

DEVELOPMENT AND DECEASE OF THE SO-CALLED FRASNIAN REEFS IN THE FRASNIAN OF BELGIUM

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The Belgian middle Frasnian is famous for a long time for limestone corals interpreted as typical stromatoporoid-coral reefs. However, large quarries now display full section in some of these “reefs” allowing to document their pattern, stratigraphic evolution and their final decease relating to the beginning of the upper Frasnian crises. It appears that only the core of these limestone corals is really composed of boundstone, most of the rest being composed of subtidal bioclastic deposits showing slumps and palaeoslopes of 25-30° and capped by shallow subtidal and intertidal lime mudstone.

The sequence stratigraphy of the Middle and Upper Frasnian was revised and has allowed to establish that the development of these limestone corals was well correlated with third-order sequences. During the Middle Frasnian, the onset and vertical growth of the built core (few hundreds m wide) of the three levels of “reefs” (“Arche”, “Boverie” and “Lion”) corresponded to the transgressive system tract (TST) of the sequences. During the high-stand (HST) and the falling-stage system tracts (FSST), they evolved to progradant carbonate platforms, 1 – 3 km wide and up to 140 m high (including the biohermal core), in which boundstone are replaced by packstone – grainstone, then by shallow-water and intertidal mudstone (FSST). There is never evidence for the development of atolls rimmed by stromatoporoid-coral barriers, as it is usually suggested. The final emersion of these reef-limestone platforms in the distal areas of the basin, and of the carbonate platform in the proximal areas, stopped the carbonate production until the following transgression-regression sequence. The last (third) middle Frasnian regression is correlatable with the end of the Lion “reef” and of the Middle Frasnian type “reefs”.

During the beginning of the transgression of the first of the two recognized upper Frasnian sequences, was the first crisis affecting corals and stromatoporoids, probably due to a global fall of the atmospheric oxygen. Subsequently the carbonate production never recovered as previously. Reddish microbial mudmounds (“Petit-Mont type buildups”), grew during the TST and the HST of this first upper Frasnian sequence. They are smaller than the previous corals, reaching up to 300 m wide and 80 m high. Their growth was dominantly vertical and there is no marked progradation during the HST. During the FSST of the sequence, shallowwater mudstones and stromatolites developed on their top, then their emersion stopped their development. During the last Upper Frasnian sequence the extension of anoxic-dysoxic facies prevented the development of large buildups, and only 1 to 2 metres-wide micro-mudmounds have so far been recorded.