

Pioneer carbonate systems: bridging offshore and on-land research on carbonate mounds

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The COCARDE network roots in the unique momentum of collaborative PhD and postdoctoral research on mostly recent, largely 'live' deep-water coral mounds, a momentum that developed in the past fifteen years within European research projects supported by the EC and ESF, and through coordinated national initiatives. The involved marine research built upon an exploratory strategy of integrated seabed and sub-seafloor imaging (from kilometeric to sub-micron scale) and comprehensive 3D sampling including continuous drilling and logging. This was completed with a full environmental assessment (oceanic and sub-seafloor) and analytical characterization of key ecosystem components – from metazoan to microbial – as well as of their functional relationships and products.

This momentum logically led to a curiosity-driven march into the world of "the mounds of the past", and a most stimulating and productive meeting with the investigators of the fossil carbonate record. Evident win-win opportunities soon showed up. Furthermore and in all logic, the study of a frontier domain of carbonate building processes in deep and cold waters progressively sharpened interest for other extreme carbonate environments, such as high-T and hypersaline environments: not truly out of a sense of collection of extreme experiences, but for the likeliness that stresses induced by extreme conditions may have played a crucial role at critical moments in the evolution of Life – if not in the genesis of Life itself. The comparative study – on recent and past systems – of the adaptation of pioneer carbonate-building ecosystems to extreme conditions, and of their development of strategies to tailor these environments to their needs, can deepen our insight in the processes involved at key moments of Biosphere-Geosphere interaction in the history of our planet – not the least in a context of Global Change.

Fostering the creation of multiple projects along those research lines, with a strong capacity-building dimension, is the ambition of COCARDE. In its present functioning COCARDE acts as a network for "Collaborative Frontier Carbonate Systems Research and Project Development" that promotes collaborative research on both live and fossil carbonate systems, in academic and industrial context. COCARDE is an independent, bottom-up and open network with distributed management, pragmatically operating with modest but efficient institutional (ESF, IOC-UNESCO, FWO-Flanders) and industrial support. The effective bridging of domains and communities featuring a proper history and culture will most likely benefit of a convergence of protocols – where applicable. This is a central challenge taken by the conveners of this 5th COCARDE workshop.

In this workshop, continued progress on cold-water coral mounds research will furthermore be reported, while a possible new collaborative project tack is being explored, related to the interaction and the intertwining of carbonate and evaporitic systems, in particular at the crucial transition between continental/lacustrine and oceanic conditions. In the Ries meteor crater, during the 4th COCARDE workshop, COCARDE teams got confronted with amazing carbonate build-ups shaped in an alkaline lake, under apparently vigorous thermally-driven groundwater circulation conditions. It is tempting to extend observations in such a thermally stirred semi-enclosed basin towards an active rift basin, on the verge to oceanization – the Afar – and to compare products and sequences with those, for instance drilled in the deep Atlantic subsalt carbonate world. Opportunities towards continental scientific drilling, actively promoted by COCARDE, obviously hereby keep in the back of our mind. It was tantalizing to potentially discuss these processes and products while effectively walking on carbonate/evaporite sequences – regardless the differing context – and today, the dream comes true.

The 5th COCARDE workshop and field seminar in Catania takes a pivotal position, midway the ESF-supported COCARDE-ERN network lifetime. The two collaborative frontier research strings in which COCARDE thus hitherto has engaged in an exploratory way – “Cool Carbonates” and “Hot Carbonates” – will further give shape to two major sessions at the “First COCARDE Research Conference” planned to be organized late 2015 by the Fribourg University teams, and for which the mythic location of Monte Verità (Switzerland) is targeted. The third planned session – “Rocks of Life” – aims to bring together project architects and key scientists who achieved the recognition of world-class carbonate sites as UNESCO World Heritage, or who are working at it – from the Jurassic Coast in the West to the Dolomites in the East, and from Stevn’s Klint in the North to a planned Moroccan “Route Royale” of Carbonate Mounds in the South. This aiming again to explore win-win collaborative opportunities in the development of for instance common protocols in documentation and promotion, to maximize the outreach and the impact of carbonate research on a wider public and in education.

References

<http://www.cocarde.eu/>