



IFM-GEOMAR

Ocean Circulation and Climate Dynamics

Present-Day Climate



Modelling & Forecast

Paleo-Climate Records

Risk Analysis and Management of European Margins

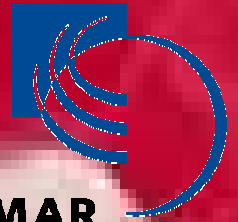
- submarine slides and tsunamis (Norway, UK)
- earthquakes and tsunamis (Portugal, Gulf of Cadiz, East Sicily, Hellenic Region, Black Sea)
- volcanic eruptions (Mt. Etna)
- toxic phytoplankton blooms



Changes Need to be Monitored



Gashydrates: Norway, Black Sea



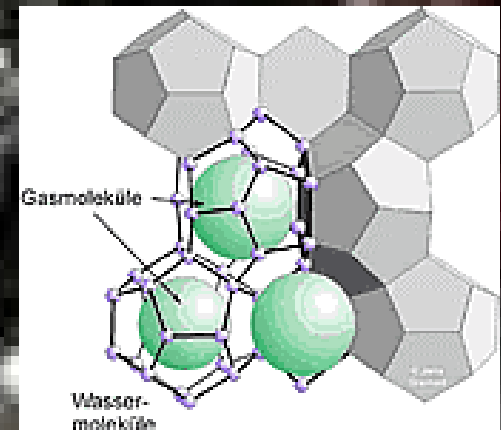
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... consist of methane and water in solid form

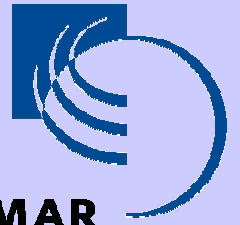
... occur at continental margins and in permafrost areas

... are stable at specific pressure and temperature conditions

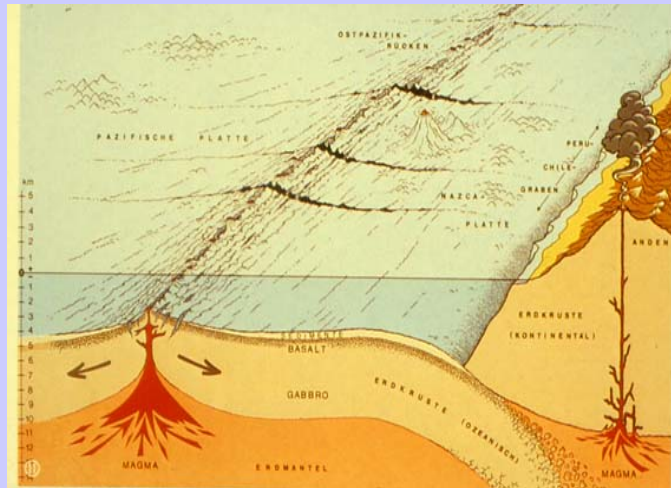
- potential energy source (methane)
- potential greenhouse gas (30xCO₂)
- hazard potential (submarine landslides: tsunamies)



Volcanic Eruptions and Earthquakes: Mediterranean



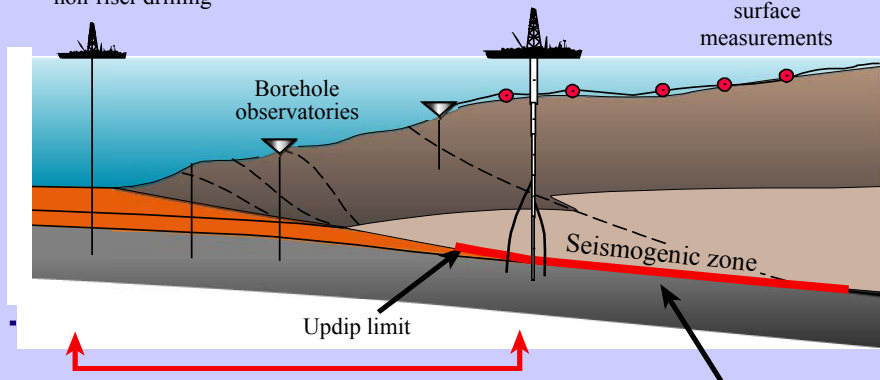
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Characterizing the incoming material by non-riser drilling

Riser drilling of the seaward limit of the seismogenic zone

Sediment surface measurements



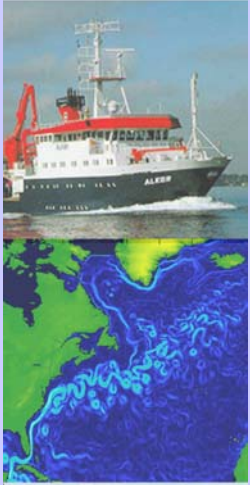
Quantify lateral changes in the nature of the physical, chemical, and hydrogeologic changes in the subduction fault

Image seismogenic zone using earthquakes and artificial sources



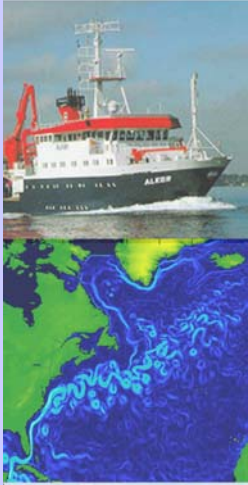
Sustainable Use of Marine Resources

- oil and gas deposits (Norway, UK)
- gashydrates (Norway, Black Sea)
- genetic and biochemical resources (Porcupine region/Ireland)
- mariculture in contrast to fish farming



Extreme Environments and Habitats

- mud mounds (Mediterranean, Iberian P.)
- deep and cold water coral reefs (Norway)
- diverse deep water habitats (Ireland)
- carbonate mounds (Ireland)
- hydrothermal vent fauna (Azores)



A photograph of a deep-sea coral reef ecosystem. The scene is dominated by a large, fan-shaped, yellowish-brown coral structure in the center-right. The surrounding seabed is covered with various other coral species, including branching and encrusting forms, and patches of greyish sediment. The lighting is dim, typical of deep-sea environments, highlighting the textures and colors of the marine life.

**Deep and cold water corals
at European Margins: one of the largest
ecosystems of this kind in the world**

Porcupine Area, Ireland

