

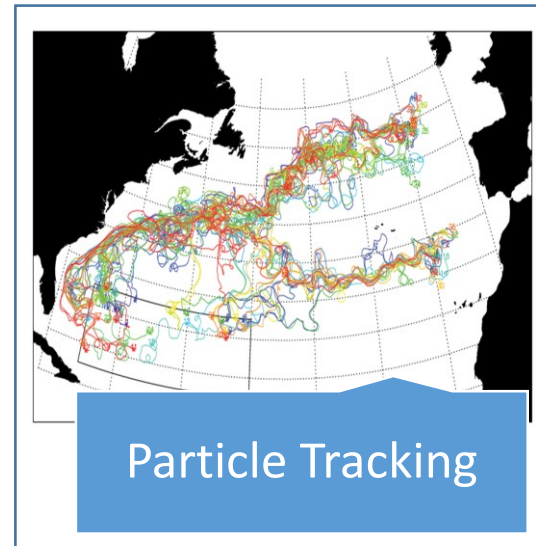
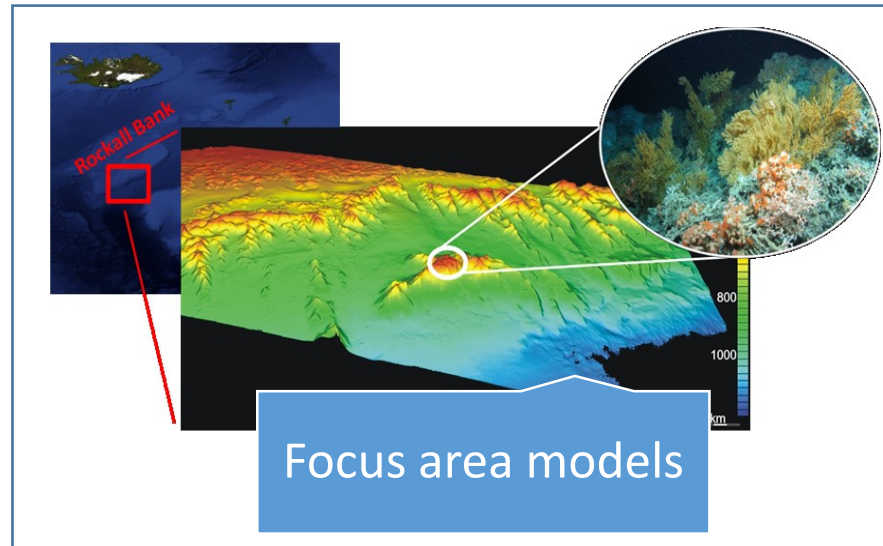


WP2 Case Study Area Modelling: Concepts and Status

Christian Mohn (AU), Eva Friis Møller (AU), Jørgen L.S. Hansen (AU),
Dick van Oevelen (NIOZ), Karline Soetaert (NIOZ), Stefan Gary
(SAMS)

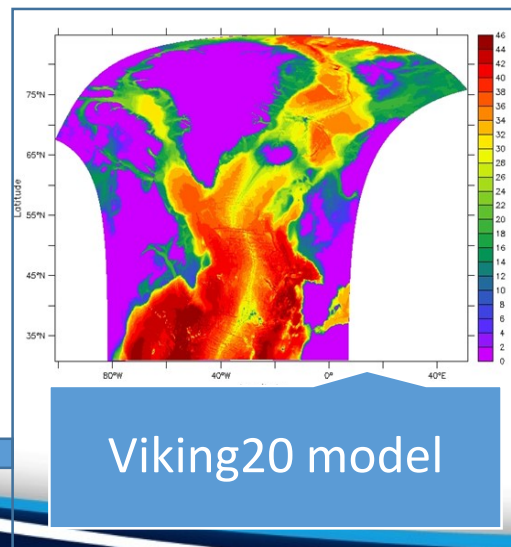


ATLAS Modelling Framework



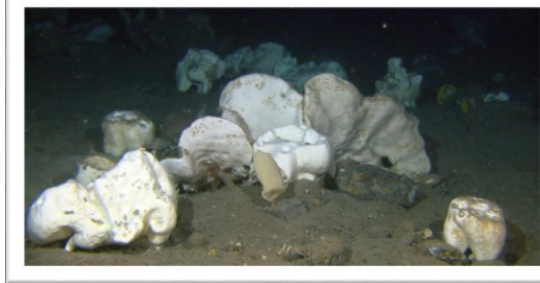
Forcing for
integrated focus
area models
(WP2)

Ecosystem and
resource
connectivity
(WP1)

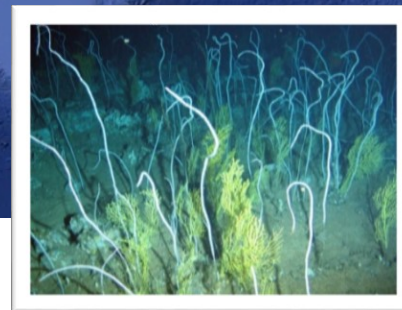
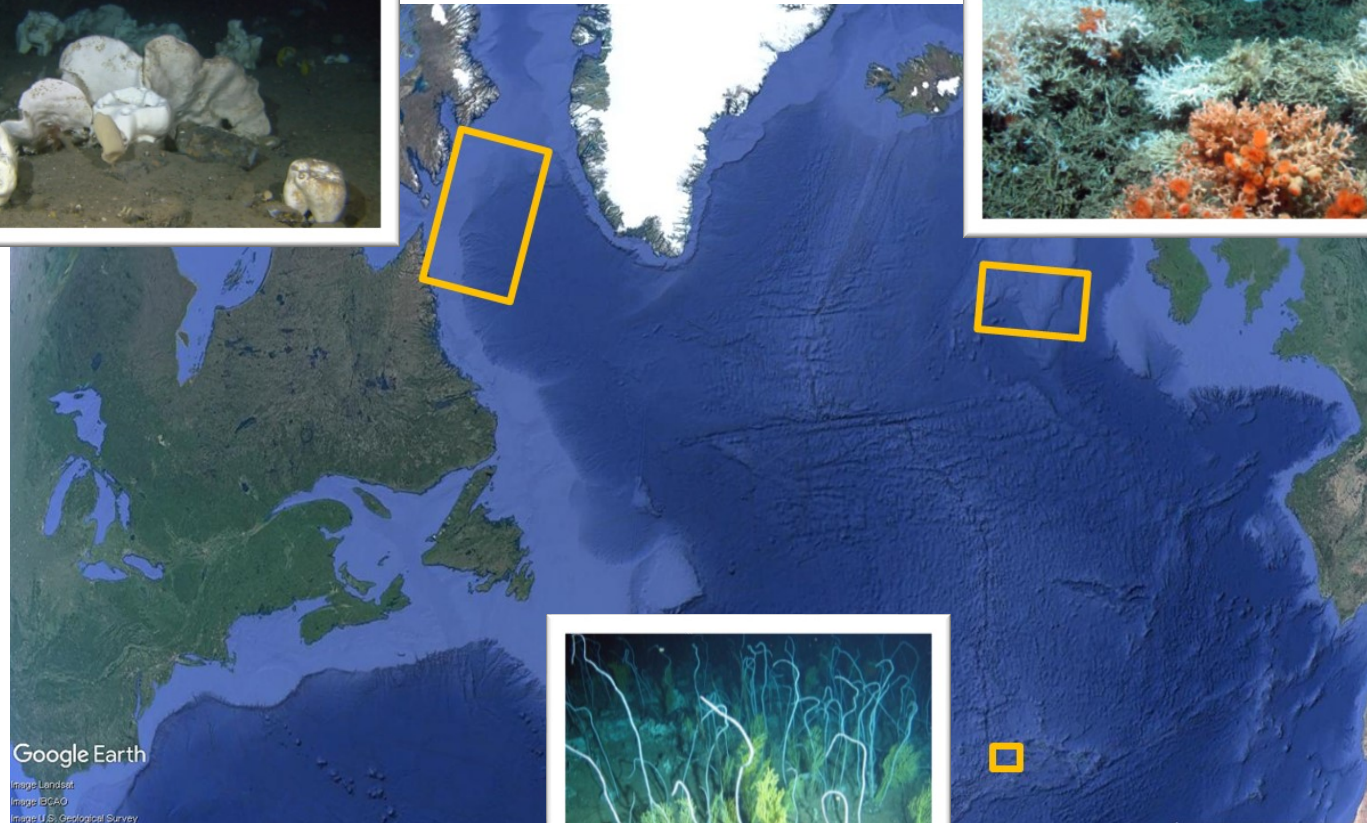


Three Case Studies: Deep-Sea Focus Ecosystems

NW Labrador Sea / Davis Strait



Rockall Bank



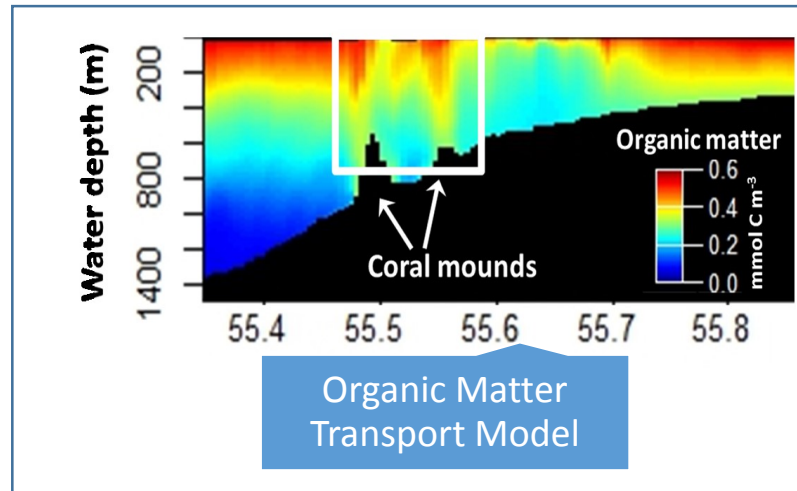
Condor Seamount / Azores

Experimental Strategy

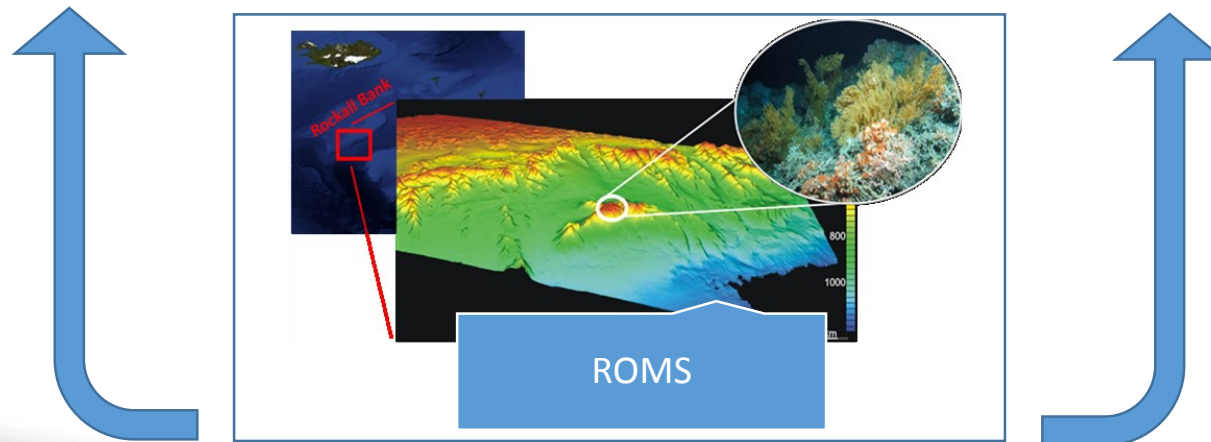
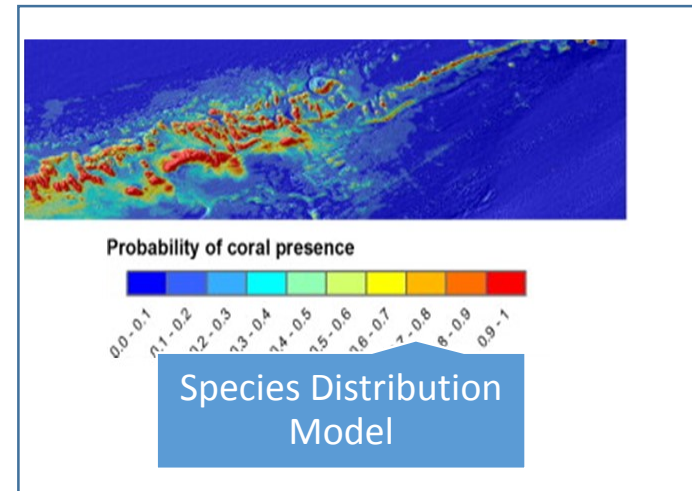
- Aim: Quantify hydrodynamic controls, organic matter supply and ecosystem response to changing AMOC in case study areas
- Identify periods of extreme AMOC states for different key parameters (SST, MLD, bottom and depth-averaged currents) through analysis of VIKING20 model output (1958 – 2009).
- Create boundary conditions for relevant periods (WP1).
- Use experimental data from Tasks 2.1 to 2.3 to validate models.

Integrated Focus Area Modeling

3D OM Concentration, Pathways



Habitat Suitability (WP3)



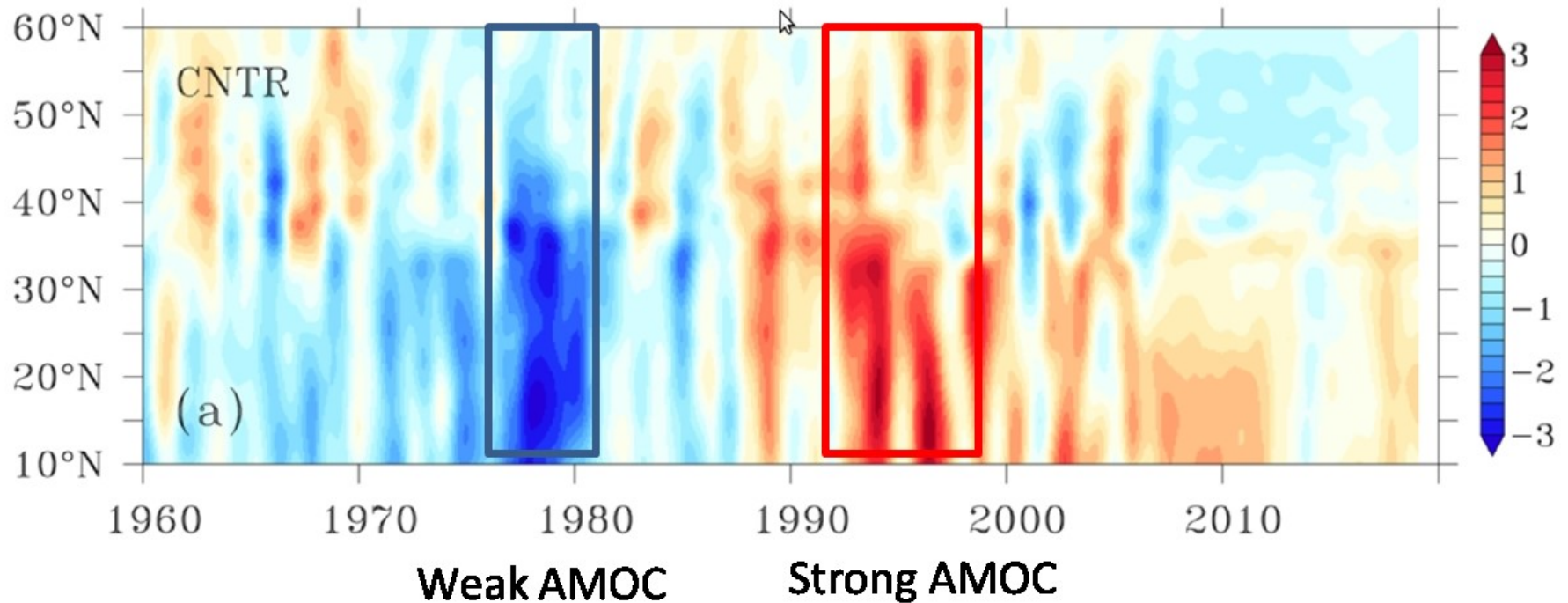
3D currents, T, S

WP2 Case Study Areas: ROMS & NIOZ OM Model

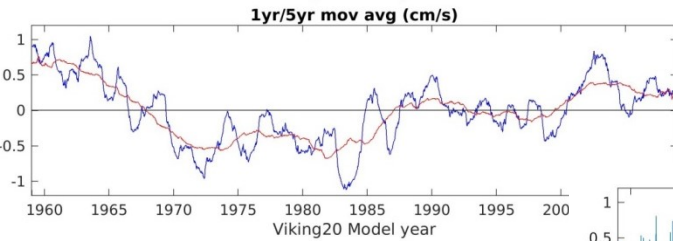
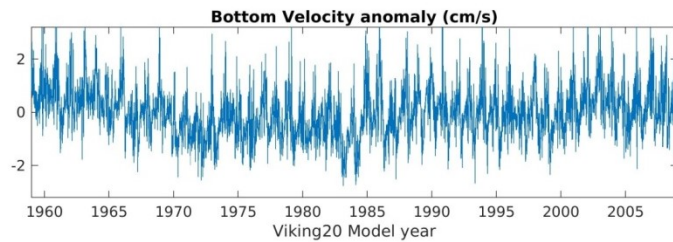
- **ROMS** (Regional Ocean Modelling System)
 - Resolution: 750 m (parent grid), 250 m (child grid), up to 32 vertical terrain-following levels
 - Boundary conditions: CORE, VIKING20, tides, high-resolution bathymetry
 - Simulation period: 2 years representing different AMOC states
 - Model output: T, S, u, v, w, SSH

- **OM model**: Organic matter dynamics in the water column, including production at the upper boundary, advective horizontal and vertical transport, constant decay and passive sinking.
 - Resolution: same as ROMS child grid
 - Boundary conditions and forcing: High-resolution bathymetry, ROMS currents

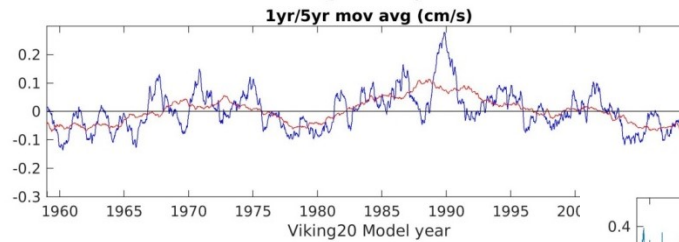
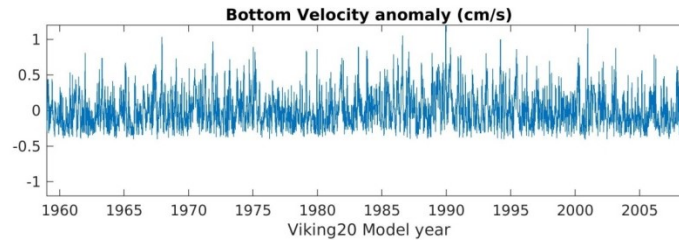
VIKING20 North Atlantic Basin-Wide AMOC anomalies (reproduced from Böning et al 2016)



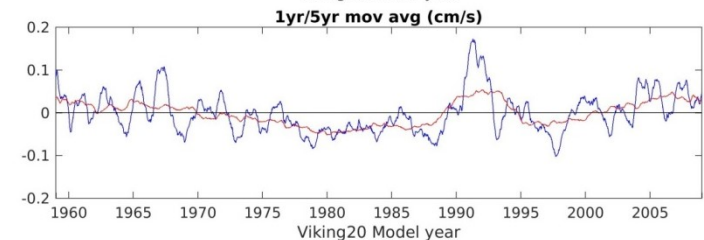
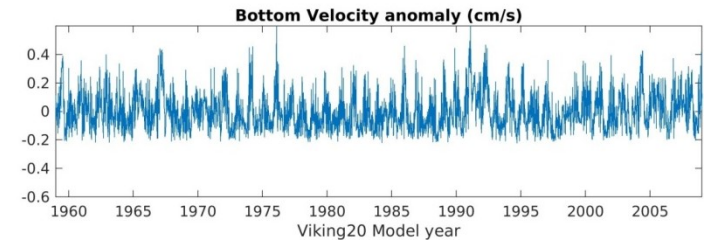
Bottom Velocity Anomalies (area-averaged) from 53 Years of VIKING20 Model Output



Davis Strait



Rockall Bank



Condor Seamount

- Weak AMOC: 1978-1980
- Strong AMOC : 1992-1994

Next Steps

- **Davis Strait:** Preparing VIKING20 model data for offline use to drive the OM transport model.
- **Rockall Bank:** Executing ROMS simulations based on VIKING20 boundary conditions and tidal forcing.
- **Condor Seamount:** Preparing boundary conditions from VIKING20 model data, preparing high-resolution bathymetry for use in ROMS, evaluating the possibility of a model-model comparison (ROMS – MOHID)

Thank You!



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Breakout Session 1 – Tuesday, 25th April 2017, 17.15 – 18.15

Group 1: Reversal of trends in the subpolar North Atlantic, causes and consequences

Lead: Igor Yashayaev

Location: Sala Gestión

Group 2: WP2 Experimental work plans within ATLAS

Lead: Marina Carreiro-Silva & Christian Mohn

Location: Sala Cabrera

Group 3: ATLAS Deliverables 4.1 and 4.2

Lead: Sophie Arnaud-Haond and Cova Orejas

Location: Sala Es Trenc