



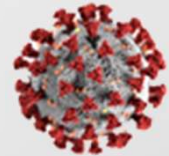
# MANGAN 2021: Cruise to monitor the environmental impacts of GSR's Patania-II collector trial

**BGR & JPI-Oceans MiningImpact consortium**

Stakeholder Information Event, 21<sup>st</sup> January 2021

# Schedule changes since 2018

- Repurpose BGR exploration cruise to monitoring cruise
- Postponed to 2021 due to the SARS-CoV-2 pandemic
- Parallel timing to the GSR collector tests (April 2021)
- Complete involvement of MiningImpact partners

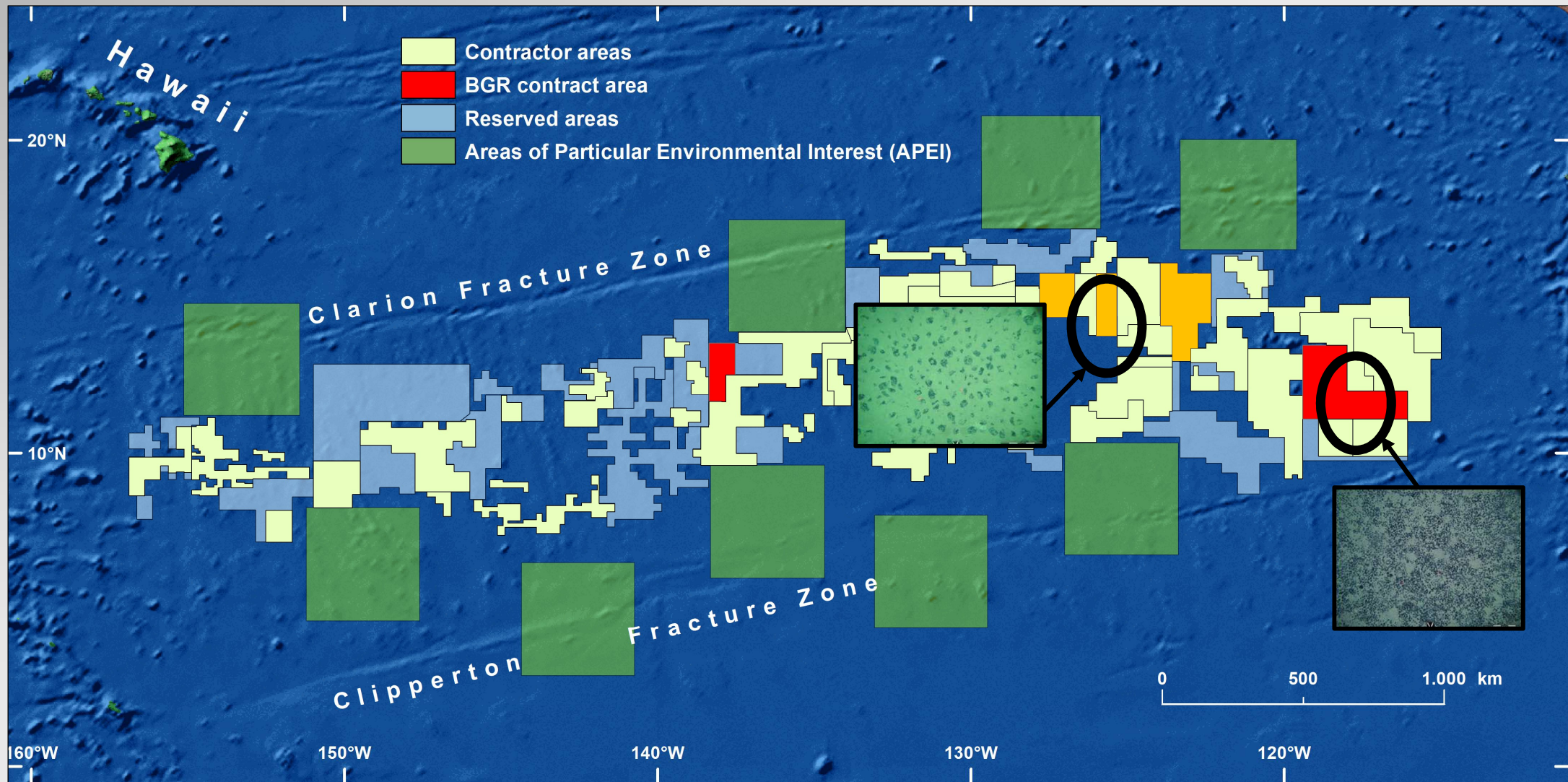


## Environmental Impact Assessment

for the testing of a pre-prototype manganese nodule collector vehicle in the Eastern German license area (Clarion-Clipperton Zone) in the framework of the European JPI-O MiningImpact 2 research project



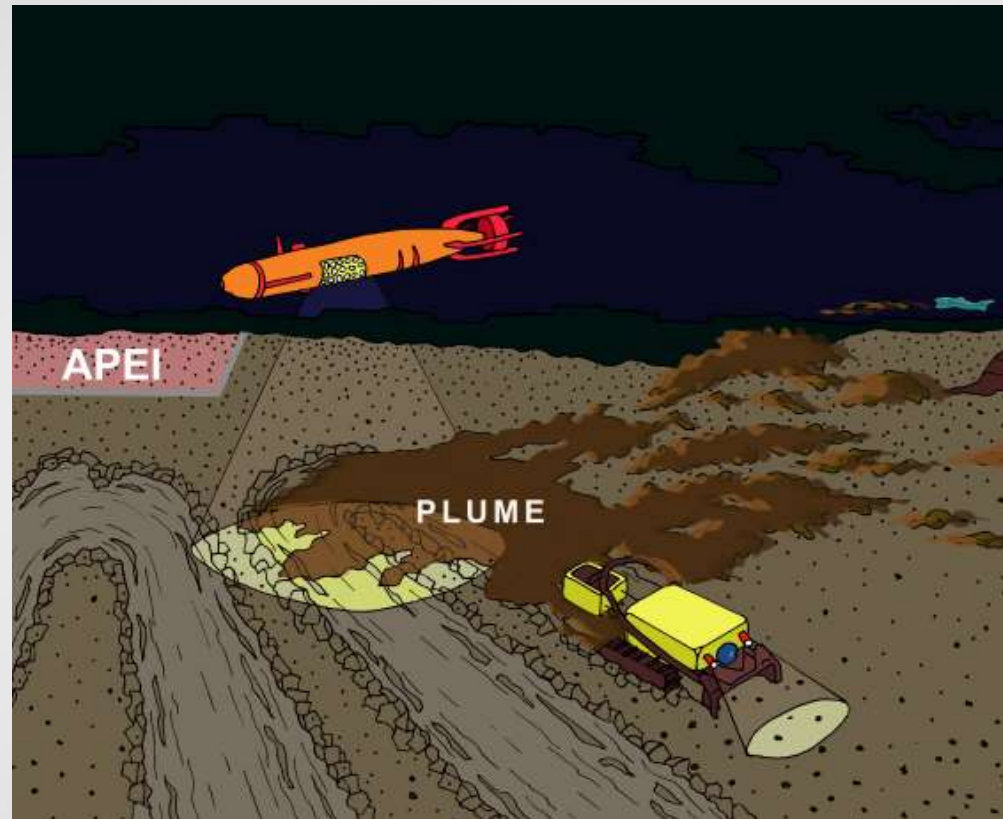
# CCZ, contractor areas and trial sites



# Key objective of MiningImpact

**Independent scientific monitoring** of the collector trials

All project data will be published in “open-access” databanks (PANGAEA)





# Ship charter: Island Pride





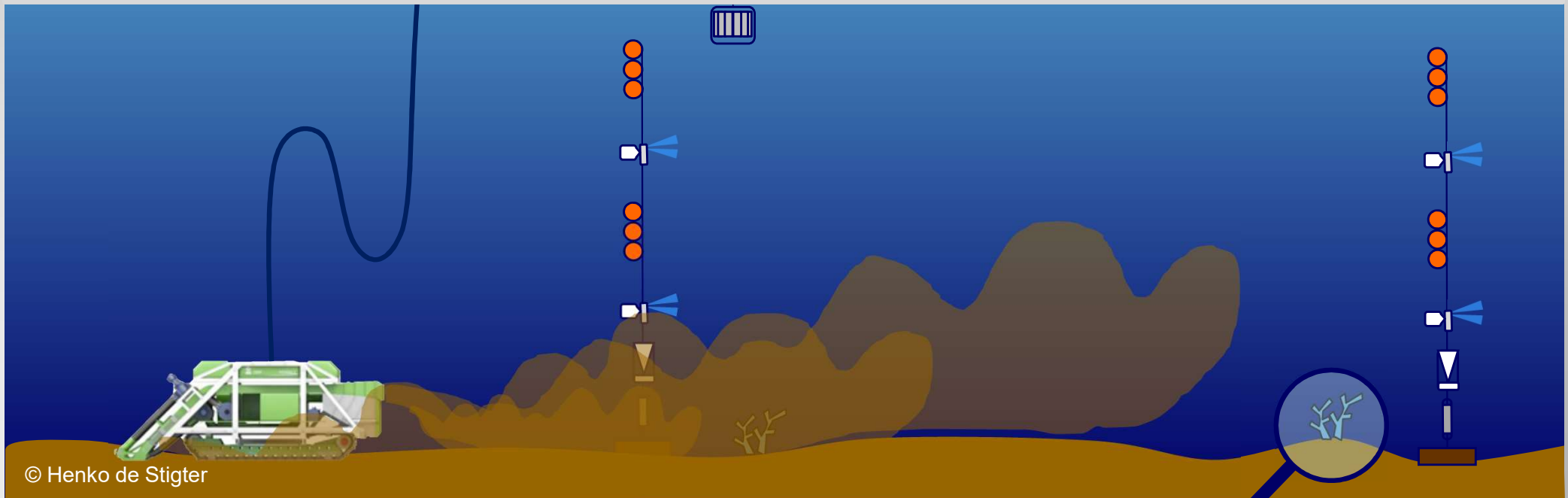
# Equipment: What will we do?



# Aims of the monitoring programme

## Analysis of dispersion and fate of the sediment plume: Scale of the impact

- Plume dispersal and sediment deposition
- Evolution of physical and chemical characteristics of the plume
- Ecological impact of the plume



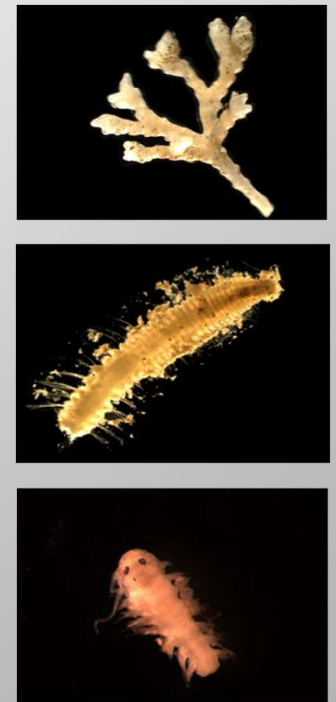
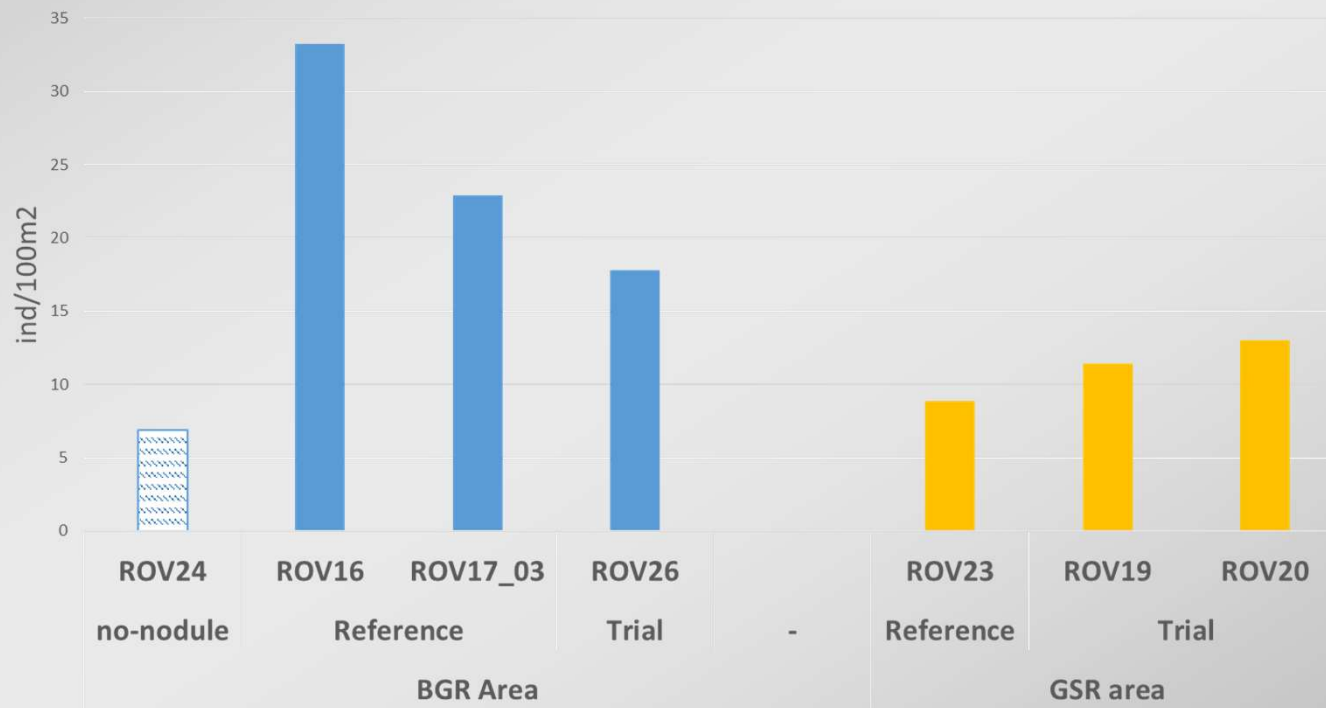
© Henko de Stigter



# Aims of the monitoring programme

## Regional biodiversity and connectivity of species; resilience to impacts

- Habitat, natural variability, disturbance effects, temporal evolution
- Microbial and micro-eukaryote communities
- Development of techniques for rapid biodiversity assessment

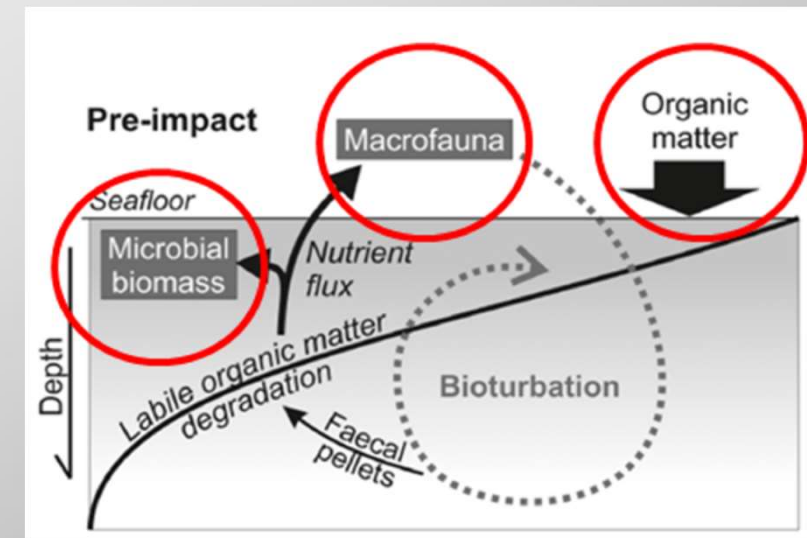




# Aims of the monitoring programme

## Integrated effect of disturbances on seafloor / habitat integrity and ecosystem functions

- Compaction effects on sediment physical properties
- Sedimentation and bioturbation dynamics
- Effects on sediment biogeochemistry (biogeochemical processes, fluxes)
- Effects on microbial ecology and functions
- Effects on ecosystem functioning



# Time Plan

April		Mai	
	1 harbour	1	
	2 harbour	2	end trial
	3 harbour	3	
	4 leave San Diego	4	end plume monitor
	5	5	impact assessment GER
	6	6	pickup sensors
	7	7	
	8 arrive BE area	8	
	9 put down sensors	9	
	10	10	
	11	11	leave GER area
	12 start trial + plume BE	12	
	13	13	
	14	14	
	15 end trial	15	arrive San Diego
	16	16	harbour
	17 end plume monitor	17	harbour
	18 impact assessment BE	18	
	19 pickup sensors	19	
	20	20	
	21	21	
	22	22	
	23 leave BE for GER area	23	
	24 arrive GER area	24	
	25 pick up moorings	25	
	26 put down sensors	26	
	27	27	
	28	28	
	29 start trial + plume GER	29	
	30	30	
		31	

- 42 days at sea
- 30 working days (14 d BEL, 16 d GER)
- 12 transit days



# Footprint of the trial

© DEME-GSR



## DEME test collector:

Collector width: 4 m

Sediment removal: 0.12 m

Collector speed: (0.2-) 0.5 m/s



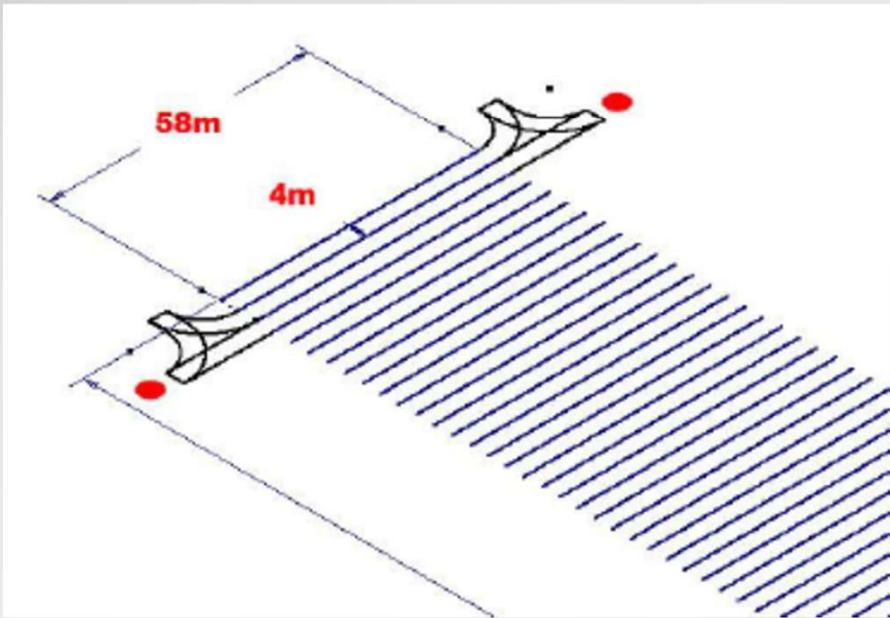
≈ 50 t/h on average for 4 days



Concentration up to 5 g / L

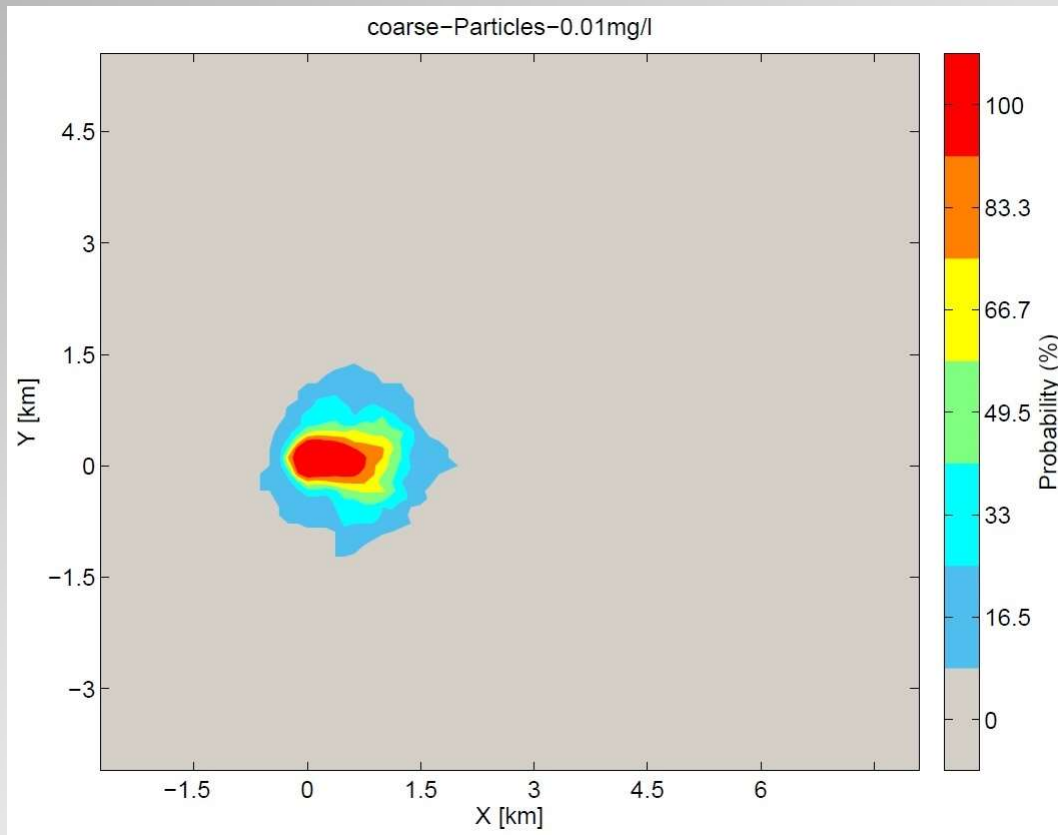
Gravity flow?

How much goes into suspension?

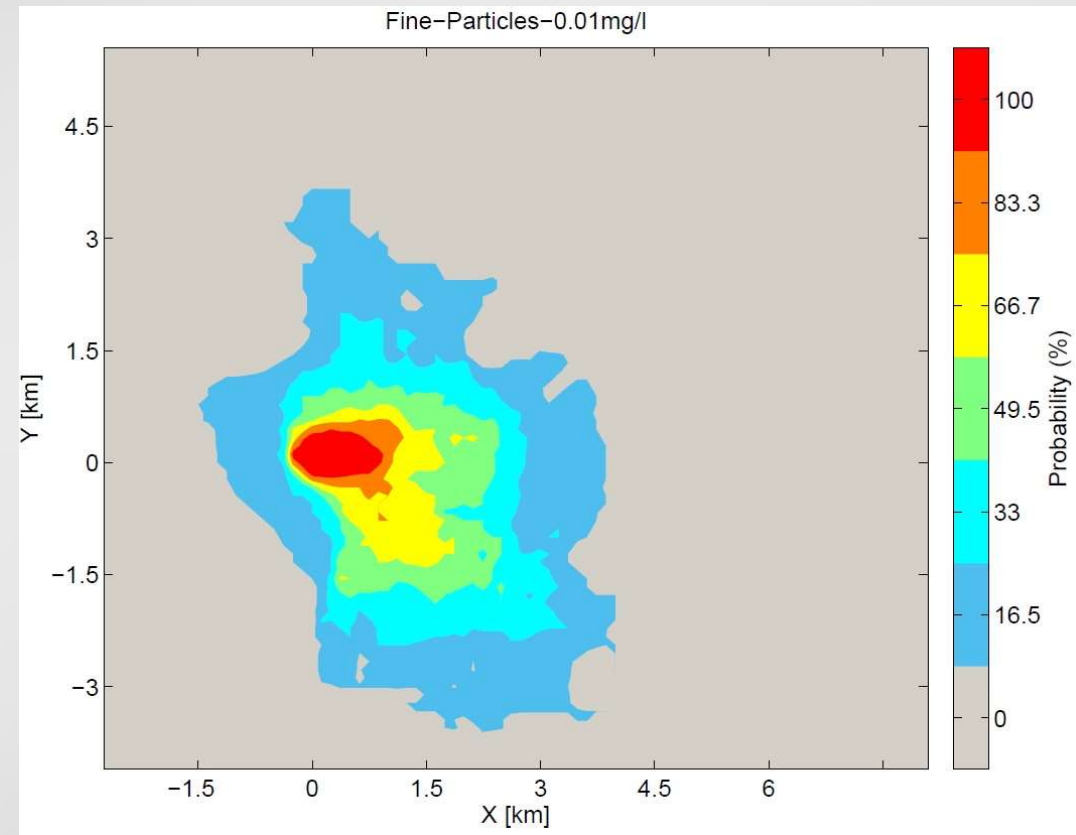


# Plume dispersion modelling: probability scenarios

## Coarse fraction (300 $\mu\text{m}$ )



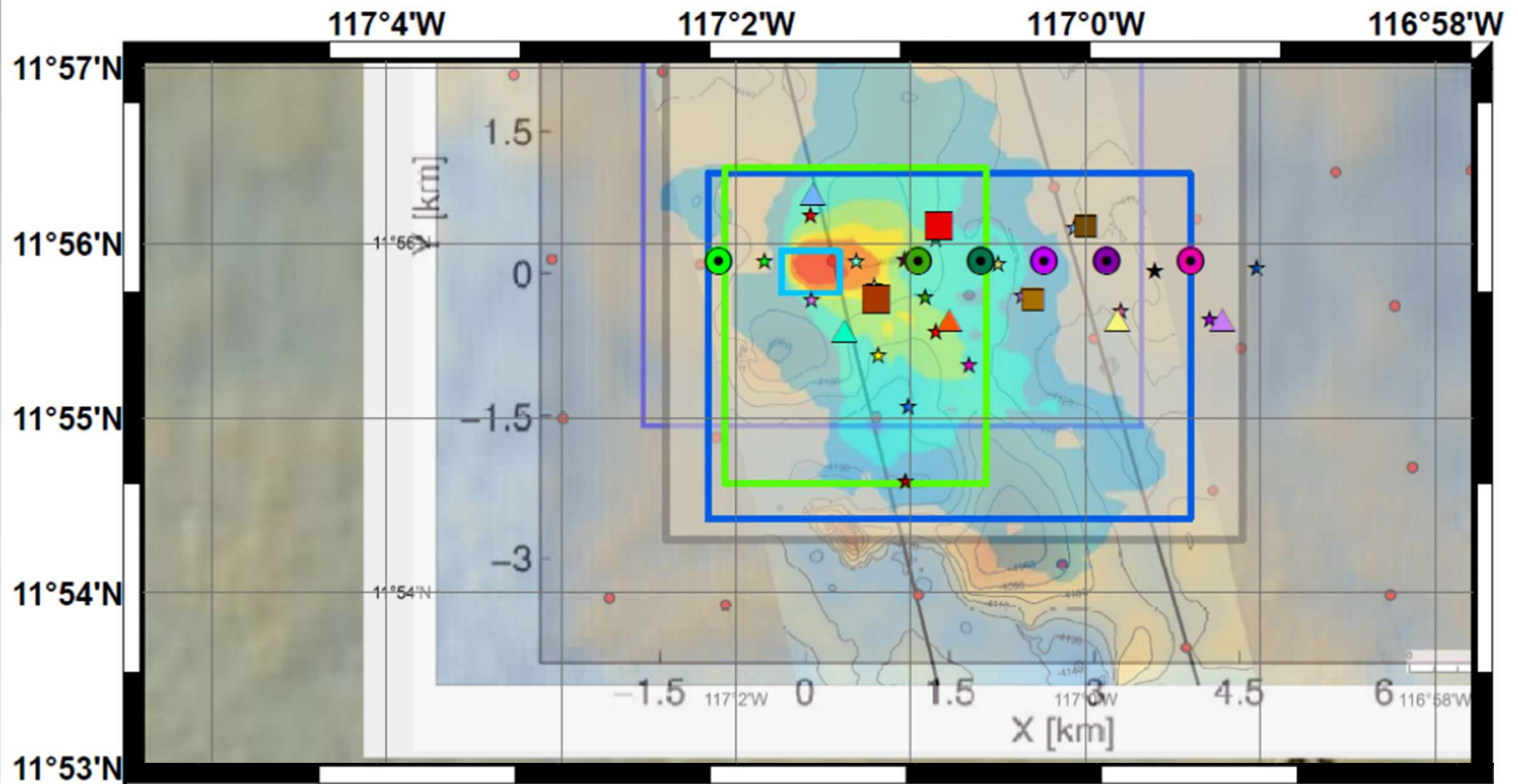
## Fine fraction (30 $\mu\text{m}$ )



- Month April (2010–2018): 6 intervals of 5 days each
- 4 days test + 4 days dispersion



# Possible sensor array set-up



# Expected results of the trials and monitoring

- Scientific monitoring and evaluation: Determining the extent of impacts
- Recommendations for (standardised) monitoring concepts and strategies
- Recommendations for mitigation strategies and REMP
- Development of sound methodologies for the evaluation of risks
- How can we deal with uncertainties in knowledge?



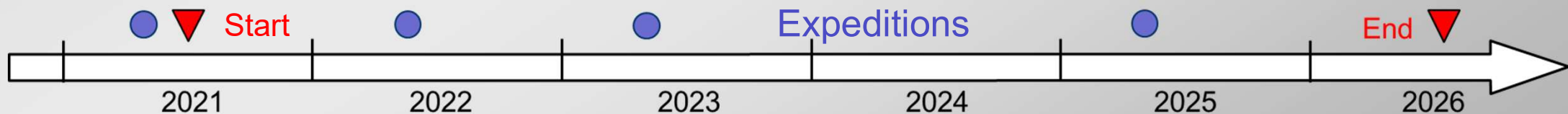
Implementation in future ISA mining regulations and guidelines

Reference for risk analysis / EIAs for component testing and possible future DSM

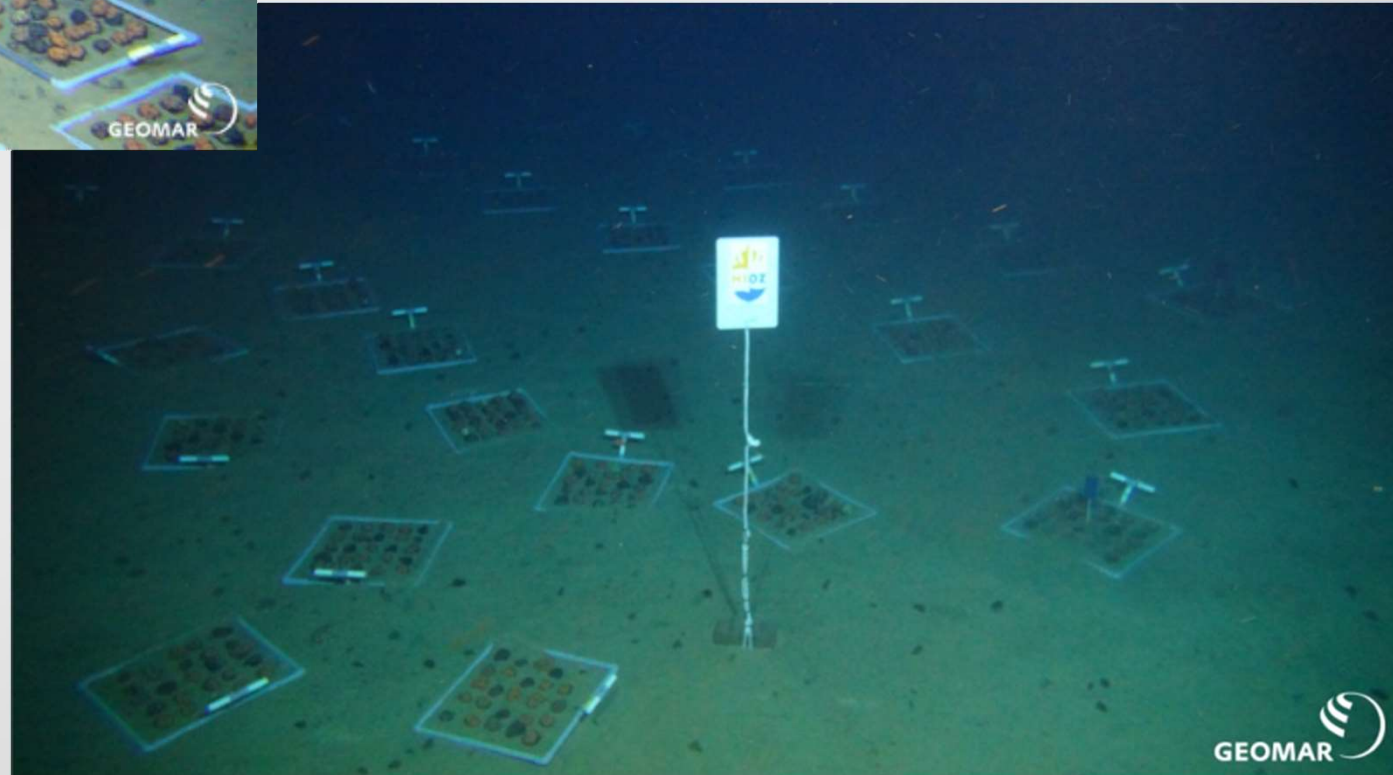
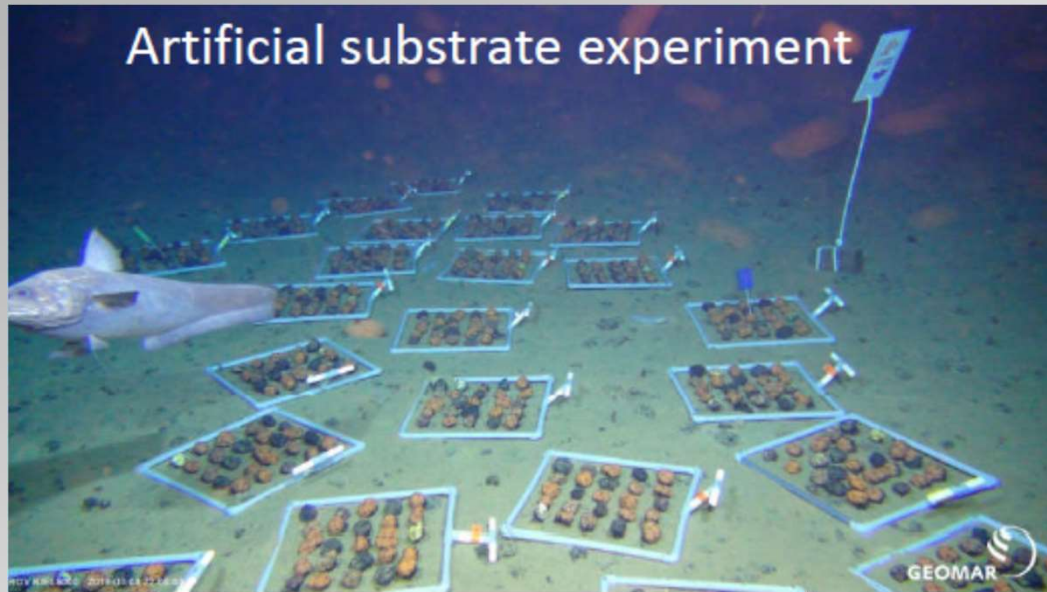


# Long(er)-term monitoring in the German area

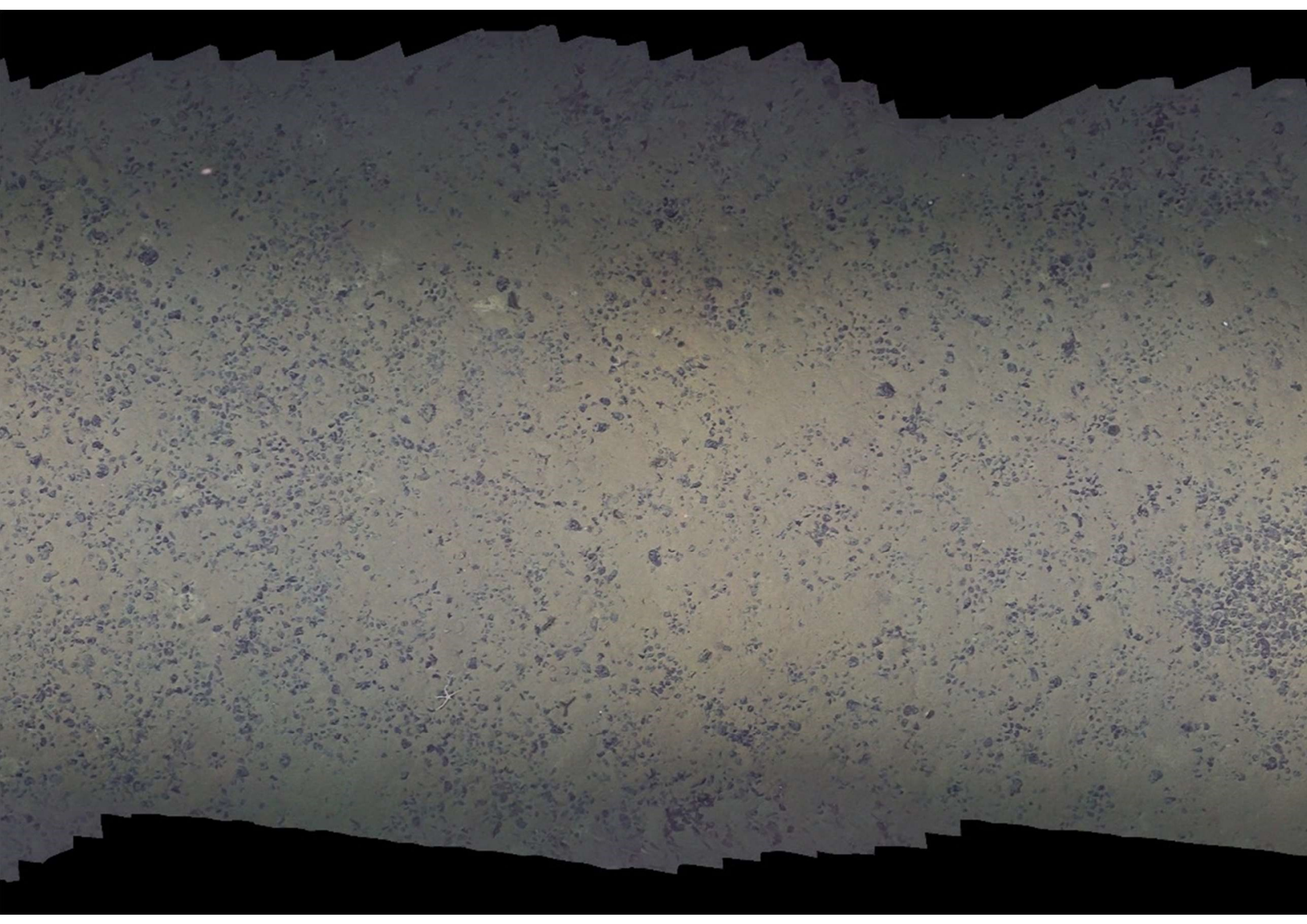
- 2018/19/21: Baselines before, monitoring during and after test
- 18 July 2021: Exploration contract expires (appl. for 5-yr extension)
- 2022: BGR exploration campaign planned
- 2023: BGR exploration campaign with RV SONNE (applied)
- 2025: BGR exploration campaign planned



# Colonisation frames











Thank you for  
your attention!