JPI OCEANS

MIDAS MANAGING IMPACTS OF DEEP SEA RESOURCE EXPLOITATION

Polymetallic nodules are required to preserve abyssal epifauna

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SENCKENBERG world of biodiversity

imar Centro da Universidade dos Açores

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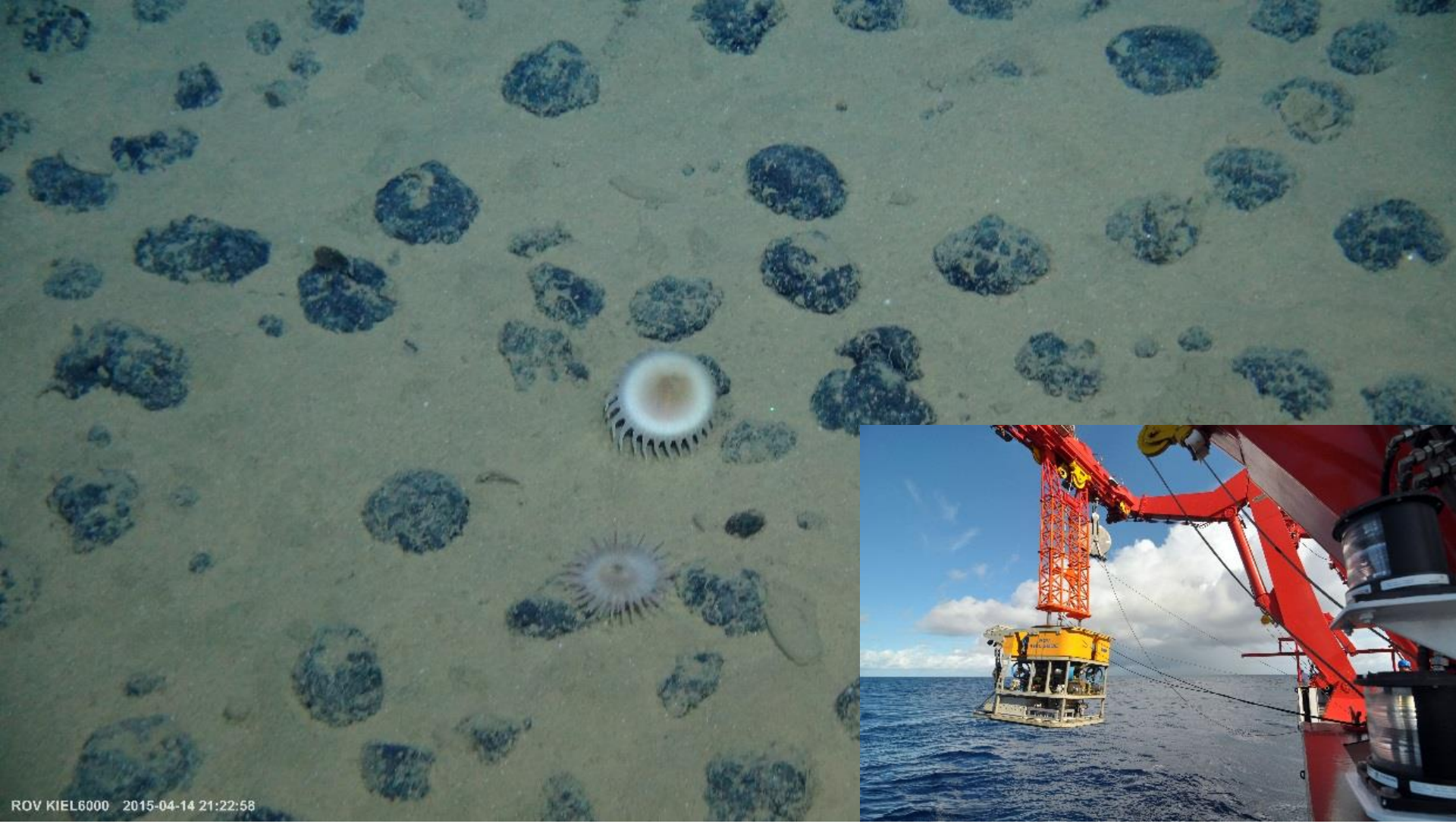
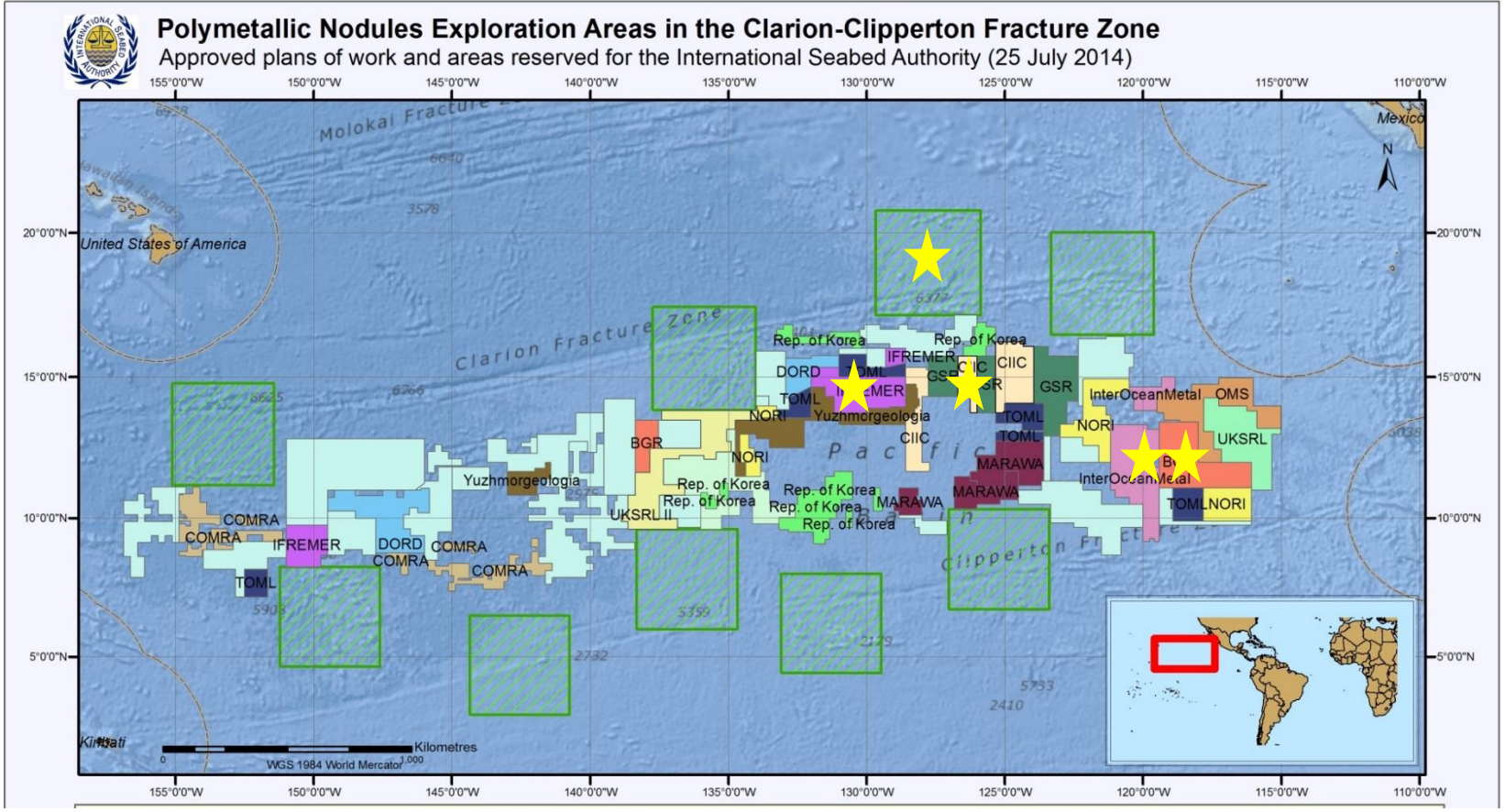
Vanreusel, Hilario, Ribeiro, Menot and Arbizu Martinez (2016 in Scientific reports)

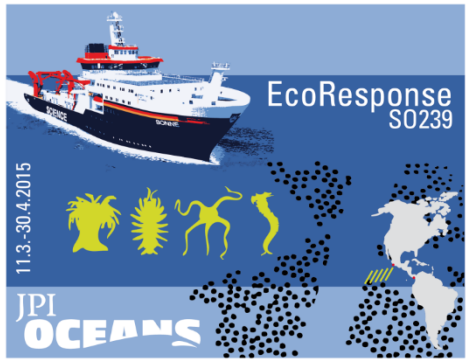


Nodules are targeted ➔ Habitat/Substrate for (epi)fauna ?

Videotransects with ROV at 1 m above seafloor across CCZ
➔ allowed to identify smaller epifauna

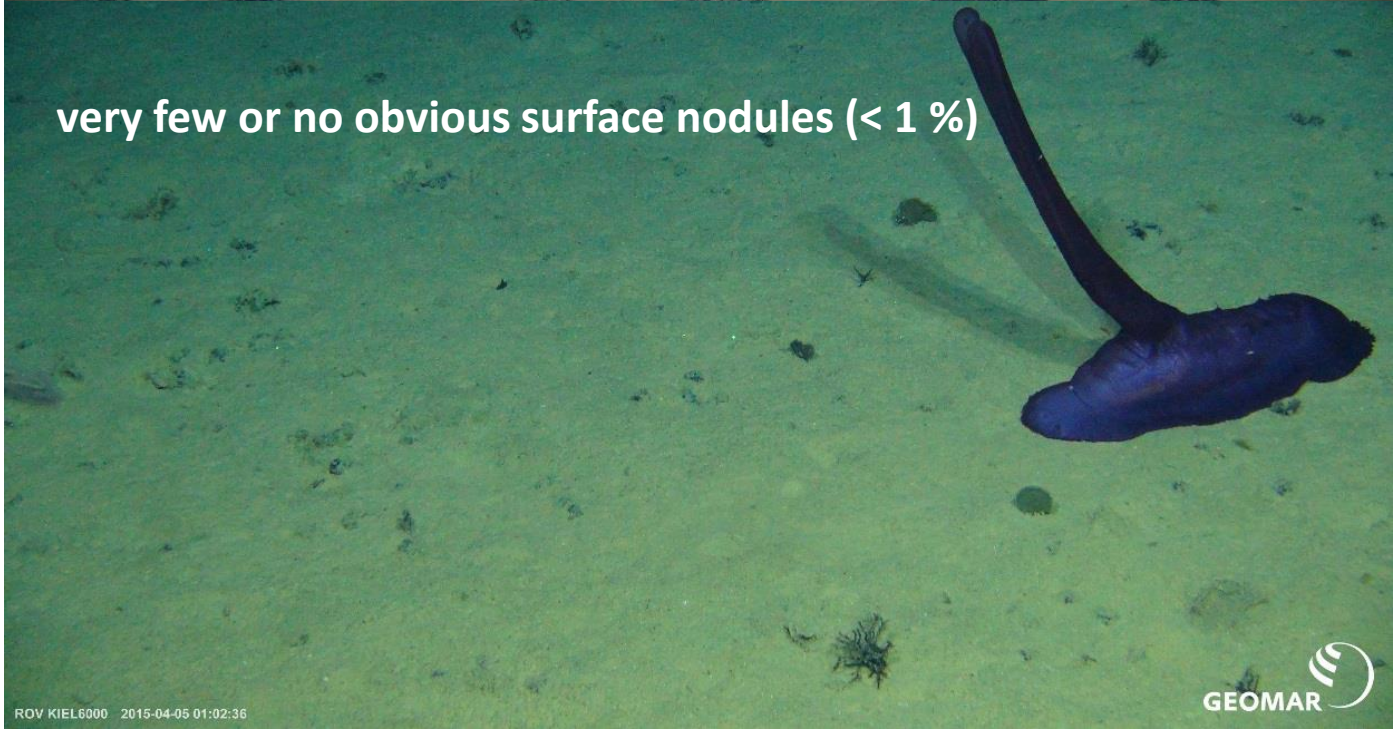


1. To identify the importance of nodules for local biodiversity
2. To validate the impact of nodule removal
3. To estimate the recovery at decadal time-scales
4. To gather preliminary data on one of the APEIs for which virtually nothing is known



★ Study areas of SO 239


dense nodule concentrations (> 15% cover)
ROV KIEL6000 2015-04-14 21:22:58
GEOMAR


very few or no obvious surface nodules (< 1 %)
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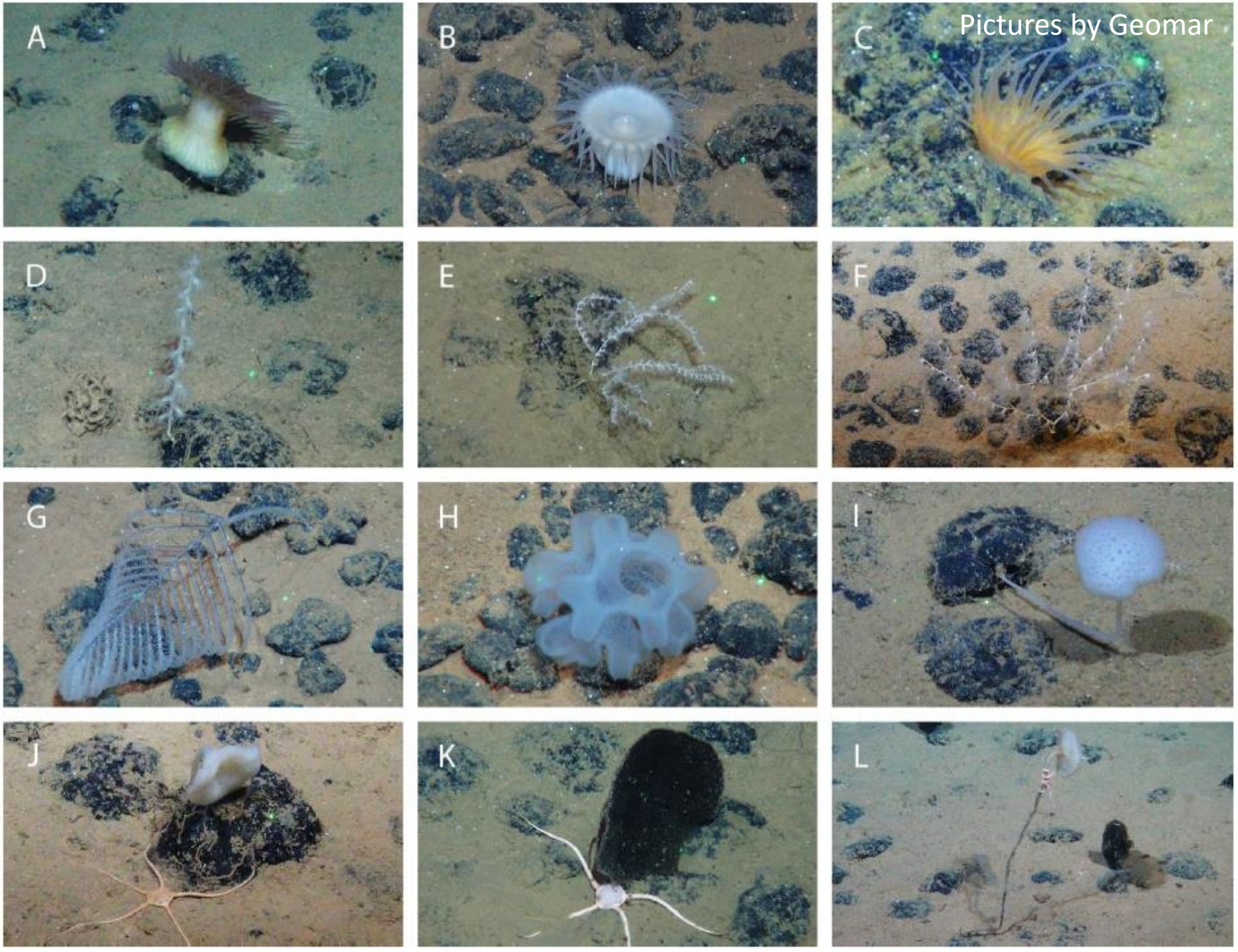
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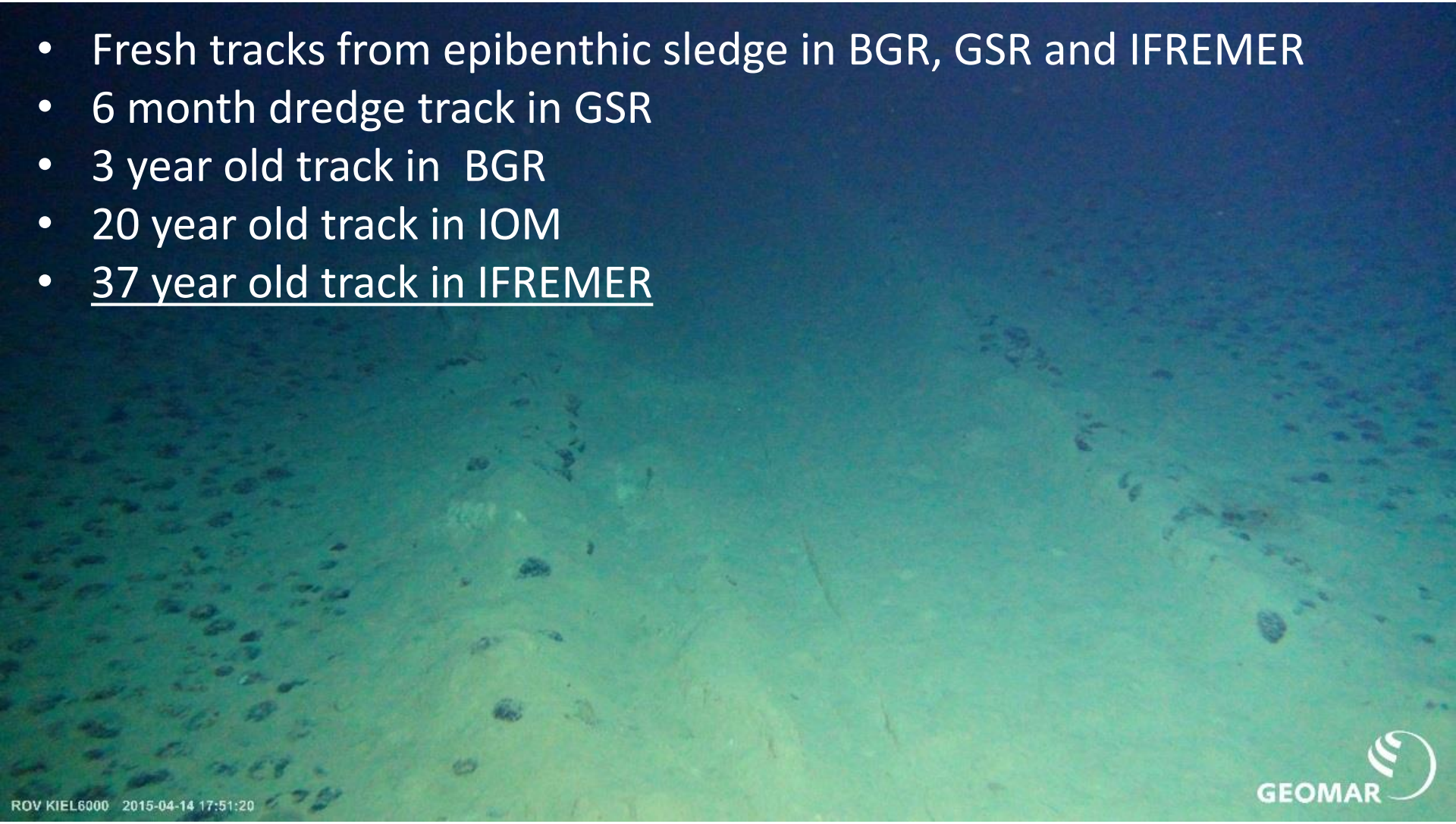
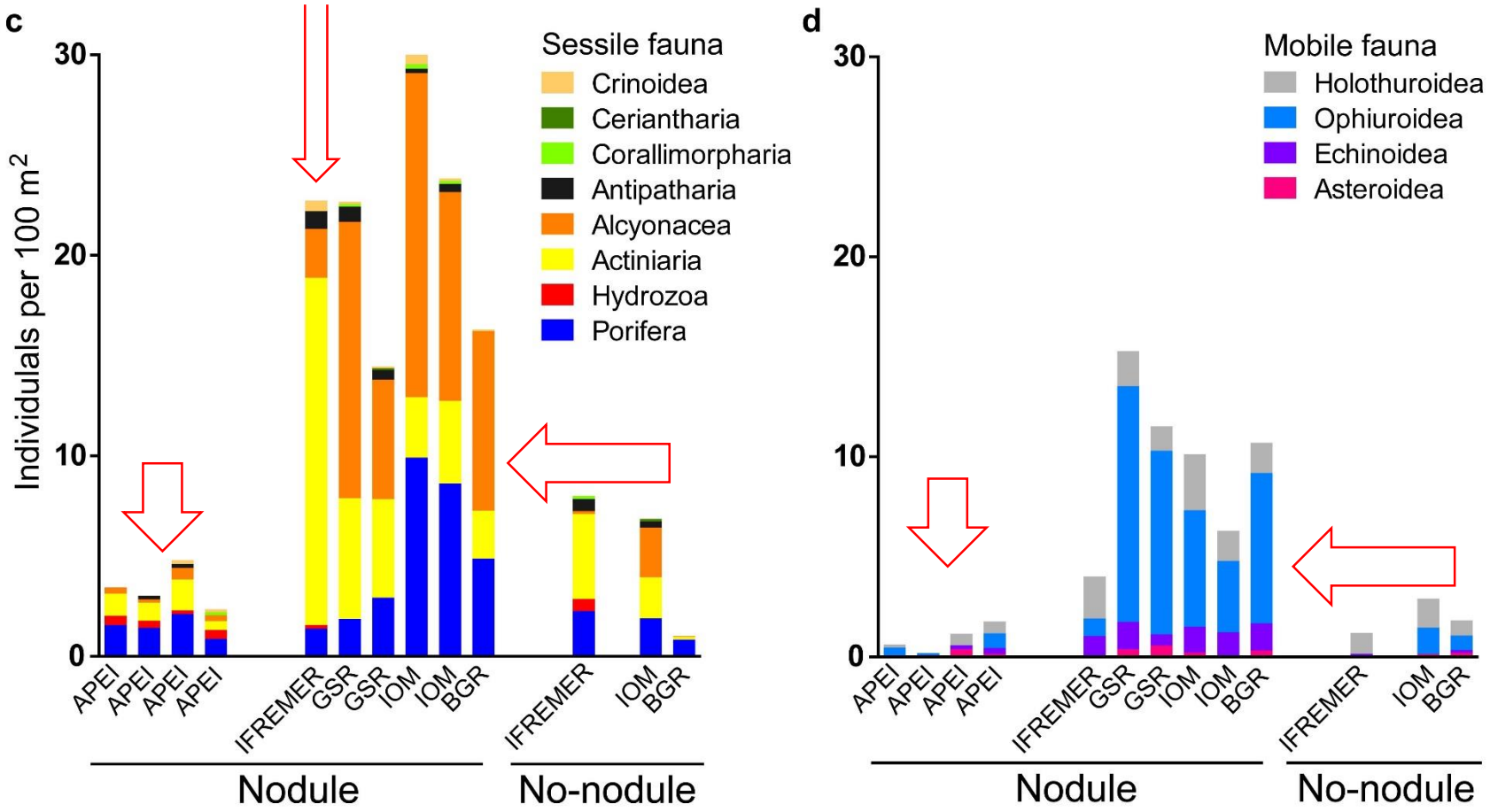
In each study area ➔ Disturbance and recovery experiments:



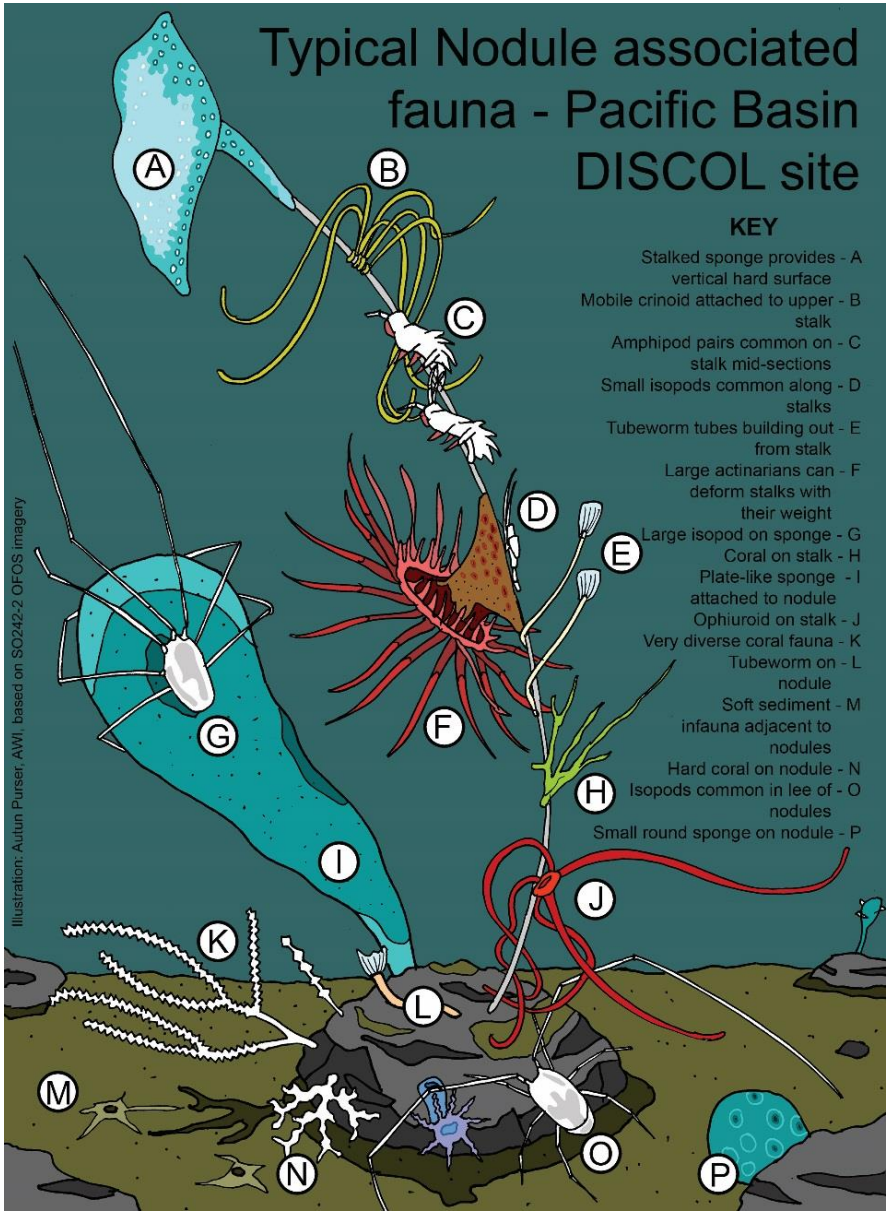
- Fresh tracks from epibenthic sledge in BGR, GSR and IFREMER
- 6 month dredge track in GSR
- 3 year old track in BGR
- 20 year old track in IOM
- 37 year old track in IFREMER

Reduced densities in experimental tracks

Nodule rich areas vs nodule poor areas

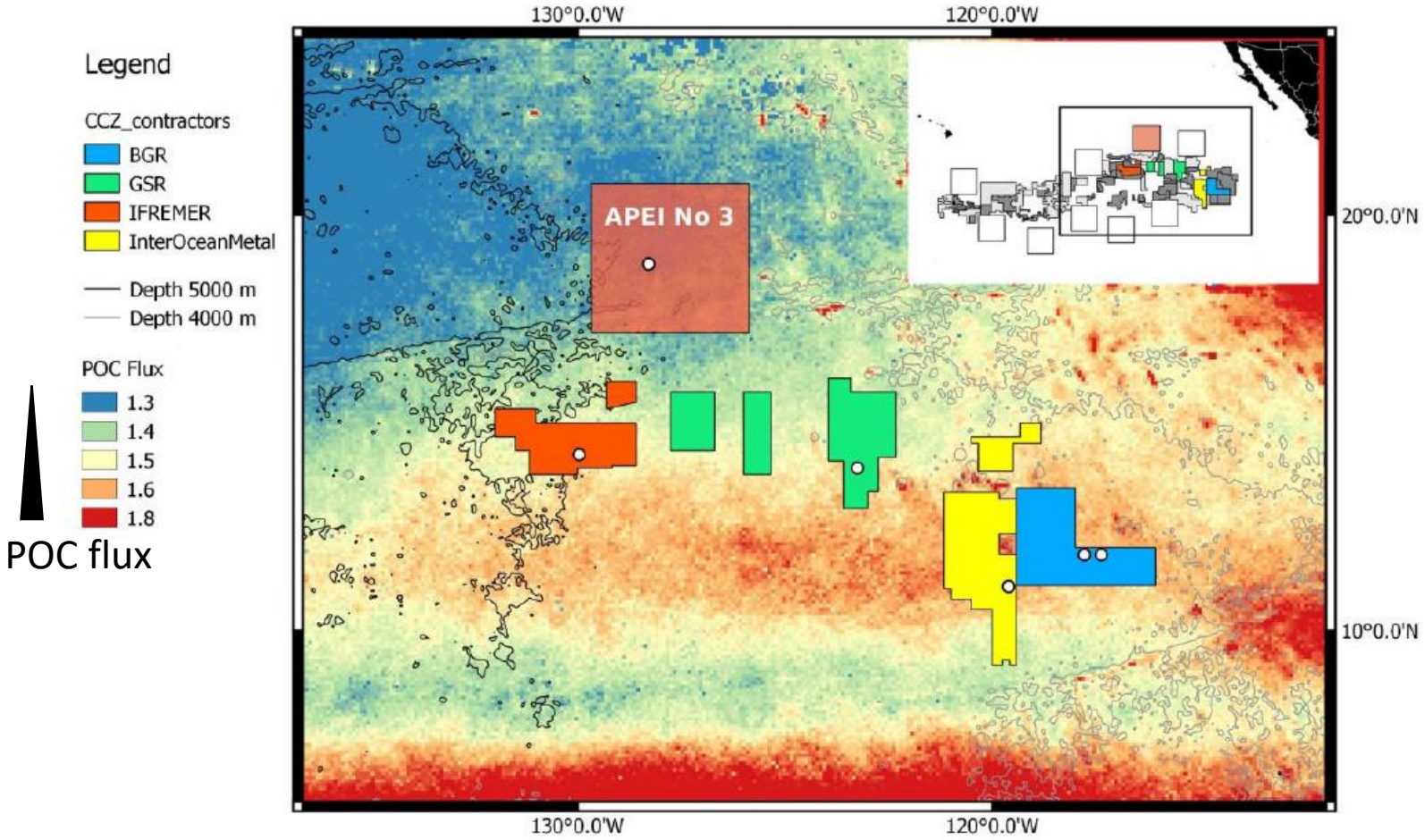


Nodule-attached sessile organisms typically associated with mobile fauna



Purser et al., AWI, unpublished results

APEI 3 is below the most oligotrophic surface waters of this oceanic region, at the northern edge of the Northern equatorial surface current, which resulted in low numbers compared to the more southern areas in the CCZ, where spring blooms occur more prominently and higher POC fluxes are expected especially in the eastern part of the surveyed area.



Study sites for benthic surveys

Background colors refer to POC flux (Lutz et al 2007)

Conclusions

- Polymetallic nodules sustain diverse benthic communities
- Removal of nodules but also the disturbance of the sediments creates at least a decadal impact on the epibenthic biodiversity
- Epifauna is depending on nodule concentrations and surface productivity

Recommendations

- High densities of surface nodules in the preservation reference zones (PRZs) is an ultimate requirement for the preservation of abyssal biodiversity within the CCZ.

- Further research is required in each of the APEIs to understand how representative they are of, and connected with, the central CCZ abyssal ecosystems