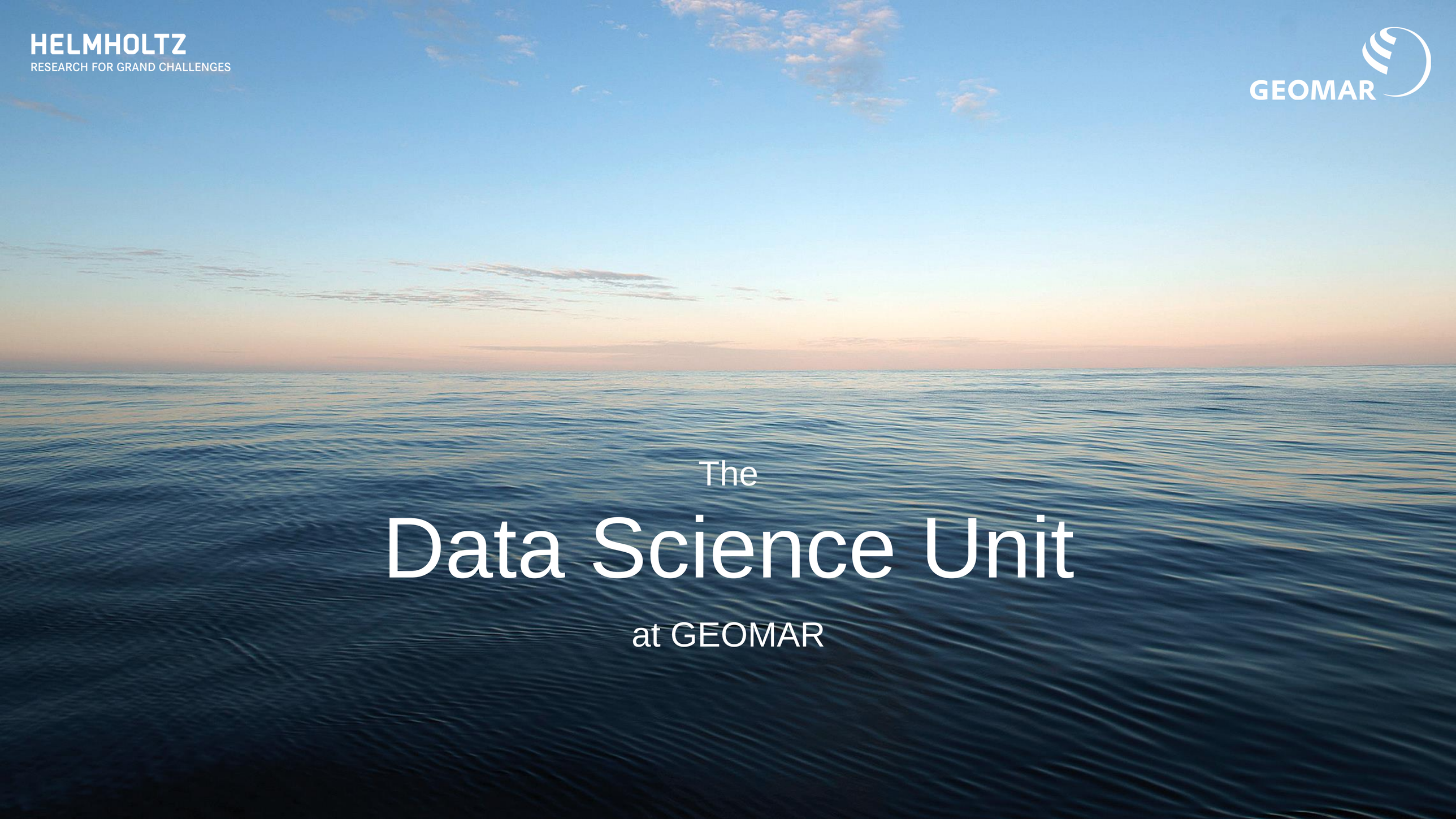

HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES
GEOMAR
The
Data Science Unit
at GEOMAR



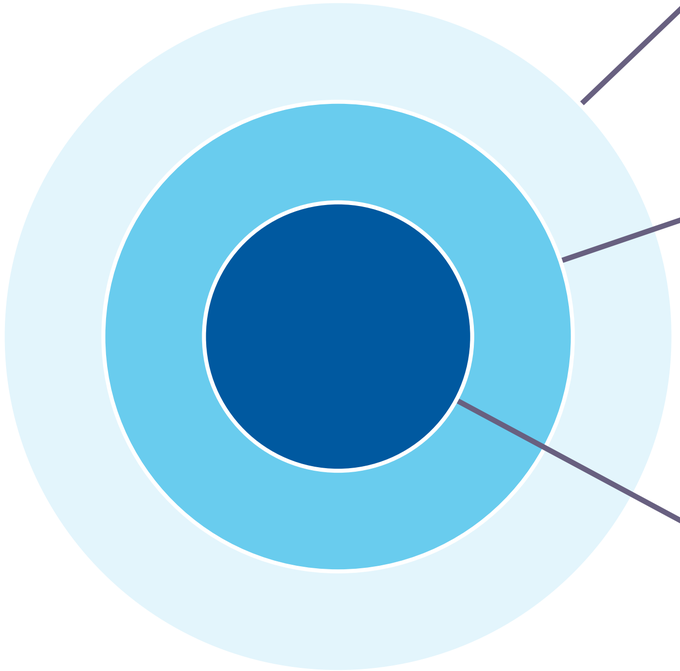
Our mission:

We support and train team GEOMAR in developing and applying Data Science methods in ocean research.

The DSU at GEOMAR

Key facts:

- Founded in 2022 for three years.
- Institutional anchor point for DS support
- ~ 5 Data Scientists employed + 14 associated members
- Evaluation in 2025

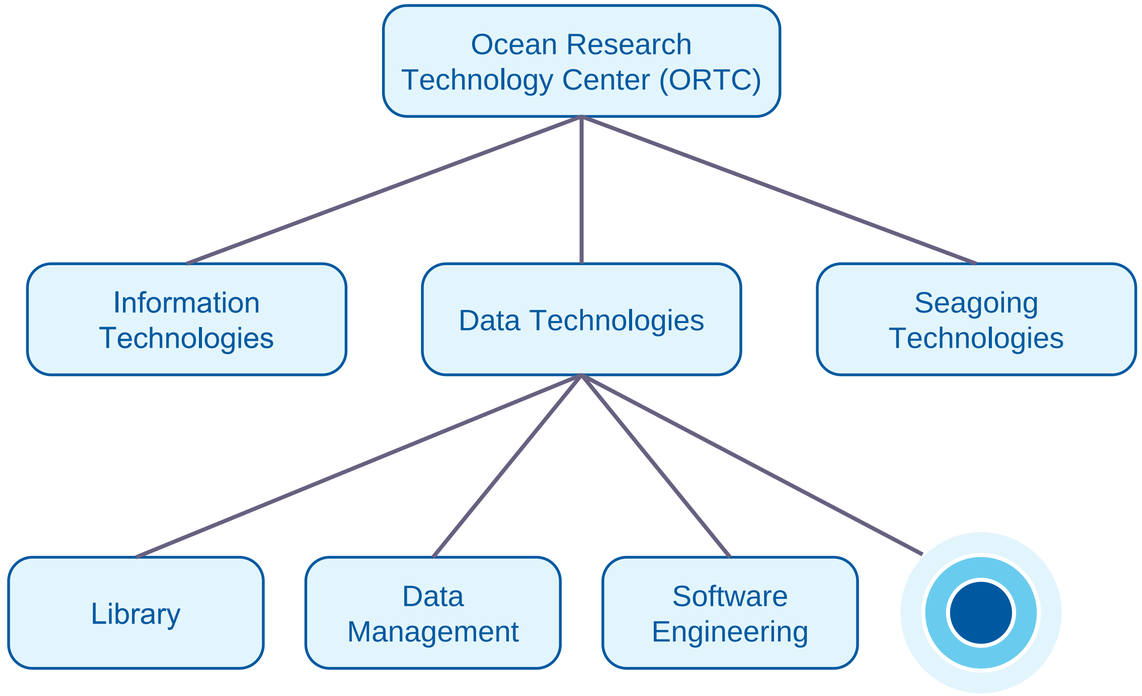


Scope:
Develop & Apply Data Science, Educate & Train team GEOMAR

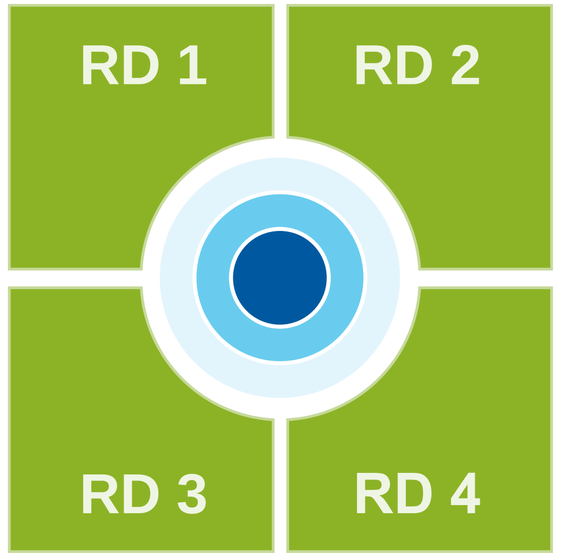
Methods:
AI/ML, Visualisation, DevOps, Imaging, Digital Twins, Intelligent Robotics, ~~Modelling/Simulation~~

Core capacities:
Marine Science, Computer Science, Math/Statistics

Embedding at the center

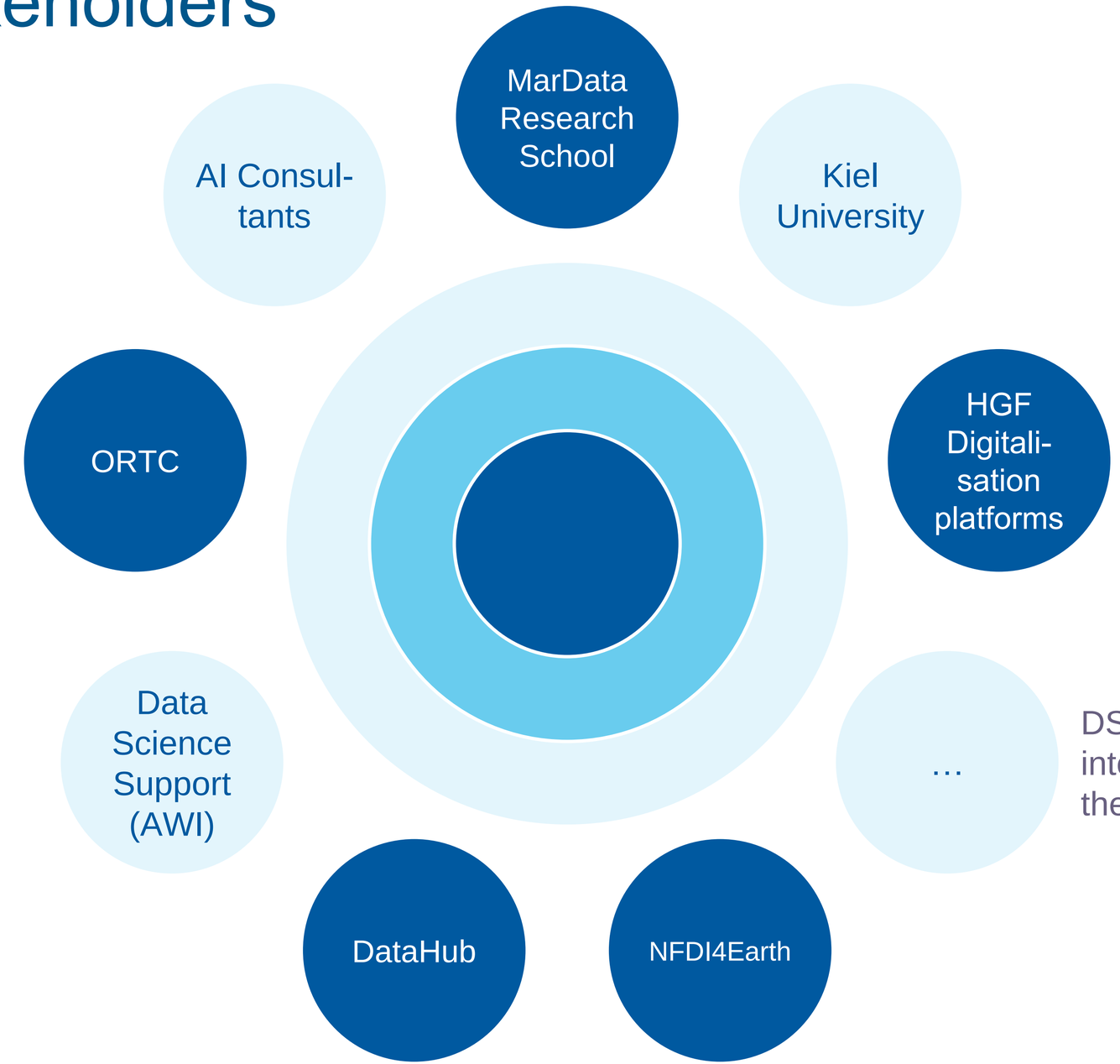


structure



mission

Key DS stakeholders

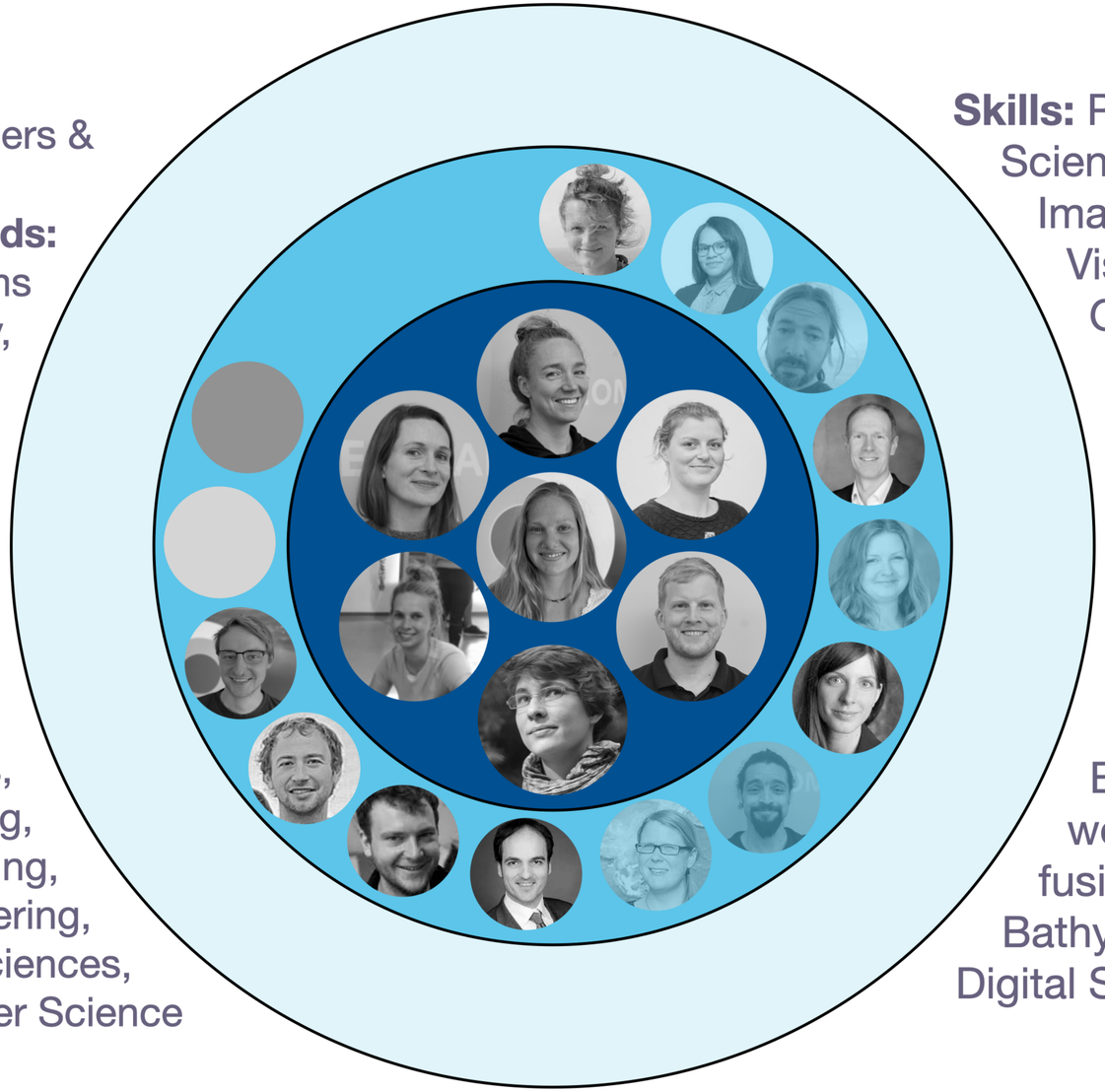


DSU provides an institutional interface between GEOMAR and the rapidly evolving field

Team skills & background

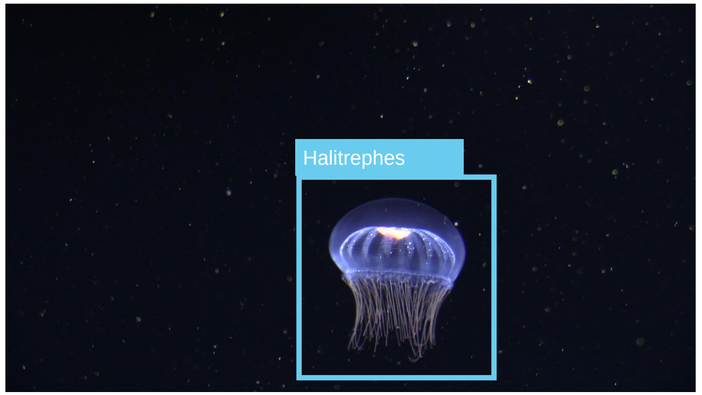
Core team: 7 people (5.2 FTE)
Associated team: 14 researchers & technical staff

Backgrounds:
Marine Technologies, Systems Engineering, Geochemistry, Numerical modelling, Machine Learning, Physical Oceanography, Research Software Engineering, Exascale Modelling, Project management, Infrastructure Engineer, Biological Oceanography, Marine imaging, Bioinformatics, Electrical Engineering, Information Engineering, Biomedical Engineering, Geosciences, Marine Sciences, Computer Science

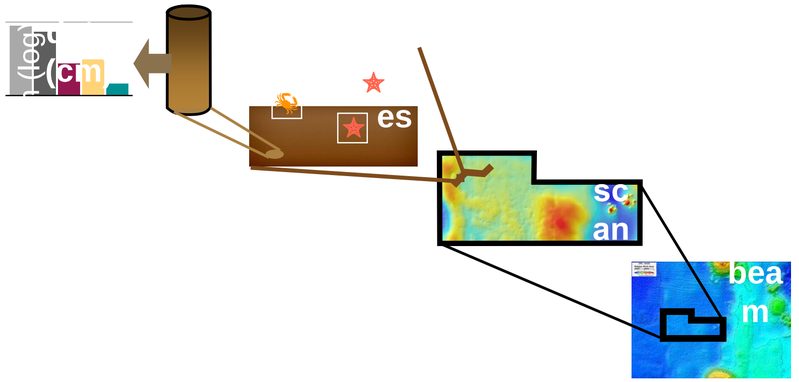


Skills: Python programming, Data Science Support, Remote Sensing, Image Analysis, Computer Vision, AUV Operations, Geospatial data analysis, Large-scale Earth Science, Big data analysis workflows, Cloud computing, Interactive scientific computing, peer teaching, Digital Twinning, Jupyter, Data Stewardship, Expeditions, FAIR Data, Efficient Terabyte-scale data workflows, Cross-domain fusion, AI, ML, Neural networks, Bathymetry, GIS, Habitat Mapping, Digital Storytelling, Networking

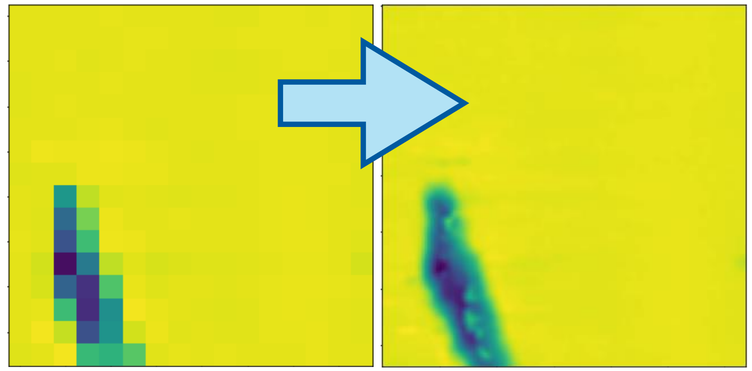
Example AI activities



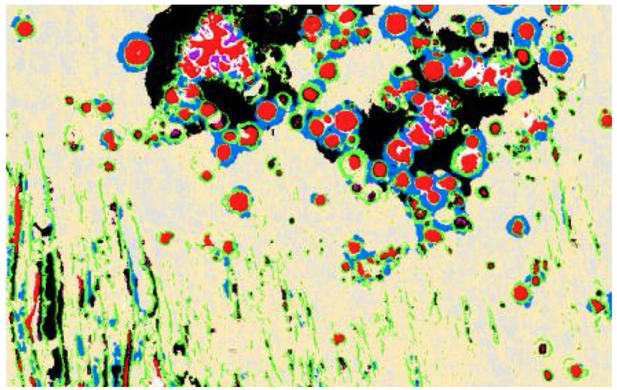
Object detection & classification



Cross-domain data fusion



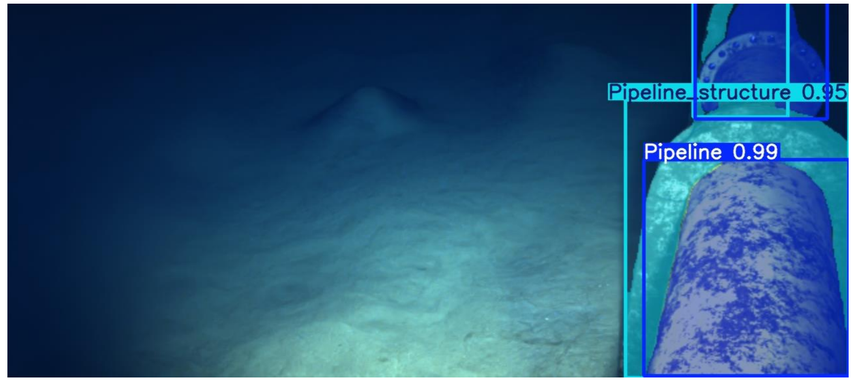
Super-resolution



Unsupervised seafloor clustering



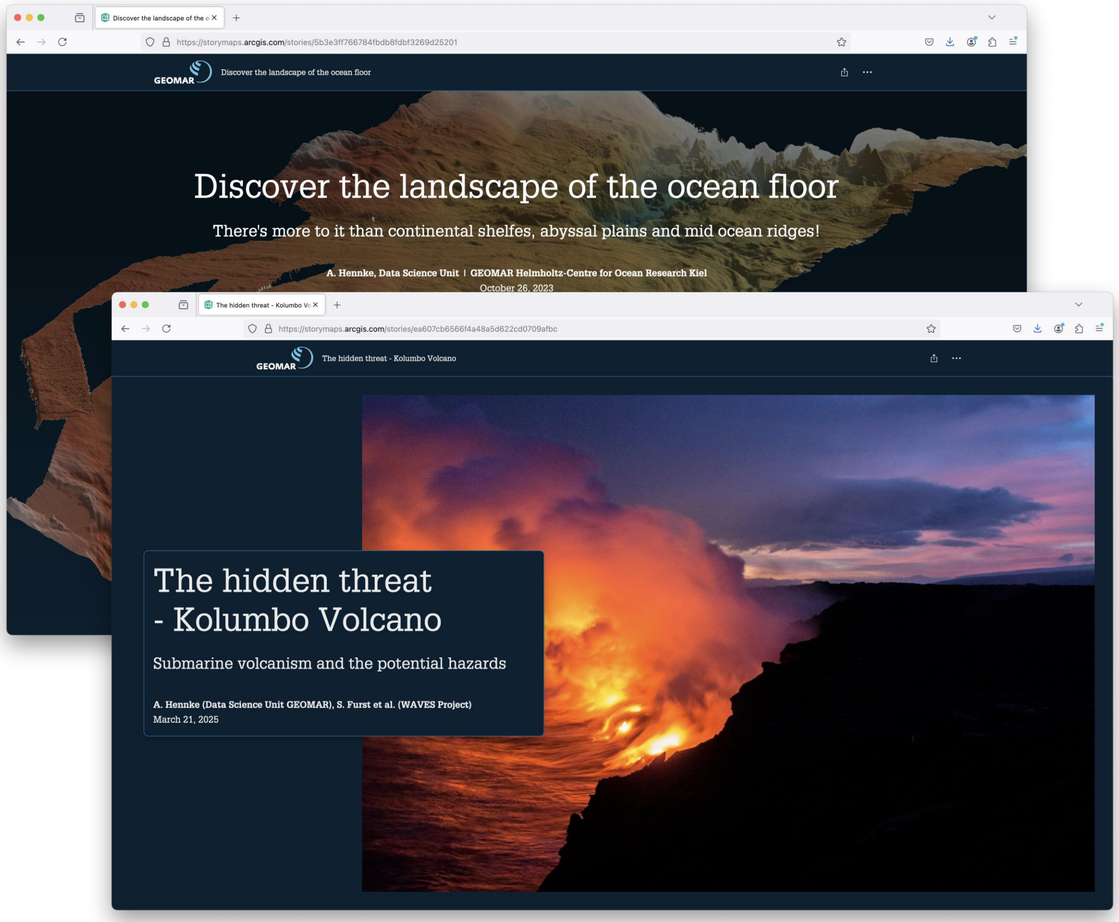
Smart seagrass mapping



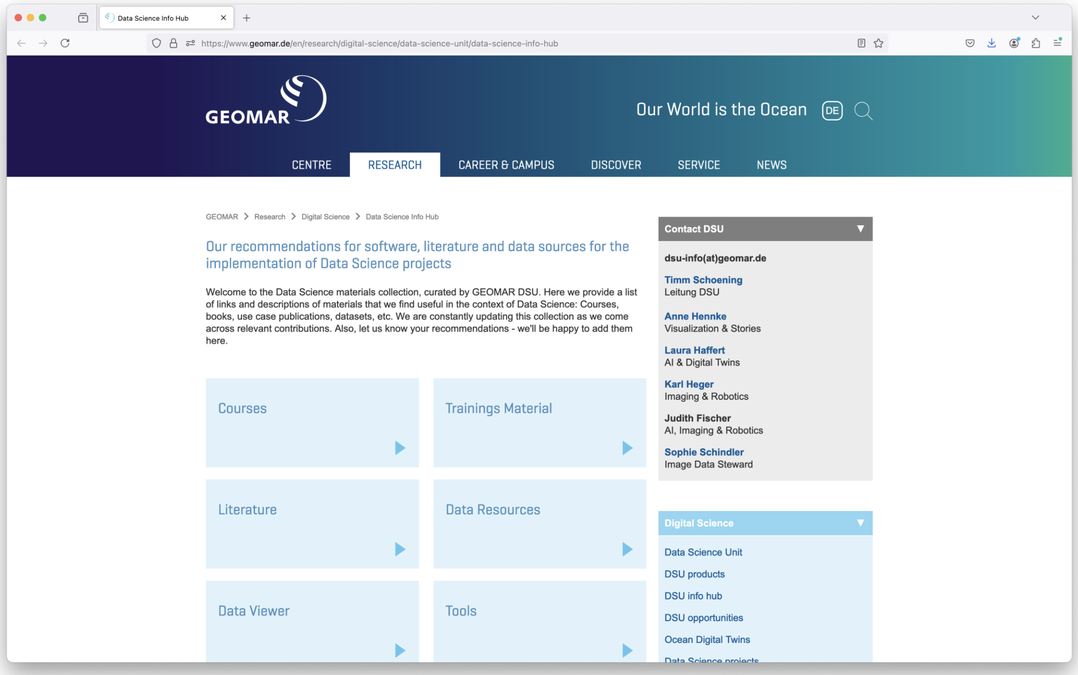
Smart infrastructure monitoring

And more: 3D biological structure classification, offshore groundwater mapping, seismic data clustering, …

Example products

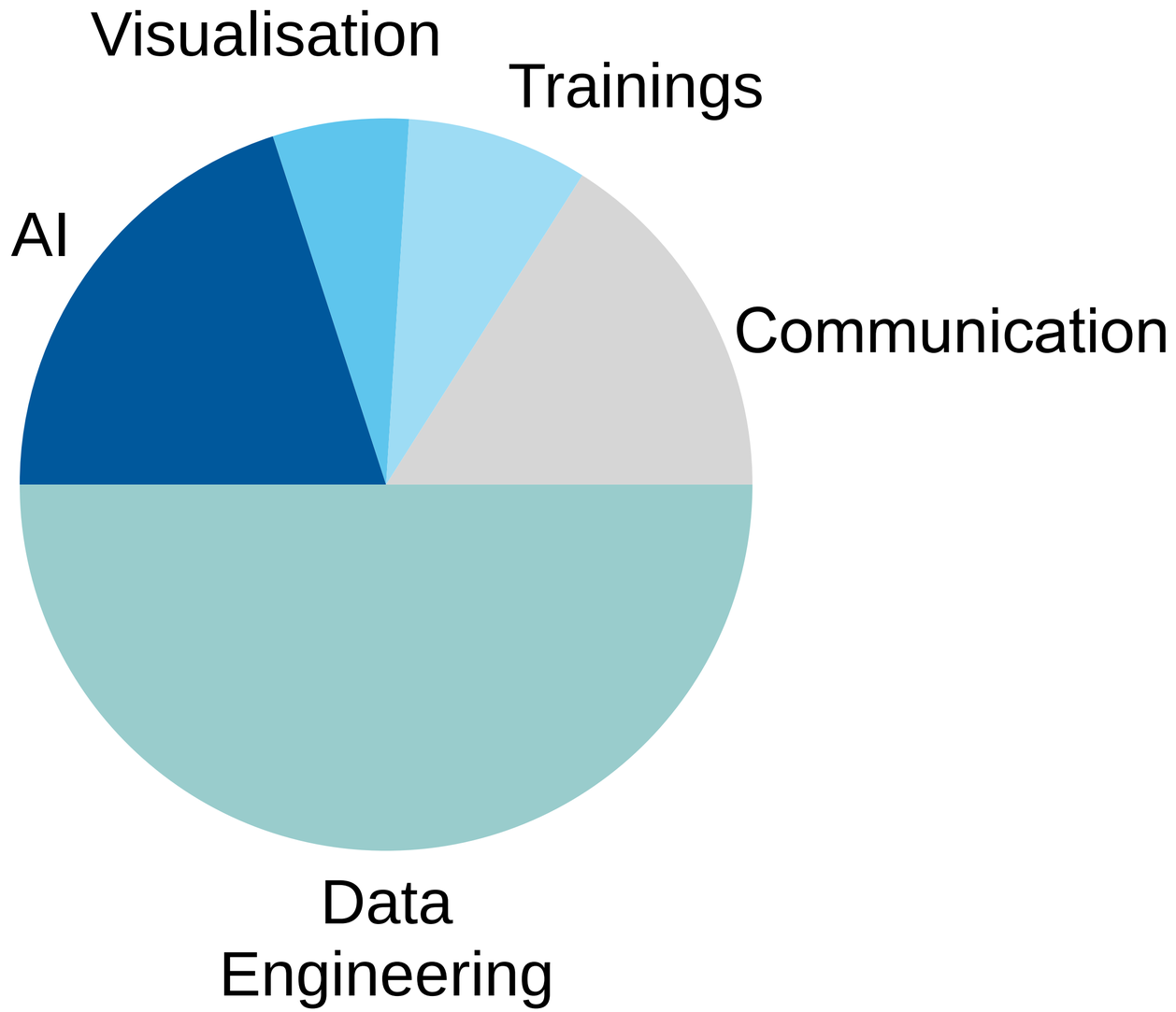


Interactive scientific story maps.



Data Science information hub

Data Science Unit workload



Evaluation criteria

Defined in 2022 by the GEOMAR directorate, RD leads and Scientific and Digital Councils

Hiring 4 Data Scientists through third-party funding	✔	Presence of DSU members in relevant HGF organisations	✔
Acquisition of > 500 k€ third-party funding for DSU activities	✔	Coordination of internal DS fora	✔
Establishing a DS Lab at GEOMAR	✔	Conducting DS trainings	✔
Open Access publication of DS activities	X*	Establishing a DSU governance	✔
Creating visibility for DS activities	✔		

*multiple articles in press and preparation

Lessons learned

- It takes longer than three years to found a DSU, establish DS projects, create results and publish derived journal papers
- We underestimated the demand for trainings at the center
- Although there are vast DS resources out there, support at the center through natural science peers is widely preferred
- We need more “free” Data Scientists that are unbound by project restrictions



Earth Science topics + Data Science competencies = strategic impact & funding potential

Looking forward:

The Earth & Environment AI & Data Science consultants support and train Earth scientists in developing and applying future smart methods in Earth System research.

Moving forward

