

ESF Short Visit Grant 4853

Report generated by Prof. Dr. André Freiwald (Senckenberg am Meer, Wilhelmshaven)

The Short Visit Grant 4853 “Cold-water carbonates, modern and ancient” within the ESF framework activity entitled “Cold-water Carbonate mounds in shallow and deep time – The European Research Network” was executed from May 26 to May 31 this spring.

Purpose of the visit

My activity started already on May 27 with the provision of a key note lecture on the occasion of the Annual Meeting of the Geological Association of Canada – Mineralogical Association of Canada (GACMAC) in St. John’s, Newfoundland. I was invited to provide a 45-m-long key note in the special session entitled “Cold-water carbonates, modern and ancient”. This special session was organized by Dr. Fritz Neuweiler (Quebec), Dr. Graham Layne (St. John’s) and by Dr. Evan Edinger (St. John’s). My key note was entitled “Portrait of a mound-building deep-water coral”. The strategic purpose of my visit was to explore the future possibilities for co-ordinated research on cold-water carbonates, corals and mounds in Canada and highly interested European parties such as the COCARDE-ERN.

Description of the work carried out during the visit

Due to some internal re-scheduling of the GACMAC organization team, the special session on Cold-water carbonates, modern and ancient was preponed from May 29 to **May 27** already but my already fixed flight booking was still alright to cope with the changed presentation day. The key note was well received by the audience and we had a very long and intense discussion on various topics of the key note contents. As this presentation was placed as the last prior to the lunch break, there was no (major) need to interrupt the lively discussion. The special session continued in the afternoon with exciting contributions on ancient and modern examples.

On May 28, the session leader, Dr. Edinger, organized a half-day-long discussion with the following participants: Fritz Neuweiler, Jochen Halfar, Shawn Meredyk, Walter Adey, George Dix, Stephanie Lamargnat, Vincent Lecours, Graham Layne, Alan Ruffman, David Piper, Evan Edinger and myself. The goal was to establish a Canadian network to study cold-water carbonates to link with COCARDE-ERN in Europe or other funding opportunities. I raised the point that it may be wise to broaden the topic not only to carbonates or carbonate-producing communities as the proportion of silica-secreting becomes more substantial in the polar region. The group agreed to raise visibility of the newly formulated topic “Cold-water biosedimentary systems – modern and ancient” by preparing a review paper of what is known about this challenging theme in modern and ancient worlds and where are the gaps of knowledge? In a next step the participants explained their personal interest and expertise which can be summarized as follows:

Fritz Neuweiler: Diagenesis and its role in sponge mound formation; biomineralisation & growth in cold-water sponges, silica isotopes in spicules, geological fate of habitat forming sponges. He refers to the Van Wagner et al. (1989) paper on siliceous sponge communities, biological zonation and recent sea level change on the Arctic margin, published in Can J. Earth Sci. 26: 2341-2355.

Jochen Halfar: Coralline-algal sclerochronology and climate records using elemental ratios, stable isotopes.

Walter Adey: Quantify carbonate production by coralline algae; High-arctic climate records from corallines, coralline algae & maerl generated habitats & the biodiversity hosted by these, possibility of biodiversity loss with climate change.

George Dix: Sedimentary systems at water mass boundaries, controls on cold-water carbonate accumulation, role of physical oceanography in affecting biosedimentary systems (and ancient analogues).

Vincent Lecours: Habitat mapping and predictive distribution models for cold-water corals and other biosedimentary systems.

Alan Ruffman: Cold seeps and biological links (also international cooperation and student training).

Graham Layne: Biomineralisation, geochemical microanalysis and sclerochronology of cold-water carbonate producing skeletons.

David Piper: Continental slope sedimentary processes.

Evan Edinger: Carbonate production and degradation, taphonomy of different components of CW carbonate systems, corals in high latitude systems.

André Freiwald: Longevity and stability of polar benthic ecosystems, and their geological legacy; carbonate production and degradation of these systems, history of these systems since the last glaciation, future fate; coralline-algal grounds as a recent innovation? Consider full range of high-latitude carbonate producers – corals, bryozoans, coralline algae, barnacles, bivalves (e.g. scallop-grounds) – note importance of oceanographic fronts. Mixed silica sponge-bryozoan systems.

The next topic leads to the discussion of a geographic focus with the obvious study area – the Canadian Arctic as one of the least explored region. The rocky coasts, fjord sills and troughs and open shelves and slopes with canyons in the Labrador Sea and Baffin Bay would largely increase our knowledge on polar biosedimentary systems. The importance to include photic systems, such as the coralline algal grounds, jointly with dys- and aphotic systems was pointed out several times.

This geographic focus is in line with the new Geological Survey of Canada initiative “North of 60” and with increasing oil and gas exploration in these two seas. The final major issue was the discussion of funding lines. While the Canadian participants try to gather funds from their Discovery funding schemes, a more official participation with the Canadian ArcticNet was seen positive to raise profile within the Canadian community. Connections to COCARDE-ERN are self evident and will be followed accordingly. The discussion ended with a joint dinner in a typical Newfoundlandian restaurant.

On **May 29**, I took the liberty to join other interesting sessions offered on the GACMAC and to meet a couple of Canadian and US colleagues.

On **May 30**, Dr. Edinger organized a field trip to the geological and scenic highlights around St. John’s and we visited the new Marine Aquarium where cold-water corals are cultured successfully since several years.

May 31 was my departing day and I took the time to explore St. John’s town by feet and organized by flight back to Bremen Airport, where I landed on July 1st.

Description of the main results obtained

The special session on “Cold-water carbonates, modern and ancient” was important for making each other familiar with their own research. Most important, in terms of a future strategy was the group discussion the other day, where we agreed upon a starting review paper on the status, research objectives and gaps of knowledge of Arctic biosedimentary systems. This step is seen essential to prepare joint Canadian-European projects with a main focus in the Canadian Arctic (but other polar regions should not be excluded per se). ESF was seen as a major foundation to support this envisaged Canadian-European collaboration on an emerging geo-biological topic.

Future collaboration

Dr. Edinger from Memorial University, St. John’s and me agreed upon exchange of students between our research institutions and on the exchange of samples of interest. Jochen Halfar from Toronto University, plans to visit my place at Wilhelmshaven in order to merge his internationally renown expertise on Canadian Arctic coralline algal as climate archive with my own research on Svalbardian coralline algal grounds. I was asked to seek for possible ship time on a German research vessel as the lack of Canadian vessels seemed to be major obstacle to handle with. On **June 20** I was invited to join the AMAR initiative (**A**rctic **M**ARUM-**A**WI **R**esearch) group meeting in Bremen, where I gave a summary of my ESF Short Visit experiences. The suggested topic to explore biosedimentary systems in the Canadian Arctic was seen very positive. We agreed to prepare a ship time proposal to bring the German RV Maria S. Merian into the Labrador Sea and the Baffin Bay to explore the shallow and deep biosedimentary environments. Deadline for this proposal is September 30th. I regard this step as a major impetus to keep the momentum of the ESF Short Visit running.

Projected publications

As mentioned before, the state-of-the-art review paper on polar biosedimentary systems, modern and ancient will be the first milestone.

Other comments

I want to express my sincere thanks to ESF for this ESF Short Visit Grant. It was very helpful to set the foundation of a promising international scientific cooperation.

A handwritten signature in blue ink, appearing to read "André Finckh". The signature is written in a cursive, flowing style.