Research Networking Programmes

Cold-Water Carbonate Mounds in Shallow and Deep Time –
The European Research Network (COCARDE-ERN)

Short Visit Grant N. 6573 - REPORT

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Mediterranean vs. NE Atlantic CWC mounds: decoding the paleoenvironmental signal of carbonate benthic assemblages (Pleistocene - Holocene) - PART I

Purpose of the visit

My short study period in Germany, funded by the ESF through the COCARDE network, was carried out at the Marum - Center for Marine Environmental Sciences (University of Bremen), from the 5th to the 13th of May 2014, and at the Senckenberg am Meer Institute (Wilhelmshaven), from the 14th to the 18th of May 2014. My visit was framed within a larger research project aimed at comparing modern and Pleistocene carbonate benthic assemblages associated to cold-water coral (CWC) buildups from Mediterranean and NE Atlantic key study areas. My work in Germany had a twofold objective: to analyze Pleistocene CWC limestones from southern Italy in collaboration with Dr. Juergen Titschack (University of Bremen) and to finalize, in collaboration with Dr. Lydia Beuck and Prof. André Freiwald (Senckenberg am Meer), a project on the classification of modern NE Atlantic and Mediterranean CWC habitats through video analysis.

Description of the work carried out during the visit and main results obtained

1. Visit a t MARUM - Bremen

In Bremen I examined rock hand-samples, associated thin sections, and loose sediments collected from “La Montagna” (Sicily), a key site for the study of Pleistocene Mediterranean CWC deposits (Fig. 1).

Fig. 1 – “La Montagna” outcrop, Messina, Sicily. The samples analysed in Bremen were collected along the logs indicated in red.

Dr. Titschack and I compiled an Excel file containing the most important sedimentological and paleontological features of over 50 samples and discussed about the similarities between the

Pleistocene CWC coral facies from Sicily and the modern ones from NE Atlantic CWC mounds. Our preliminary results allowed us to identify the following main facies along the La Montagna logs: 1) Octocoral (*Keratoisis*) floatstones; 2) *Dendrophyllia* rudstones; 3) *Pachylasma giganteum* rudstones, 4) Brachiopod (*Terebratula*) float- to rudstones; 5) Scleractinian and stylasterid rudstones; 6) *Lophelia/Desmophyllum* - dominated rudstone to bafflestones; 7) *Madrepora* – dominated rudstones; 8) *Enallopsammia* – dominated rudstones. Facies 6 is the dominant one and forms the core of the La Montagna outcrop. Its fossil benthic assemblage includes several species (corals, molluscs, bryozoans etc.) absent in the modern Mediterranean but still existing in NE Atlantic bathyal environments. Facies 1, 2, 3 and 4 are restricted to specific stratigraphic layers located in the basal part of the outcrop. *Madrepora*- and/or *Lophelia*-dominated rudstones are enriched in siliciclastic grains in the upper part of the outcrop and truncated by a major erosional surface, overlaid by debris flow deposits and allochemic sandstones.

We will carry out more detailed taxonomic and sedimentological analyses, combined with chronostratigraphic studies, in order to properly interpret the observed vertical facies variations and to understand the causes that led to the disappearance of CWC mounds from the Messina Strait.

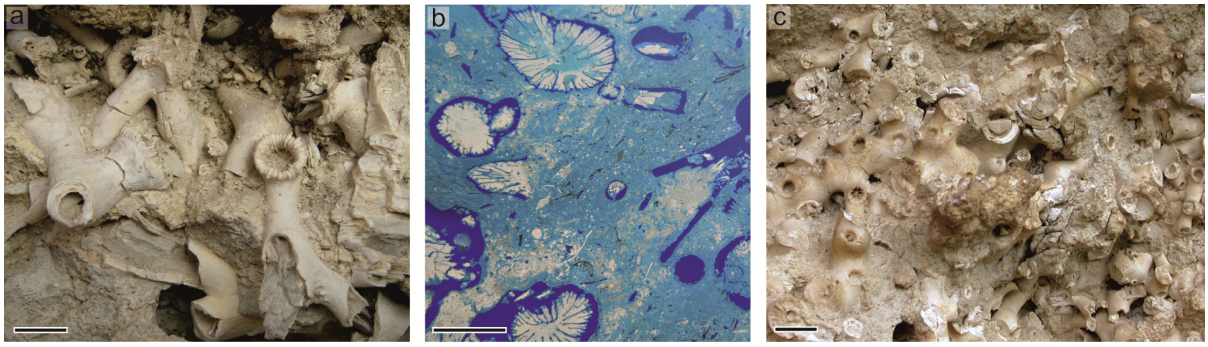

Fig. 2 – Examples of CWC facies identified in Bremen: a-b. *Lophelia/Desmophyllum*-dominated rudstones, hand sample and thin section, respectively; c. *Madrepora*-dominated rudstone.

2. Visit at the Senckenberg Institute - Wilhelmshaven

The activity carried out at the Senckenberg Institute aimed at finalising a standardised classification of modern CWC habitats developed within the EU-FP7th CoralFISH Project. In particular, I worked together with Dr. Lydia Beuck and Prof. André Freiwald (i) on the final version of an illustrated glossary for habitat classification through video analysis and (ii) on a database containing information on CWC habitats from Mediterranean (Santa Maria di Leuca Province, Ionian Sea) and NE Atlantic (Bay of Biscay, Porcupine Seabight, off Northern Norway and off south Iceland) key study areas. This work, currently led by Senckenberg am Meer, the University of Milano-Bicocca and IFREMER, is the result of a wider collaboration, including all partners of the EU-FP7th CoralFISH Project (http://eu-fp7-coralfish.net/consortium.php). During my visit, we updated an Excel sheet containing information on habitats located at depth higher than 200 m and dominated by azooxanthellate frame-building scleractinian corals, gorgonians, antipatharians and solitary scleractinians. Collected data refer to both biotic and abiotic components detectable through video observations, among which: growth form, status (live *vs.* dead) and taxon of frame-building or

dominant corals; coral framework development stage and coverage (isolated colonies, patchy framework, thicket, coppice, bank/reef); substrate composition and coverage; geoforms (e.g. ripples); evidences of anthropogenic impact.

Future collaboration and Projected publications

The short visit grant funded by the ESF-COCARDE Research Network allowed me to strengthen existing collaborations with colleagues from the University of Bremen and Senckenberg am Meer and to discuss about future network possibilities.

The scientific results of the two projects described above are included in manuscripts in progress that will be submitted to peer-reviewed journals.