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2.3.6 Bornival Formation - BNV

Lower Paleozoic

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Version: revised November 2011, A. Herbosch and J. Verniers

Authors: informally mentioned as «...laminated siltstone and mudstone of Bornival Formation» by Van Grootel et al. (1997) in the «Rue de Bornival» at Fauquez, Sennette valley. Briefly described in Verniers et al. (2001). More recently, the Member 1 was described by Vanmeirhaeghe et al. (2005) and the members 2 and 3 by Verniers et al. (2005) always in the Sennette valley.

Description: A centimetric alternation of dark grey mudstone and dark grey to blackish claystone with gradual transitions. In the clayey part abundant coarse silt grains are distributed throughout. The bedding planes are rarely sharp and mostly gradual. Occasional very fine sandstone beds, laminated or finely obliquely stratified and never >10 cm in thickness are observed. In the Sennette valley the formation can be subdivided into (at least) three members. The unnamed Member 1 (also called informally the "laminite member") shows a centimetric alternation of light to medium grey fine-grained sandstone, siltstone to mudstone with dark grey to black mudstone. The member contains cm to mm light grey mudstone «lenses», irregularly distributed in the dark grey mudstone. Brachiopods and ichnofossils are only present in this unit. These sediments are interpreted as distal turbidites with individual sequences of 1 to 4 cm thick that are frequently bioturbated (Debacker et al., 2001; Van Noten in Vanmeirhaeghe et al., 2005). The unnamed Member 2 is characterized by a centimetric alternation of black to dark grey mudstone and claystone with visible quartz silt grains. Some of the bedding planes show small-scale ripples which are crenulated by a cleavage. Some isolated patches of millimetric pyrite crystals occur parallel to the bedding. In the unnamed Member 3 the sediments are finer grained than the underlying unit: a very faint centimetric lamination, caused by a varying proportion of fine silt grains, is present in the very dark grey to black shale.

The megaslump affecting the Ittre and the Bornival formations in the Sennette valley occurred between the deposition of the lower and the middle members (Debacker et al., 2001). In the Orneau valley, a medium to dark grey mainly silty unit apparently overlays the Ittre Formation and shows indistinct centimetric laminations without sandstone beds. In the Senne valley (Herbosch, 2005; Herbosch et al., in press), the upper member 3 crops out to the west of Rebecq and presents a black lustrous facies unknown in the Sennette valley. The lower contact with the Ittre Fm. is visible along the Asquempont canal section, 1.2 km N of the Fauquez bridge (Debacker et al., 2001) but the upper contact with the Huet Fm. is by fault. Boundaries between the three members are faulted contacts.

Stratotype: Type section area in the Sennette valley, for the Member 1 along the southern half of the large canal section south of Asquempont km 39.318 to 39.210 (see Debacker et al., 2001). For the Member 2 in the crags at the crossing of the Ry de Fauquez and the Rue de Bornival (see Verniers et al., 2005 fig. 3; 50°37'26.49" N/4°14'06.85" E) and for the Member 3 along the abandoned railway section north of the abandoned Huet quarry (see Verniers et al., 2005 fig. 7; 50°37'42.74" N/4°13'42.96" E).

Area: Sennette, Senne and Orneau valley.

Thickness: estimated in the Sennette valley at minimally 265 m (lower member: >116 m (Van Noten in Vanmeirhaeghe, 2006); middle member: >85 m, upper member: >64 m).

Age: Nearly no macrofossils were found in the unit except for the recently found rare specimens of brachiopods and ichnofossils in member 1 (Verniers et al., 2005). Acritarchs from member 1 of the Bornival Formation were described by Martin & Rickards (1979), who inferred a late Arenig? to Llanvirn age. Chitinozoan from all the members were studied by Van Grootel et al. (1998) and Samuelsson & Verniers (2000) who mention the presence of *Lagenochitina dalbyensis*, *Belonechitina hirsuta* and *Belonechitina cf. robusta*. These authors deduced a mid Sandbian (Burrellian) age for the Bornival Formation. A restudy on more samples by Vanmeirhaeghe et al. (2005) and Vanmeirhaeghe (2006) could not confirm the identification of *L. dalbyensis* and of *B. hirsuta*. Hence they suggest an early Katian (mid Oandu or late Cheneyan) age for the Bornival Formation. The lack of *D. juglandiformis* and *L. baltica* argue for a rather high position in the *S. cervicornis* Zone, but still below the *F. spinifera* Zone. As this age is deduced in the absence of the index species, it remains speculative. They add also that the chitinozoan assemblages of the Ittre and Bornival formations do not differ much from each other.

Remarks: Synonyms: the "Formation de Pierre de Gembloux" (Michot, 1980) and the Moulin Formation (Michot, 1980; Servais et al., 1993) are probably parts of the formation in the Orneau valley.