



MODERN CARBONATE MOUND SYSTEMS

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Carbonate mounds are prominent features throughout the geological record. In many hydrocarbon provinces, they form prime reservoir structures. But recent investigations have increasingly reported occurrences of large mound clusters at the surface of the seabed, or buried at shallow depth on modern ocean margins, and in particular in basins rich in hydrocarbons. Such exciting new observations along the West-European margin are promising for elucidating the setting and environment of modern carbonate mounds, but at the same time they confront us with puzzling or sometimes contradictory observations in the quest for their genesis.

Spectacular cold-water coral communities have colonized such mounds, but convincing arguments for recognizing them as prime builders are still lacking. The geological record provides ample evidence of microbial mediation in mound build-up and stabilisation, but as long as mound drilling is lacking, we have no opportunity to verify the role of such processes and identify the key actors in the earliest stage of onset and development of modern mounds. Some evidence from the past record and from present very-high resolution observations in the shallow seabed suggest an initial control by fluid venting, and fluid migration pathways have been imaged or are tentatively reconstructed by modelling in the concerned basins, but the ultimate link in the shallow subsurface seems still to elude a large part of our efforts. Surface sampling and analyses of both corals and surface sediments have largely failed in giving any conclusive evidence of present-day or recent venting in the considered basins. But on the other hand, applying rigorously the interpretational keys derived from e.g. Porcupine Seabight settings off NW Ireland on brand new prospective settings e.g. on the Moroccan margin have resulted in the discovery of totally new mound settings, in the middle of a field of giant, active mud volcanoes. Keys are

apparently working, but we still do not understand how or why. We are no doubt facing complex systems at the interface between the Biosphere and the Geosphere, owing their genesis and spectacular growth to a complex woven of internal and external controls, feedback and process relay processes.