



HERMES

Hotspot Ecosystem Research on the Margins of European Seas

A major international research project funded by the EC's Framework Six Programme

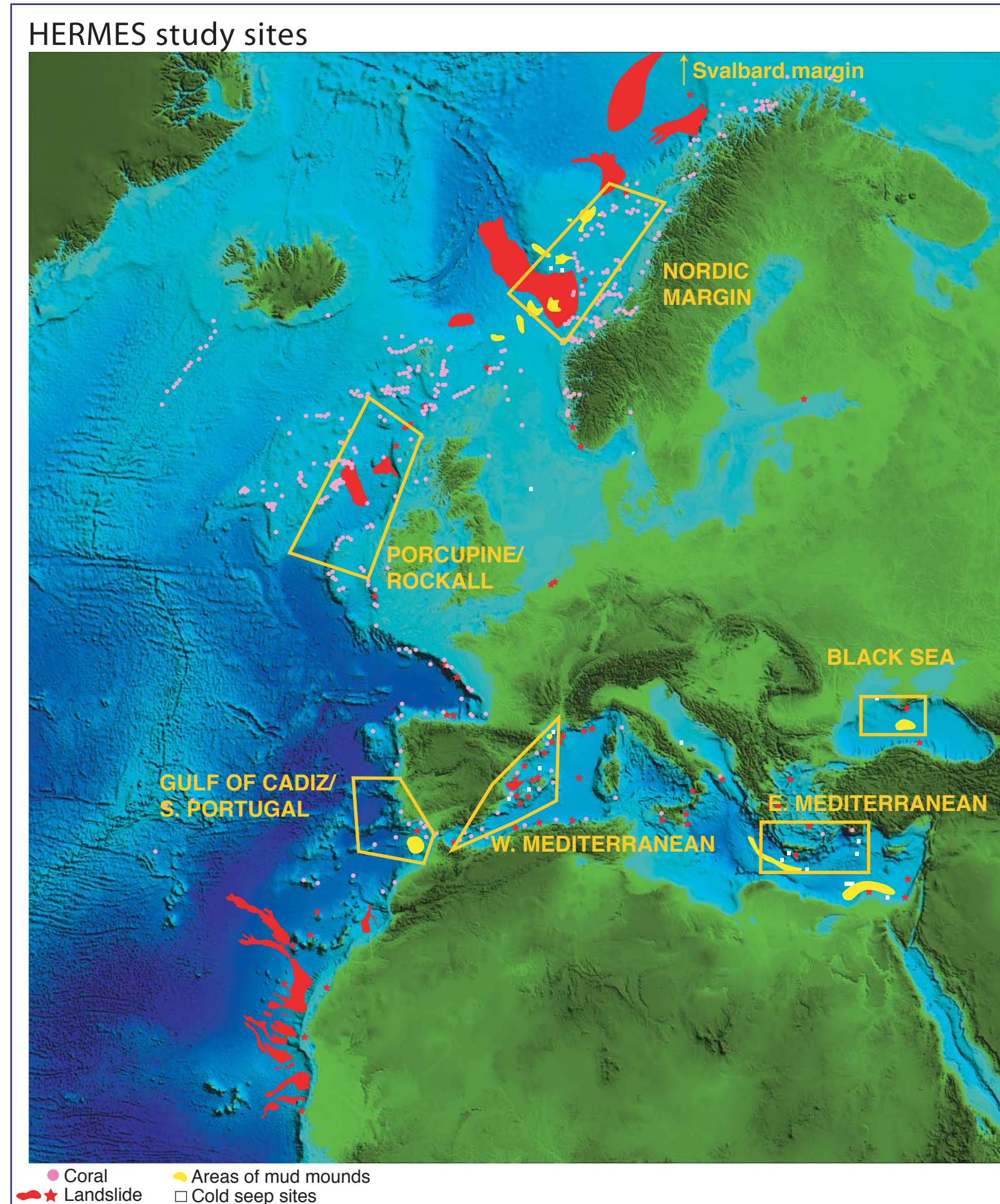
HERMES is designed to gain new insights into the biodiversity, structure, function and dynamics of ecosystems along Europe's deep-ocean margin. It represents the first major attempt to examine European deep-water ecosystems, their environment and their drivers in an integrated way by bringing together expertise in biology, geology, and physical oceanography. HERMES aims to understand the relationship between biodiversity and ecosystem functioning, forecast the long-term response of ecosystems to global change, and develop concepts and strategies for the sustainable use of marine resources.

An integrated approach

HERMES will follow an interdisciplinary approach to deep sea ecosystems research by bringing together experts in all the necessary disciplines of natural science together with leaders in socio-economic and legal research. HERMES will produce biodiversity maps and better coupled geochemical and ecosystem models which will enhance our ability to forecast ecosystem response to changes in forcing factors. A major output of the project will be the development of the first pan-European GIS, which will provide the framework for integrating science, environmental modelling and socio-economic indicators.



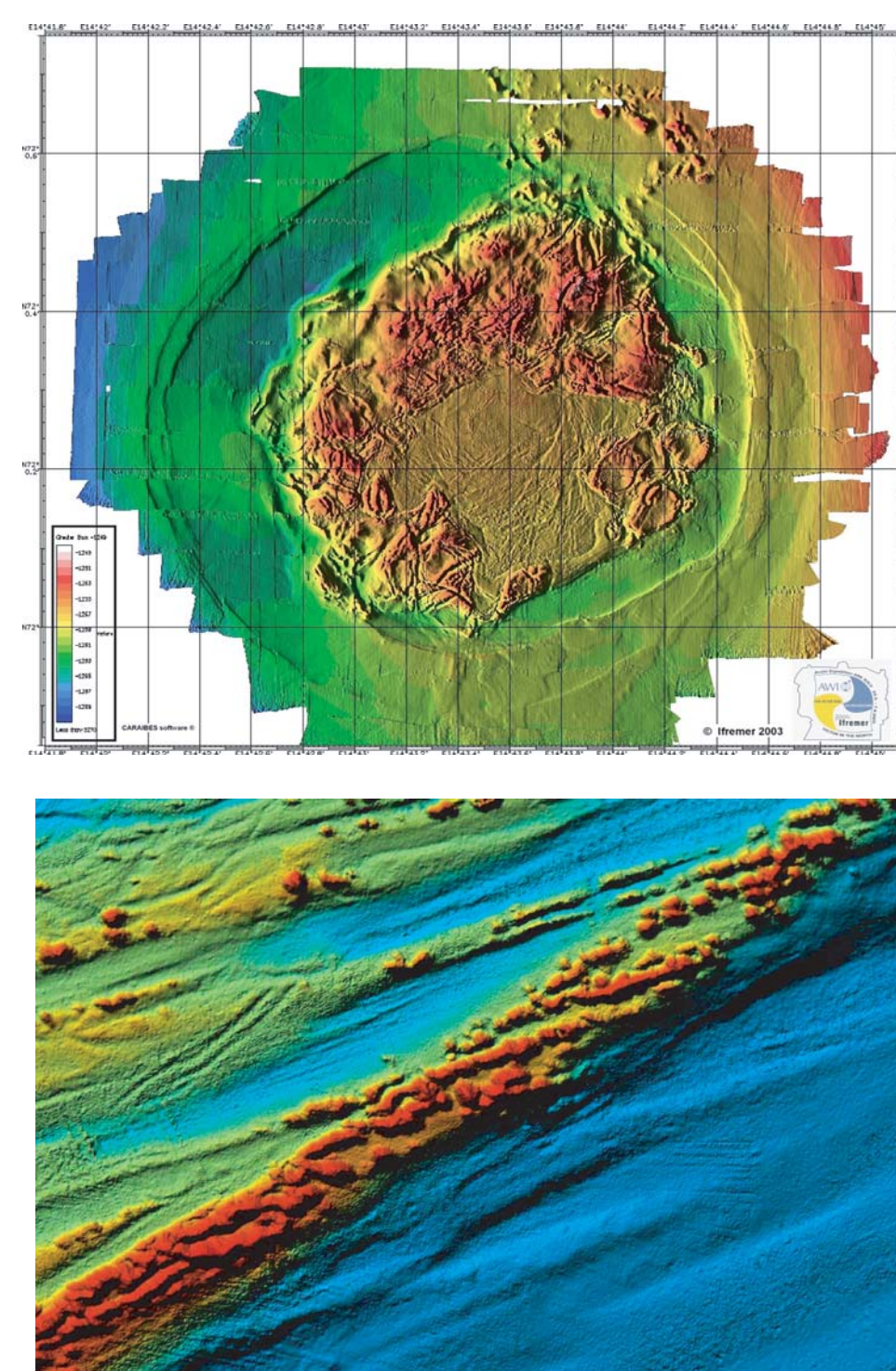
Clockwise from left:
Deployment of SOC's new ROV ISIS.
Sediment coring on board RV Urania in the Adriatic Sea.
Deployment of free-falling grab respirometer to assess the oxygen consumption by the sediment-inhabiting community, Fram Strait, west of Svalbard.
Investigating micro scale turbulences around a drop stone using a high resolution acoustic current meter, Fram Strait.



HERMES study sites

Cutting edge technology

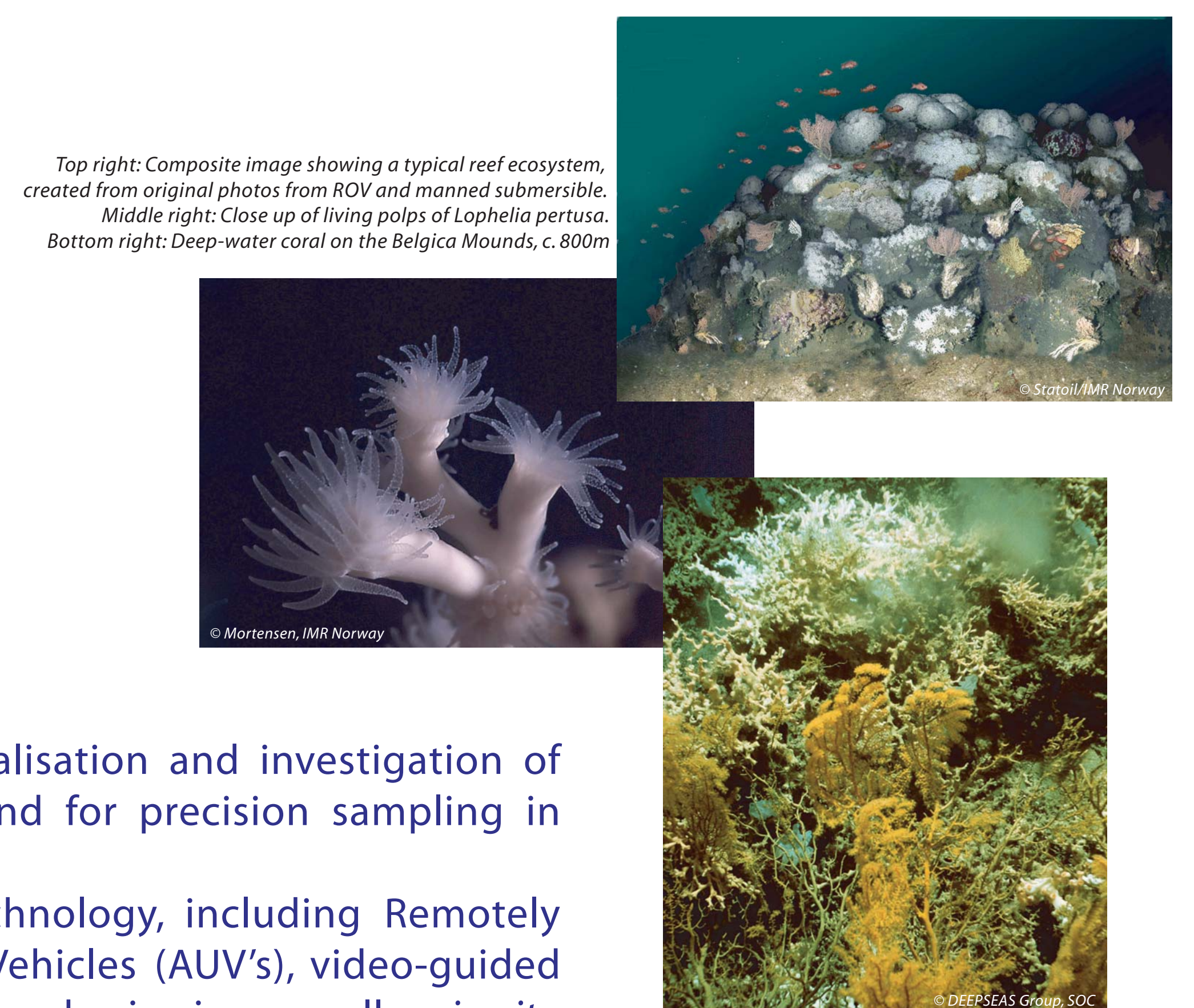
New state-of-the-art technology is vital for the visualisation and investigation of submarine structures and biological communities, and for precision sampling in rugged terrain. HERMES will use a wide range of sophisticated technology, including Remotely Operated Vehicles (ROVs), Autonomous Underwater Vehicles (AUV's), video-guided sampling instruments, high resolution 3D bathymetry and seismics as well as *in situ* measurement and observation tools, long term monitoring stations and experimental systems that can retain organisms under *in situ* temperature and pressure.



Above top: 3D microbathymetry mosaic of the Håkon Mosby Mud Volcano, one of the HERMES study sites. This data was collected during a joint IFREMER/AWI cruise aboard RV Polarstern in 2003.
Above bottom: Multibeam map of a part of the Lophelia reef on the Sula Ridge on the continental shelf of mid-Norway. The colours designate depth and the red is about 300 m. This reef was protected against bottom trawling in 1999. Map by NGU and the Institute of Marine Research, Norway.

Focus on ecosystem hotspots

HERMES will focus on ecosystem 'hotspots' that are strongly physically controlled by and associated with dynamic geological and/or hydrogeological structures. Study sites will extend from the Arctic to the Black Sea (see map, left) and will include open slopes, where landslides and deep-ocean circulation affect ecosystem development, and biodiversity hotspots such as cold seeps, cold-water coral mounds, canyons and anoxic environments, where the geosphere and hydrosphere influence the biosphere through fluid escape, gas hydrates and deep-water currents.



Top right: Composite image showing a typical reef ecosystem, created from original photos from ROV and manned submersible.
Middle right: Close up of living polyps of Lophelia pertusa.
Bottom right: Deep-water coral on the Belgica Mounds, c. 800m

Towards sustainable management

HERMES will study the large-scale physical and environmental constraints upon which deep-ocean biological communities rely. Improved description of these controlling factors will allow us, for the first time, to assess how global change, anthropogenic impact and environmental management schemes affect ecosystems and biodiversity. This is a fundamental requirement before strategies relating to mitigation, conservation and post-impact rehabilitation of ecosystems and biodiversity can be formulated. HERMES will establish regional stakeholder networks, and convene an international panel of key scientists, industry stakeholders, EU policy makers and NGO's. This forum will provide a channel for the dissemination of results and advice to policy circles and other end users.

Educational initiatives

HERMES will provide extensive training and education closely oriented towards industry, government and academia. Hands-on training in an active research environment for 40 undergraduates, postgraduates and young researchers will be provided by a dedicated Training Through Research (TTR) cruise, and a number of interdisciplinary workshops spanning a wide range of topic are planned. An extensive programme of public outreach activities aims to enhance public awareness of ocean margin ecosystems, with special emphasis on forging links between HERMES scientists and local educators. Opportunities for teachers to participate in HERMES cruises provides a direct route for real marine science to be introduced into classrooms across Europe.

'Showcase' cruises

HERMES has an ambitious cruise programme, with fifty cruises planned for the first 18 months of the programme. These cruises will be multidisciplinary and involve scientists and students across the project consortium. The use of ROV's is critical to the success of HERMES, and three major ROV-based 'showcase' cruises led by SOC, IFREMER and AWI are planned, spanning the entire length of the European margin. Each showcase cruise will have strong links with the media, and will feed science into classrooms across Europe via a dedicated website.



Clockwise, from right:
Young researchers undergoing training on the TTR vessel, RV Professor Logachev
Deploying TOBI for sidescan sonar surveying in the Adriatic Sea
Deployment of the French ROV Victor
RRS Charles Darwin at work in the Atlantic

The HERMES consortium has 45 members, comprising 36 academic partners and 9 SME's:

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| Southampton Oceanography Centre, UK | CSIC-ICM, Spain | University of Birmingham, UK | SME's: |
| IFREMER, France | CoNISMA, Italy | Netherlands Institute for Ecology | Challenger Oceanic, UK |
| The Netherlands Institute for Sea Research | Max Planck Institute, Germany | University of Aberdeen, UK | Volcanic Basin Petroleum Research, Norway |
| University of Barcelona, Spain | CNRS-CEFREM, France | University of Liverpool, UK | Praesentis, Spain |
| HCMR, Greece | Instituto Hidrografico, Portugal | University of Yasar, Turkey | Median, Spain |
| IFM-GEOMAR, Germany | International University Bremen, Germany | Scottish Association for Marine Science, UK | MMCD, Germany |
| CNR-ISMAR, Italy | University of Bremen, Germany | University of Aveiro, Portugal | Olex A/S, Norway |
| Alfred Wegner Institute, Germany | University of Wales Cardiff, UK | GeoEcoMar, Romania | Archimex, Germany |
| University of Tromsø, Norway | Institute of Marine Research, Norway | IOC/UNESCO | Proteus, France |
| National University of Ireland Galway | University of Goteborg, Sweden | University of Pierre & Marie Curie, France | Jobin Yvon SAS, France |
| University of Erlangen, Germany | University of Southampton, UK | University Bretagne Occidentale, France | |
| University of Gent, Belgium | OGS, Italy | Institute Scientifique Rabat, Morocco | |

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