

# **Sponges associated with Arctic coral reefs**

**- results from a photo study off Mid-Norway**

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**Arctic Biodiversity Congress**

Trondheim, 4th Nov., 2014

**Session: Tools for Assessing, Managing and Monitoring**

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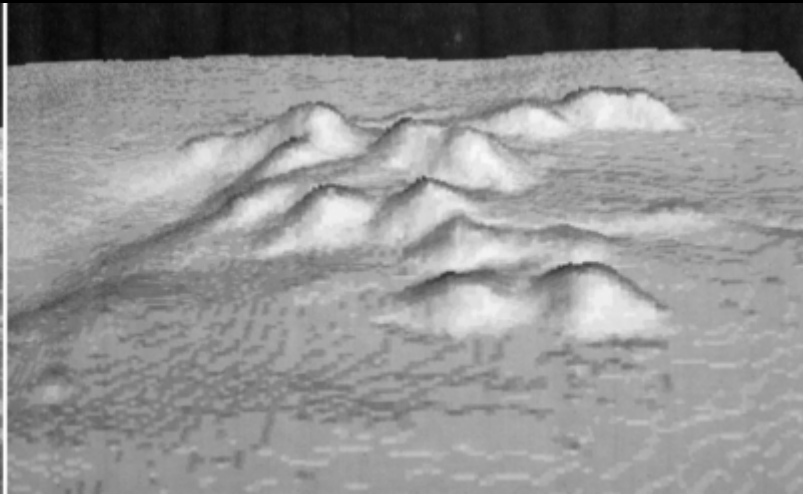
# Norwegian oil and gas transport systems, 1980 - 2005

## Industry Survey methodology

Use of Remotely Operated Vehicles (ROVs) is very common in the hydrocarbon industry.

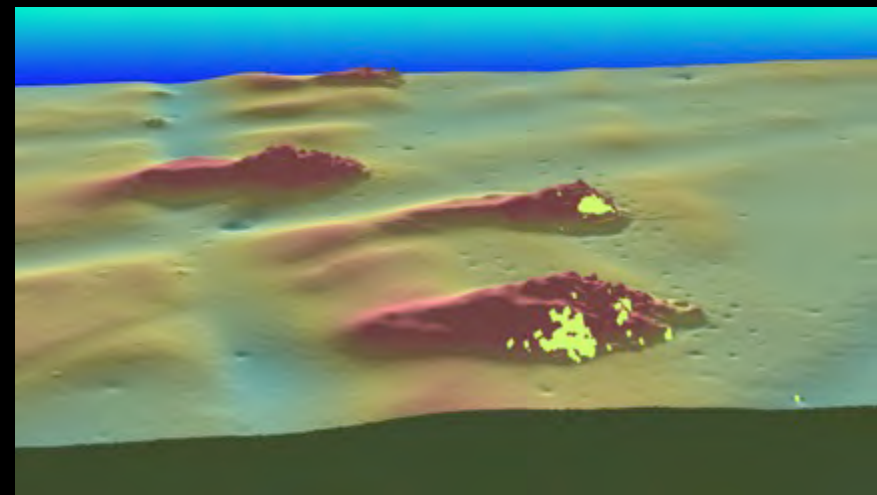
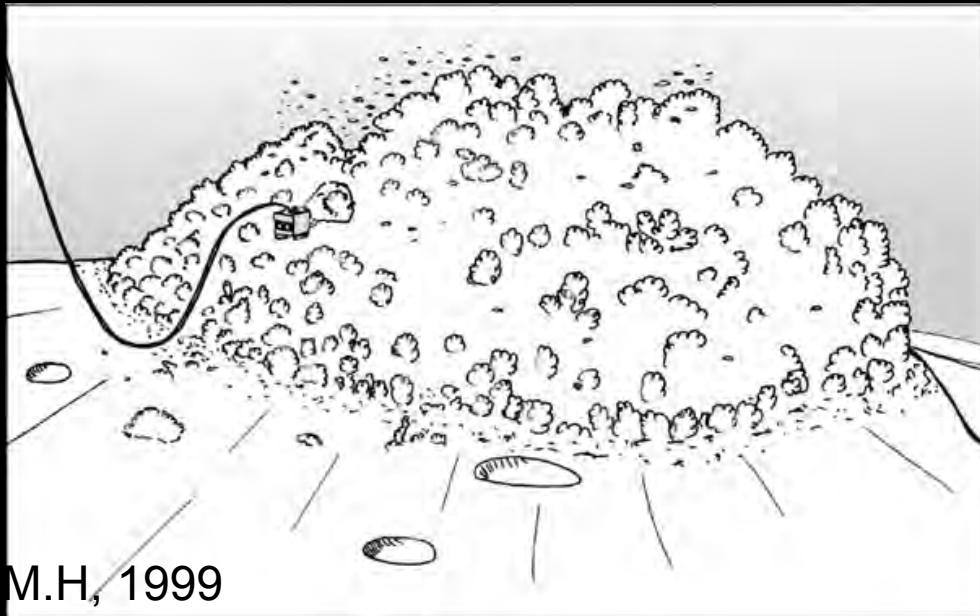


# Norwegian *Lophelia*-reefs discovered and mapped, from 1982 till today



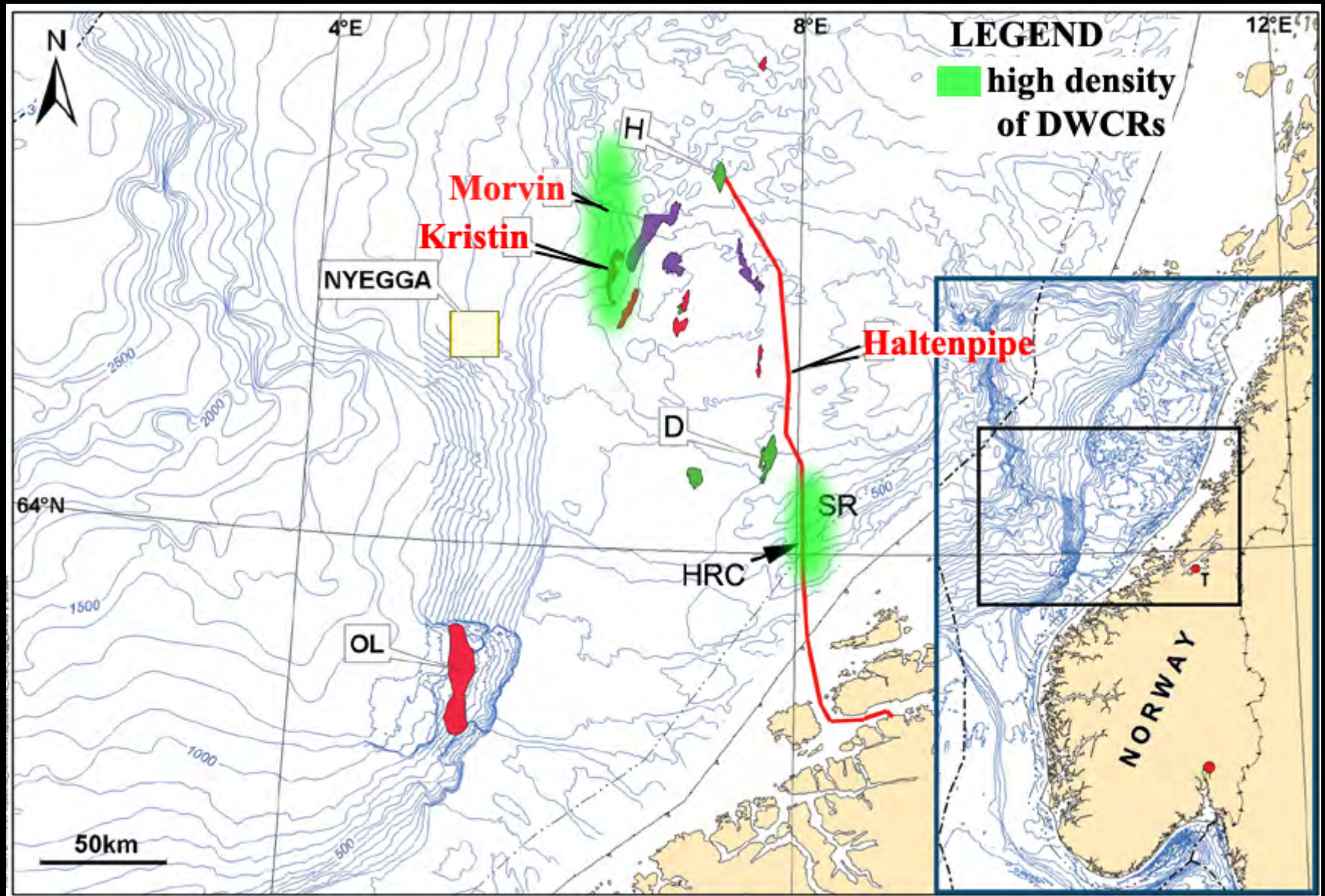
Vintage DTMs,,  
from the early 90's

'DTM'=Digital  
Terrain Model



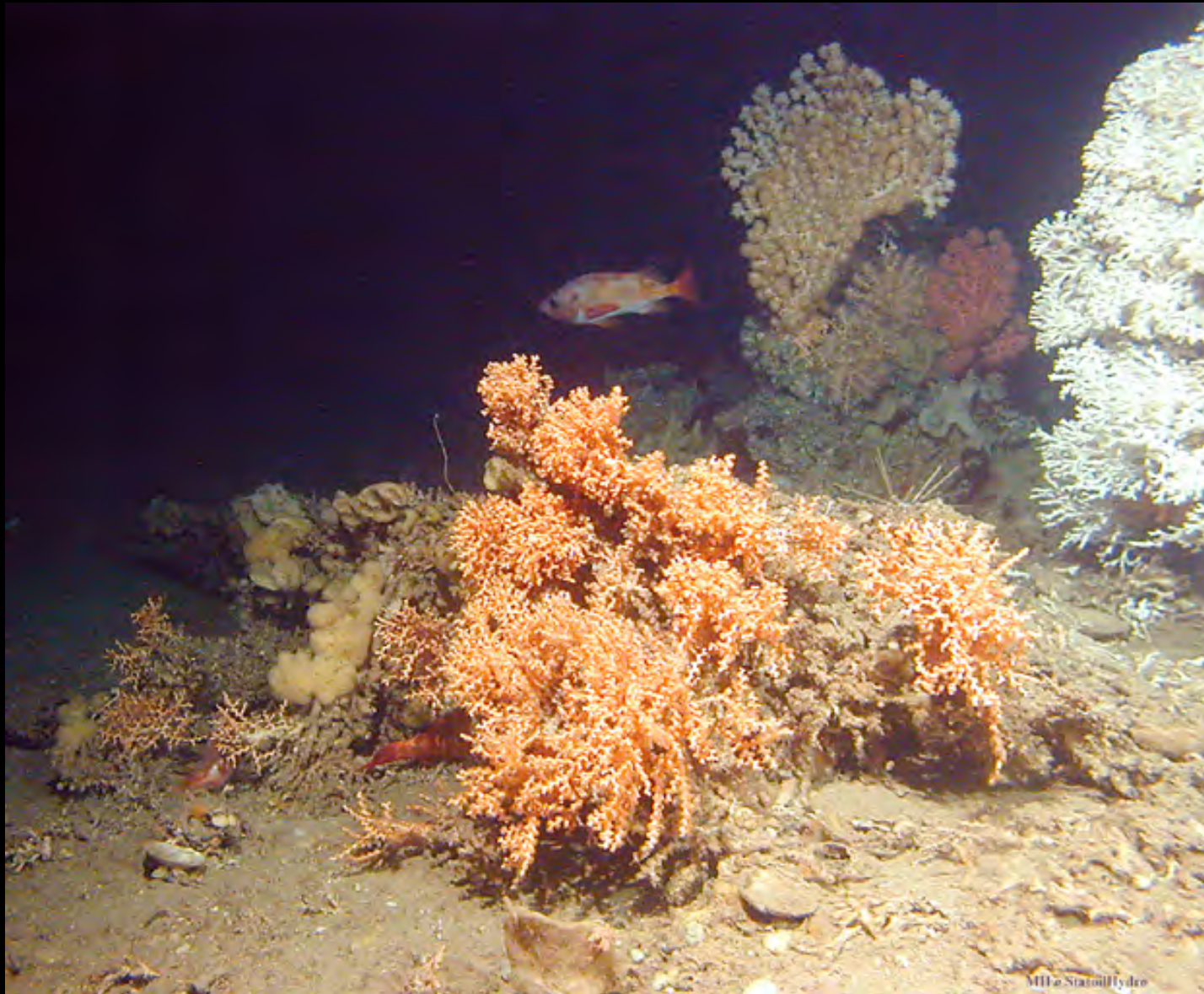
Modern DTM of  
high resolution

# Lophelia-reefs are especially dense off Mid-Norway



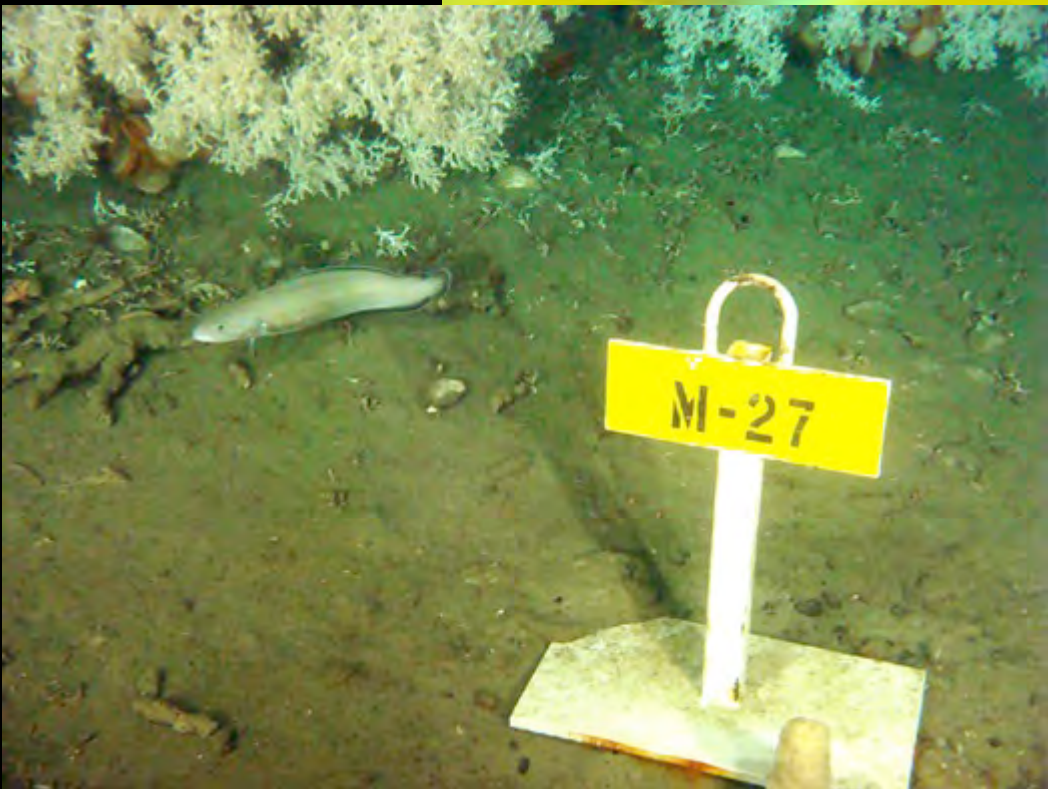
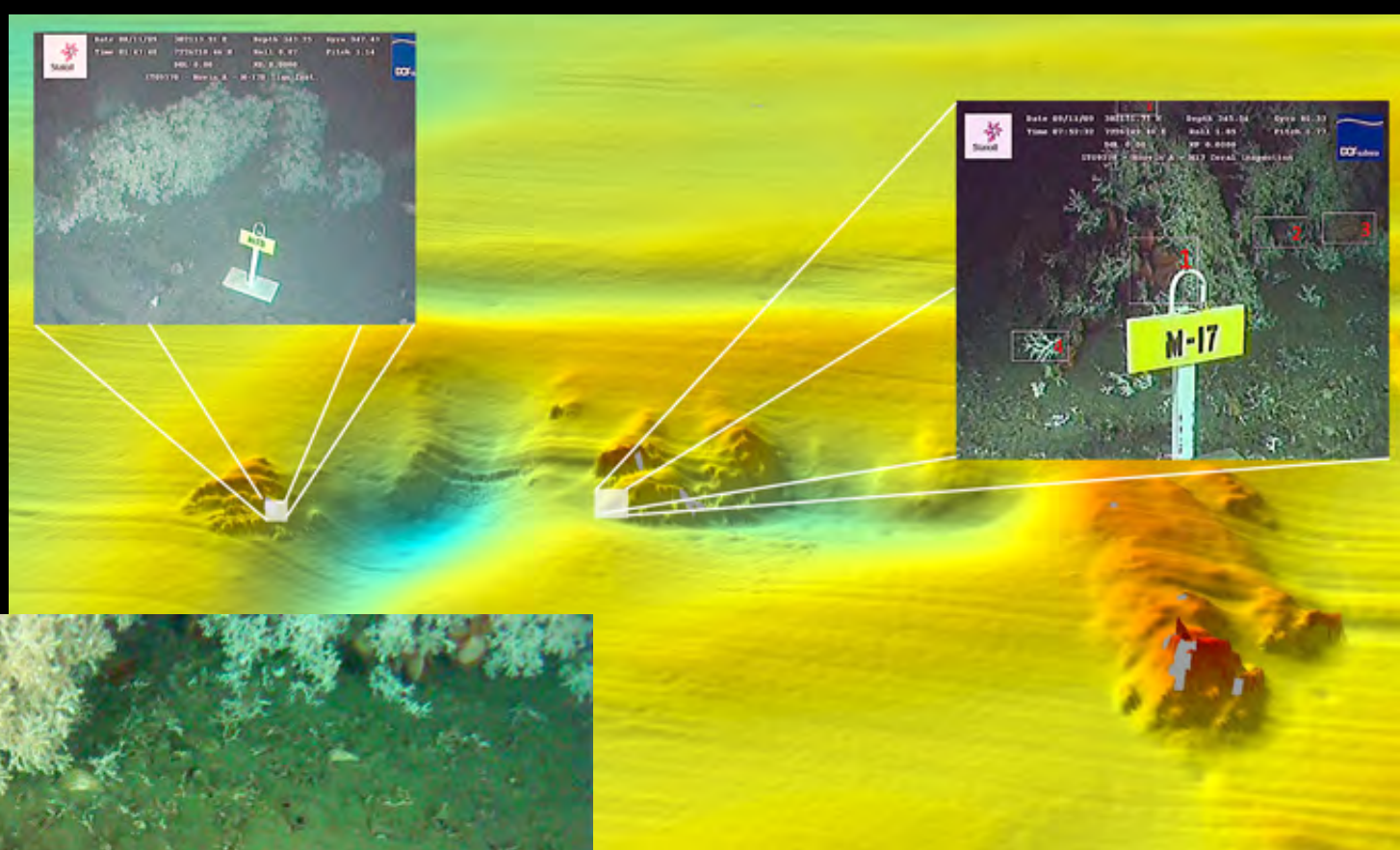
OL=Ormen Lange; D=Draugen; H=Heidrun; SR=Sula Ridge; HRC=Haltenpipe Reef Cluster

*Lophelia*-coral reefs are unique,  
high bio-density and -diversity ecosystems



Scene from  
one of the  
*Lophelia*-reefs  
at the Morvin  
field off Mid-  
Norway

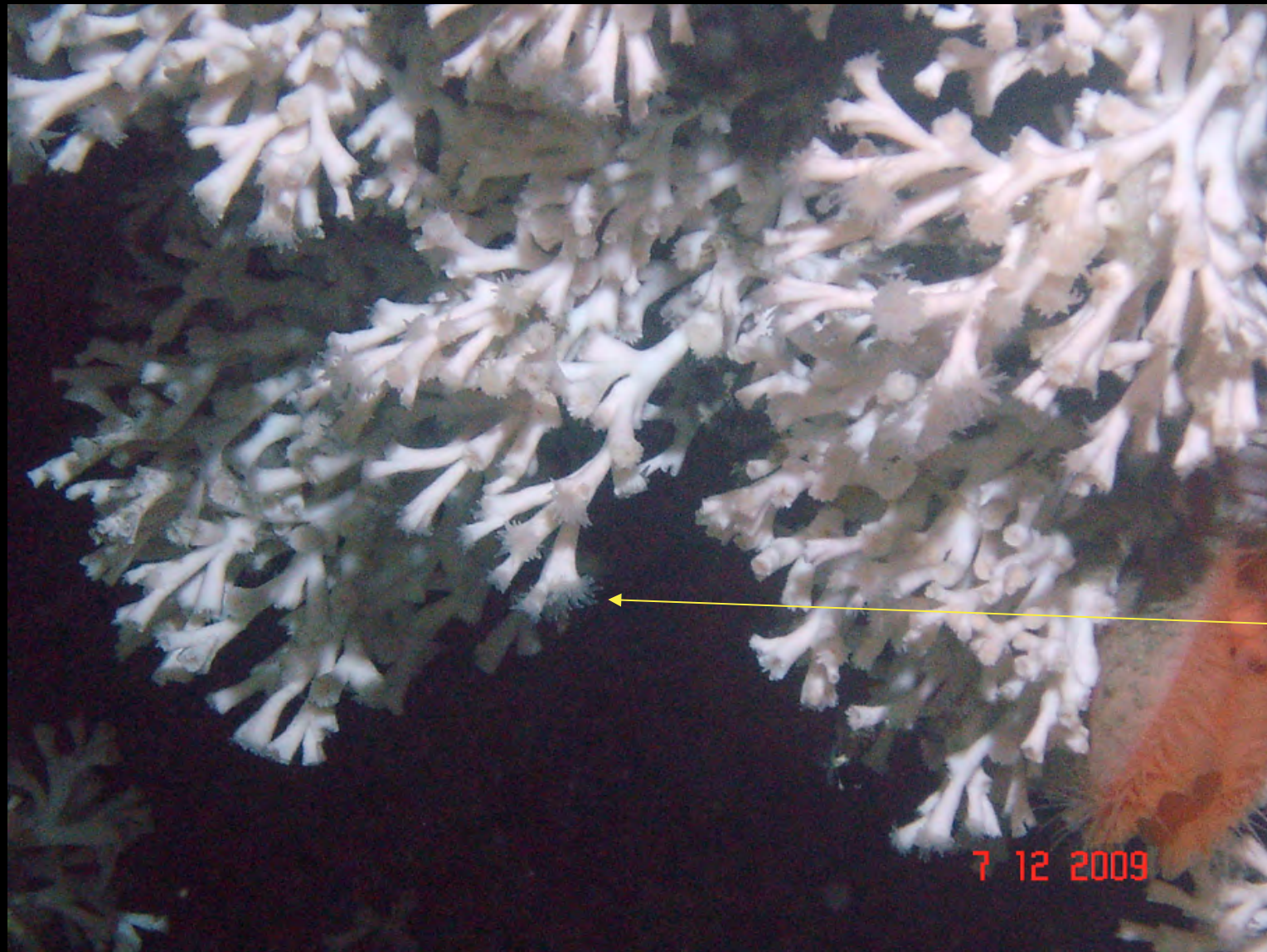
Production drilling at Morvin, 2010 required full monitoring of nearby reefs



This was done by using ROVs and Landers equipped with cameras, strobe light, and sonar systems

# Coral monitoring with ROV



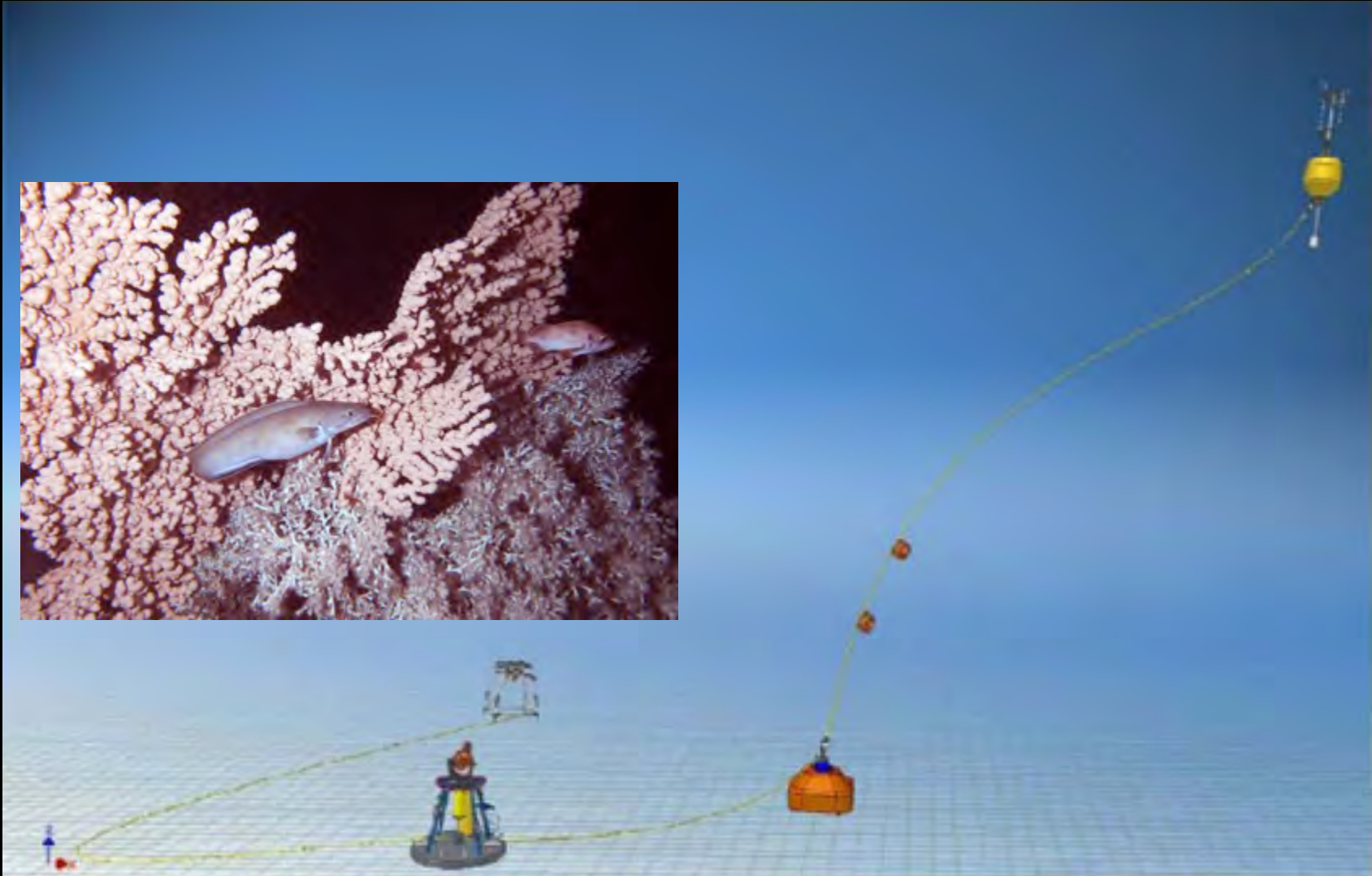


How are  
the  
*Lophelia*  
polyps  
today?

They are  
out and are  
fine.  
Also the  
*Acesta* is  
articulating.

Daily polyp monitoring

# Time-lapse polyp-monitoring



Video from monitoring  
at Morvin, 2010



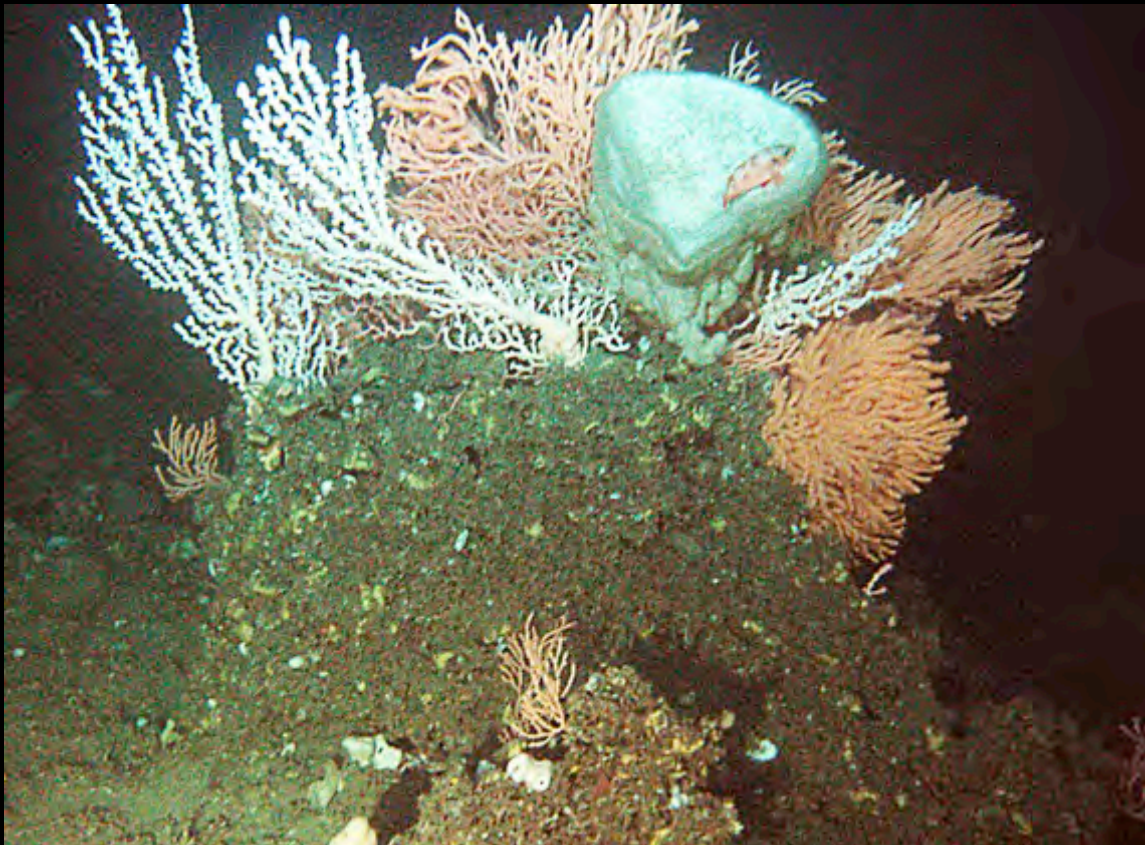
Vogel, 2008

“Sponges are ancient and very primitive animals basically consisting of single cells held together with extracellular material/proteins (collagen/spongin and/or spicules of calcium or silicium).

Internally, they are found to contain numerous types of bacteria, some of which may participate in nutrient processing and up-take from the water.”

Ackers et al. 2007(Sponges of the British Isles)

**ATLAS of sponges  
associated with *Lophelia*-reefs  
off Mid Norway**

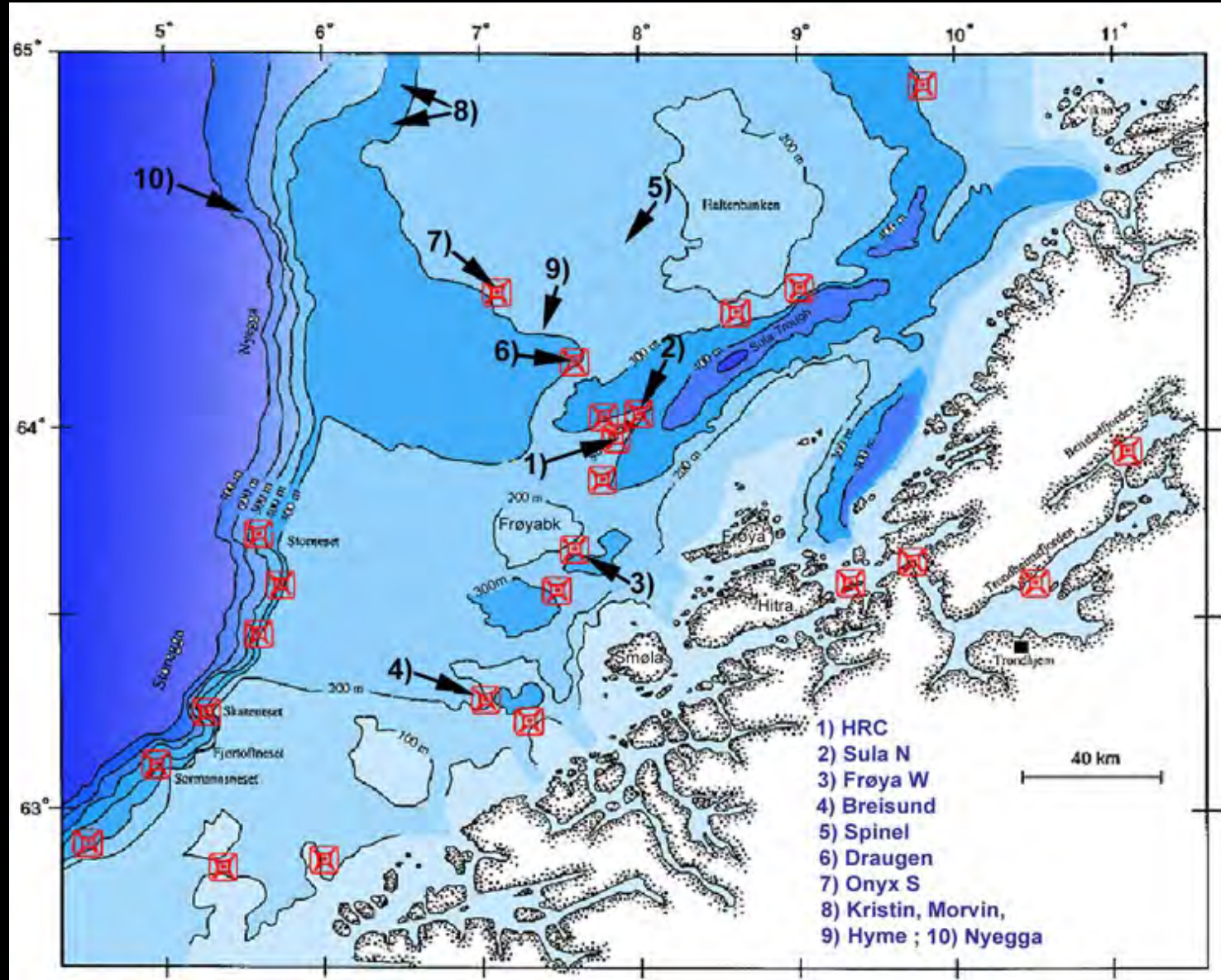


## The Atlas

contains 60 relatively high-resolution in-situ photographs of sponges associated with Norwegian deep-water coral reefs. It provides information on location and water depth, and could be useful as a **time-reference** in a future

'climate-change' environment.

# Lophelia-reefs off Mid-Norway



Included in the Atlas

Document:  
**ATLAS of sponges associated with *Lophelia*-reefs off Mid-Norway**

<b>Project:</b> Sponge Atlas	<b>Supplier:</b> Martin Hovland, SME corals		
<b>Document number:</b>	<b>Revision:</b> 01	<b>Date:</b> 29.09.14	<b>Page:</b> 2



# ATLAS of sponges associated with *Lophelia*-reefs off Mid Norway

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# Sponge Atlas images and details

5.3.1 Picture SRN-Hbk11E92



**Sponges:** 2 white-grey, circular, sponges: *Geodia macandrewii*? (15 cm x 15 cm x 10 cm); White irregular sponge: Unidentified, but could possibly be a glass sponge (*Caulophacus arcticus*?); Yellow sponge on dead *Lophelia p.*: suspected *Placortis simplex*.

**Live corals:** None

**Associated fauna in picture:** Squat lobster: *Munida sarsi*?

# Sponge Atlas images

5.4.2

Picture FW-Hbk03B92



**Comments:** Top of a 2 m high “sponge reef”, probably without *Lophelia partusa*.

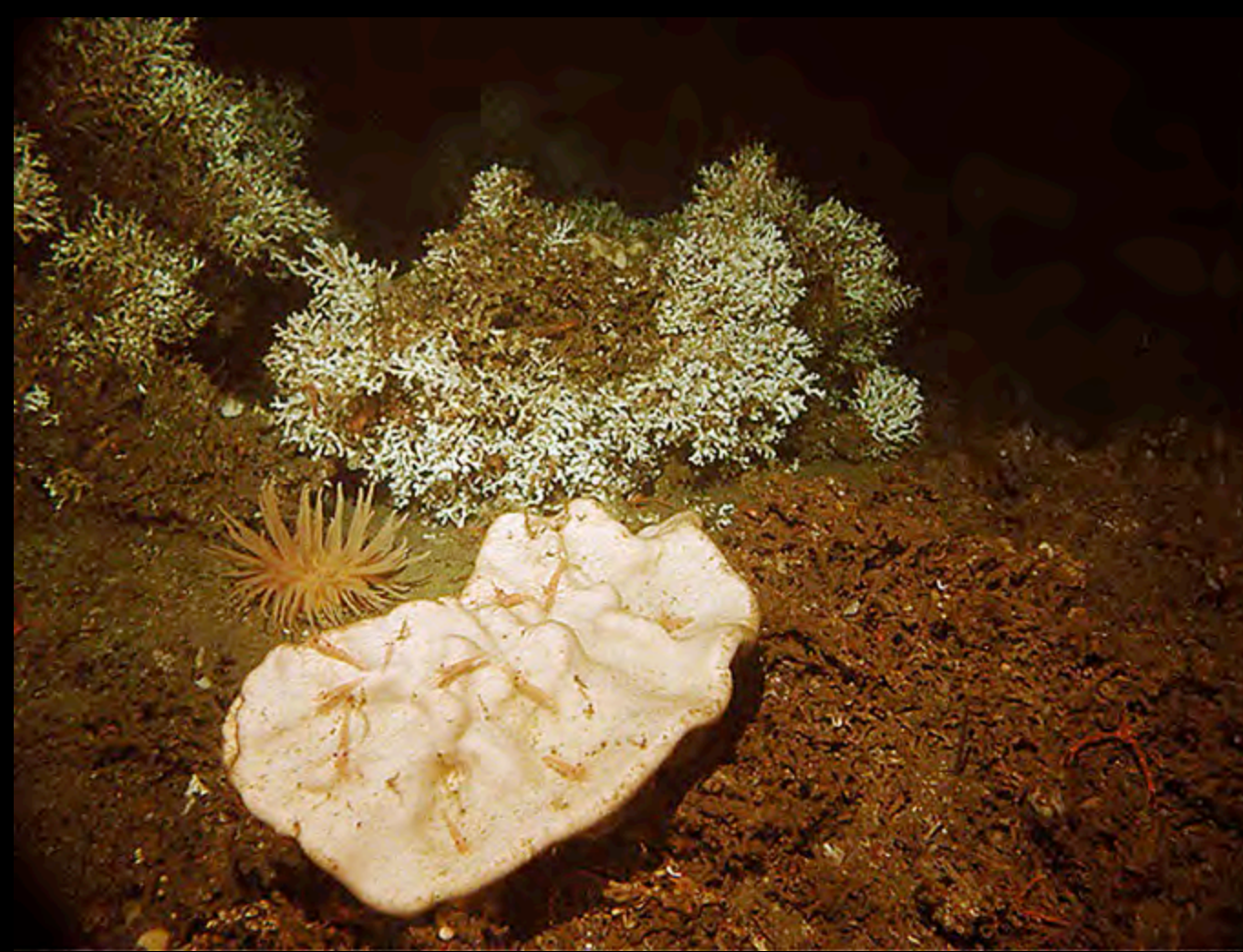
**Sponges:** 1) Grey with sediment: *Geodia Atlantica*? 2) Pure white: unidentified, but may be *Stryphnus ponderosus* ?), 3) Bright yellow: unidentified, but may be *Aplysilla sulfurea* ? 4) In the background, possibly living on dead *Lophelia*: *Placortis simplex*.

**Live corals:** None

**Associated fauna** in picture: Feather stars, yellow starfish (*Henricia* sp.?).

# Sponge Atlas images

5.5.1 Picture Br-LoSp05



**Sponges:** *Geodia atlantica* ? Size of sponge: 40 cm x 20 cm x 10 cm.

**Live corals:** *Lophelia pertusa*.

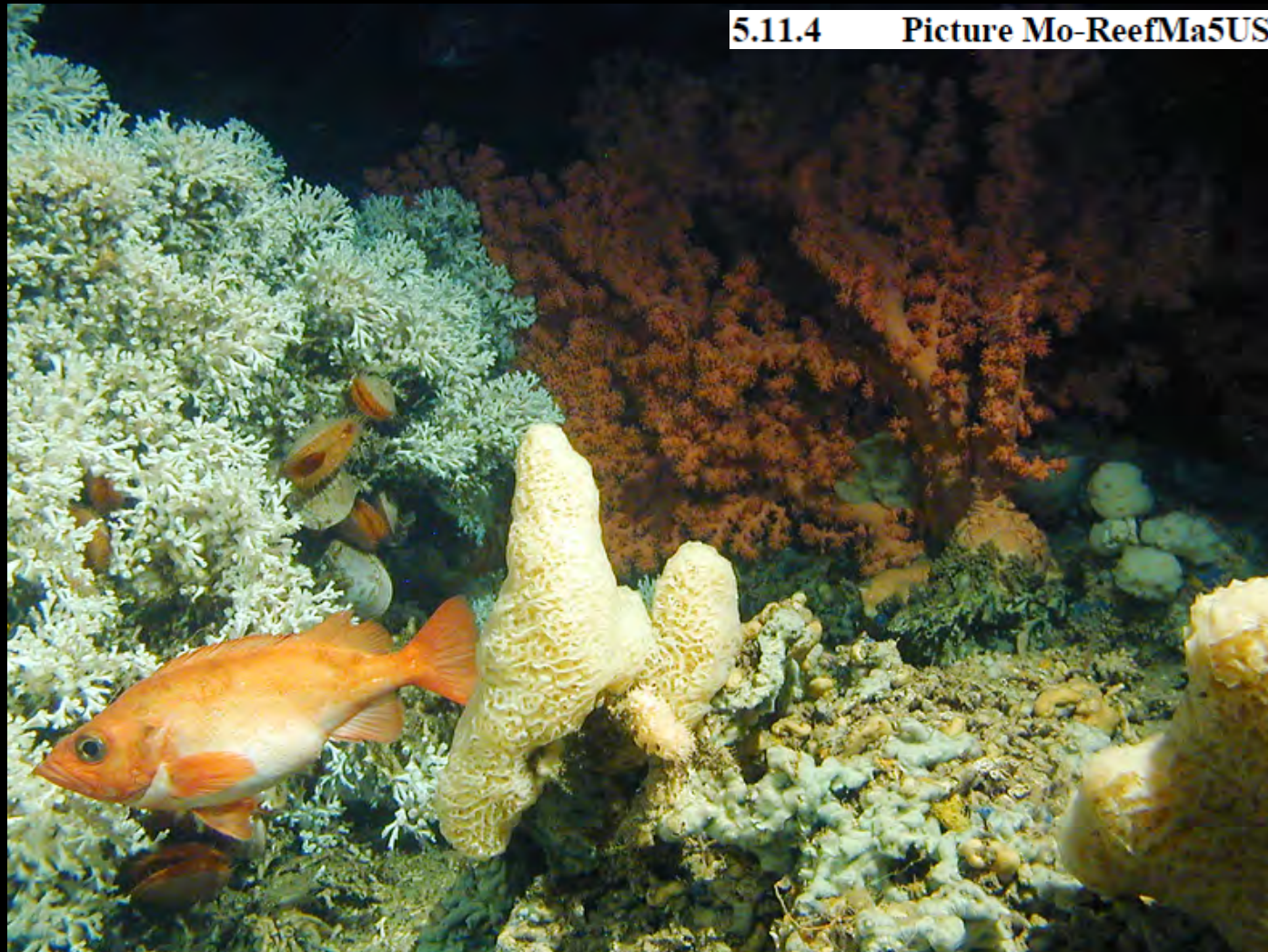
**Associated fauna** in picture: Squat lobster (*Mumida sarsi* ?), Sea Anemone (*Actina* sp.?); Shrimp (*Pandalus borealis*?)

**Year:** 2005.



**Live corals:** Unidentified.

**Associated fauna** in picture: Shrimp (*Pandalus borealis*), pencil urchin, *Cidaris cidaris*?, brittle stars.



**Sponges:** Yellow, erect sponges (probably *Mycale lingua?*), yellow sponges at right, living on dead *Lophelia*, probably *Placortis simplex*, unidentified white sponge at same location (on dead *Lophelia*), and possibly *Geodia atlantica?* in the background.

**Live corals:** *Lophelia pertusa*, and red *Paragorgia arborea*.

**Associated fauna** in picture: Clams: *Acesta excavata*, and fish (*Sebastes marinus?*).

## Summary

- A total of 67 pictures of *in-situ* sponges and *Lophelia*-associated organisms are included in the Atlas
- Most of them have exact coordinates for future visual comparison
- There are 10 areas that are covered
- Range of depth: ~ 250 – 350 m (~750 m, Nyegga)
- The three most common sponges associated with *Lophelia*-reefs are: *Geodia* sp., suspected *Mycale* sp., and suspected *Placortis* sp.
- They do not only grow on the dead part of the *Lophelia*-reefs, but also on the live (front) part.

## Acknowledgements:

- Norske Shell



- Statoil ASA



- Dr R. Bannister, IMR

- Norsk Dypvanns Program, NDP

## References:

- Ackers, R.G., et al., 2007 Sponges of the British Isles. Marine Conservation Society. [www.habitas.org.uk](http://www.habitas.org.uk).
- Hovland, M., 2014 Atlas of sponges associated with *Lophelia*-reefs off Mid-Norway. NDP, Oslo.
- Cadenas, P., et al., 2013. Taxonomy, biogeography and DNA barcodes of *Geodia* species (Porifera, Demospongiae, Tetractinellida) in the Atlantic boreo-arctic region. *Zoological J. of the Linnean Soc.* 169, 251-311.