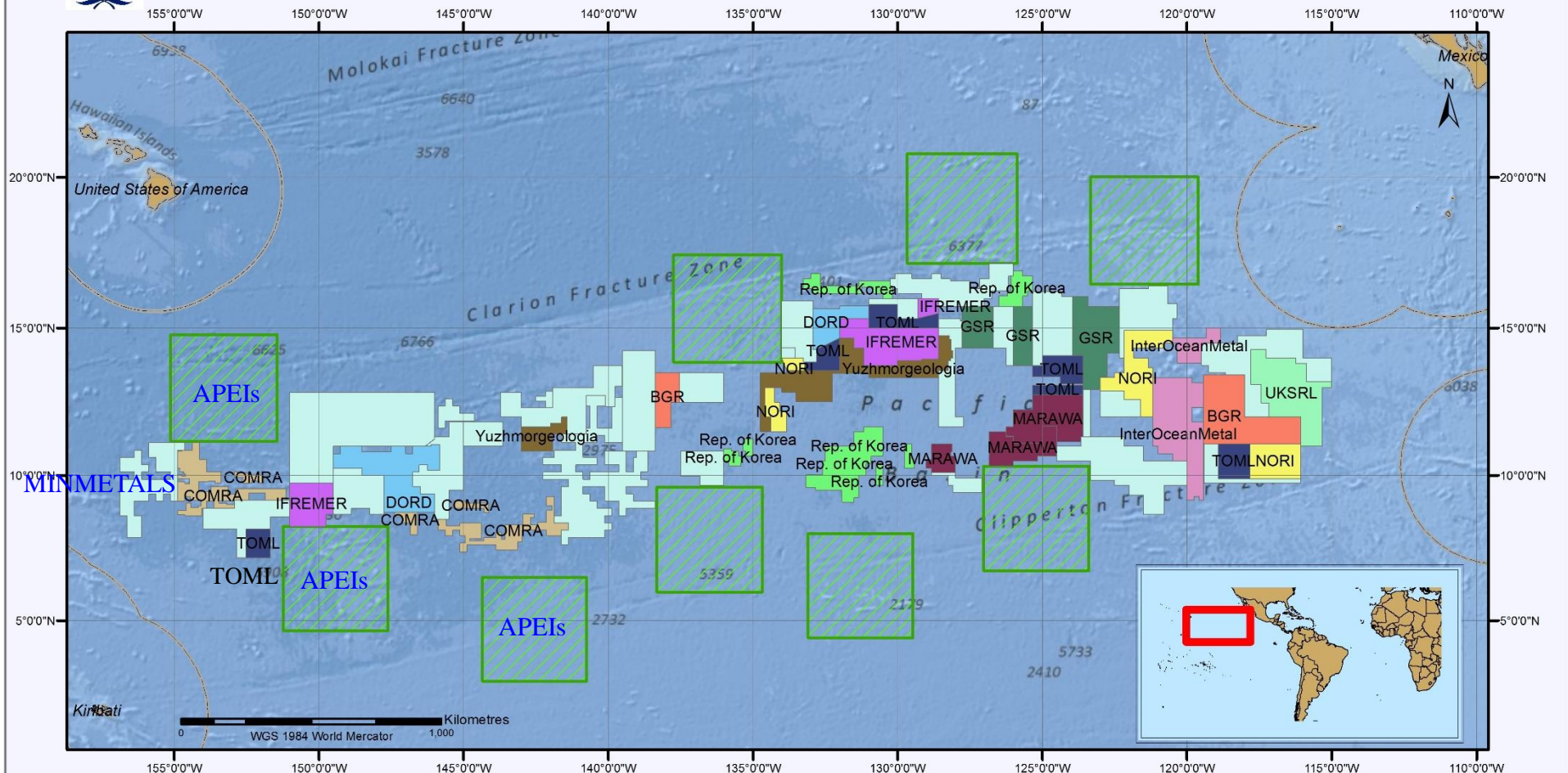
Outline

- 1. Introduction of the COMRA's contract area**
- 2. Surveys and preliminary achievements**
- 3. The challenges and suggestions in the selection of reference zones**
- 4. Conclusion**

1. Introduction of the COMRA's contract area



Polymetallic Nodules Exploration Areas in the Clarion-Clipperton Fracture Zone
Areas under contract and areas reserved for the International Seabed Authority



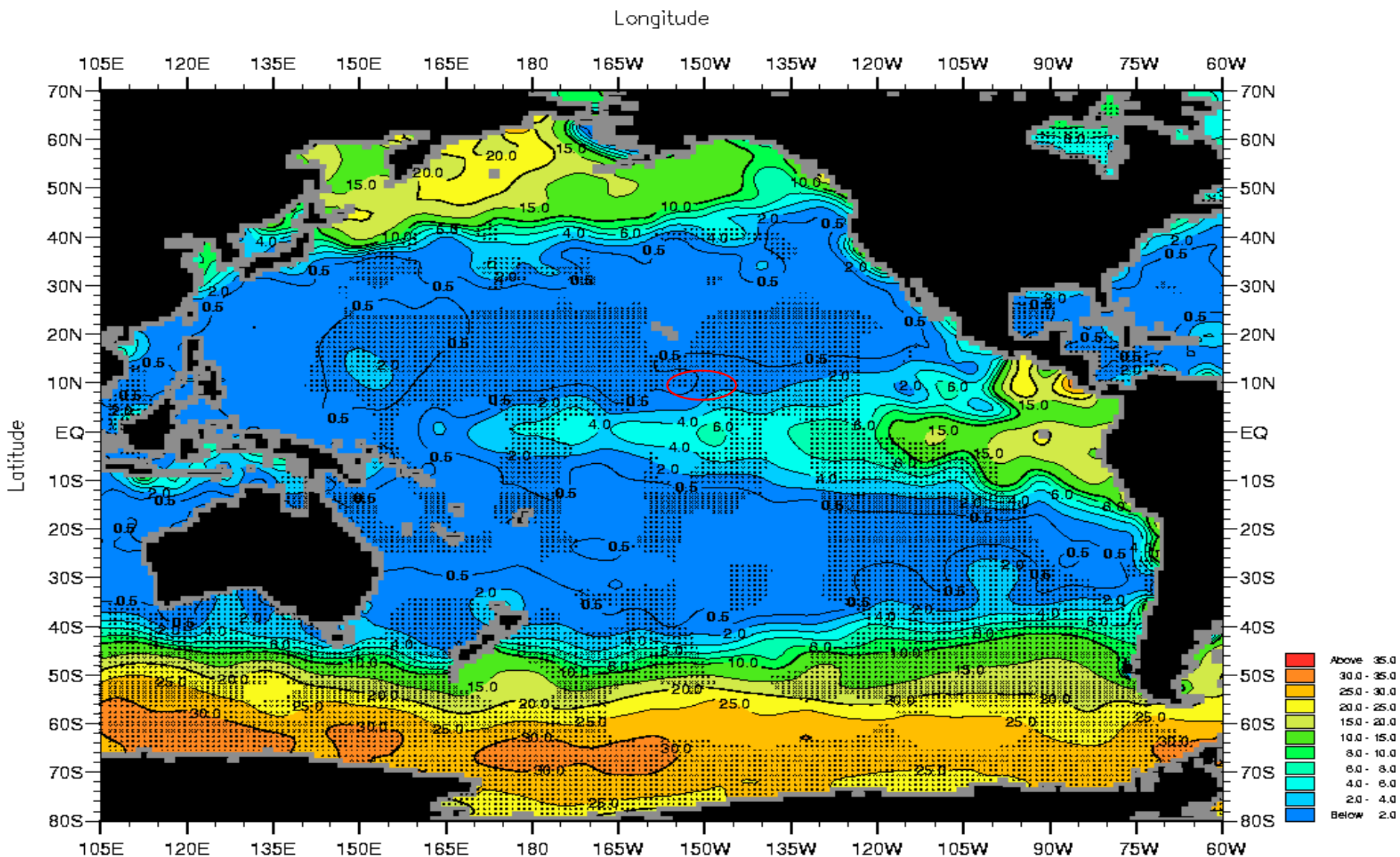
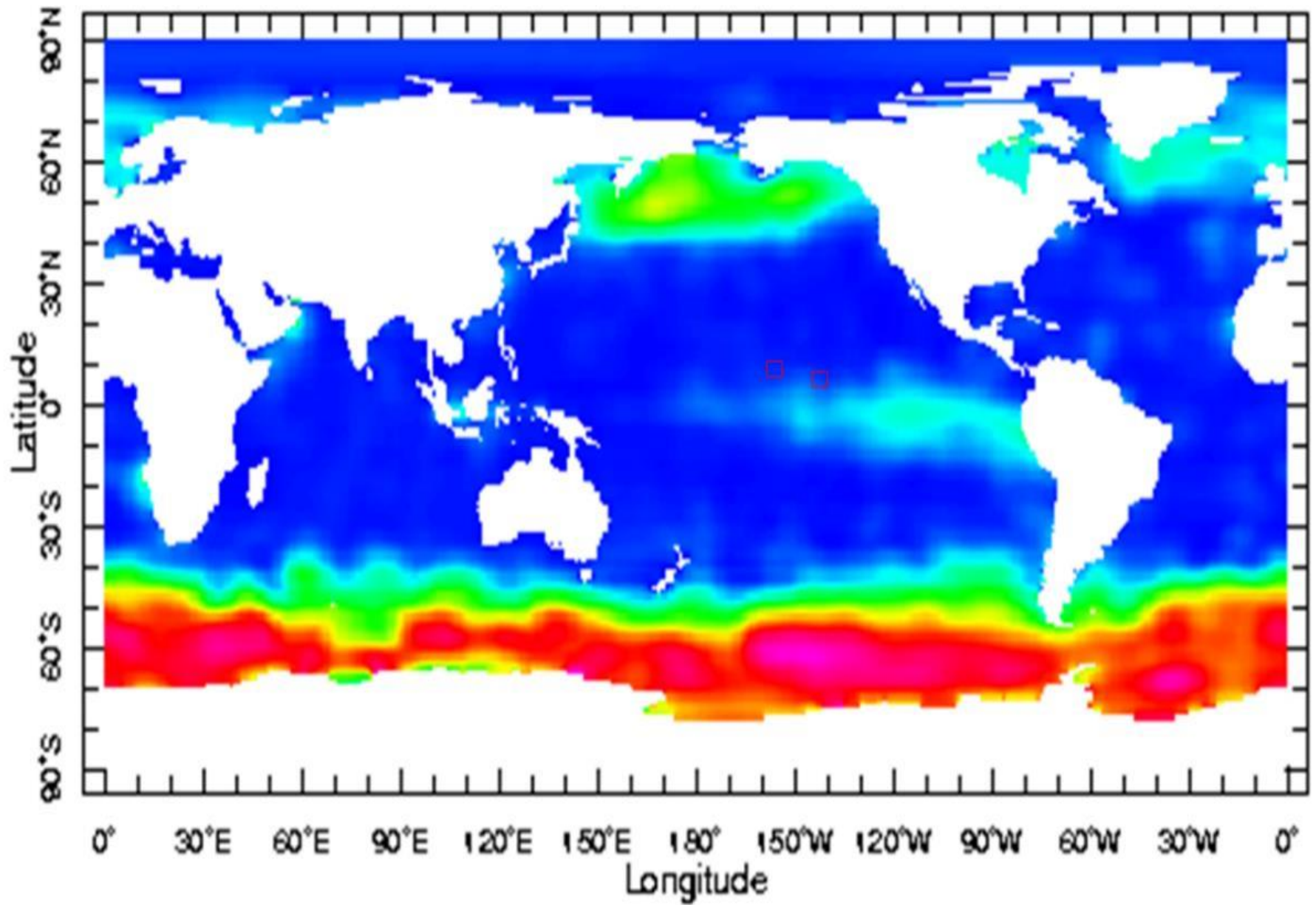


Fig. D2-5. Summer (Jul.-Sep.) mean nitrate (μM) at 50 m. depth.

Low nutrients

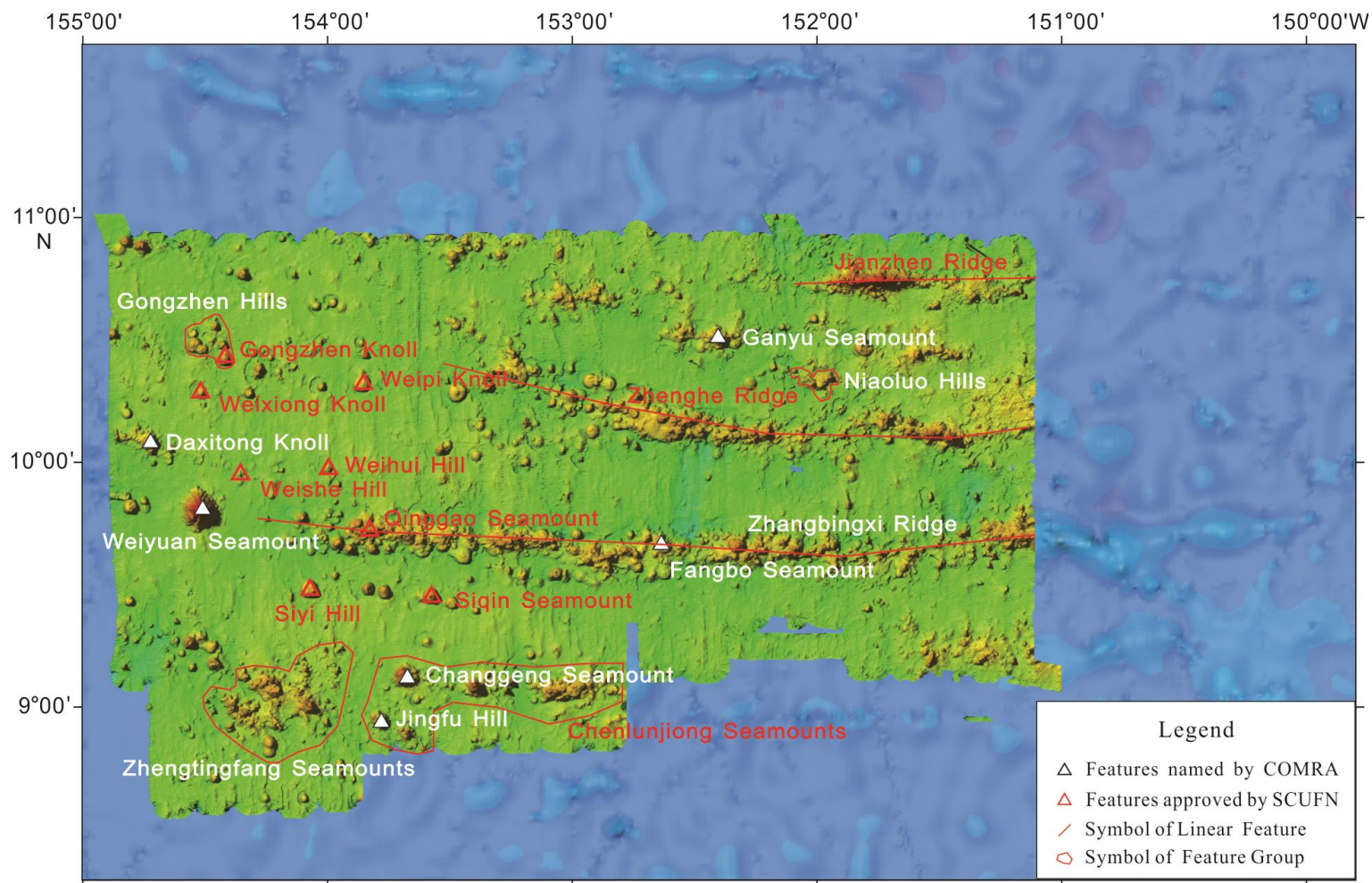
(NOAA, 1998)



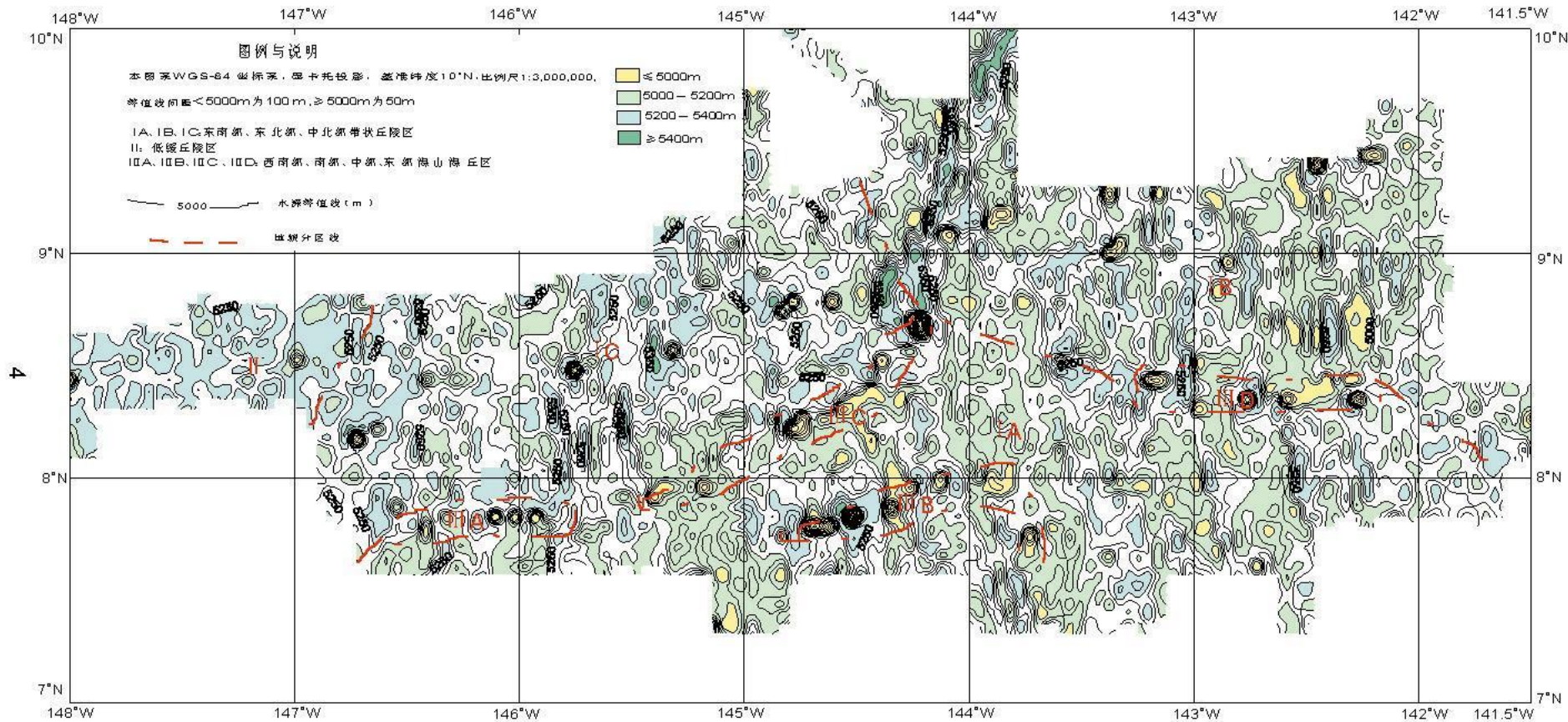
Low productivity

(NOAA, 1998)

In the western area , there are several east-west seamount chains.



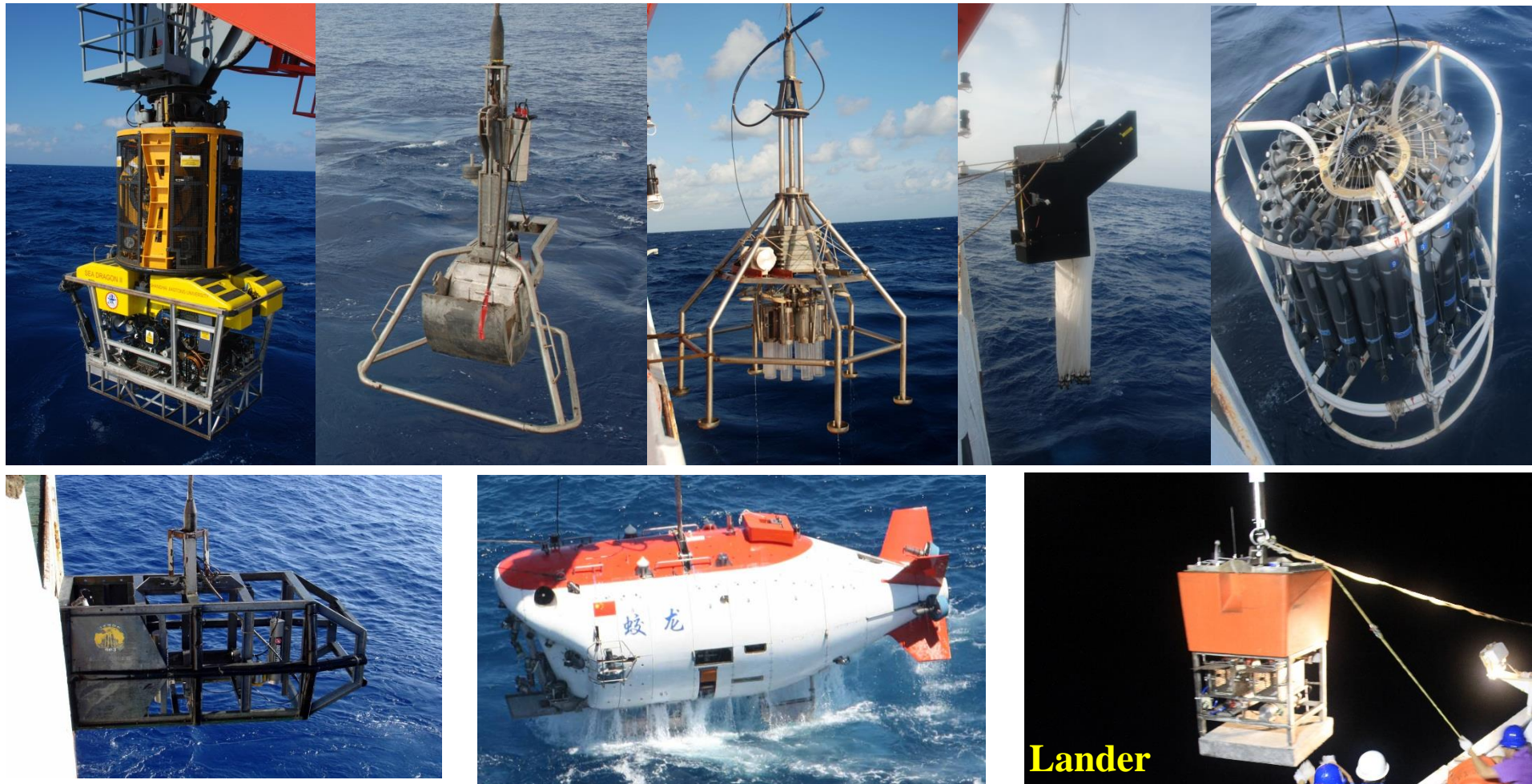
In the eastern area there are striped hills and seamounts



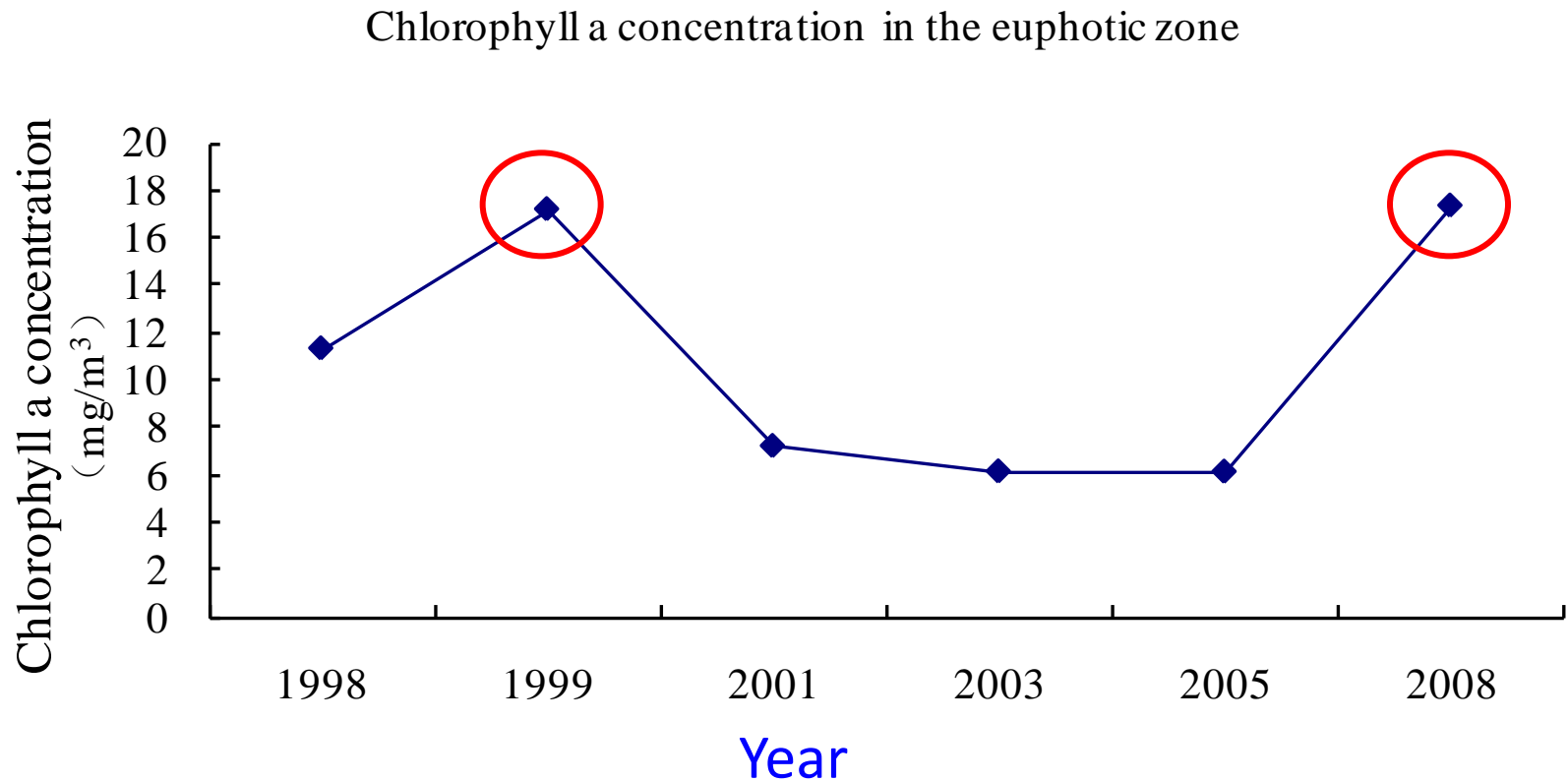
Zhang, et al. 2001.

2. Surveys and preliminary achievements

In 1997, COMRA began its NaVaBa program in nodule province of the CCFZ

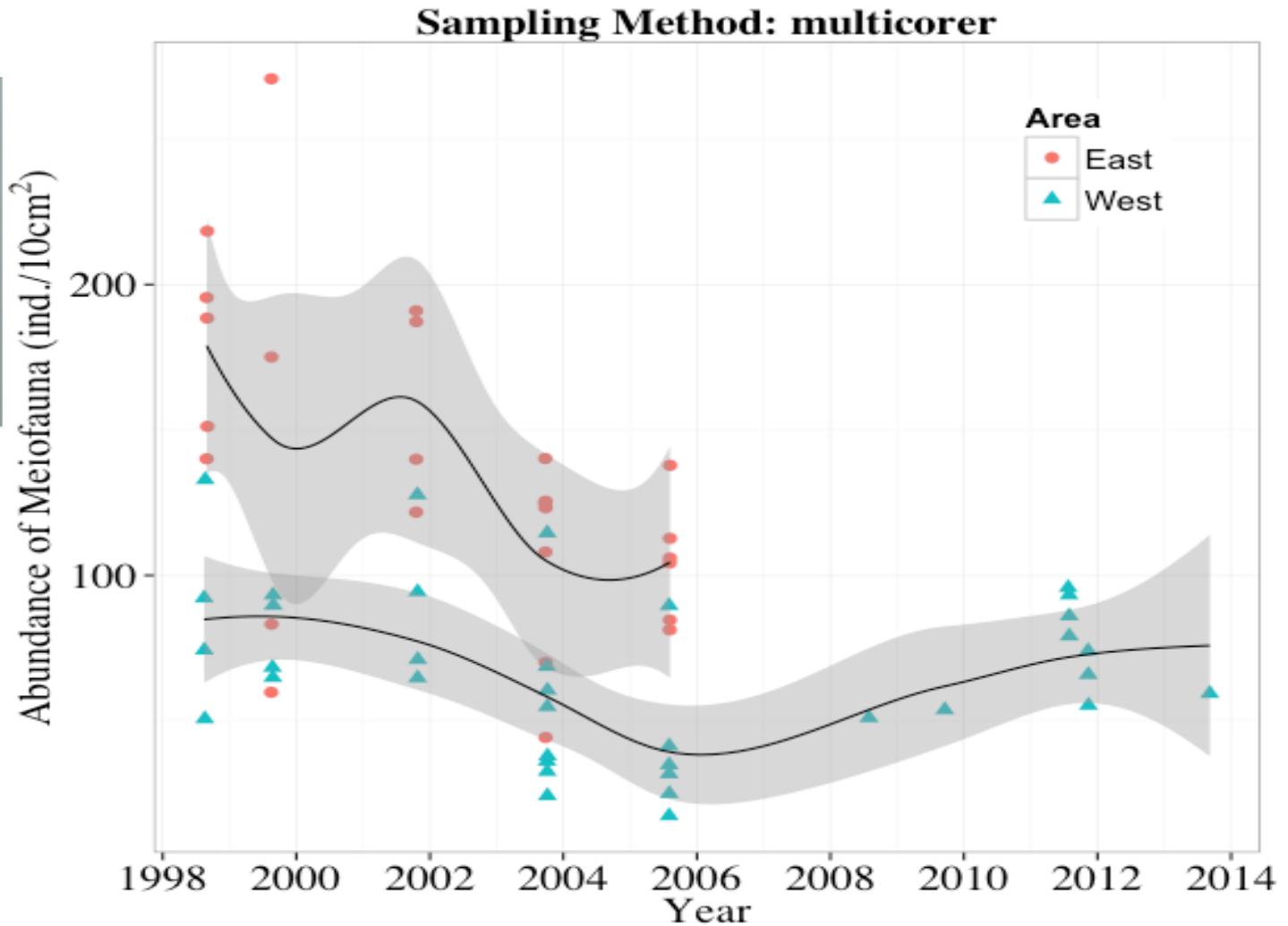


Environmental baseline has significant inter-annual variations

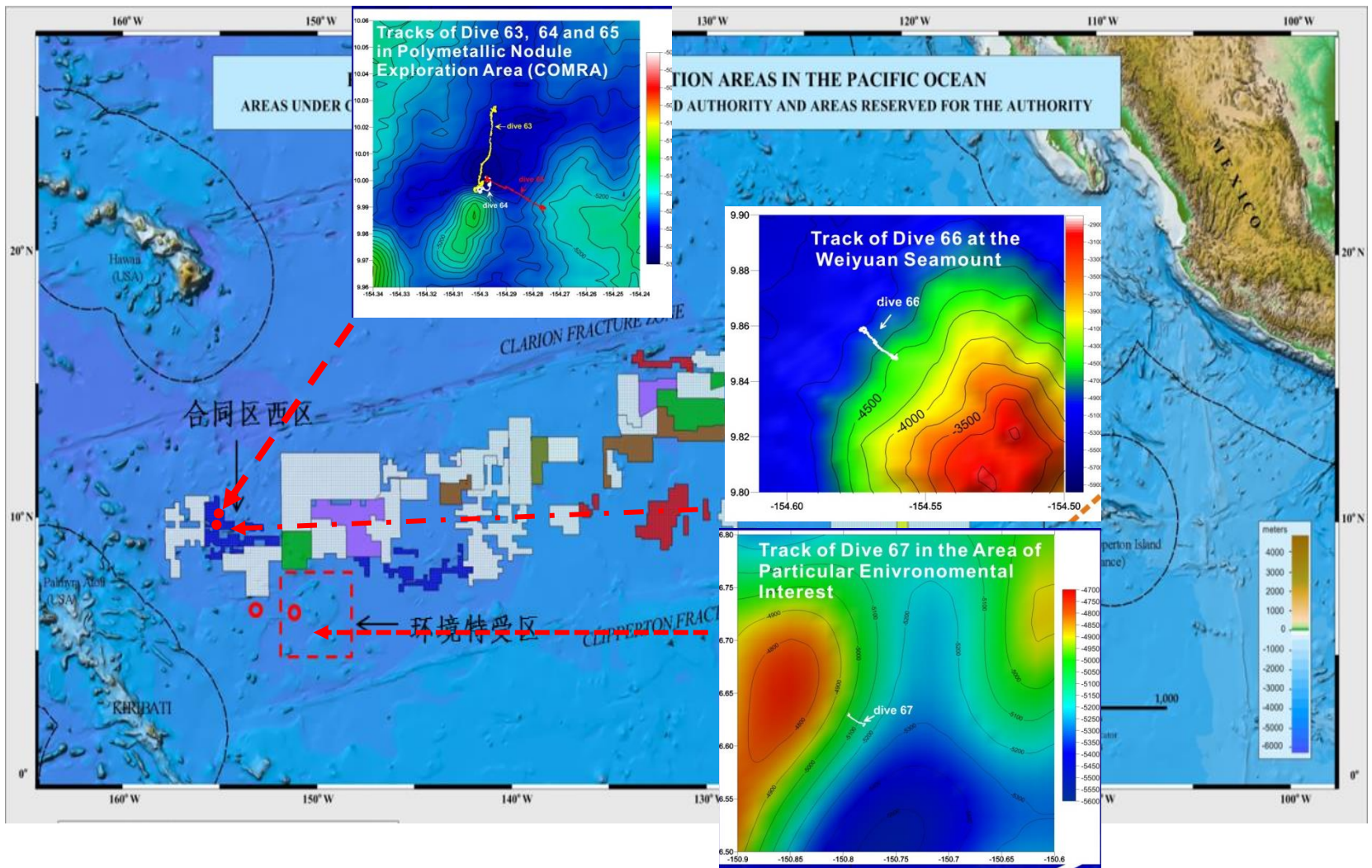


In the La Nina year Chlorophyll a concentrations increase significantly

Inter-annual variations of meiofaunal abundance

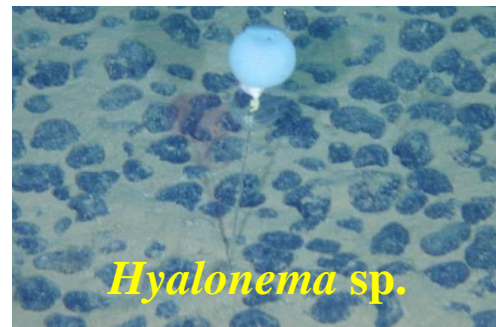


5 dives were carried out by Jiaolong manned submersible in COMRA's contract area, Weiyuan Seamount, and APEI in 2013.



JIAOLONG's Survey Areas in Clarion-Clipperton Fracture Zone of Northeast Pacific in 2013

High similarity in the species composition of megafauna between Weiyuan Seamount and the COMRA's contract area.



Weiyuan seamount

COMRA's contract area



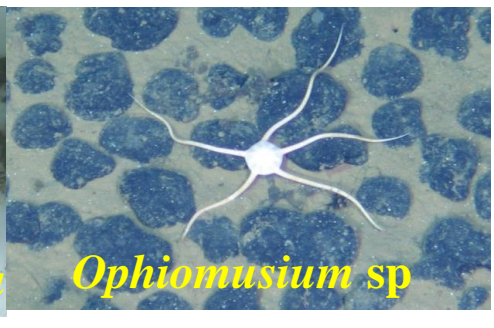
Hymenaster violaceus



Ophiomusium sp.



Hymenaster violaceus



Ophiomusium sp



Typhlonus nasus



sponge



Sicyonis biotrans



Sea anemone



Sicyonis biotrans



Sea anemone



Bathypathes sp.



Psychropotes longicauda



Bathypathes sp.

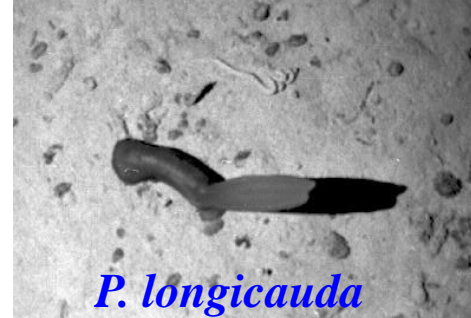
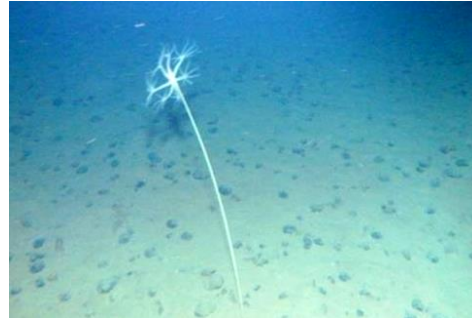


P. longicauda

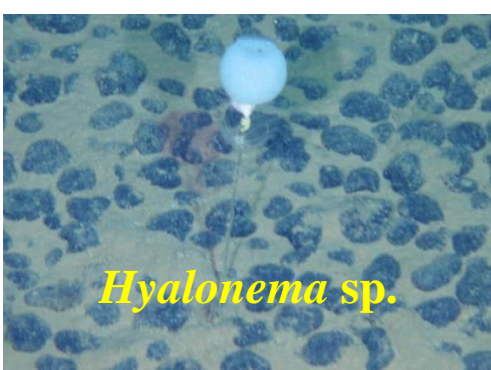
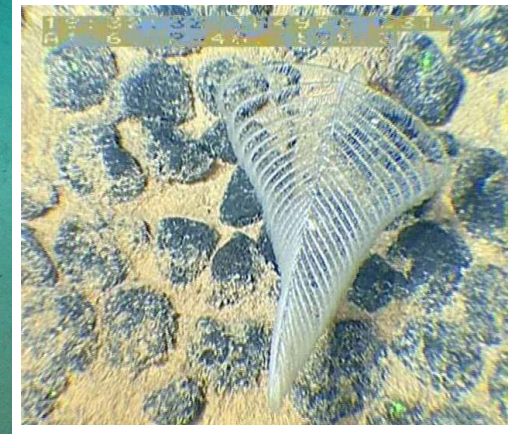
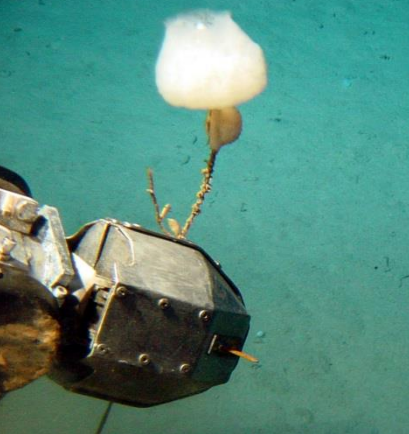
APEI and adjacent area

COMRA's contract area

High similarity in comparison of species between contract areas of COMRA and IFREMER



P. longicauda



Hyalonema sp.



Bathypathes sp.



Typhlonus nasus

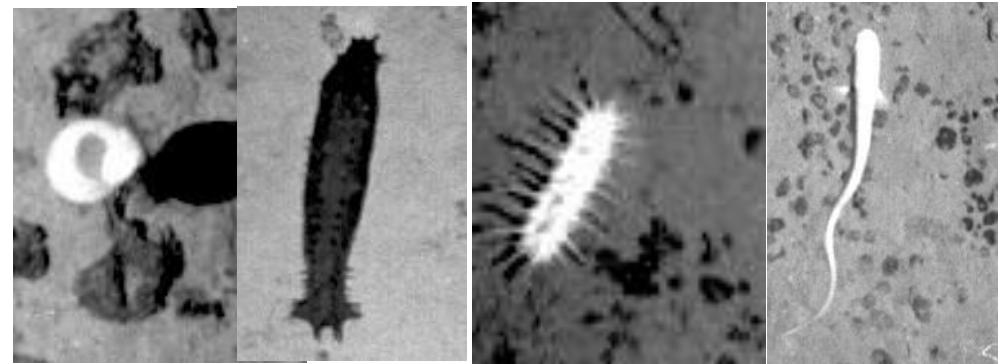
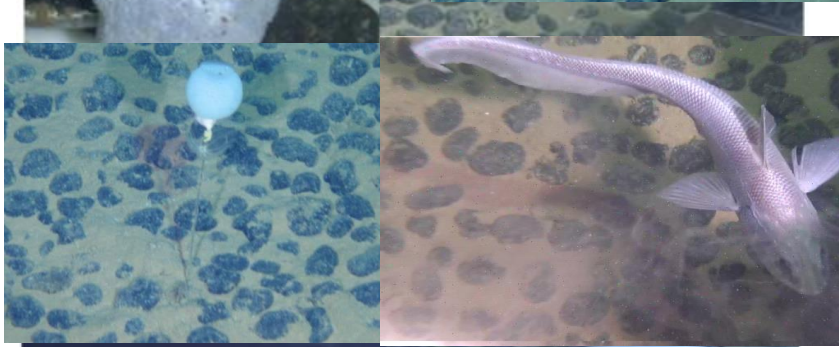
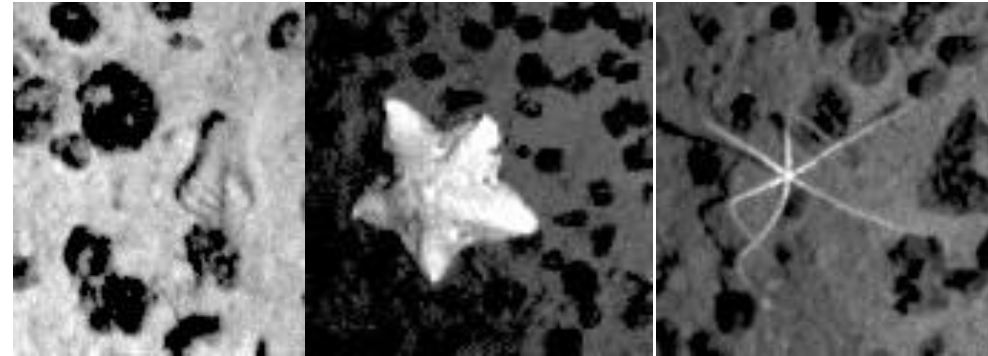
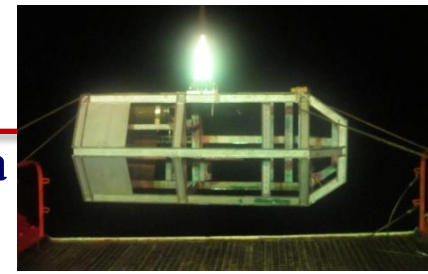


IFREMER's contract area(Ifremer 2004)

COMRA's contract area

High similarity in comparison of species between western area and eastern area

Deep-tow Video Camera
and Still Camera



Western contract area

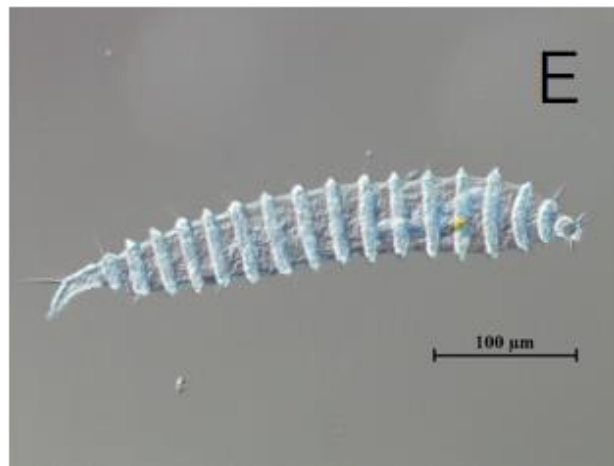
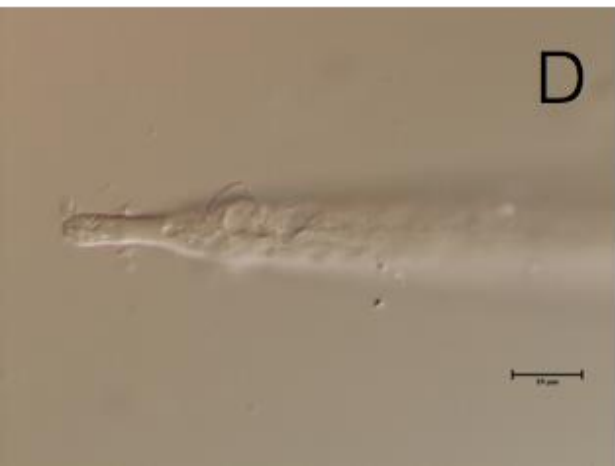
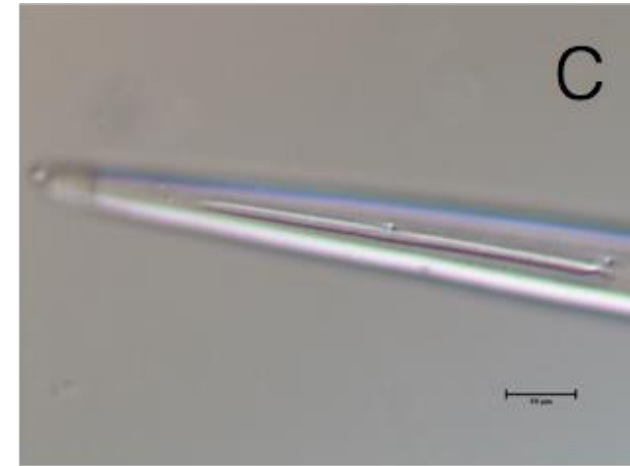
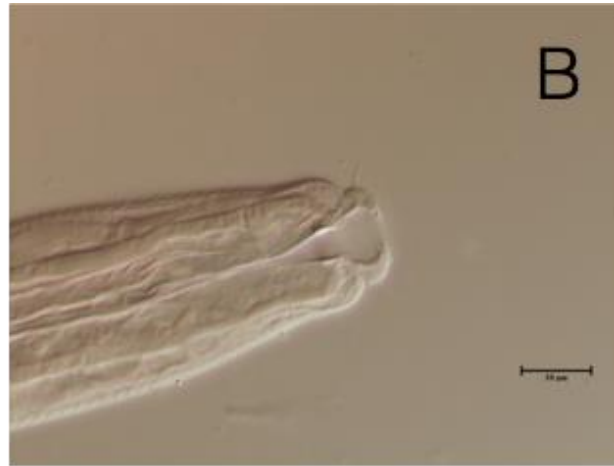
Eastern contract area

Species composition of nematodes in the COMRA's contract area

Preliminary classification identified the nematodes belonging to 44 families and 151 genera.



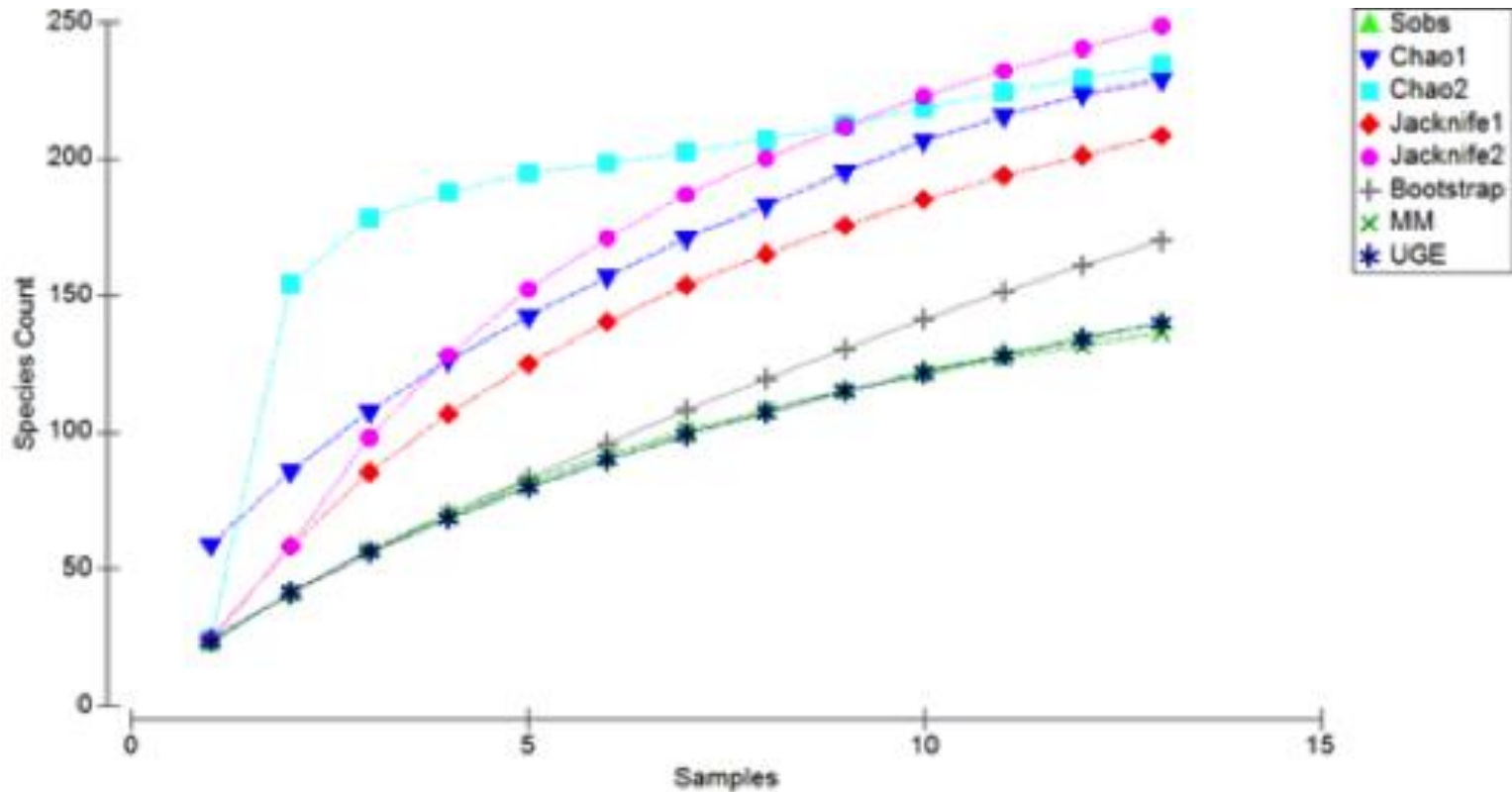
Species composition of nematodes in the COMRA's contract area



- A: *Acantholaimus*
- B: *Theristus*
- C: *Halalaimus*
- D: *Manganonema*
- E: *Desmoscolex*

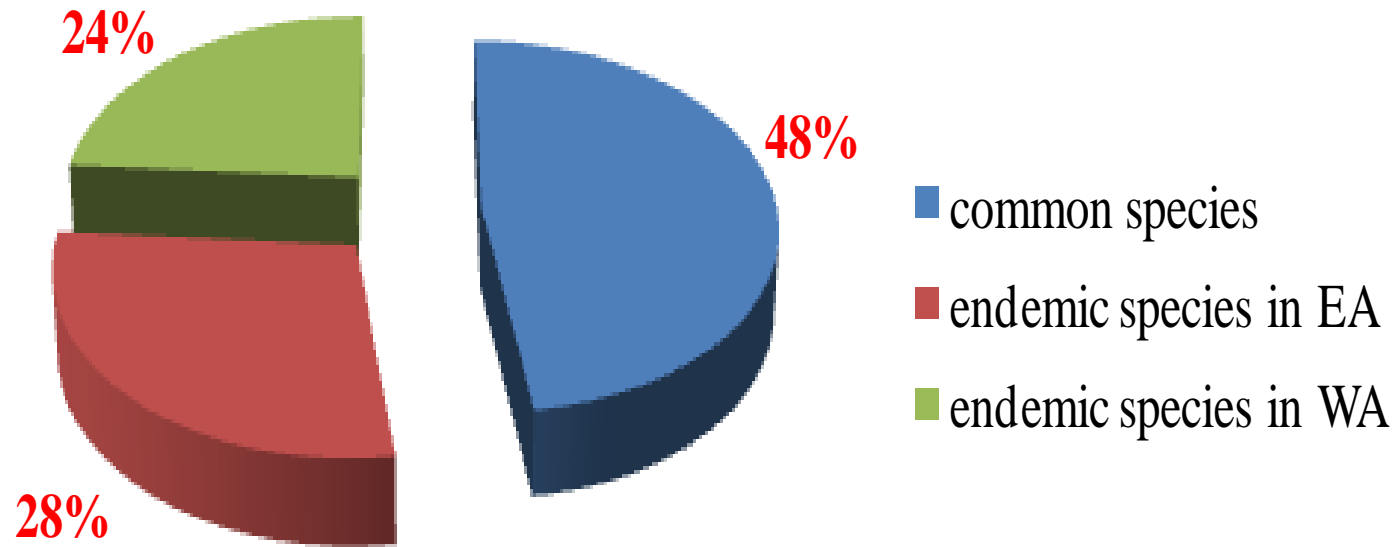
Common **genera** found in **the COMRA's contract area**

Estimation of the genus number in our area



BY using PRIMER, It is estimated that there may be 250 **genera** exist in CORMA's contact area.

Similarity in species composition of nematodes between the two areas

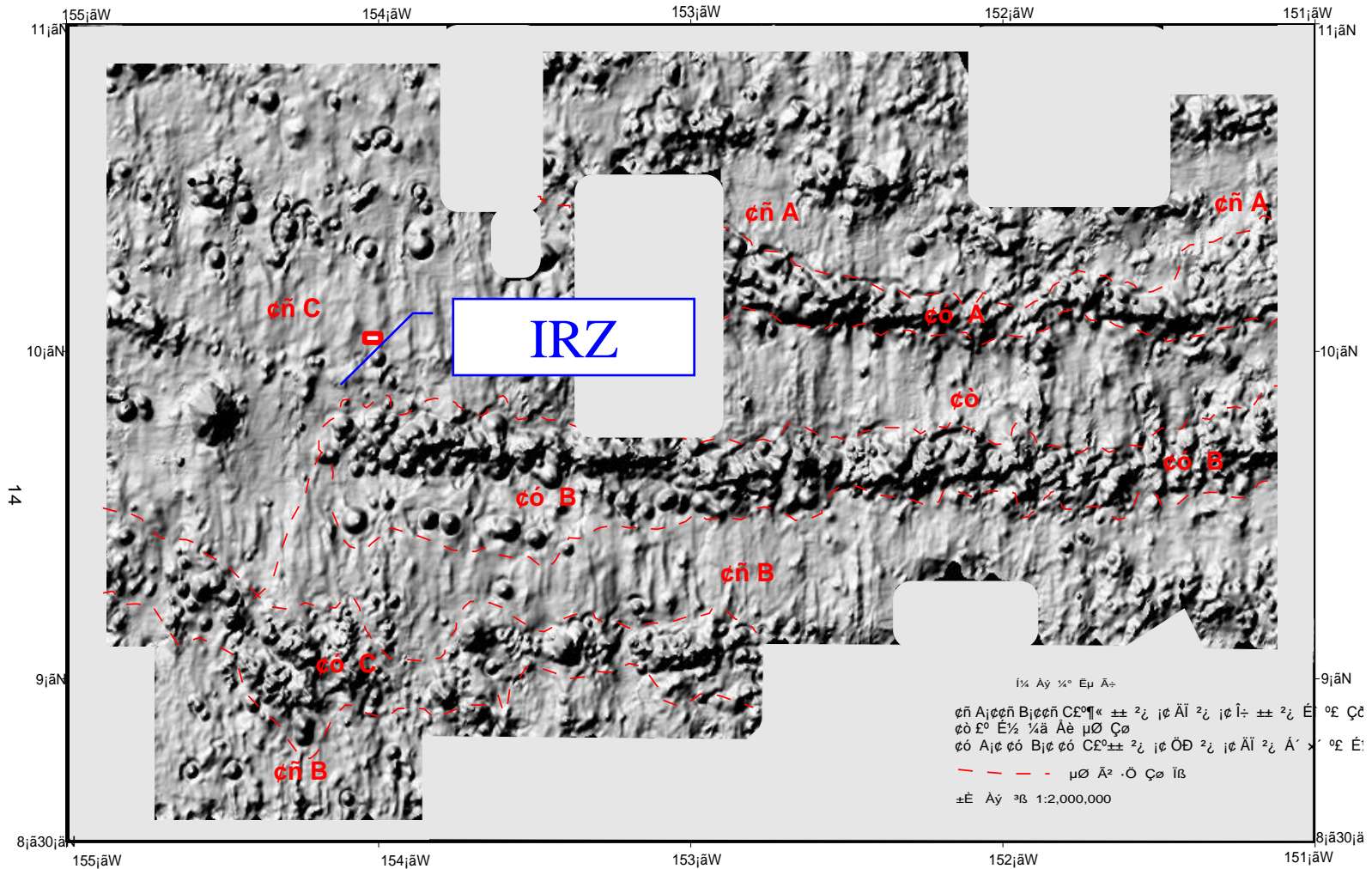


The preliminary results shows that the number of common species between the two areas accounted for 48% of the total species.

The similarity of meiofauna species between the two areas is lower than that of megafauna. However, we still do not understand the geographical distribution of meiofauna at large-scale, which needs further investigation.

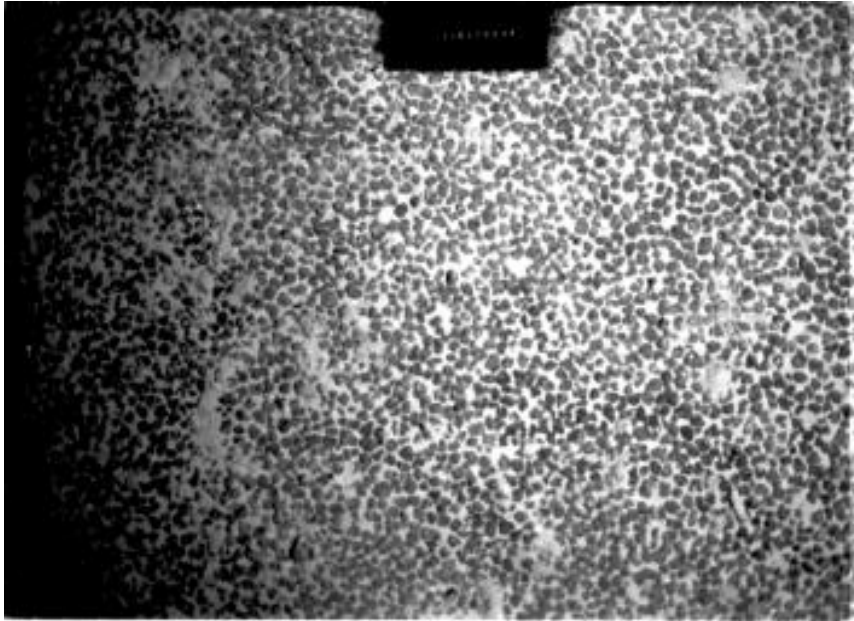
Selection of IRZ

IRZ is proposed to be selected in the west environmental survey area.

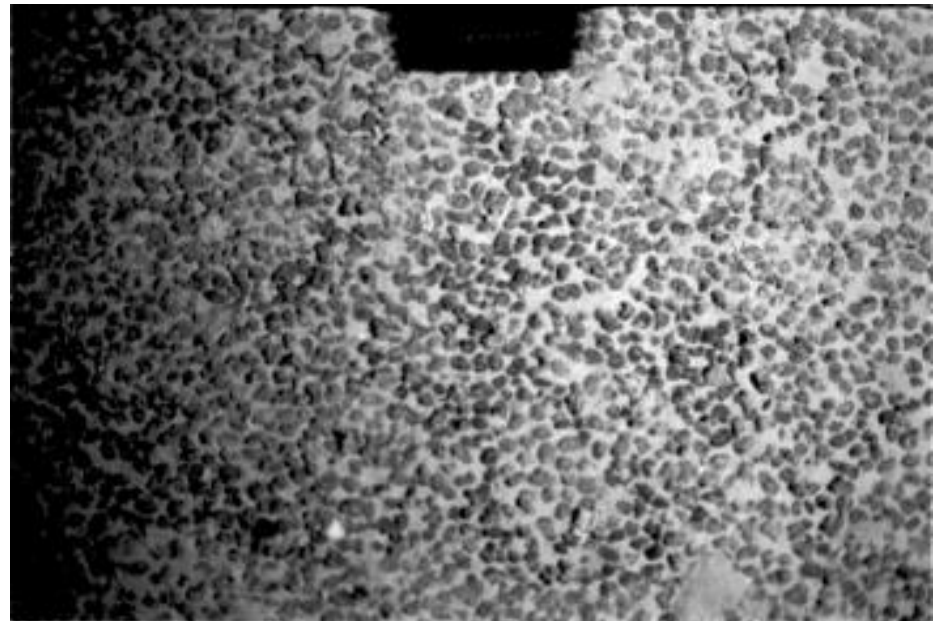


Selection of IRZ

The topography, nodule coverage and sediment types in the proposed IRZ are representative, similar to most of the west area.



Western area



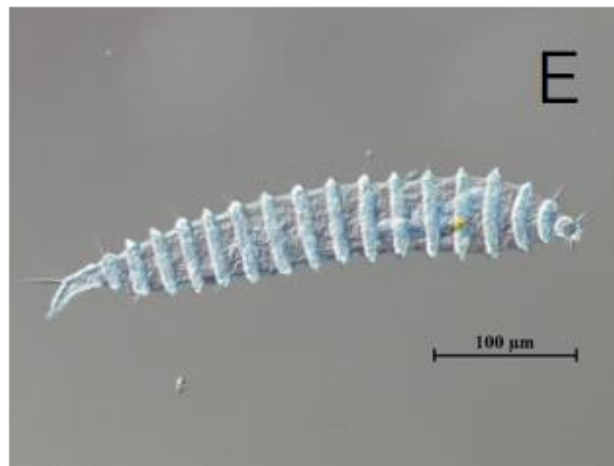
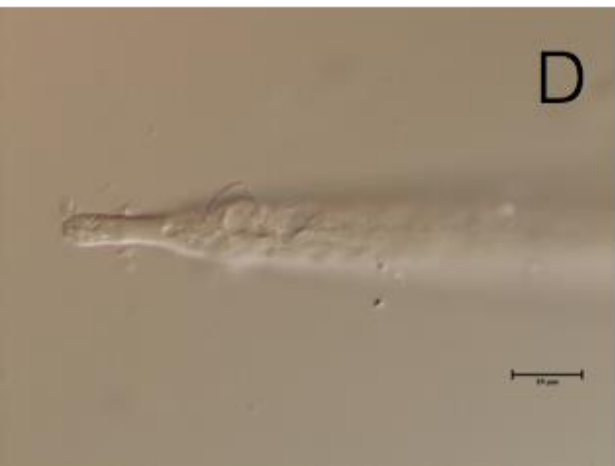
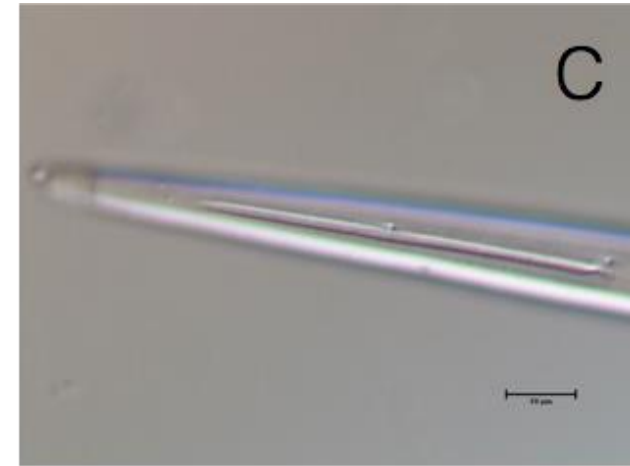
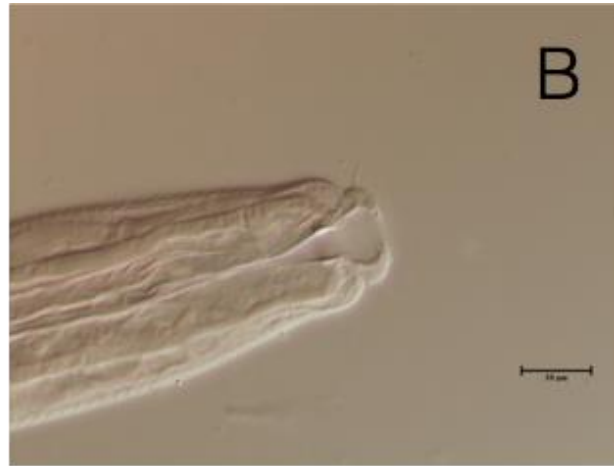
Proposed IRZ

Comparison in density and major taxa of megafauna between proposed IRZ and western area

Area	Total abundance (ind/10000m ²)	Ophiuroidea (%)	Holothuroid ea (%)	Sponge (%)
Proposed IRZ	146	68	5	10
West Subarea	148	68	6	11

The above table showed that the density and main taxa composition of the megafauna in the proposed IRZ is representative of the west subarea.


The meiofauna in proposed IRZ is also representative and the dominant species are the same as those in the west subarea.



A: *Acantholaimus*
B: *Theristus*
C: *Halalaimus*
D: *Manganonema*
E: *Desmoscolex*

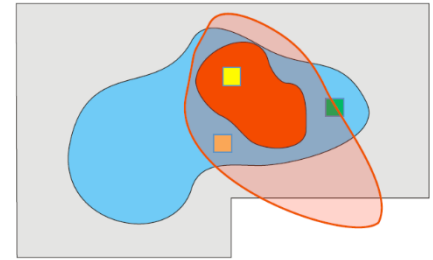
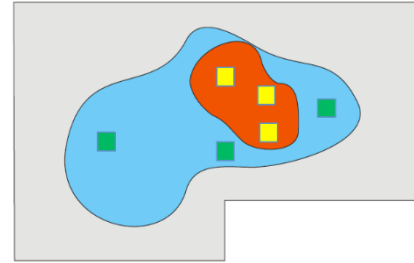
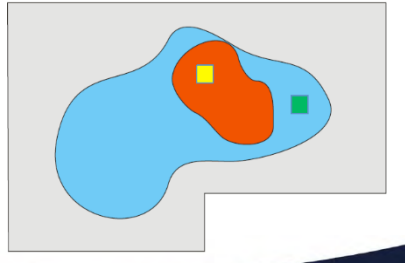
3. The challenges and suggestions in the selection of reference zones

MIDAS: Managing Impacts of Deep-sea Resource exploitation
Environmental considerations for impact and preservation reference zones for deep-sea mining
Dr Daniel Jones

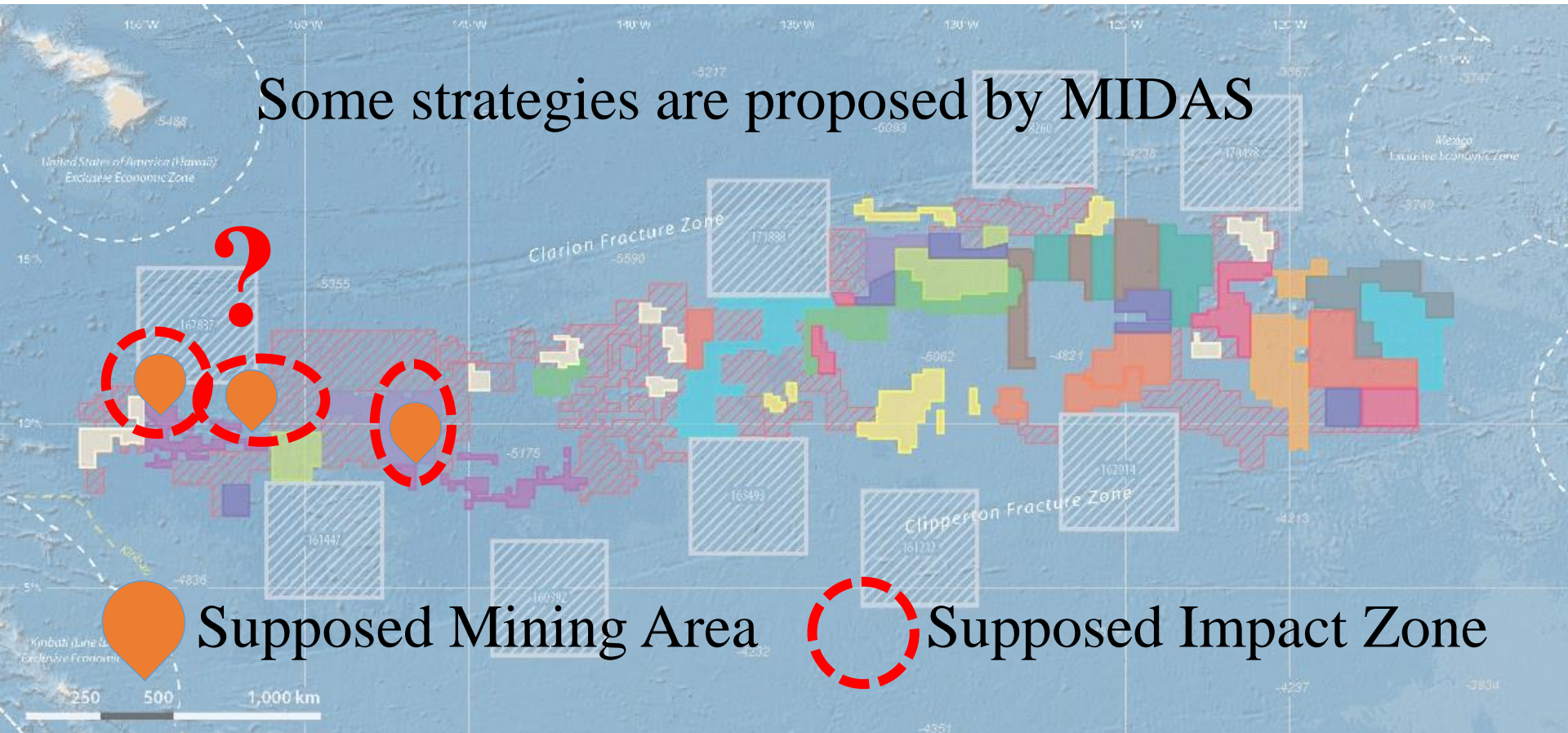


MIDAS
European Union Framework Programme 7 Project
Work Programme ENV.2013.6.2-8 Sustainable management of Europe's deep sea and sub-sea floor resources

NERC
National Oceanography Centre

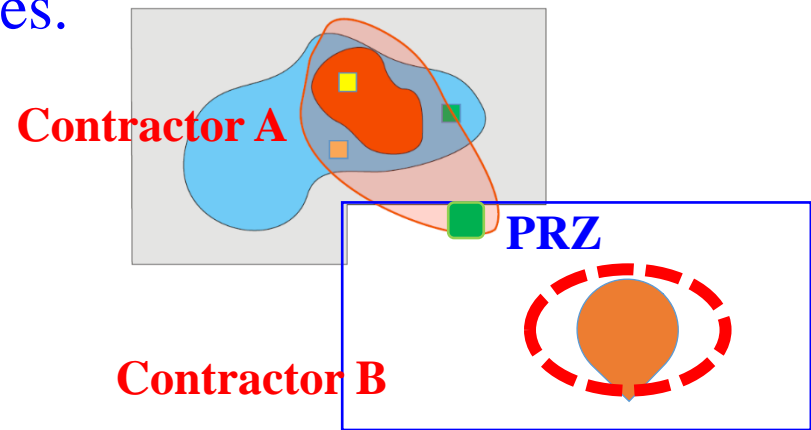


Some strategies are proposed by MIDAS



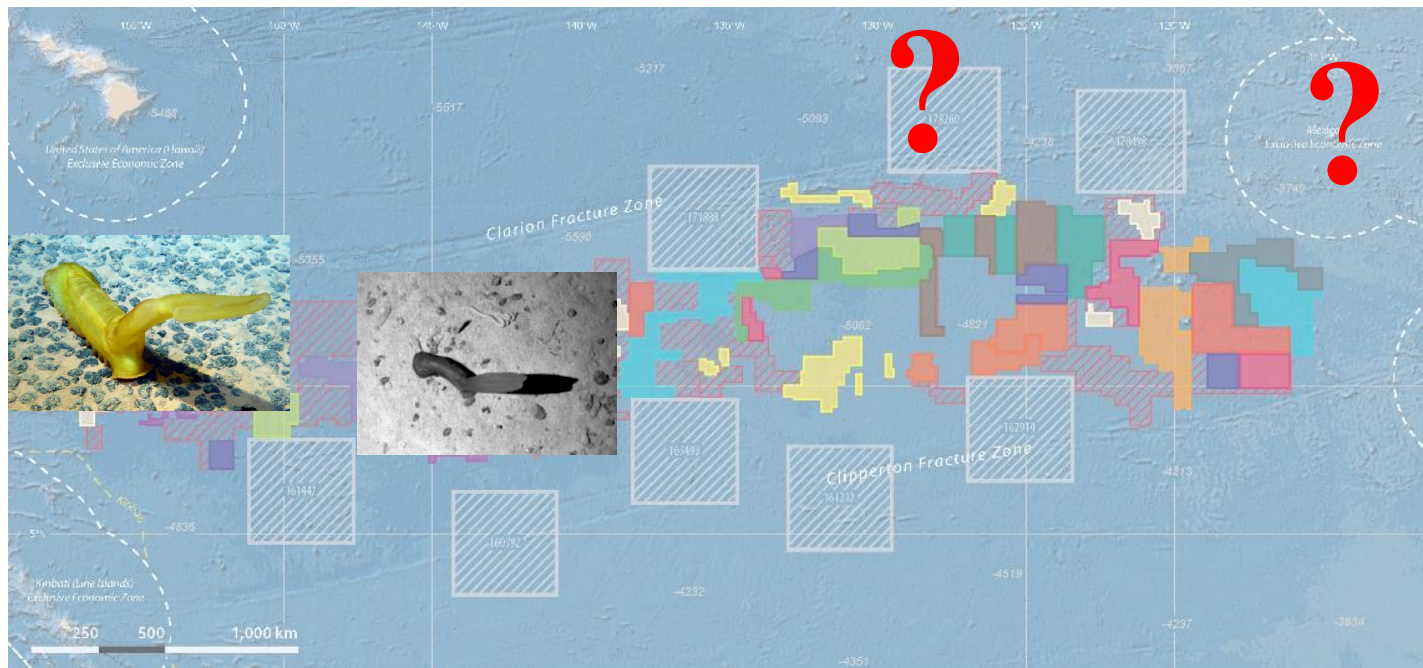
Questions

- At present, there is no mature deep seabed mining system, and related technology is still under development. The range of the plume from mining is still not clear, and there is difficulty in defining the geographical boundaries of directly and indirectly affected areas, as well as non-affected area.
- Our knowledge of the geographical distribution of benthos is still limited. All of these will affect the selection of the reference zones.
- Some contractor's areas are next to each other, and there is potential influence during mining. Certain contractor's PRZ may be affected by another contractor's mining activities.



Suggestions

- ISA should systematically analyze the environmental data submitted by the contractors, in particular plot large-scale geographical distribution maps of the major benthic species in the CCFZ, and accurately divide the bio-geographical subregions, based on which the **contractors cooperate to build the preservation reference zones.**



Suggestions

- Selection of environmental reference zones covers many areas, such as law, environment, resources and mining. Since lack of practical experience, at current stage it is advisable to develop guidelines for the design of reference zones in PMN areas. The guidelines for the design of the reference zones for contract area of polymetallic sulphides and cobalt-rich crusts should be based on the guidelines for selection of reference zones for PMN, and be promoted steadily.

4. CONCLUSION

- COMRA will continue to participate and contribute in the selection of reference zones and share the experiences of environmental data and PRZ and IRZ. COMRA is willing to collaborate with neighbor contractors in selection of PRZ under the Authority's coordination.
- Considering the regional environmental conservation as a whole, it is recommended that a systematic environmental management plan for CC zone may be established.
- During designing principle and framework, the contractor's comments and suggestions, especially from contractors, should be considered. The reference zones should be adjusted based on scientific evidences.

Thank you for your attention !

