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Cold-water coral mounds and contourite drifts: two chapters of the palaeoceanographic log-book?

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During the past two decades, many marine geoscience studies have focused on the genesis, growth and decay of cold-water coral (CWC) mounds, especially along the northeastern Atlantic margin. A key study site was the Belgica mound province (Porcupine Seabight), where during IODP expedition 307 the base of a mound was drilled, enabling to date mound initiation at 2.65 Ma [1]. Although this offered insight in the evolution of CWC mounds, a lot of questions regarding the "start-up" phase and growth remained unanswered. This is partly due to the inability to obtain a continuous high-resolution environmental record from such a mound, to compare with continuous "off-mound" records, which are most likely contourite drifts. Luckily, the Belgica mounds are just one of the many expressions of CWC mound growth. More enigmatic is the buried Magellan mound province, located in the northern part of the Seabight, featuring over 1000 relatively closely spaced buried mounds, which are all rooted on a common reflector. This indicates a common and sudden start-up event, but the true driving forces behind their initial settling, growth and demise are also still unknown.

Further south along the margin, smaller expressions of CWC mounds are found, of which the presently inactive "minimounds" at the head of the Ferrol Canyon could give an indication on the start-up conditions of closely-spaced CWC mound forms. Moreover, in 2013, a new province of buried CWC mounds was discovered along the Moroccan Atlantic Margin. They have an average height of 10-20 m and are approximately 250 m wide. With respect to the Magellan mounds, they do not root on one single stratigraphic level. At least 8 different initiation levels were identified. These individual initiation levels of these mounds seem to indicate fast and relatively short-lived mound growth during one or more climatic cycles. These new key sites may contain the key to better understand mound growth in relationship to palaeoclimatological variability.

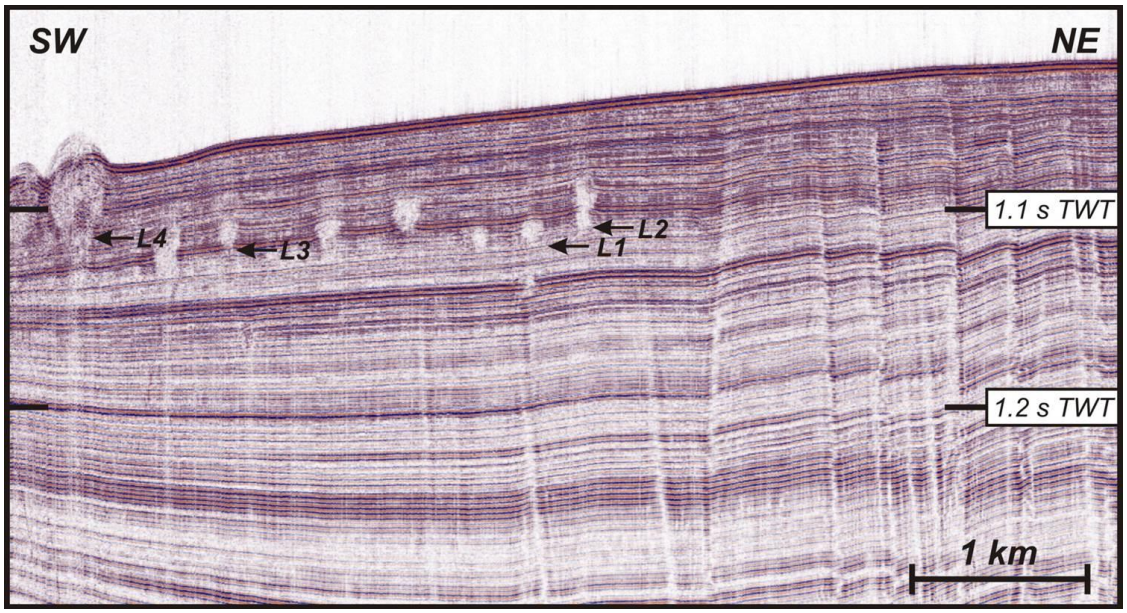

Figure 1: Single-channel reflection seismic profile along the Moroccan Atlantic margin illustrating the different growth levels of the buried cold-water coral mounds with respect to the surfacing ones.

References:

[1] Huvenne et al. (2009) Deep-Sea Research 56: 2263-2280