

CIESM Congress Session : Shelf and slope dynamics
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Moderator's Synthesis

The discussion focused on two main topics: (1) Dense shelf water cascading (DSWC) and (2) Cold-water coral (CWC) ecosystems and mounds. DSWC occurs in the NW Mediterranean, in the Adriatic and in the Aegean Sea. It is driven by very cold and dense water formed on the shelves in winter that often pass through canyons to the deep-sea, basically driven by their density. Such DSWC events can temporarily increase downward particle fluxes by >2 orders of magnitude, result in significantly enhanced current speeds, increase the supply of organic matter to deep-sea ecosystems and can leave clear traces in the sedimentary record. To understand the imprint of such events on the seafloor, an interdisciplinary approach must be followed linking oceanographers, biologists, sedimentologists and others to answer questions like, e.g., if the traces of such events dominate the sedimentary record in specific regions and to what extent well-known, yet not understood, sea floor features can be linked to such events.

By providing high-energy settings and high particle loads, including food particles, DSWC events are also beneficial for CWC, supporting their occurrence in DSWC-affected areas. However, CWC are also found in many other places in the Mediterranean Sea. As ecosystem engineers the CWC form biodiversity hotspots in the deep Mediterranean (~200-1000 m) although they are close to their ecological limit in terms of temperature. These thriving ecosystems attract many organisms and serve as nursery for many species, including commercial ones, explaining that many Mediterranean CWC settings show a clear anthropogenic impact (e.g., lost fishing gear). Over time, the CWC can generate impressive seabed features, so-called coral mounds, that can reach > 100 m above the surrounding sea floor and that form very valuable sedimentary archives. Also the investigation of CWC and of coral mounds requires very broad interdisciplinary approaches to answer questions regarding the distribution of CWC and coral mounds in the Mediterranean and their forcing factors, with many new discoveries to expect in the future. The coral mound records are very complex, consisting of coral fragments in a hemipelagic sediment matrix and our ability to read the coral mound record needs to be further developed. Such records provide temporal resolutions of a few meters per thousand years, bearing a huge potential.

Other issues that were briefly touched during the discussion were canyon systems and the impact of internal waves on the sea floor. Two key points were highlighted during the discussion : (a) our lack of knowledge on most parts of the African margin in the Mediterranean and (b) the need for interdisciplinary approaches in studying specific topics/systems, as only a more holistic approach can really result in a mechanistic understanding/reconstruction of many processes in the Mediterranean and beyond.

