

The deep sea around Malta: a biodiversity hotspot?

Patrick J. Schembri
on behalf of the
LIFE BaHAR for N2K Consortium



MINISTRY FOR SUSTAINABLE DEVELOPMENT,
THE ENVIRONMENT AND CLIMATE CHANGE



UNIVERSITY OF MALTA
Faculty of Science
Department of Biology



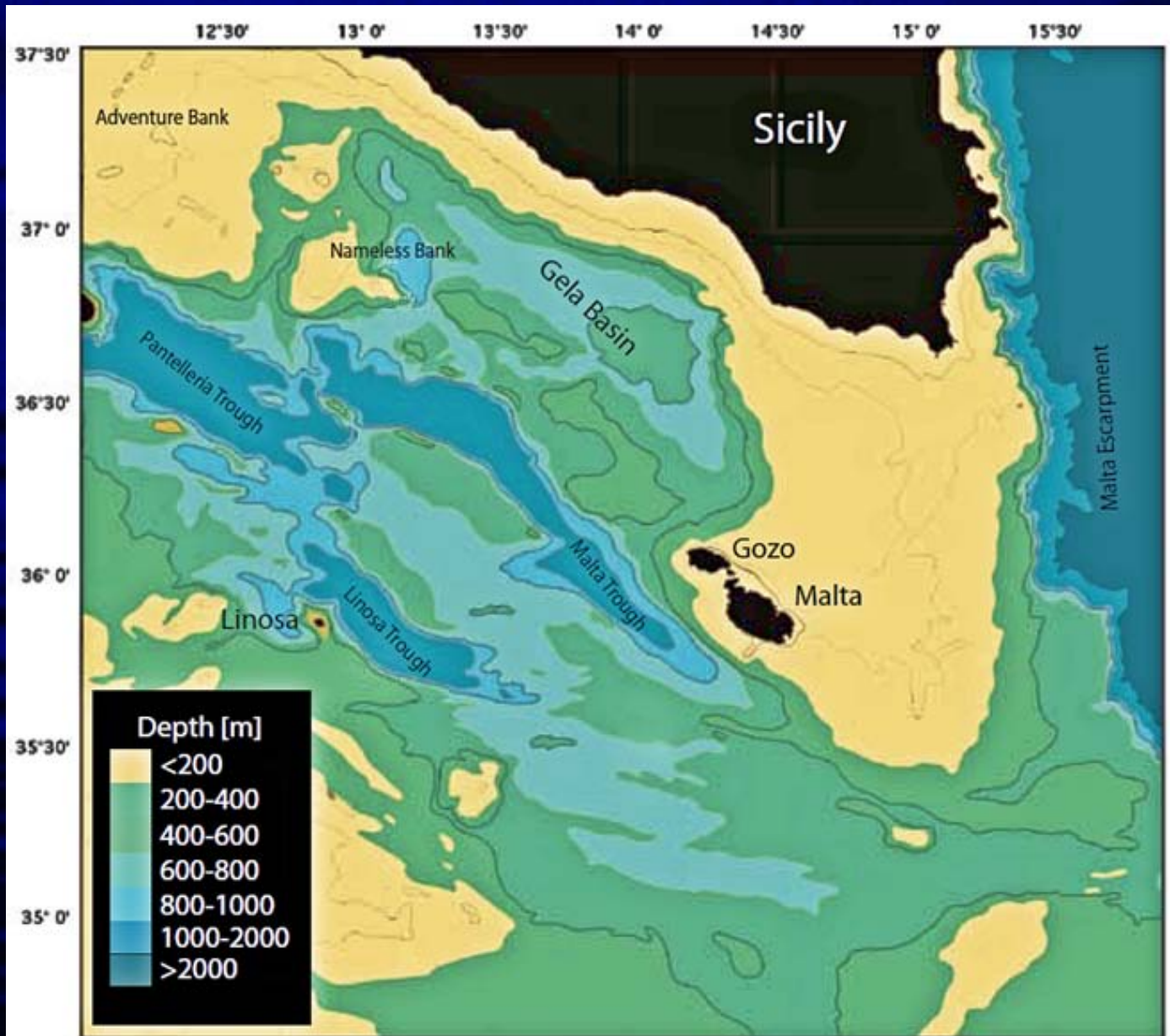
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The LIFE BaHAR for N2K (LIFE12 NAT/MT/000845) Project
is 50% co-financed by the
EU LIFE+ Funding Programme



Area of interest



Past research

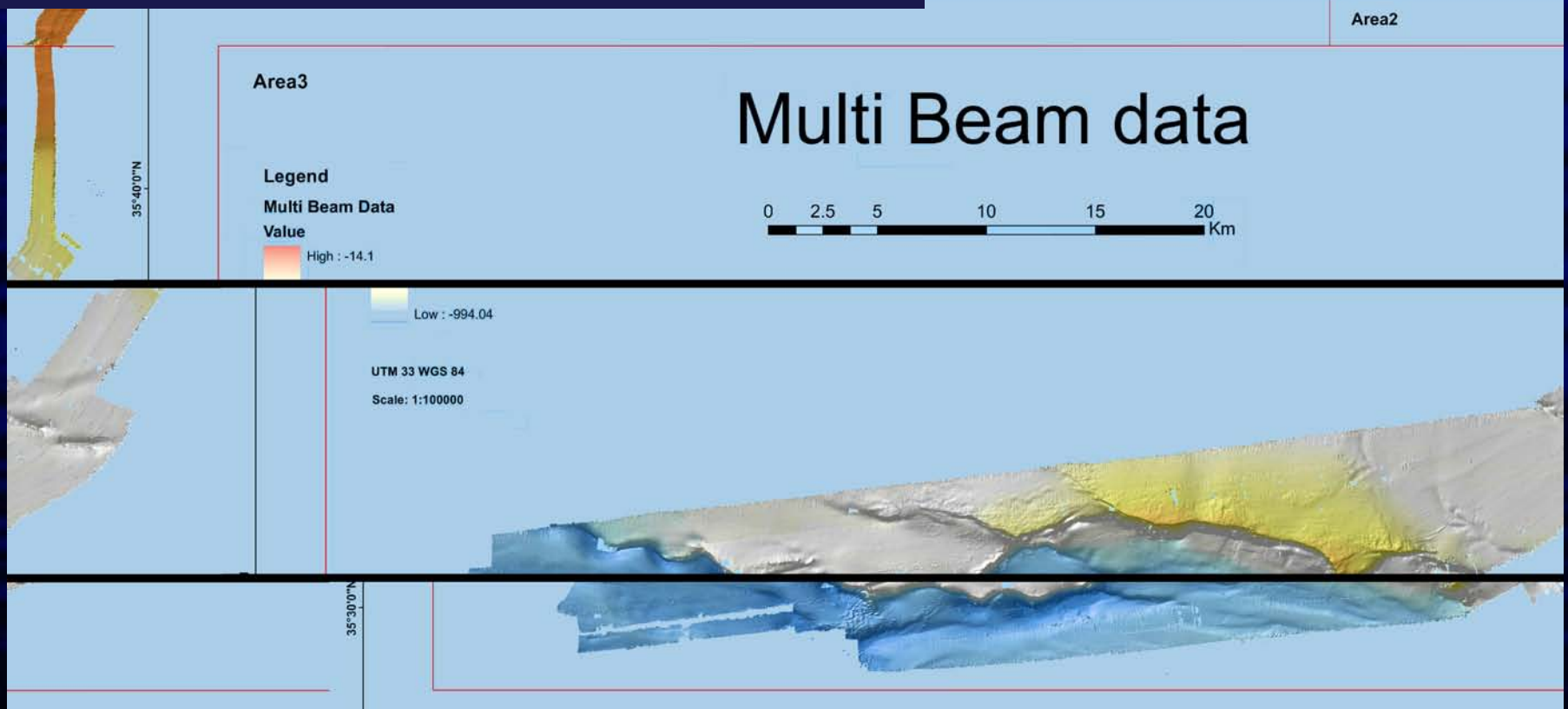
- **2003:** Living *Madrepora*, *Lophelia* and *Desmophyllum* found at 400–600 m [GRUND / MEDITS trawl surveys]
- **2006:** ROV dive located more living deep-water corals on 150–200 m high escarpment [R/V 'Meteor' cruise]



Live *Lophelia pertusa*
recorded in 2003
(Schembri *et al.*, 2007)

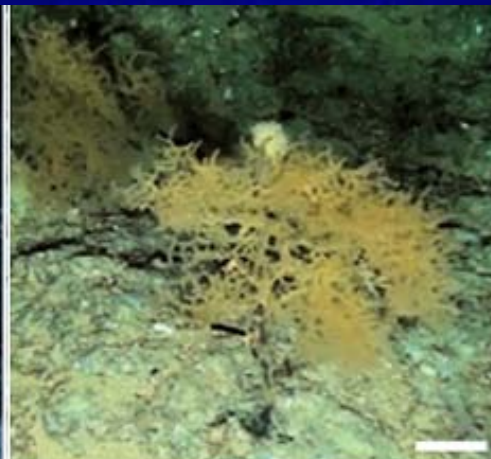
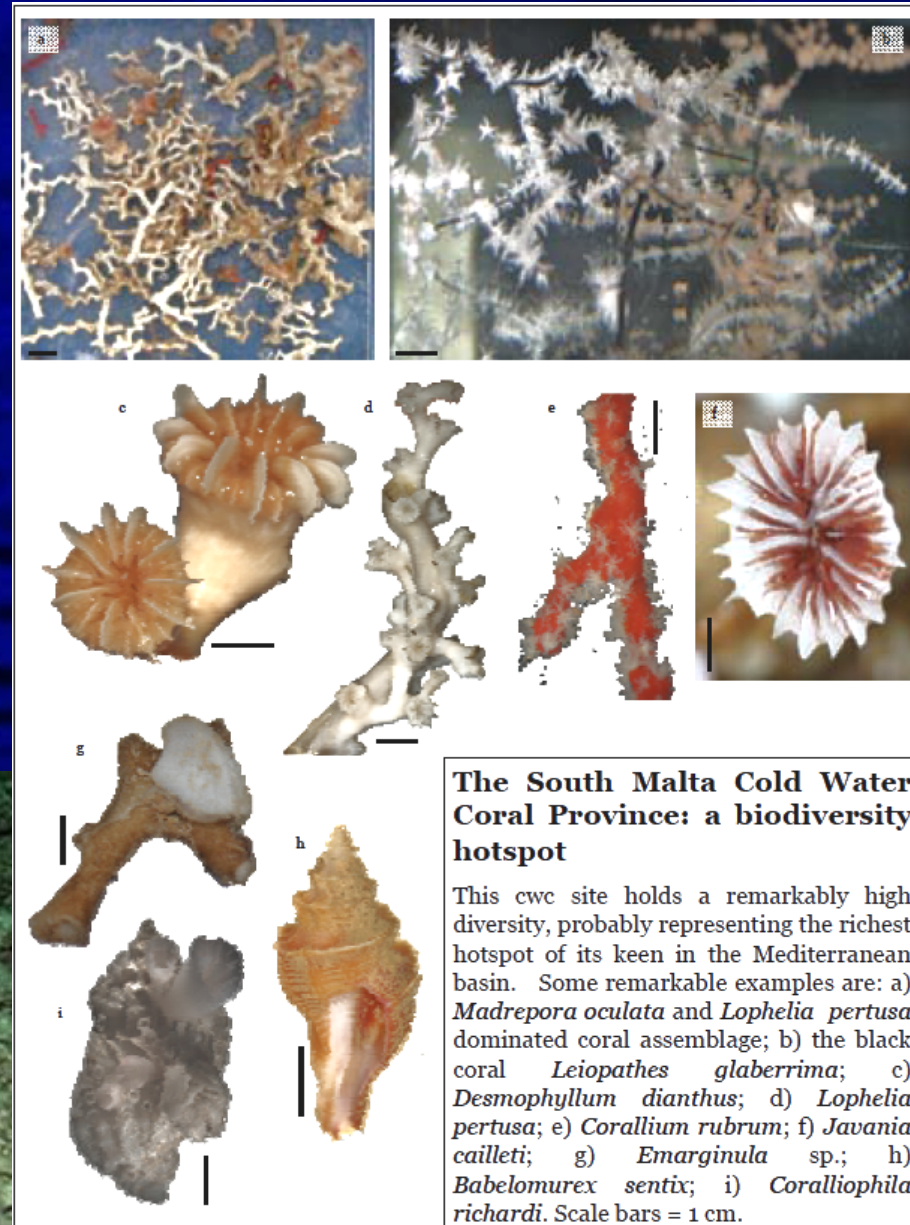
Past research

- **MARCOS** (2007), **MEDCOR** (2009) & **DECORS** (2011) research cruises mapped and characterized deep-sea coral reefs in 'South Malta Coral Province'.



Past research

- Angeletti *et al.* (2011) comment that SMCP “*holds a remarkably high diversity, probably representing the richest hotspot of its kind in the Mediterranean basin*”.
- 2013: Preliminary characterization of *Leiopathes* forest based on ROV dive at 250–400 m depth, SW of Malta.



(Deidun *et al.*, 2014)

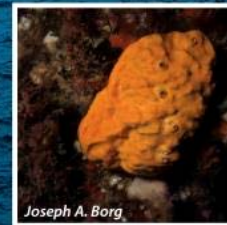
Current research

- 'LIFE BaHAR for N2K' project aims to support designation of marine NATURA 2000 sites.
- Research focus is on characterisation and mapping of sandbanks, reefs, marine caves.
- Surveys are conducted in coastal and offshore habitats within the 25 nautical mile Fisheries Management Zone around Malta.

LIFE BaHAR for N2K
*Life + Benthic Habitat Research
for marine Natura 2000 site designation*



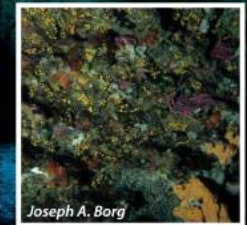
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Joseph A. Borg



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OCEANA



University of Malta
L-Università ta' Malta



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Il-proġett LIFE BaHAR for N2K (LIFE12 NAT/MT/000845)
huwa parzjalment (50%) iffinanzjat mill-fond LIFE+ ta' Unjoni
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Current research

- First expedition with Oceana's research catamaran '*Ranger*' in summer 2015 aimed to locate 'reefs'.
 - + 85 ROV dives - 81 at offshore sites, 4 at coastal sites.
 - + 12 SCUBA dives - all at coastal sites.
- ROV dives at offshore sites generated new information on deep sea habitats around Malta.



Coral reefs of the Central Mediterranean

- 2015 BaHAR surveys confirmed importance of the **South Malta Coral Province** as a deep sea biodiversity hotspot.
- Other areas with extensive and diverse living coral assemblages were found at 300–1000 m, including white, black, red and gold corals.
- Most important habitat forming species on rocky habitats were *Callogorgia verticillata*, *Leiopathes glaberrima*, *Madrepora oculata* and *Lophelia pertusa*.
- A stratification of coral grounds was observed:
 - + *Leiopathes glaberrima* forests peak at 300–400 m.
 - + *Madrepora oculata* and *Lophelia pertusa* were most abundant at 500–600 m.
 - + *Callogorgia verticillata* had a patchy distribution but was dominant in places.

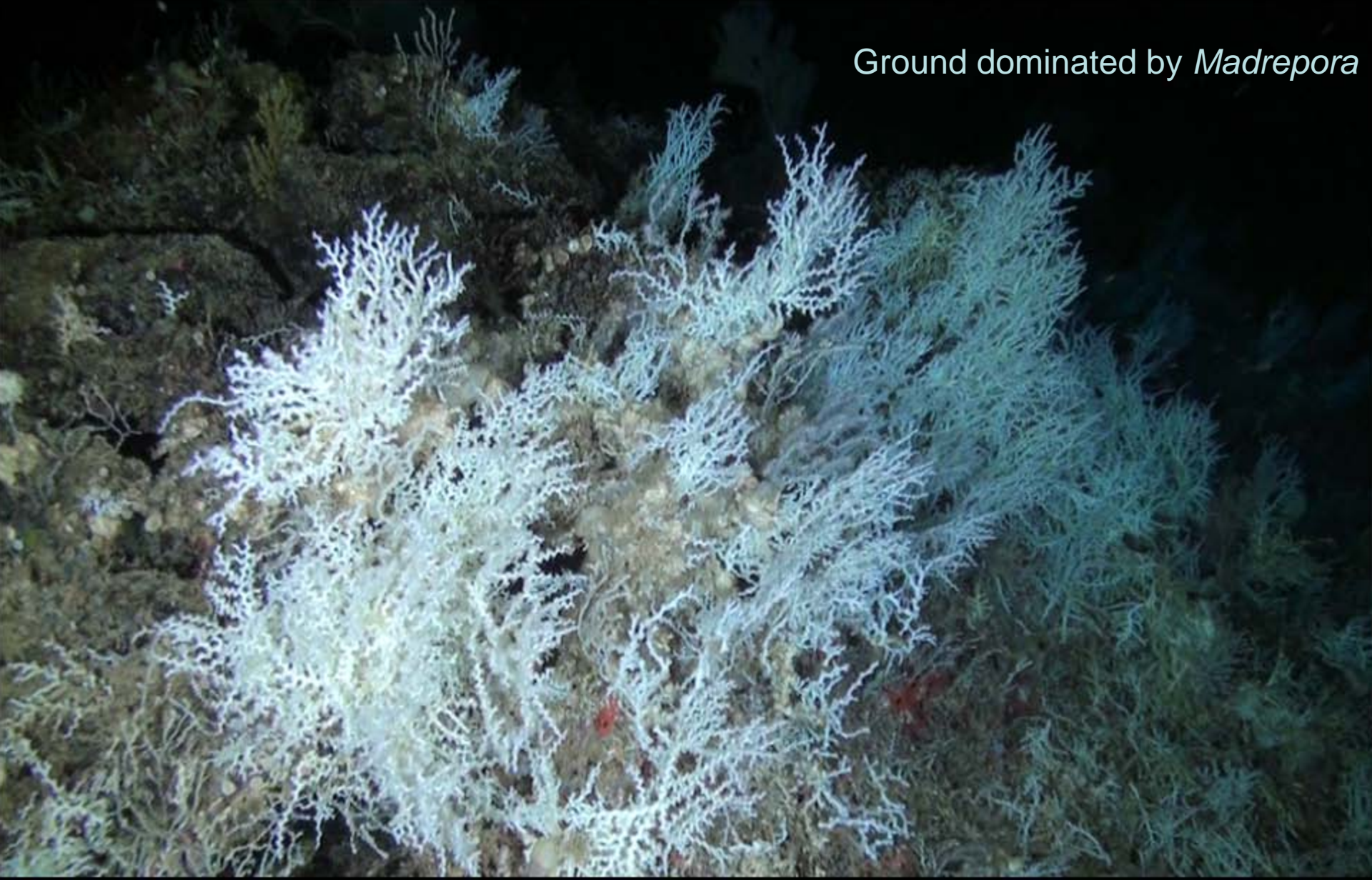
Coral reefs of the Central Mediterranean

Ground dominated by *Leiopathes*



Coral reefs of the Central Mediterranean

Ground dominated by *Madrepora*



Coral reefs of the Central Mediterranean

Ground dominated by *Callogorgia*



Coral reefs of the Central Mediterranean

- Several other less abundant habitat-forming species were encountered, including: *Acanthogorgia hirsuta*, *Villogorgia bebrycoides*, *Paramuricea macrospina*, *Dendrobrachia bonsai*, *Muriceides lepida*.
- A high diversity of associated fauna was also observed. From a preliminary analysis of video footage:
 - + 86 fishes,
 - + 63 cnidarians (mainly anthozoans),
 - + 33 echinoderms,
 - + 32 poriferans,
 - + 30 crustaceans,
 - + 27 molluscs,
 - + tunicates, bryozoans, brachiopods, annelids, echiurans...

Coral reefs of the Central Mediterranean

Associated biota



New depth record for *Corallium rubrum*

- Previous depth record for red coral in the Mediterranean was **819 m**, recorded in the Sicily Channel during the MARCOS cruise in 2007.
- 2015 BaHAR project surveys found live *Corallium rubrum* colonies at depths of **1017 m**.
- Colonies appeared to grow even deeper, but 1000 m was maximum operating depth of the ROV.



Dead coral frameworks

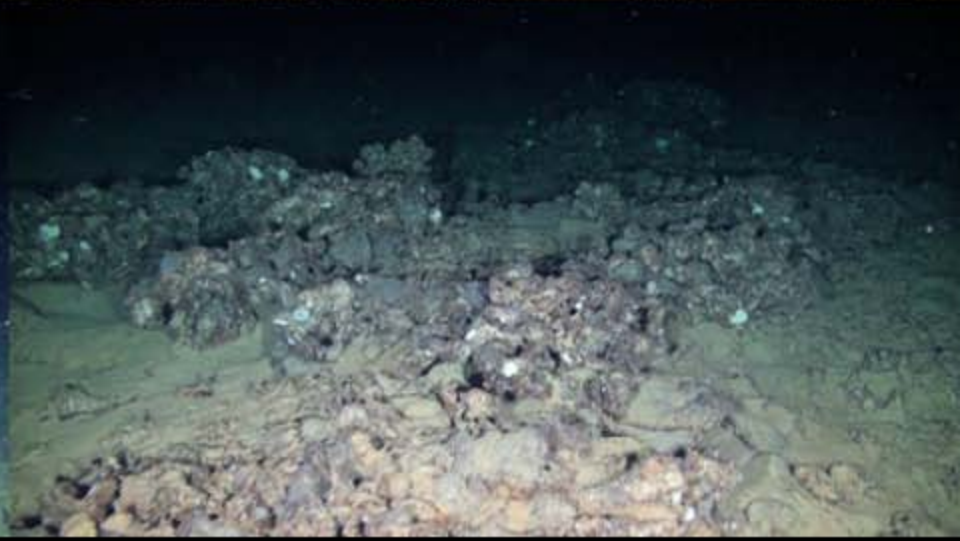
- Areas with extensive dead coral frameworks were located west of Gozo close to the Malta Graben.
- Dead coral frameworks appear to be constituted mainly by the *Madrepora* / *Lophelia* / *Dendrophyllia* triad; associated with areas of high sedimentation.
- In some areas living polyps of *Dendrophyllia cornigera* were also observed.



Discovery of a lithistid sponge reef

- Dead (? fossilised) lithistid sponge reef was discovered off the coast of Gozo.
- Located at depths of ca 300 m.
- Reef appears to be some 7–8 km long.
- Additional isolated patches of fossilized lithistid sponges were found in nearby areas.
- Species associated with the reef included: *Bebryce mollis*, *Callogorgia verticillata*, *Villogorgia bebrycoides*, *Stenocyathus vermiformis*, bryozoans, sponges, ophiuroids and hydroids.

Discovery of a lithistid sponge reef



Deep-water caves

- Deep-water caves located at 270 m / 320 m depth, west of Gozo.
- These caves possibly date back to the Messinian.



Deep-water soft bottom habitats

- Lack of accurate bathymetric data for most of survey area resulted in many ROV dives being partially over soft bottom habitats.
- Important structuring soft-bottom epibenthic species were *Funiculina quadrangularis*, *Isidella elongata*, *Pennatula* spp., and in some areas *Kophobelemnon stelliferum*, *Thenea muricata*.
- Other very abundant species were *Cidaris cidaris*, *Stylocidaris affinis*, *Cerianthus* spp.
- In many areas large burrows likely created by *Nephrops norvegicus* were found.

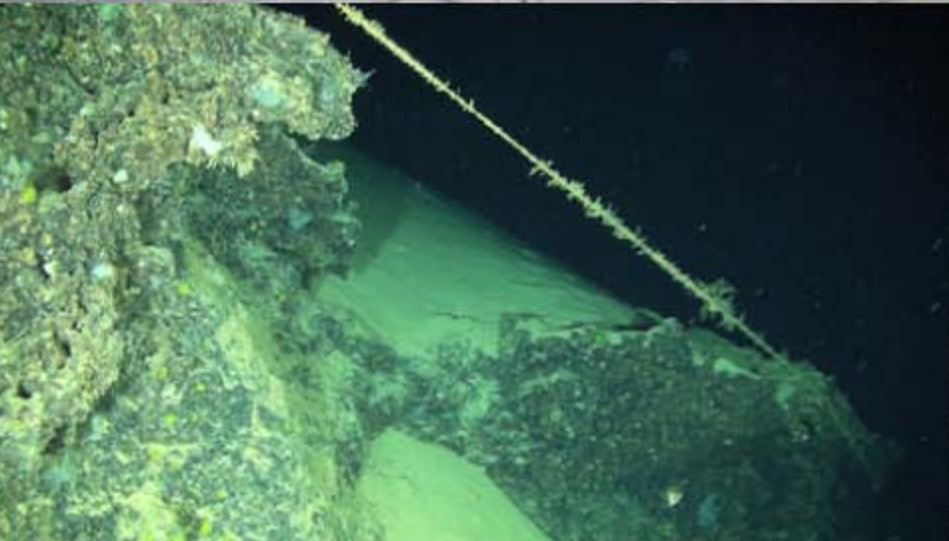
Deep-water soft bottom habitats



Anthropogenic impacts

- Plastic and other litter was encountered during most dives.
- The single most important anthropogenic impact on deep-water biocoenoses is due to discarded fishing gear.
- Fish Aggregation Devices (FADs) anchored to the sea floor with limestone slabs / plastic ropes are discarded at the end of traditional *Coryphaena hippurus* fishing season.
- Limestone slabs and ropes serve as substratum for colonisation, but cause damage by becoming entangled with bottom organisms.

Anthropogenic impacts



Next phase

- LIFE BaHAR for N2K project work is ongoing.
- Planned work for 2016:
 - + Evaluation and publication 2015 survey results.
 - + Multibeam surveys.
 - + ROV surveys.



Presented at;
IUCN Centre for Mediterranean Cooperation / Agence Française des Aires
Marines Protégées (AFAMP) meeting
'Mediterranean Deep-Sea Ecosystems'
9 -10 September, 2015
Station Marine D'Endoume – IMBE Marseille France