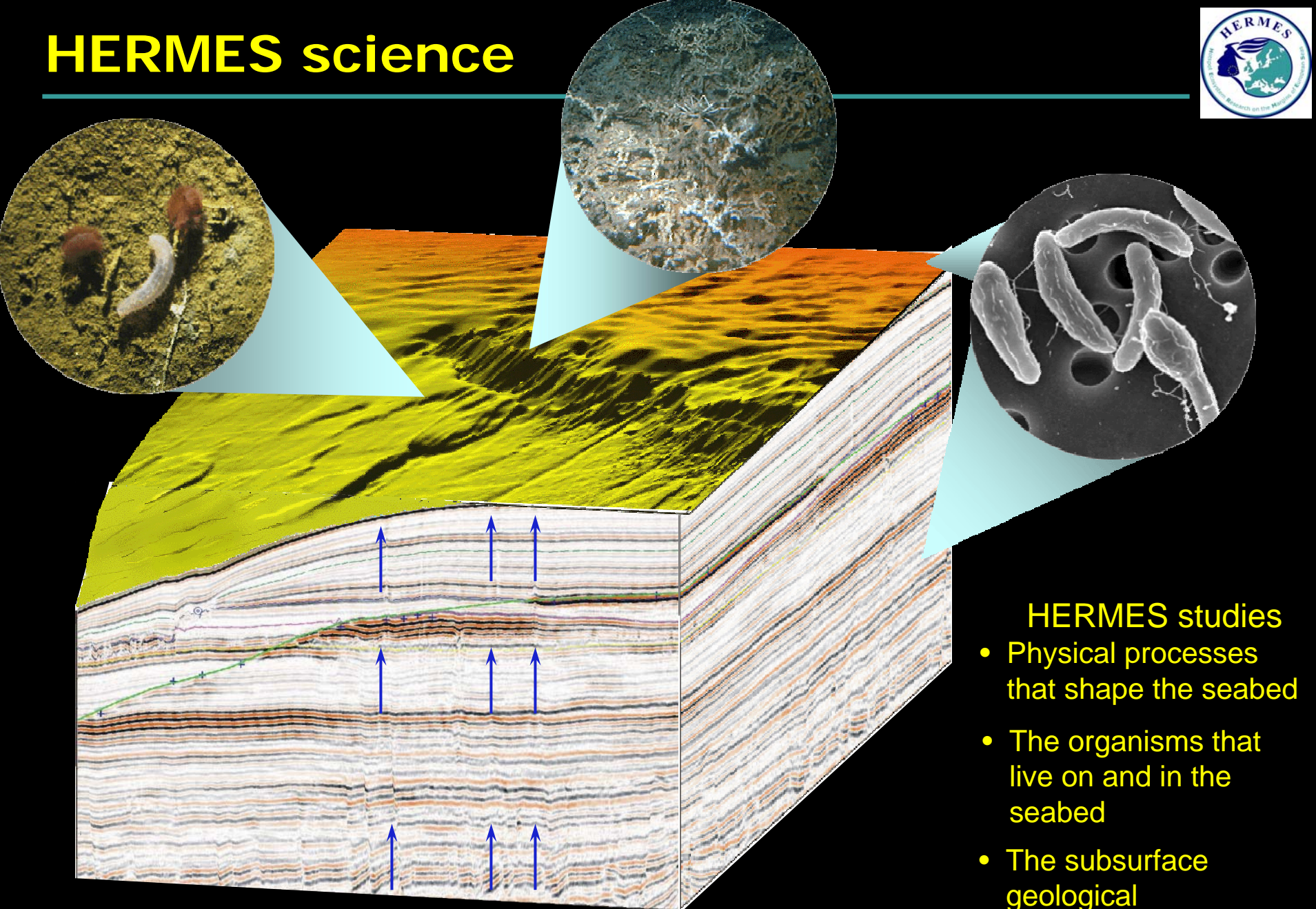


Phil Weaver, NOC, Southampton
EPBRS meeting, Porto, November 8th 2007

HERMES science



- HERMES studies**
- Physical processes that shape the seabed
 - The organisms that live on and in the seabed
 - The subsurface geological processes that affect the seabed



Cold-water corals



Growing coral

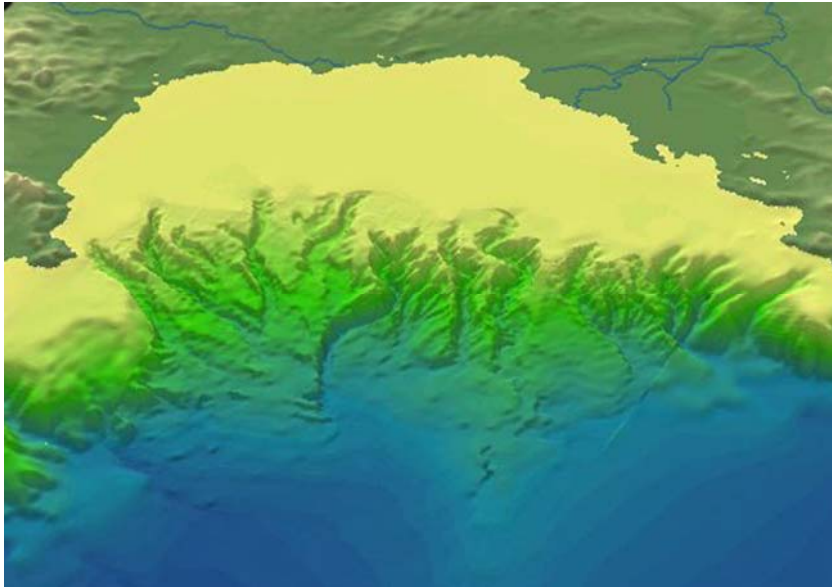


Smashed coral

Courtesy of Jan Helge Fossa, IMR Bergen

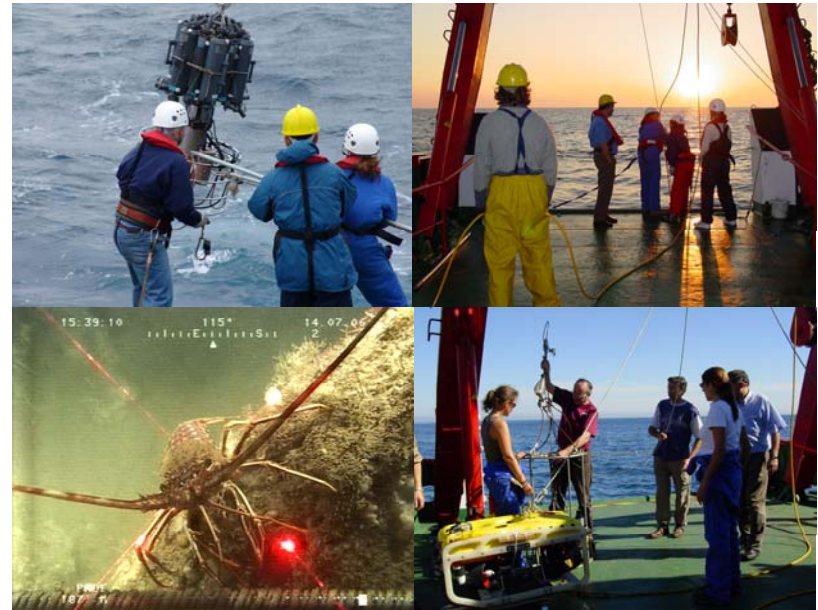
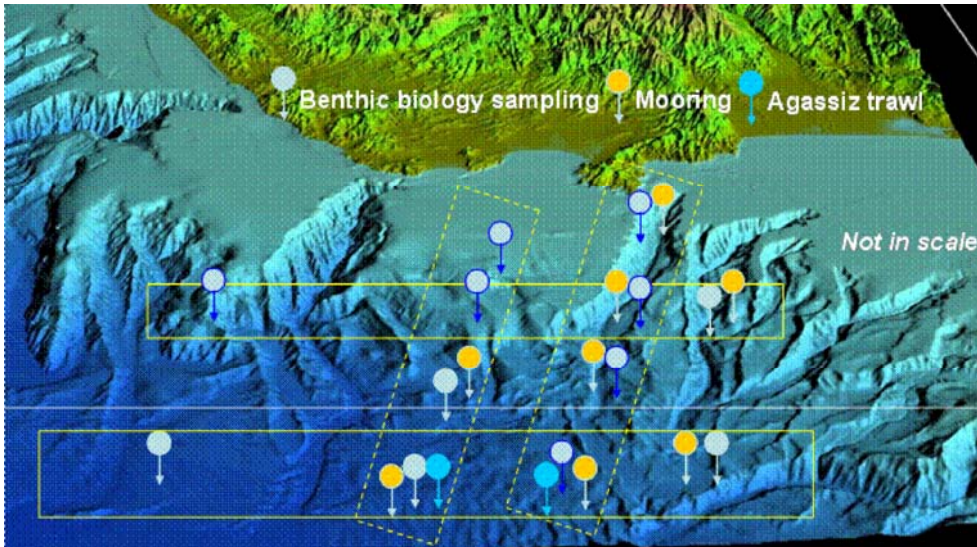


Canyons



Integrated sampling strategy in the Gulf of Lions: open slopes and canyon environments

Images courtesy CSIC and CoNISMa




Successes of HERMES

1. Building the European Research Area with 50 partner labs including 9 SMEs, involving over 200 scientists
2. Encouraging large amounts of support from member states through National programmes that have funded cruises, postdocs, studentships etc.
3. Gathering of vast data sets – over 50 cruises in 3 years
4. Links to policy makers and industry where genuine dialogues have begun but large gulfs of understanding have been exposed.
5. Huge training effort with 75 PhD students and 70 postdocs associated with the project.
6. Very large outreach programmes with several TV films and TV news items, schools programmes and specialist SMEs developing software packages
7. Beginning to model ecosystems and use genetics to understand interconnections between isolated communities
8. Perhaps most importantly, the will of all participants to work together, to share data, exchange personnel on cruises and create joint publications.




The Future




 **EUROPEAN COMMISSION**
Community research

The Deep-Sea Frontier:
Science challenges for a sustainable future



STUDY

EUR 22812 EN



SEVENTH FRAMEWORK PROGRAMME

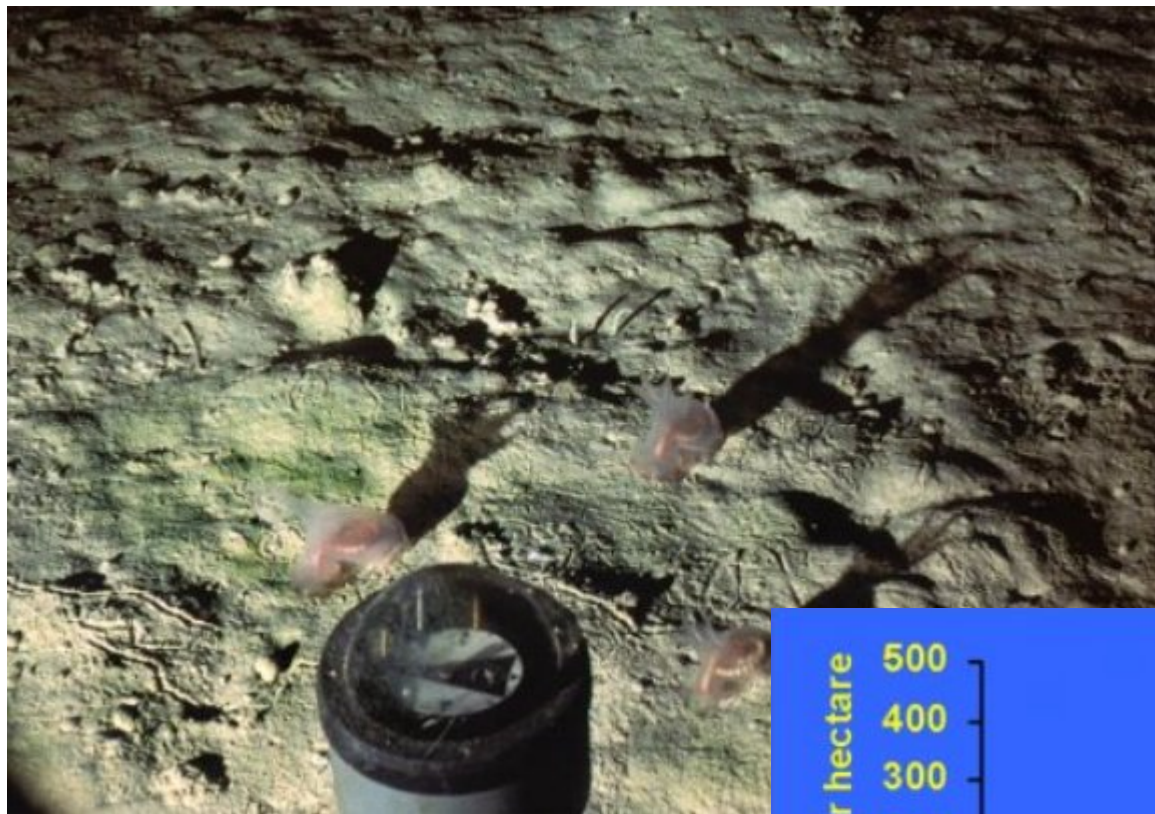


Major questions related to deep-water ecosystems

1. How do deep-sea ecosystems respond to deep-sea warming and ocean acidification, and the resulting changes in hydrodynamic regime and productivity?
2. What is the relative importance of biotic and abiotic time-varying factors in structuring deep sea communities?
3. What are the impacts of episodic and extreme events on deep-sea ecosystems?
4. How does biodiversity and ecosystem functioning vary over very small regional and global scales, and with environmental heterogeneity, latitude and depth?
5. What are the effects of geobiological processes on deep-sea ecosystem functioning? What are the relative contributions of geosphere-biosphere and benthic-pelagic coupling to deep-sea biogeochemistry?
6. Are biodiversity patterns consistent from microbes to megafauna, and how do the two components interact? Do all biodiversity layers respond in the same way to driving forces in the deep sea?
7. What are the life cycles and dispersal patterns for deep-sea organisms, and what are their physiological adaptations?
8. What is the deep-sea food web structure and the energy fluxes through trophic levels? What are the heterotrophic and chemo-autotrophic production and consumption rates of the different biotic components? Is chemosynthetic production (dark energy) relevant to the other deep-sea systems?
9. How resilient are deep-sea ecosystems to deep-sea fisheries, oil, gas and mineral extraction? Can deep-sea areas be used for waste disposal?
10. Can deep-sea biotic resources be managed in a sustainable way? What ecosystems should be given conservation priority? Is the existing legal framework sufficient to support adequate deep-sea conservation?

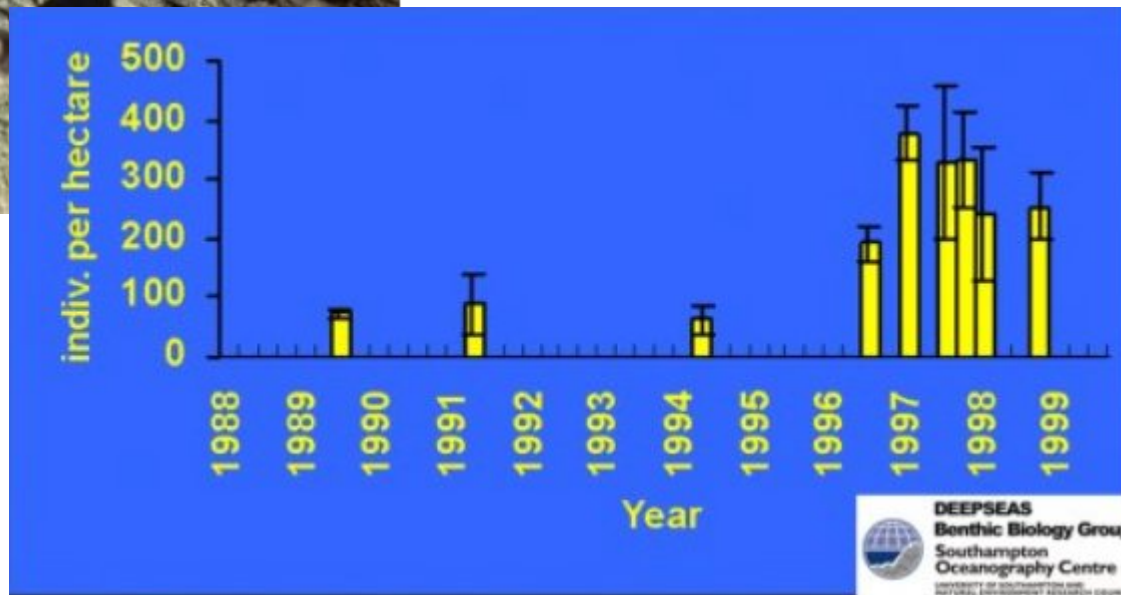


Open slopes



Long-term change

Photograph of the sea floor at the Porcupine Abyssal Plain (4800m depth) from 'Bathysnap'. Sea cucumbers *Amperima* are visible feeding in green detritus recently deposited from the surface.



Courtesy D. Billett, NOC



Major Issues for the Future

Continuity of funding

- Having built a great team how do we keep it together?
- Network of networks??

How do we afford sustained observing systems and persuade funding agencies to continue their funding into the long-term 10-20 years at least

- Common problem across all countries of Europe
- Do we need a new funding mechanism?



Major Issues for the Future

How do we get our message across?

- We must make sure that policy makers enter into a dialogue, act on our advice, and act rapidly
- But this is difficult to reconcile with (sustainable) economic growth
- We must have stronger outreach programmes to educate the general public

