Geophysical Research Abstracts
Vol. 12, EGU2010-4167-1, 2010
EGU General Assembly 2010

Identifying cold-water coral ecosystem by using benthic foraminiferal indicators: from active reefs to the geological record

Stephan Margreth (1), Andres Rüggeberg (2), Giordana Gennari (1), and Silvia Spezzaferri (1)

(1) Department of Geosciences, University of Fribourg, Fribourg, Switzerland (stephan.margreth@unifr.ch / +41263009742),
(2) Renard Centre of Marine Geology, Ghent University, Ghent, Belgium (andres.ruggeberg@ugent.be / +3292644967)

Cold-water coral ecosystems dominated by the species Lophelia pertusa and Madrepora oculata, as well as cold-water coral carbonate mounds (fossils and/or active) occur worldwide and are especially developed along the European margin, from northern Norway to the Gulf of Cadiz and into the Alboran Sea. Their discovery is a major achievement of the last few decades and their widespread occurrence presents a challenge to understand their development, preservation and possible importance in the geologic record.
On the Norwegian shelf active/living reefs are developed on elevated hard substrata. Along the Irish margin L. pertusa builds large fossil and/or active carbonate mounds. In the Gulf of Cadiz and in the Alboran Sea buried reefs and patch reefs are generally found in association with mud volcanoes.
In modern oceans, they provide important ecological niches for the marine benthic fauna in the deep-sea. In comparison to the macrofauna the microfauna, particularly the foraminifera associated to these systems, are poorly known. We present here a detailed study based on quantitative analyses of benthic and planktonic foraminifera together with the statistical treatment of assemblage data collected along the Norwegian margin, in the Porcupine-Rockall region and in the Alboran Sea.
The three regions were and/or are site of cold-water coral ecosystems settlements. Our study reveals that in the Porcupine/Rockall region benthic foraminiferal assemblages are strictly related to the distribution of facies. On the Norwegian margin, benthic foraminiferal habitats are weakly defined and grade one into the other preventing the sharp facies separation observed along the Irish margin (Margreth et al., 2009). In the Alboran Sea cold-water coral ecosystems and cold-water carbonate mounds are presently buried and corals are generally fragmented.
However, benthic assemblages from coral-rich layers in the Alboran Sea and those from Porcupine/Rockall and Norway show remarkable similarities. In particular, epifaunal-attached species such as Discanomalina coronata, Cibicides refulgens, and Lobatula lobatula dominate the assemblages with D. coronata restricted to living cold-water coral reefs facies only and/or in co-occurrence with coral fragments.
In conclusion, our data suggest that although cold-water coral ecosystems occur at different latitudes, the associated foraminiferal assemblages are consistent from Norway to the Western Mediterranean. Thus they can be used to identify these ecosystems even in the geologic record, when the corals are often strongly dissolved like in the Alboran Sea.

References:
Margreth, S., Rüggeberg, A. and Spezzaferri, S., 2009. Benthic foraminifera as bioindicator for cold-water coral reef ecosystems along the Irish margin. Deep Sea Res. Part I, 56: 2216-2234.

This study is funded by the Swiss National Foundation Projects 200020-117928 and 200021-111694.