

Working group on Gas Hydrates and Natural Seeps in the Nordic Sea region (GANS)

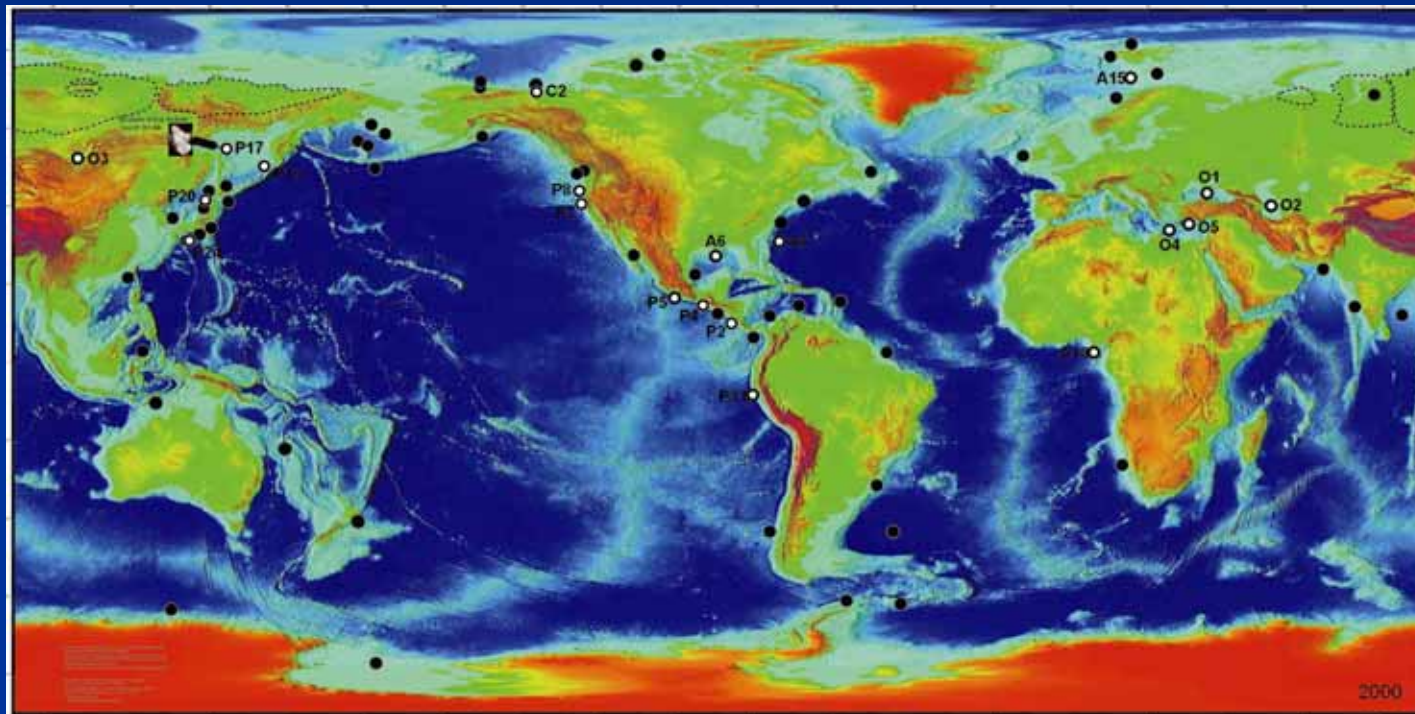
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Gas Hydrates and Natural Seeps in the Nordic Sea region



Gas hydrates occur worldwide

After Kvenvolden and Lorenson (2000)



- *locations with recovered gas hydrate samples*
- *inferred gas hydrate occurrences based on BSRs and well-logs*

Background for meeting in Bergen

- Extensive evidence of gas hydrates and seeps on the norwegian continental margin
- Why?
 - Basic knowledge on nature systems (geo, bio..)
 - Biological resources
 - Gas hydrates as a resource
 - Gas hydrates as a risk factor
- Overview of related research in Norway
- Discuss strategies to strengthen this research
 - Research priorities
 - Need for coordination
 - Sources for funding

Focus of research groups/institutions behind the GANS initiative:

- University of Tromsø (Mienert/Andreassen)
 - Gas hydrates and slope stability
 - Gas hydrates: where, why and volumes
 - Gas in sediments and geotechnical aspects

- Geological Survey of Norway (Bøe/Knies)
 - Mapping of gas hydrates and seeps
 - Gas hydrates as an energy resource
 - Gas hydrates, seeps and environment

- Norwegian geotechnical institute (Kvalstad)
 - Gas hydrates and slope instability
 - Gas in sediments
 - Physics of gas hydrates

Cont. groups involved

- University of Bergen – Department of Earth Science (Sejrup/Hjelstuen/Haflidason)
 - Seafloor expression of seeps
 - Gas hydrates and climate
 - Margin development and gas hydrates
- University of Bergen – Department of Earth Science (Pedersen/Thorseth)
 - Subsurface biosphere
 - Hydrothermal activity and seeps
- University of Bergen - Department of Physics and Technology (Kvamme/Hellevang)
 - Modelling of processes and phenomena which are partly or in whole dominated by thermodynamics.
 - Modelling of phase equilibrium and phase transition kinetics on micro- and macro-level.
 - Estimation of physical properties and transport properties by molecular simulations.
- Statoil (Hovland)
 - Seafloor expressions of seeps and gas hydrates
- And.....

Biology....



I may not be pretty but I'm happy

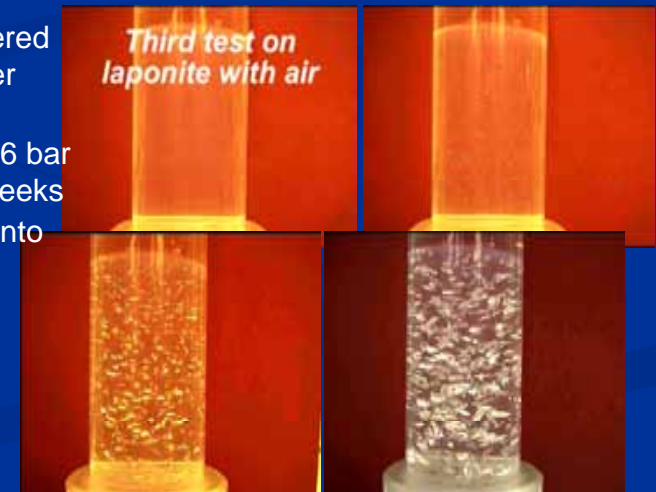
DEVELOPMENT OF RESEARCH INFRASTRUCTURE

- Field platforms
 - Multibeam systems
 - TOPAZ
 - ROV facilities
 - Coring equipment
 - Surfaced sediment sampling
 - Etc..
- Experimental facilities
- Analytical facilities
- Modelling



Gas in sediments(NGI)

Laponite covered
by water layer
Air pressure
above water 6 bar
for several weeks
Air diffusion into
Laponite
Pressure
reduction
Gas bubble
formation



Funding possibilities / Research initiatives

- EU
 - HERMES
- ESF
 - Euromargin
 - Eurodeep
- Industry
- NFR
 - Program
 - SFF

Need for national coordination?

Overall objectives for GANS

- Strengthen multidisciplinary research on deep-sea systems in Norway
- Develop a strategy for research on natural seeps and gas hydrates in Norway
- Contribute in national coordination of research on natural seeps and gas hydrates in Norway
- Coordinate the use and development of research infrastructures important for research on natural seeps and gas hydrates
- Contribute in the international evaluations of strategies for hydrate reservoir exploitation

Preliminary research tasks/focus points

- Gas and gas hydrate formation processes and conditions for transport, accumulation, preservation and dissociation (“melting”) in sediments (i.e. gas generation, fluid flow, diffusion, crystallisation, sublimation, heat flow, thermodynamics, hydraulics and geomechanics)
- Effect of gas hydrate (amount and distribution) on physical properties of sediment (elastic, electric, thermodynamic, strength etc.)
- Detection and quantification of in situ gas hydrate content and distribution pattern

(cont.) research tasks/focus points

- Effect of dissociation on soil properties (risk of slope instability and dislodgement of wells and subsea structures)
- Gas hydrates as an energy resource: production methods
- Natural seeps, habitats and ecology
- Rapid methane release and climate change
- Geohazard and environmental impact
- Database

Visions for marine research in Norway

- Resources and geography
- Deep sea challenges - interdisciplinary research
- Challenges for the Norwegian marine research community
 - Handling known problems
 - Be a part of the knowledge based future exploration and handling of deep sea systems

Further developments of GANS

- Scientific rational - open process
- Structure and management
- Activities, meetings..
- Funding..

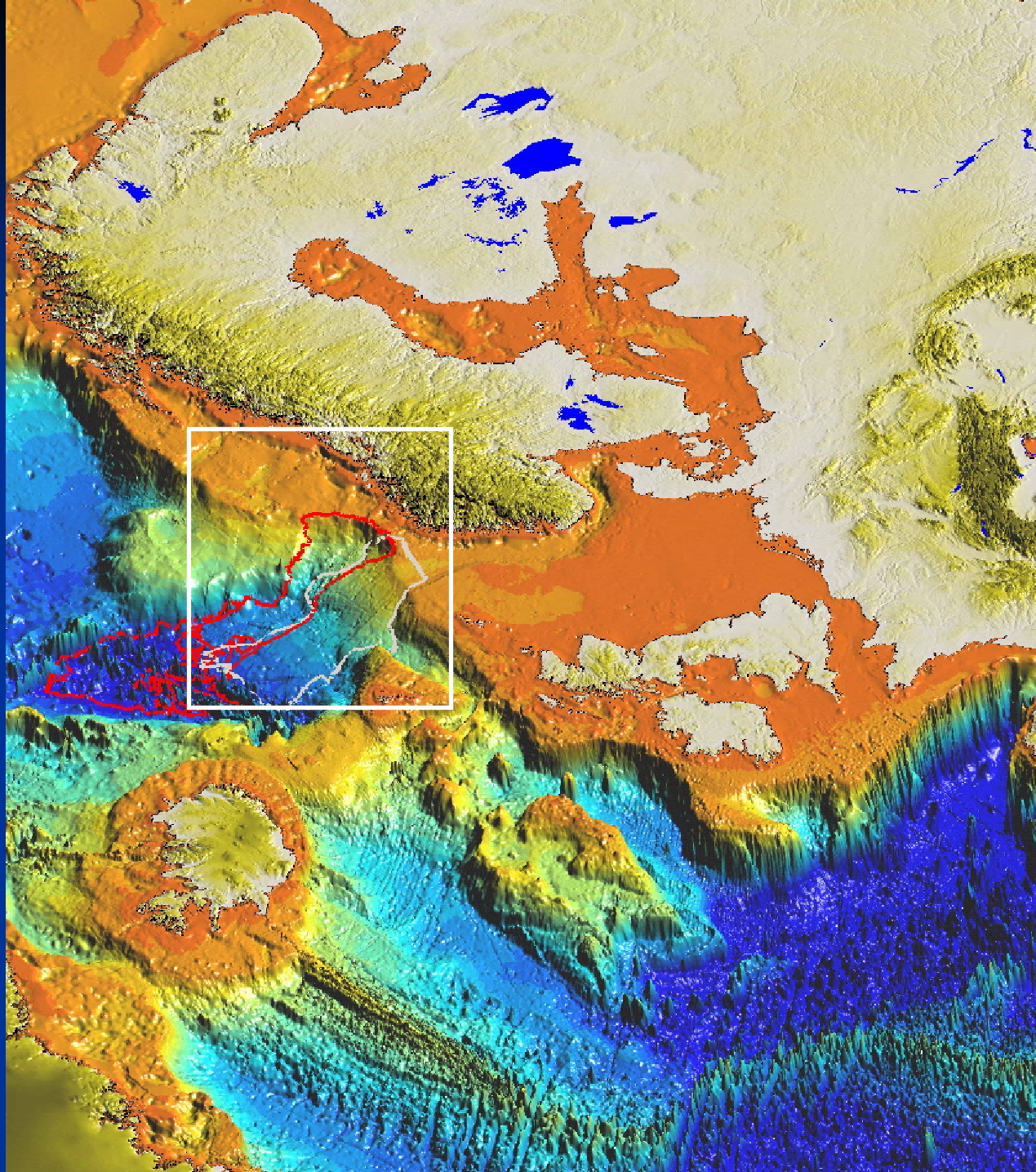
Major sedimentary processes:

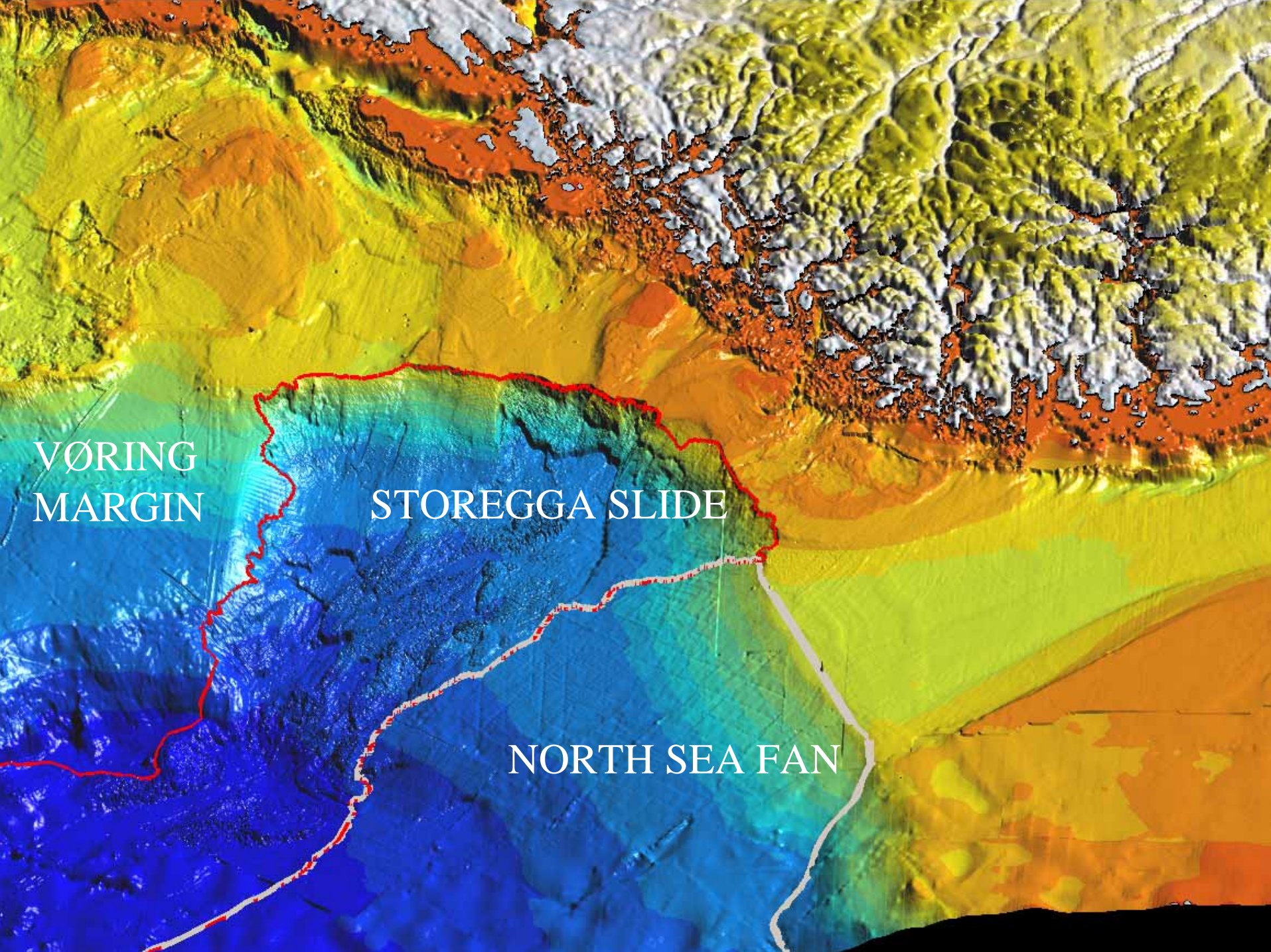
Glacial fed debris flows

Mega scale sliding

Marine/glacial marine sed.

Ice sheet-Ocean interaction



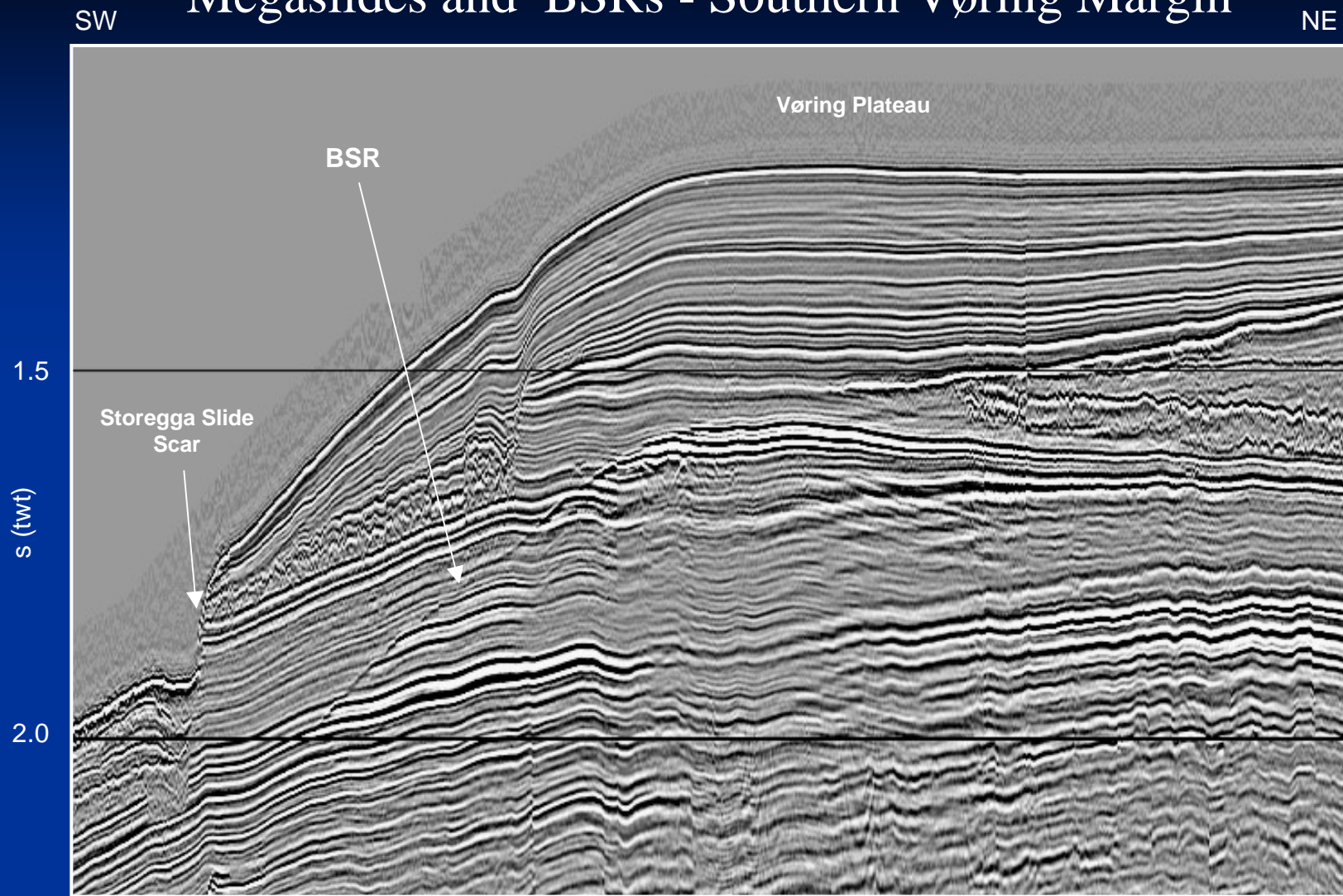


VØRING
MARGIN

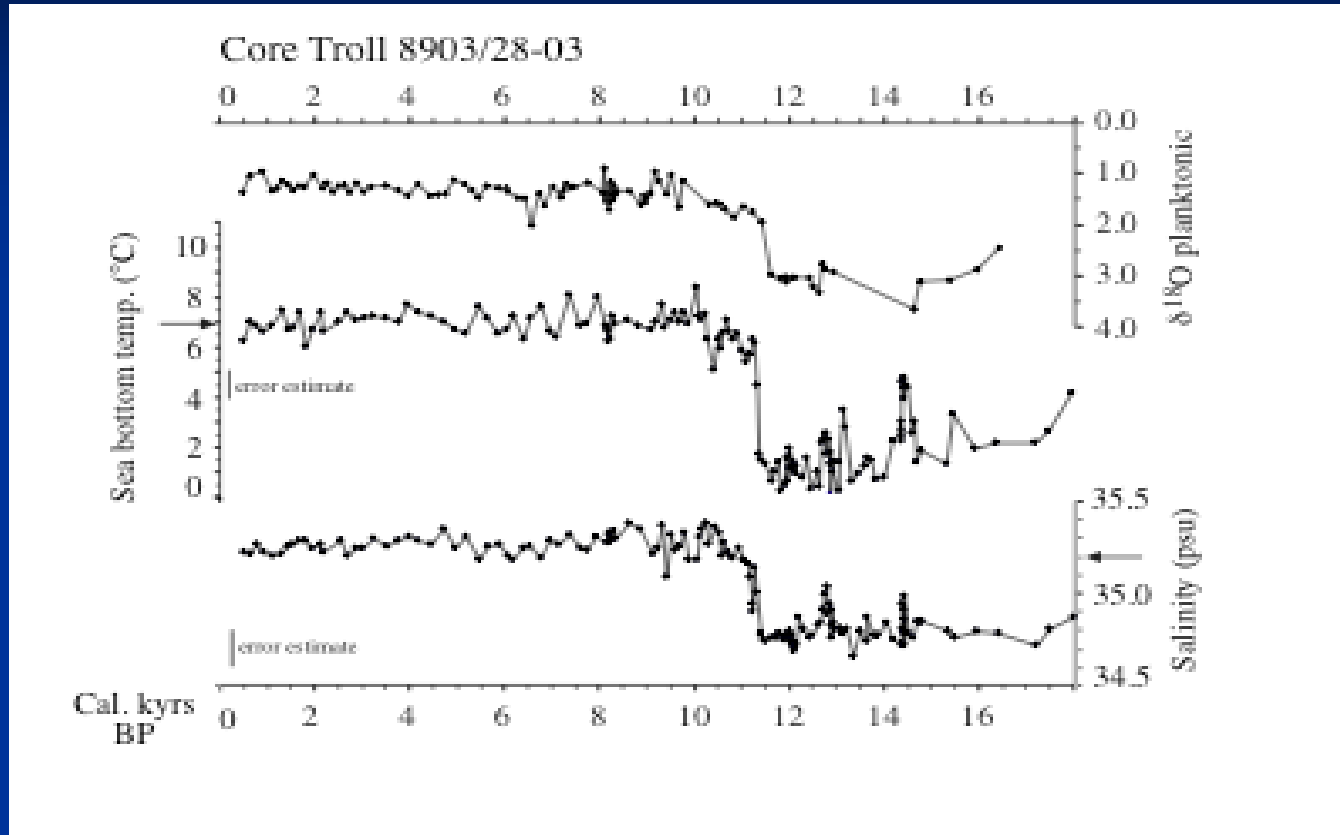
STOREGGA SLIDE

NORTH SEA FAN

Megaslides and BSRs - Southern Vøring Margin

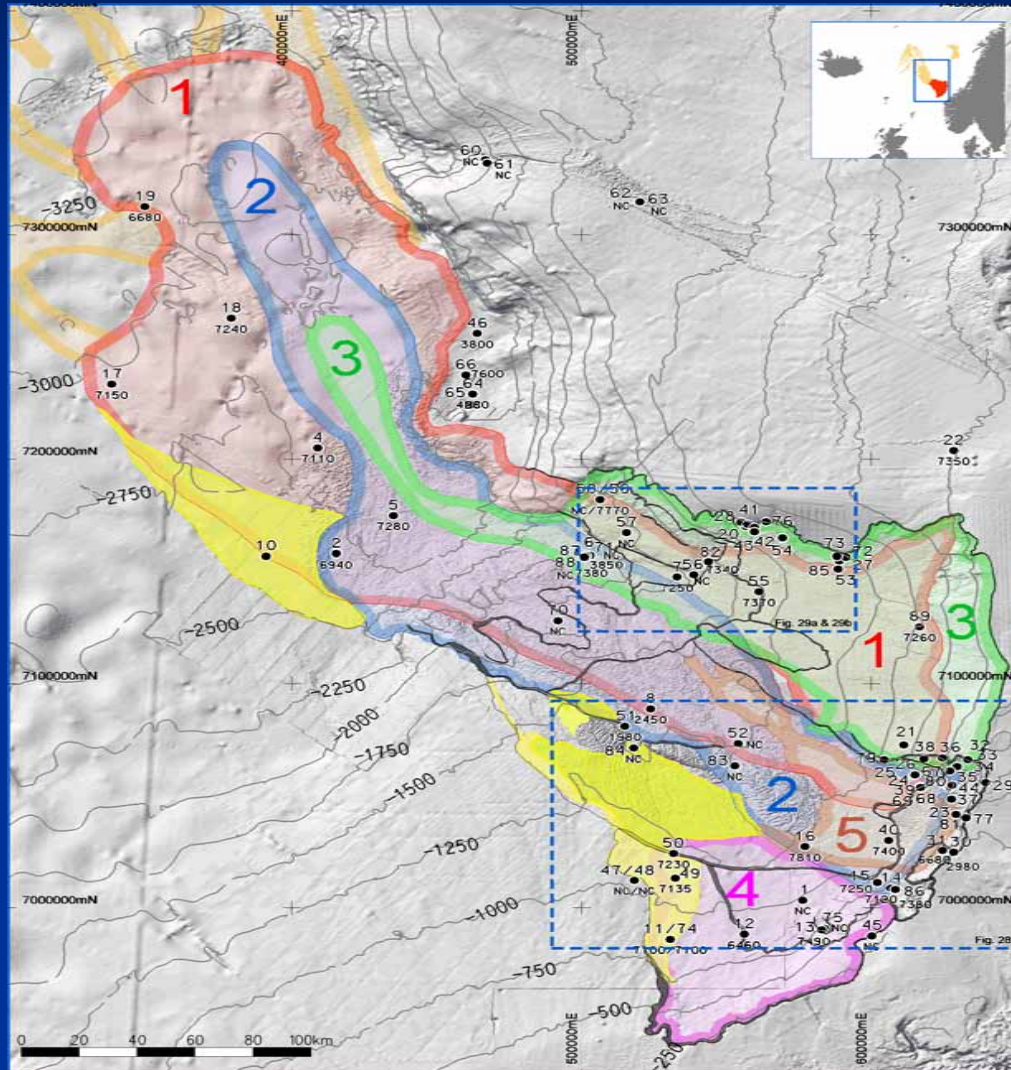


Paleoceanography - stability of Gas Hydrates



Storegga Slide

Morphological provinces

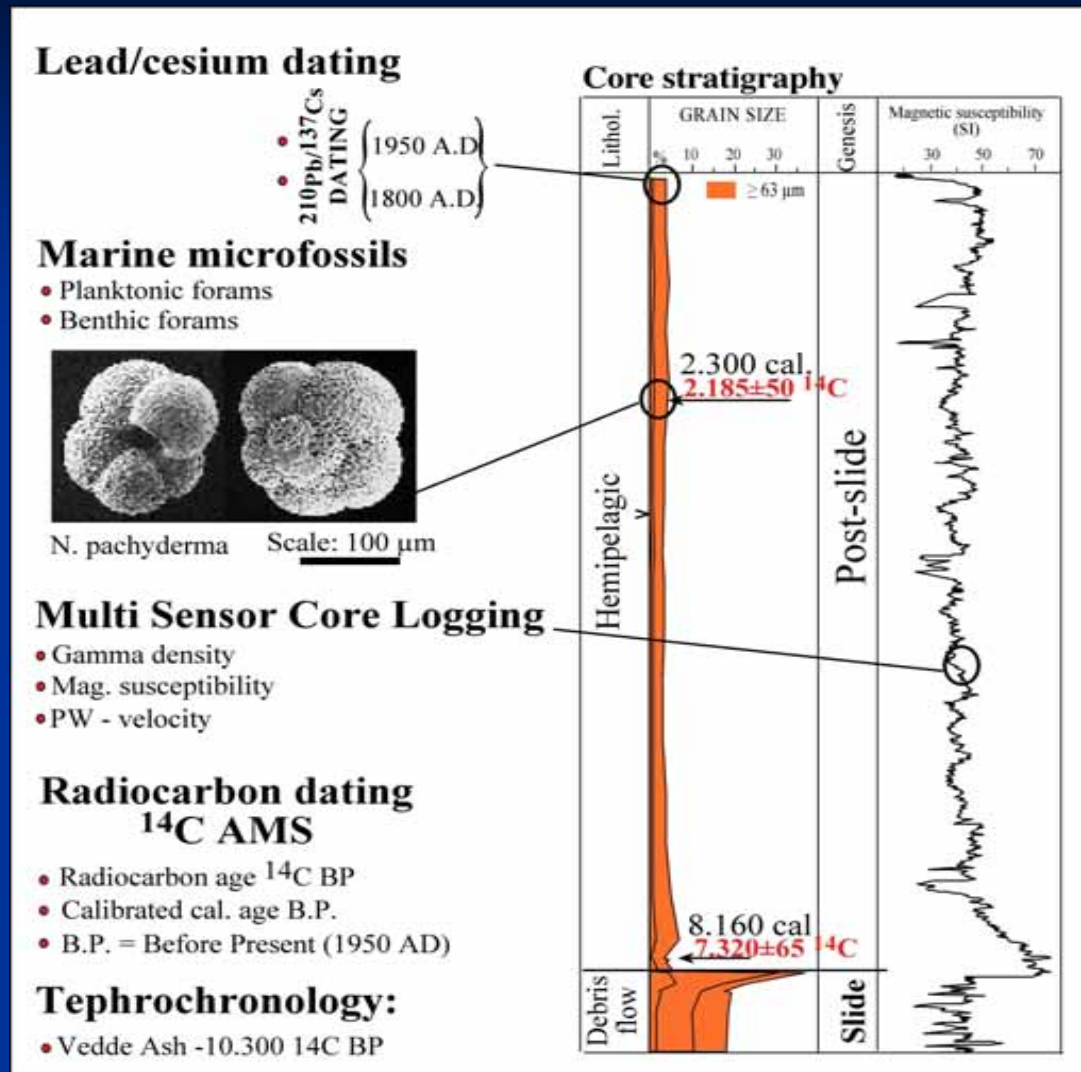


Area: 95.000 km²

Vol.: 3200 km³

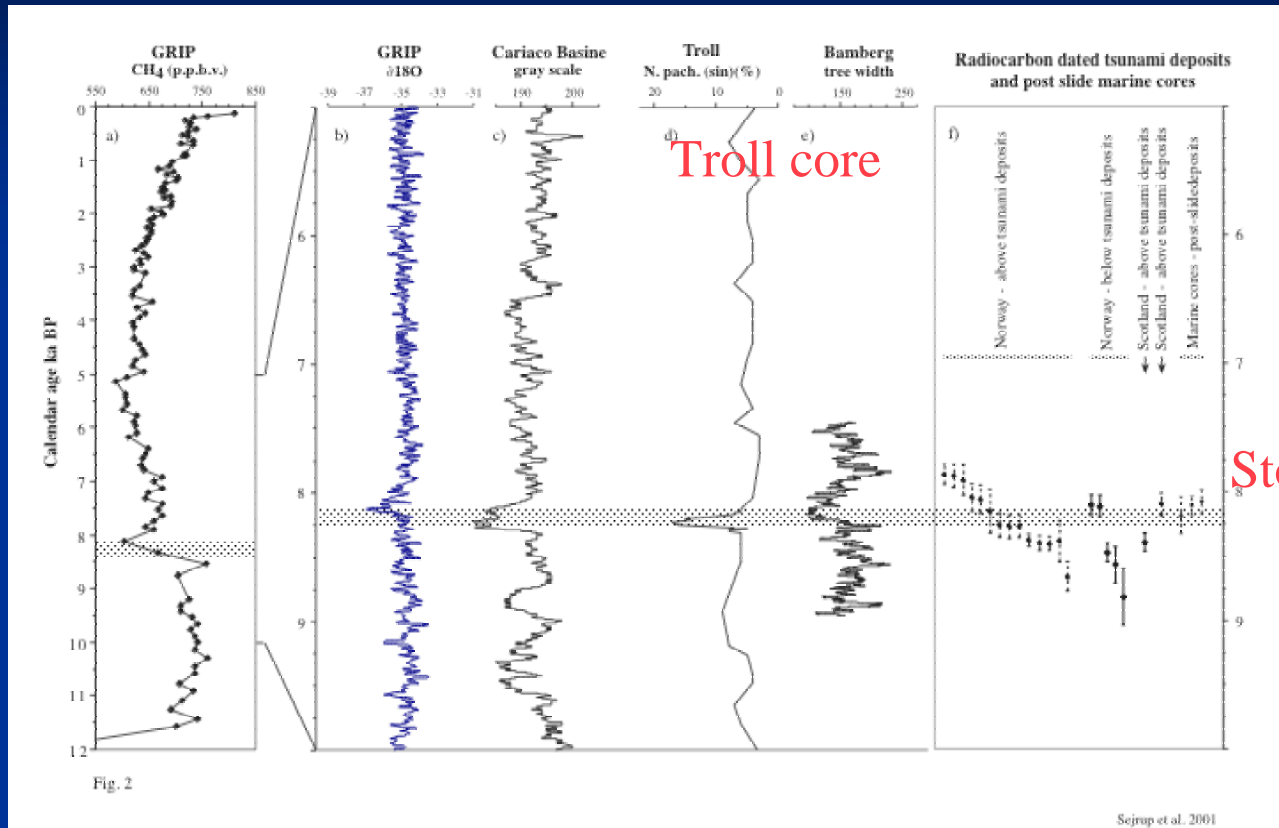
Run out: 800 km

Dating of the Storegga Slide



Haflidason et al. in press

Methane and climate change ??



Timing of events
Estimates of volumes