MiningImpact

Ecological Aspects of Deep-Sea Mining

Partners **25 institutes from 11 European countries**

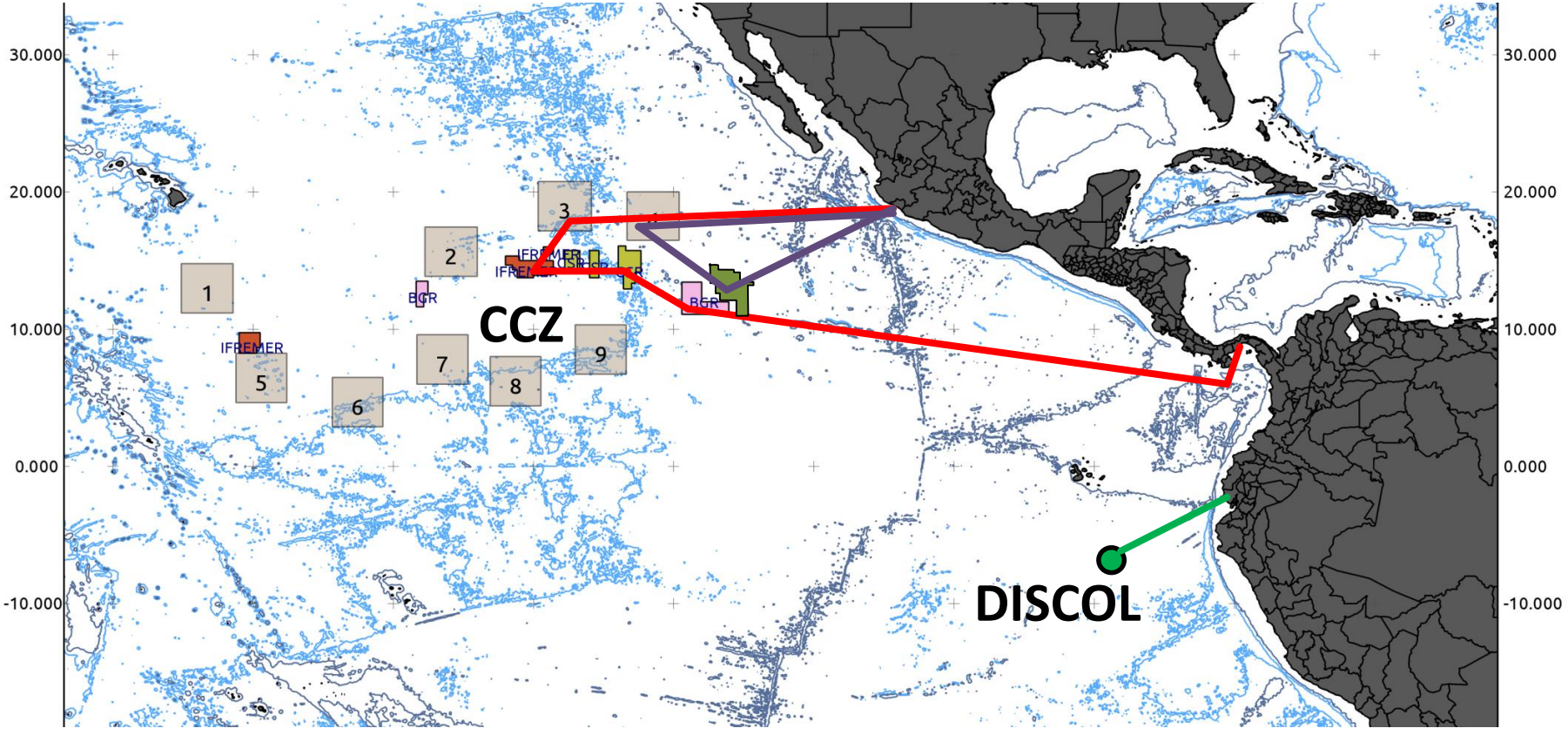
Life time 1 January 2015 – 31 December 2017

Coordinator: Matthias Haeckel, GEOMAR

UGent, RBINS, IFREMER, GEOMAR, MPI, SGN, JUB, UBremen, AWI, BGR, UBielefed, Conisma, IRIS, NTNU, UiB, ULodz, USzczecin, UAveiro, IMAR, Geoecomar, Ugothenburg, NIOZ, NOCS/NERC, NHM, USOU

Assessing the long-term impact of nodule mining in the deep sea

- Status of disturbed ecosystems in the DISCOL Experimental Area (**SO242**)
- Implications for future nodule mining in the CCZ (**SO239** + **JC120**)



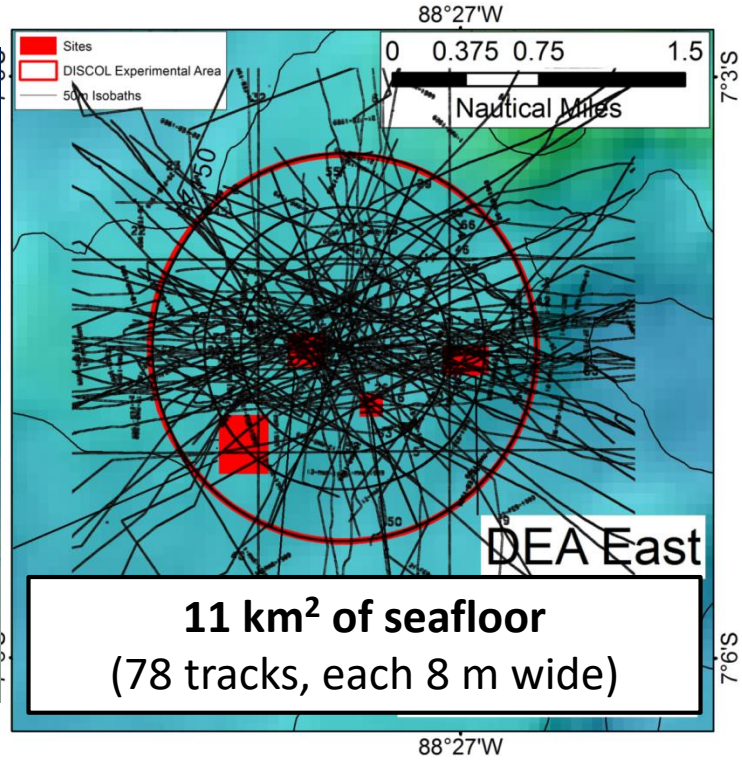
Conclusions & Recommendations

- **ISBA documents** on methods & parameters for baseline studies and monitoring **need to be revised** to current state-of-the-art science in a transparent and open way
- Need for **standardization** of monitoring technology is necessary
- Need to develop a concept for **spatial management** and restoration to **minimize large-scale impacts**
- **Knowledge exchange between industry and science** is necessary to ensure the best methodologies are ready for industry use (e.g. monitoring technologies)
- **Defining "harmful" impacts** on the environment and rules for avoiding or mitigating them (e.g. following the UN sustainability development goals or IPBES documents)
- Assessment of environmental + societal risks needs to be fed into **improved legislation**
- **Transparent, independent scientific assessment needs to be secured**

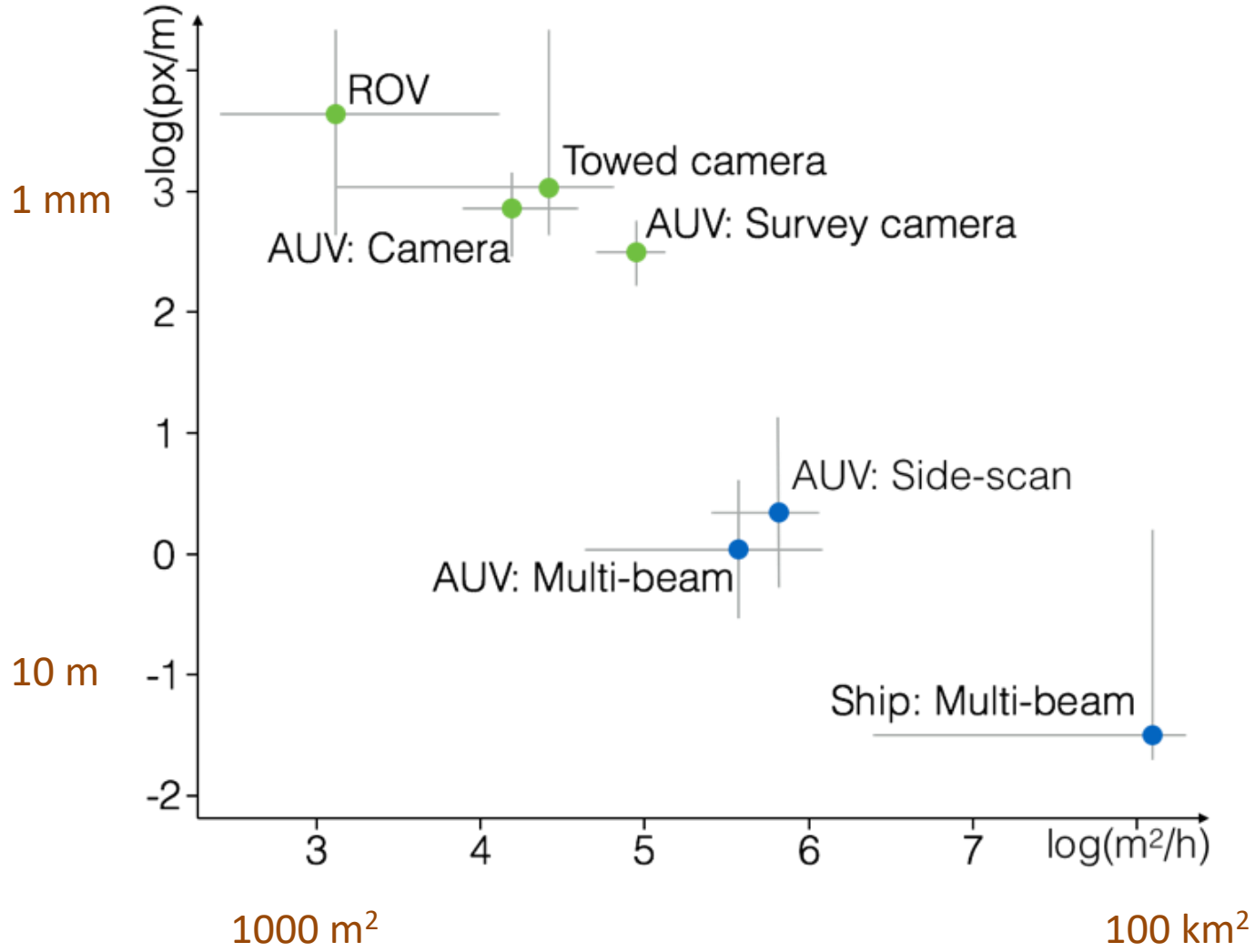
DISCOL experiment

Seafloor with nodules was ploughed in 1989

Scientific impact studies were carried out after 0, 0.5, 3, 7, and 26 years

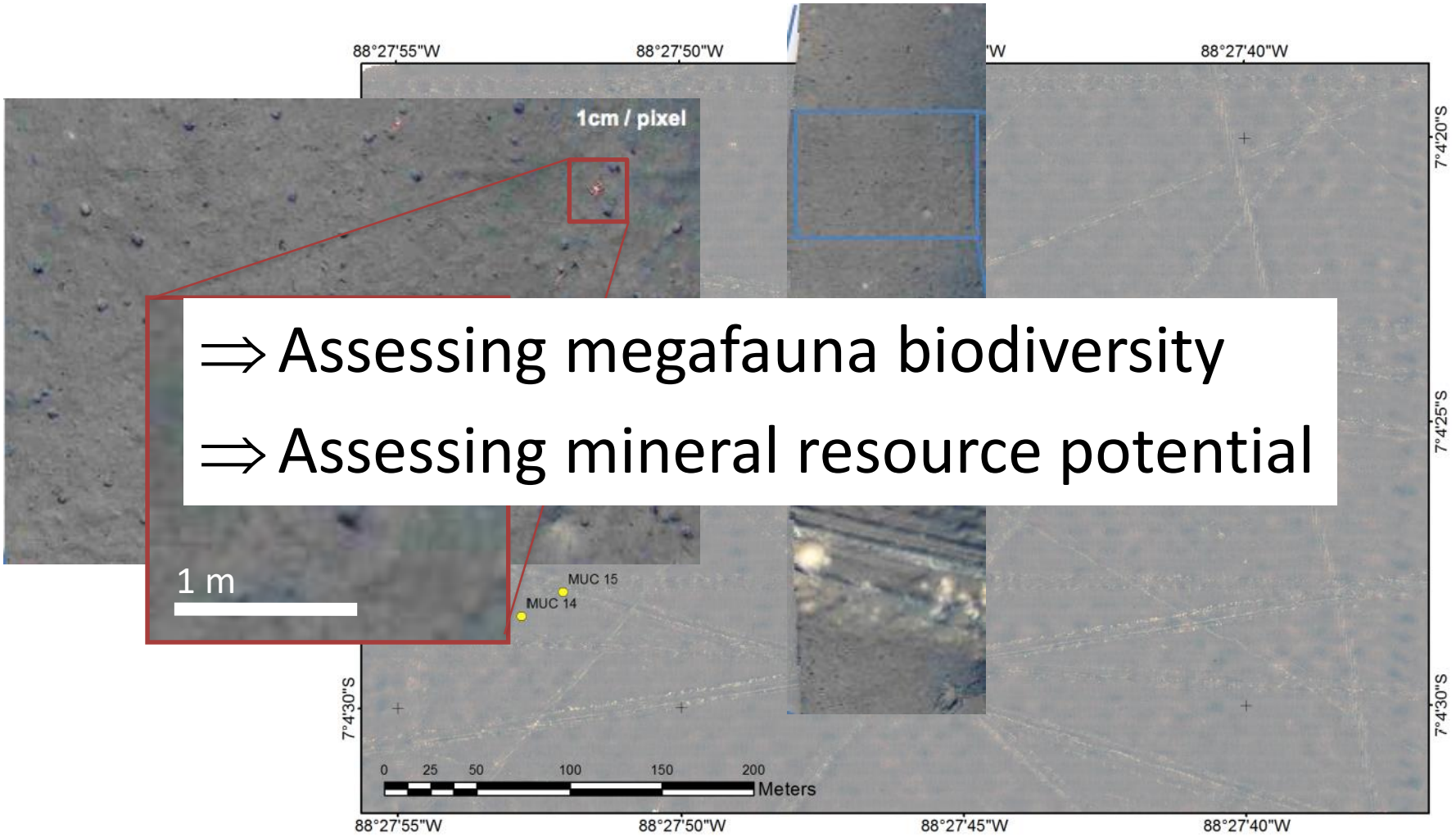


Seafloor & habitat mapping using AUVs and ROVs



AUV-based impact assessment

Image processing – pattern recognition – machine learning



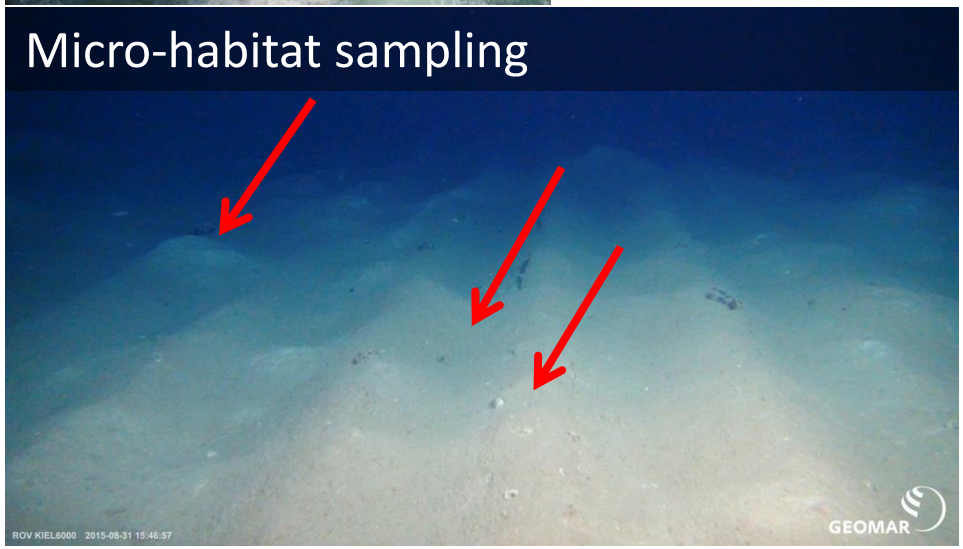
⇒ Assessing megafauna biodiversity

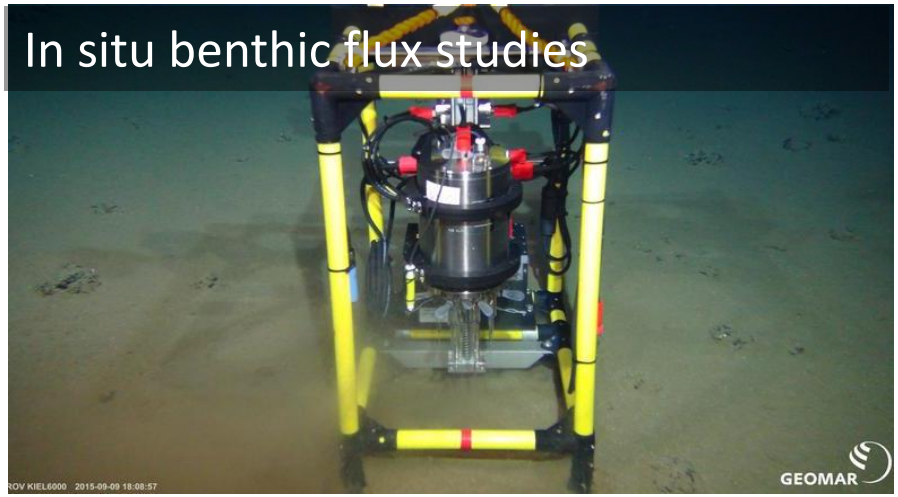
⇒ Assessing mineral resource potential

Photo mosaics resolve objects of 1 cm to 100 m

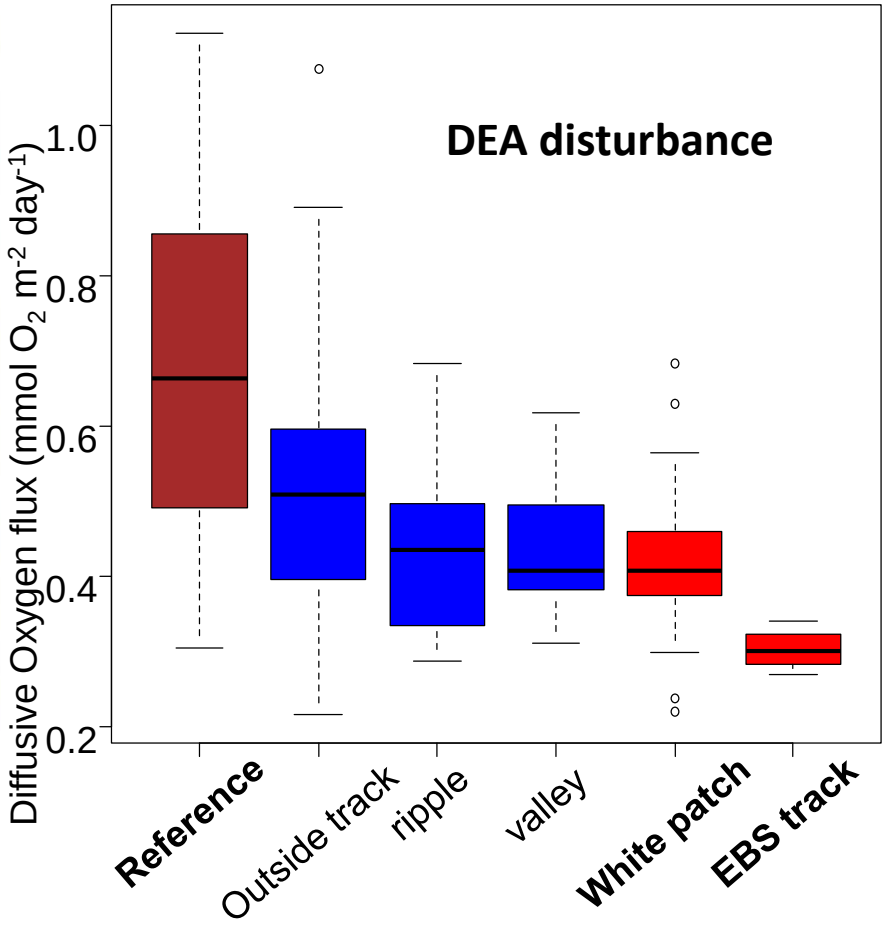
State-of-the-art in situ methodology & technology

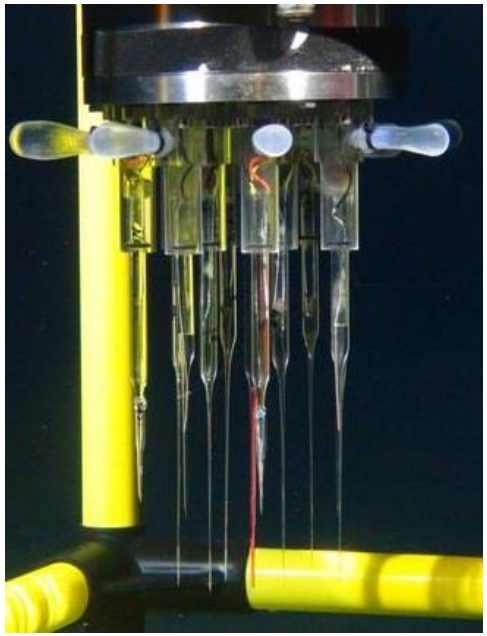
- Targeted sampling of different habitats
- *In situ* process studies with autonomous instruments
- *in situ* experimentation with ROV





Revise ISA documents (e.g. ISBA/19/LTC/8)





Recommendations :

- Seafloor integrity
- **Oxygen respiration & remineralization rates**
- Microbial activity (e.g. growth by tracer uptake / remineralization)
- Microbial community structure (Biodiversity)

Vonnahme et al., in prep. (MPI Bremen)

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