
Onset, growth, decline and decease of the Frasnian reefs and carbonate platform in the Frasnian of Belgium

Poty, E., ¹Denayer J.¹ and Mottequin B.²,

¹ Liège University, Animal and Human Palaeontology Unit, Allée du Six-Août B18, Sart Tilman B4000 Liège, Belgium; e.poty@ulg.ac.be; Julien.denayer@ulg.ac.be. ² O.D. Earth and Life History, Royal Belgian Institute of Natural Sciences, rue Vautier 29, B1000 Brussels, Belgium; bmottequin@naturalsciences.be.

The Belgian Frasnian was investigated for a long time and displays well dated and correlatable sections. They allow to document the evolution of the carbonate platform and buildups, and their decease relating to the Frasnian crises. The sequence stratigraphy of the Middle and Upper Frasnian was revised here and has allowed to establish that the development of the buildups was well correlated with the third-order sequences. During the Middle Frasnian, the onset and vertical growth of the three levels of reefs (“Arche”, “Boverie” and “Lion”) correspond to the transgressive system tract (TST) of the sequences. During the high-stand (HST) and the falling-stage system tracts (FSST), their vertical growth decreased, and they evolved to progradant carbonate platforms, 1 – 3 km wide and up to 140 m high (including the biohermal core), in which bounstone are replaced by packstone – grainstone, then by shallow-water and intertidal mudstone (FSST). There is no evidence for the development of atolls rimmed by stromatoporoid-coral bareers, as it is usually suggested. The final emersion of these reef-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 caused the end of the “Lion reef” and of the Middle Frasnian type reef.

During the beginning of the transgression of the first (“Aisemont sequence”) of the two recognized upper Frasnian sequences, was the first crisis affecting corals and stromatoporoids. Subsequently the carbonate production never recovered as previously. Reddish microbial mudmounds (“Petit-Mont” type buildups), grew during the TST and HST of this first sequence. They are smaller than the previous buildups, 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 Aisemont sequence, shallow-water mudstones and stromatolites developed on their top, then their emersion stopped their development. During the last Upper Frasnian sequence (“Lambermont 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.