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UNDERSTANDING DEEP ATLANTIC ECOSYSTEMS



Effects of changing ocean regimes on deep-sea benthos on the Scottish continental shelf and slope

ATLAS 3rd General Assembly

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Scottish shelf & continental slope macrobenthos



Porania pulvillus



Aristias nealectus



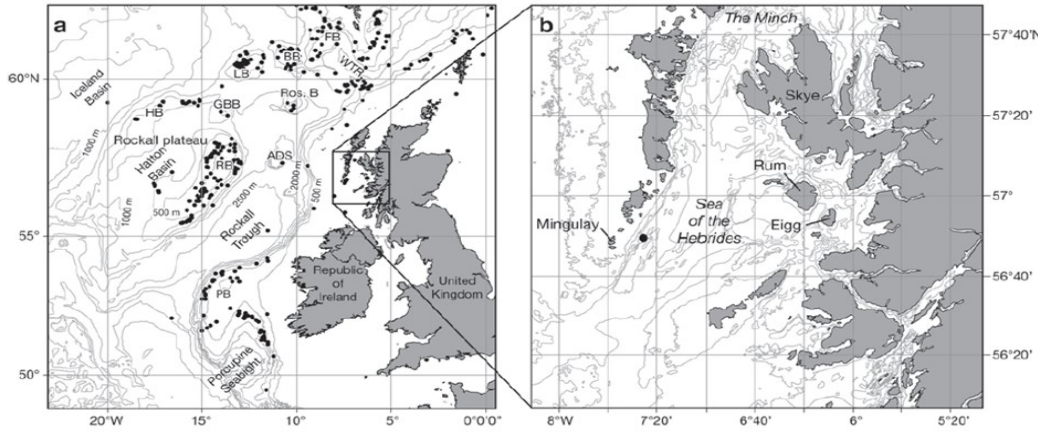
Image credit: Georgios Kazanidis /www.zeiss.com



Mingulay...a unique opportunity



Image credit: "Changing Oceans"



Roberts et al. (2009), MEPS



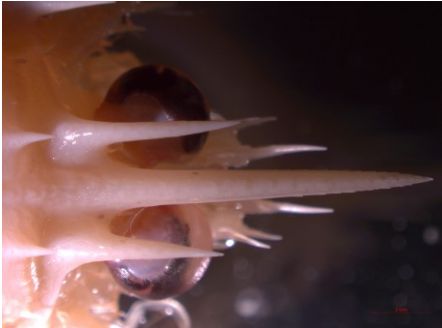
Image credit: "Changing Oceans"



Image credit: www.noc.ac.uk



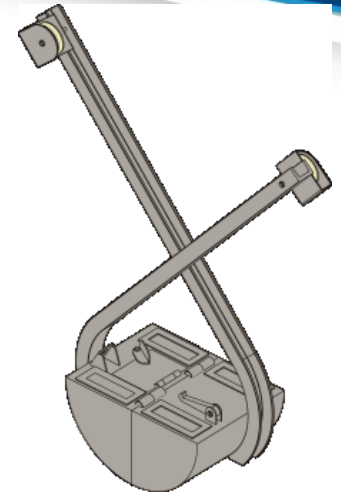
Mingulay macrobenthos



Munida sarsi Huus, 1935



Hiatella arctica (Linnaeus, 1767)



Van Veen Grab

88 stations

Years of sample collection:

2003

2005

2009

2010

2011



Seabed bathymetry

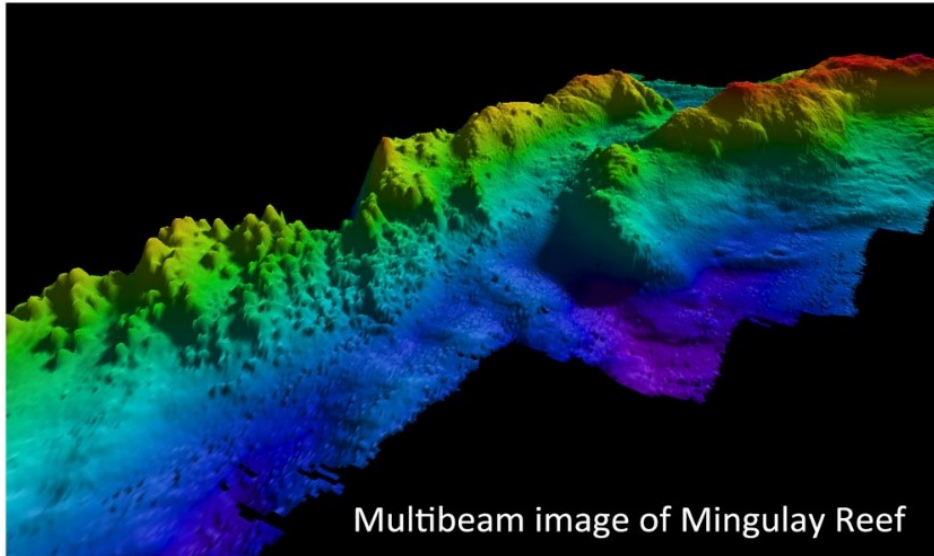


Image credit: www.lophelia.org

Depth

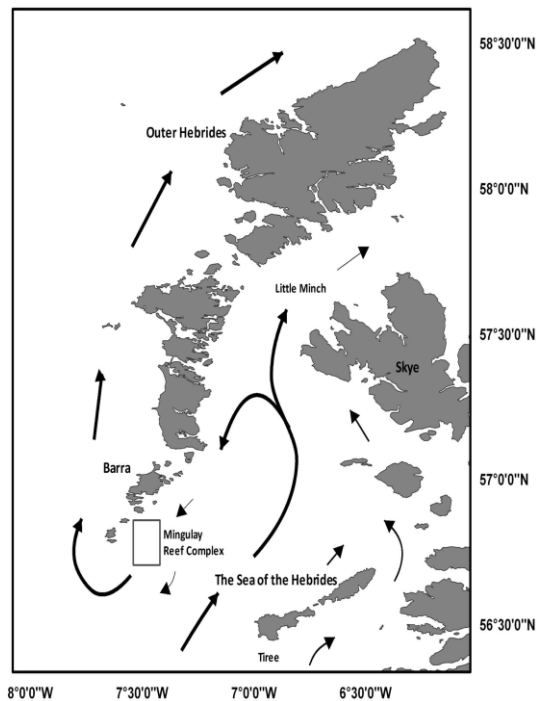
Slope

Rugosity

Bathymetric Position Index



Local hydrography



Moreno Navas et al. (2014), PLoS One

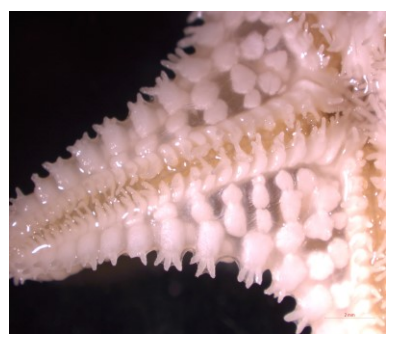
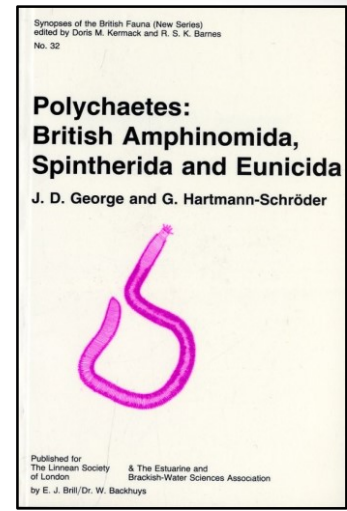
Average current speed

Maximum current speed

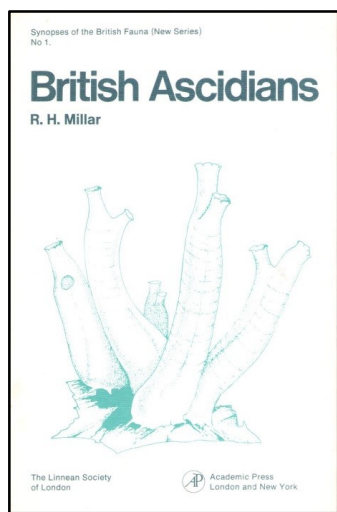
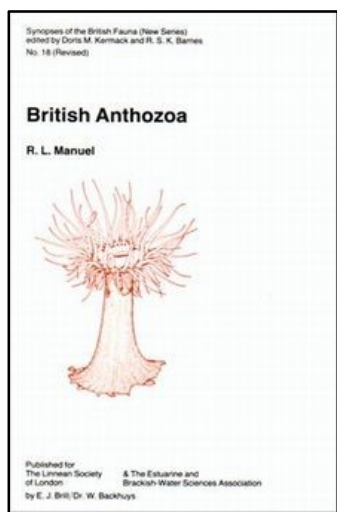
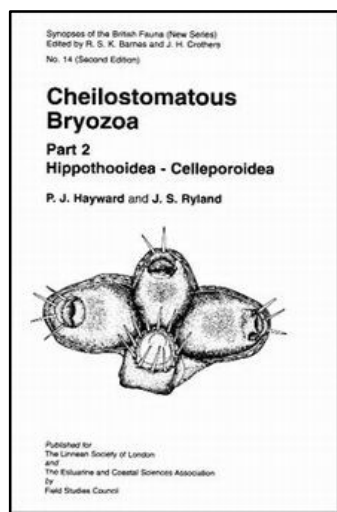
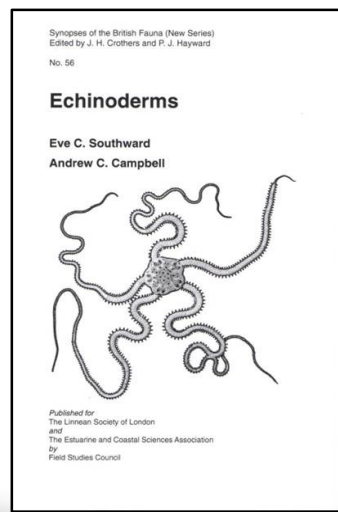
**Current speed
standard deviation**



Mesh size: 1mm



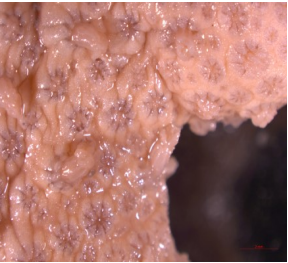
Porania pulvillus





Groups that we work on

Cnidaria



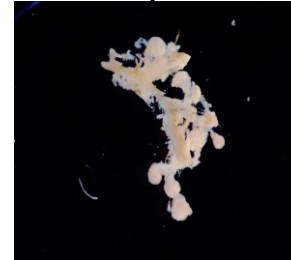
Echinodermata



Annelida



Entoprocta



Arthropoda



Mollusca



Bryozoa



Brachiopoda



Ascidians



Priapulida



Echiura



Sipuncula



Nemertea



Images credit: Lea-Anne Henry, Georgios Kazanidis, ATLAS



Year	2003	2005
Van Veen samples	18	14
Status in June 2017	Sorted & identified	Sorted & identified

Multi-scale interactions between local hydrography, seabed topography, and community assembly on cold-water coral reefs

L.-A. Henry¹, J. Moreno Navas¹, and J. M. Roberts^{1,2,3}

Beta diversity of cold-water coral reef communities off western Scotland

Lea-Anne Henry · Andrew J. Davies ·
J. Murray Roberts



Progress over the last 10 months

Year	2009	2010	2011
Van Veen samples	17	17	20
Status in June 2017	Sorted at Phylum Level	Unsorted	Unsorted



Progress over the last 10 months

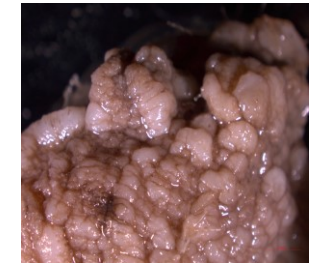
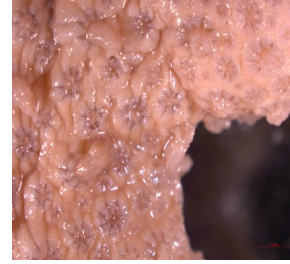
Year	2009	2010	2011
Van Veen samples	17	17	20
Status in June 2017	Sorted at Phylum Level	Unsorted	Unsorted
Status in April 2018	Sorted & identified	Sorted	Sorted



Progress over the last 10 months

Completed identification of specimens from 2010 & 2011 samples:

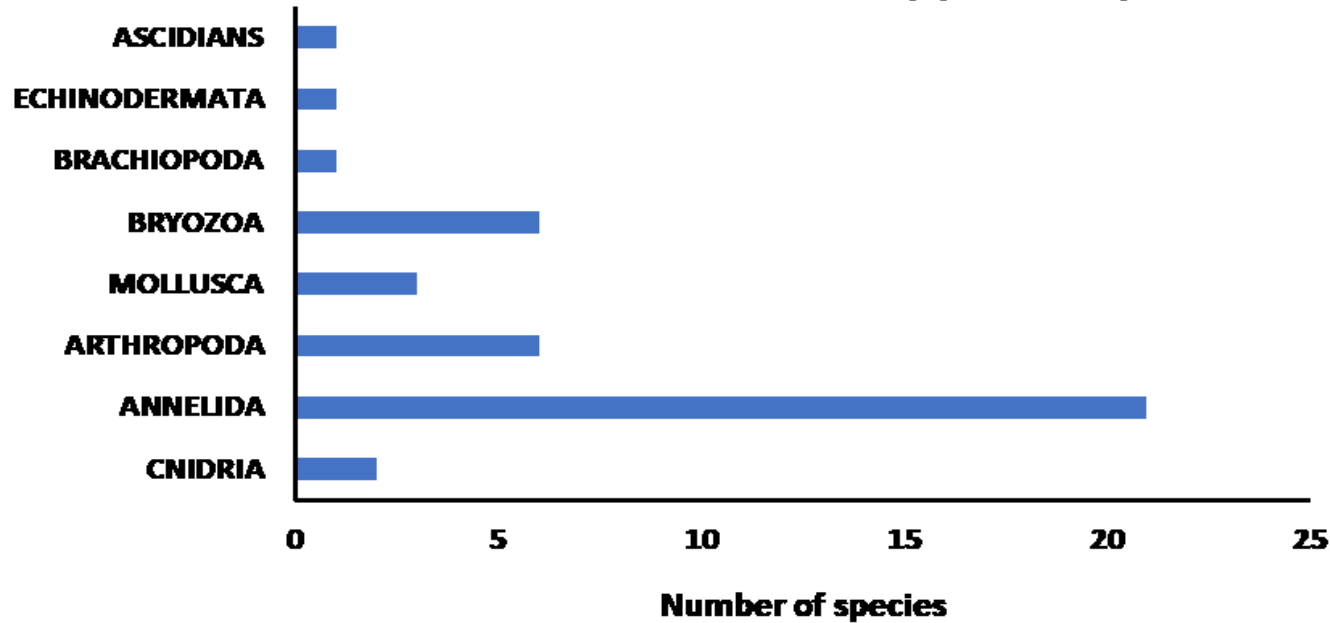
Echinodermata ✓	Arthropoda ✓	Anthozoa ✓
Ascidians ✓	Mollusca ✓	Brachiopoda ✓



Images credit: Georgios Kazanidis, ATLAS



New records (up to now...)



Alcyonium digitatum

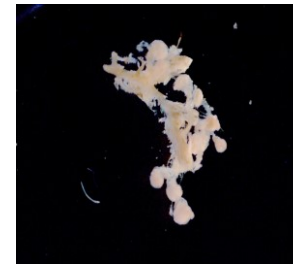
Image credit: Georgios Kazanidis, ATLAS



Next steps

Complete the identification of specimens from 2010 & 2011 samples:

Bryozoa	Annelida	Sipuncula	Nemertea
Echiura	Entoprocta	Priapulida	





Next steps

Data analysis on following aspects:

- 1) Temporal beta diversity
- 2) Time vs spatial variation in environmental variables
- 3) Role of North Atlantic Oscillation

ATLAS Deliverable D3.2: Ocean/hydrographic controls on biodiversity and biogeography



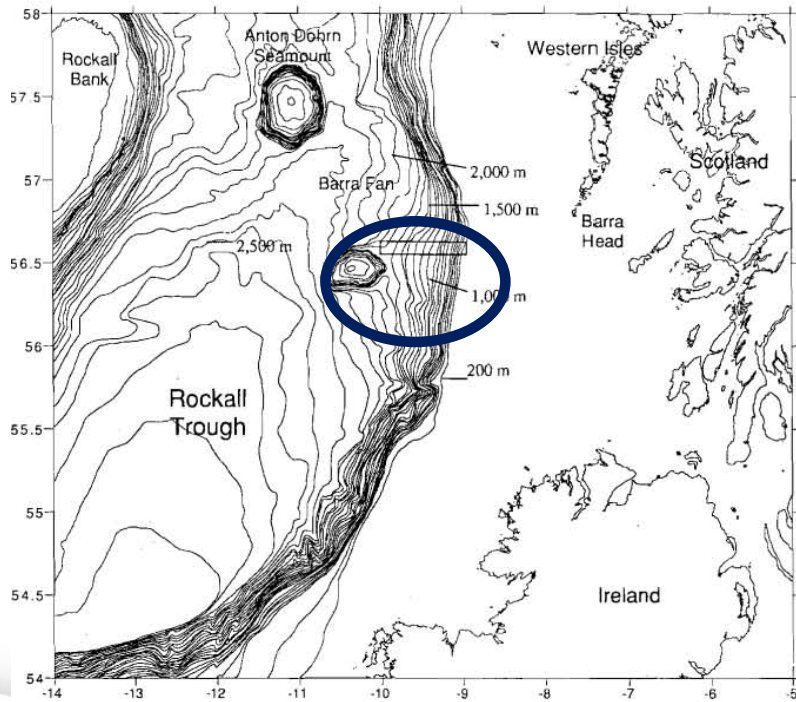


Hebrides Terrace slope macrobenthos

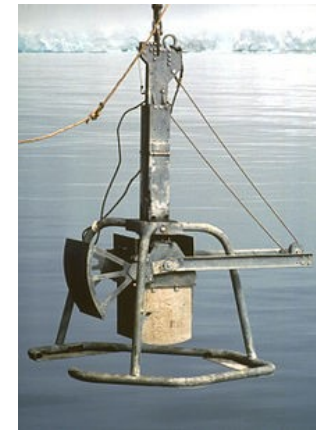
Atlantic Multi-decadal Oscillation (AMO)



D3.2



Gage et al. (2000), Hydrobiologia



Sorting & identification of samples ($n=13$)

1970s/1980s

2012



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Many thanks to taxonomists for their guidance on
species identification!

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Dr Tammy Horton (National Oceanography Centre, UK)

Dr Gretchen Lambert (USA)

Dr Jennifer Loxton (University of Edinburgh, UK)

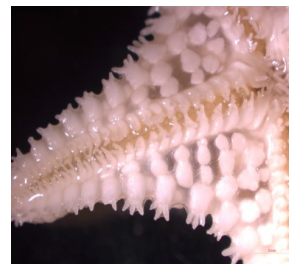
Dr Christopher Mah (Smithsonian National Museum of Natural History, USA)

Dr Graham Oliver (National Museum Cardiff, Wales)

Dr Eve C. Southward (Marine Biological Association, UK)

Dr Tim Worsfold (APEM Ltd.)

Susan Chambers (National Museums Scotland)



Thank You!



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