

HONDELANGE FORMATION

Authors : Dormal (1894), Maubeuge (1952), Boulvain & Belanger (2018).

Preliminary remarks : The Assise de Hondelange was a long-standing lithostratigraphic unit from the Lower Jurassic succession in Belgian Lorraine, remarkable for its mixed sandy and argillaceous facies (cf. Dormal, 1894; Maubeuge, 1952, 1954). This unit is often transitional with the Virton Member in the eponymous region (Maubeuge, 1954, 1963) and these two units were mapped together in the 1/40 000 detailed geological maps (see for example Dormal & Purves, 1897: Meix-devant-Virton-Virton).

For the Sinemurian-Pliensbachian interval, the new geological maps of Wallonia presents two synchronous formations distinguished by contrasting lithologies, the Luxembourg Formation with a sandy facies and the Arlon Formation which is argillaceous (Fig. 1). According to the Boulvain *et al.* (2001) proposal, the Hondelange unit was included as a member in the uppermost part of the Arlon Formation. However, this relatively simple distinction between Luxembourg and Arlon formations has proven to be less relevant for the Hondelange unit due to its mixed lithology. Moreover, geometrically speaking, an angular unconformity is observed locally at the base of the Hondelange unit. These facts led to propose to modify the lithostratigraphic status of the Hondelange *Member* into Hondelange *Formation*.

Description : The following is a summary of the main lithological characteristics of the Hondelange Formation, as observed in the boreholes and during the geological survey of Belgian Lorraine (Belanger *et al.*, 2002; Ghysel *et al.*, 2002; Belanger, 2006 a & b; Ghysel & Belanger, 2006). The typical Hondelange facies that can be observed in boreholes and some rare outcrops is a grey to yellowish grey argillaceous calcareous sandstone. Unlike the Luxembourg sandstone, that of Hondelange is poorly sorted with sandy or argillaceous patches and with black millimetric dots of organic matter. Fossils are frequent such as belemnites, bivalves, echinoderms, ammonites. The weathering gives a typical orange colour to the Hondelange facies. More precisely, in the Latour borehole (Boulvain & Monteyne, 1993) (Fig. 2), the Hondelange Formation starts over the yellowish sandstones of the Luxembourg Formation by a grey to brown bioclastic sandy limestone bed (182.8-182.1 m), passing upwards to an alternation of dark grey to brown bioturbated sandy or silty marls and dm-thick pale grey bioturbated or laminated limestone (182.1-172 m). From 172 m to 167 m, the limestone beds vanish and the silty marls are heavily bioturbated. The next facies, from 167 m to 159.6 m is again an alternation of dark grey bioturbated sandy-silty marls and dm-thick pale grey bioturbated limestone beds with lots of belemnites and crinoids. A reddish brown slightly intraclastic level is observed near 164.5 m. The top of the Hondelange Formation (159.6-157.6 m) is a calcareous argillaceous dark grey sandstone, very rich in fossils. Vertical burrows are abundant throughout the formation. The boundary with the laminated silty argillite of the Ethe Formation is marked by a reddish brown calcareous bed. Despite frequent lateral facies changes, the base of the Hondelange Formation is marked everywhere by cm-dm iron-rich beds also identified in some boreholes and interpreted as ferruginous hardgrounds. The formation is generally ordered in dm-thick locally very hardened beds which decrease in thickness towards the top and become laminated. The unit is topped everywhere by a dm-thick iron-rich level marking the transition to the Ethe Formation.

Stratotype : According to its very good preservation, the Hondelange Formation in the Latour borehole may be considered as the lithostratotype of this unit (Fig. 2).

Area and thickness: The northernmost extension of the outcropping zone of the Hondelange Formation is limited to a SW-NE line passing just N of Arlon. In the Arlon old brickyard, the formation is some dm-thick and is only represented by argillaceous and sandy layers rich in iron oxy-hydroxides on which the Ethe Formation lies. In the Châtillon quarry, the thickness of the Hondelange Formation is around one decimeter only with locally thick metric lenses of fossils-rich iron beds.

In Udange, on top of a ferruginous sandstone unit, lies a meter-thick succession of thin beds of argillaceous sandstone becoming foliated upwards. In the Toernich borehole (219E614), the Hondelange Formation is present as a ten meters thick unit of grey argillaceous sand rich in limonitic beds at the base. The thickness of the Hondelange Formation then increases southeast which corresponds to its main depositional area. It reaches 40 m SE of Arlon.

In this geographical area, important lateral facies variations together with an angular unconformity of approximately 10° are highlighted on both sides of a N-S line running from Weyler to the flank of Grouss Schock hill. This N-S line also corresponds to the track of the Arlon-Wolkrange fault.

To the east, the Sterpenich region is a vast plain occupied by marls of the Strassen Member and dominated by residual hills of the Hondelange Formation. Predominant facies are sandy limestone and sandy argillite which are relatively more resistant to erosion and well-marked in the landscape.

Towards Grouss Schock, the 219 E 254 borehole shows that the sandy-argillaceous limestone facies of the Hondelange Formation lies on sandy lenses of the Luxembourg Formation which disappears eastwards. The Weyler region can be considered as the easternmost extension of the Virton Member whose thickness grows SW, reaching a maximum in Châtillon. In Grouss Schock, the Hondelange Formation rests both on Luxembourg and Arlon formations, reflecting its unconformable contact. Towards the top of the unit, the Hondelange facies is an argillaceous to sandy sandstone which more closely resembles the Luxembourg Formation than the Arlon Formation. However, the proportion of poorly sorted clay and organic matter gives a typical hybrid nature to this Hondelange facies.

Between Saint-Léger and Virton, deep valleys were incised in the sandstone of the Luxembourg Formation, with flat surfaces marked at the occurrence of the Strassen and La Posterie argillaceous members. The Hondelange Formation is composed of meter-thick argillaceous and calcareous sandstone beds with decimetre-thick lenses of sands. Some levels are sandier with laminated or cross-laminated beds. Sandstones are poorly sorted and contains organic matter. Again, alteration gives to this formation a typical orange colour.

From the meridian of the Chou valley towards the west, the Hondelange Formation reaches 20 m in thickness and has a basal metric layer of grey fossiliferous (*Gryphaea*) clay, the Layer of Robelmont. Towards the west, in the Robelmont region, this layer leads to numerous springs. As it has not been found in boreholes farther to the south, the Layer of Robelmont may be of local importance.

Age : According to the presence of ammonites like *Beaniceras luridum* Simpson 1855 var. wright that belong to the *Ibex* Zone at the top of the unit in Châtillon, the age of the Hondelange Formation ranges from the *amesoni* to the *davoei* ammonite zones. The

Luxembourg Formation below contains ammonites of the *raricostatum* Zone and the Ethe Formation above belongs to the *margaritatus* Zone.

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Figures

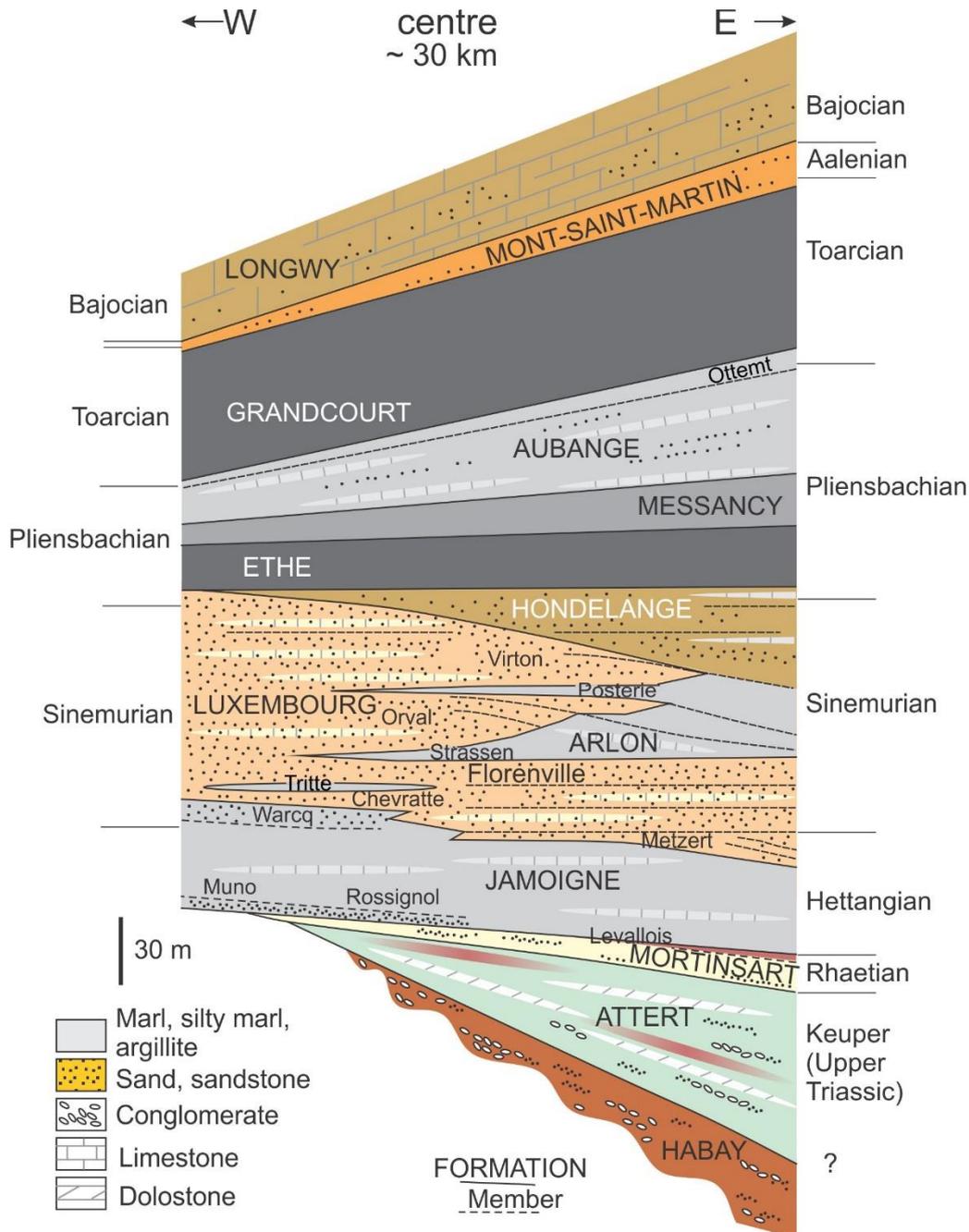


Figure 1. Upgraded stratigraphic canvas for Belgian Lorraine.

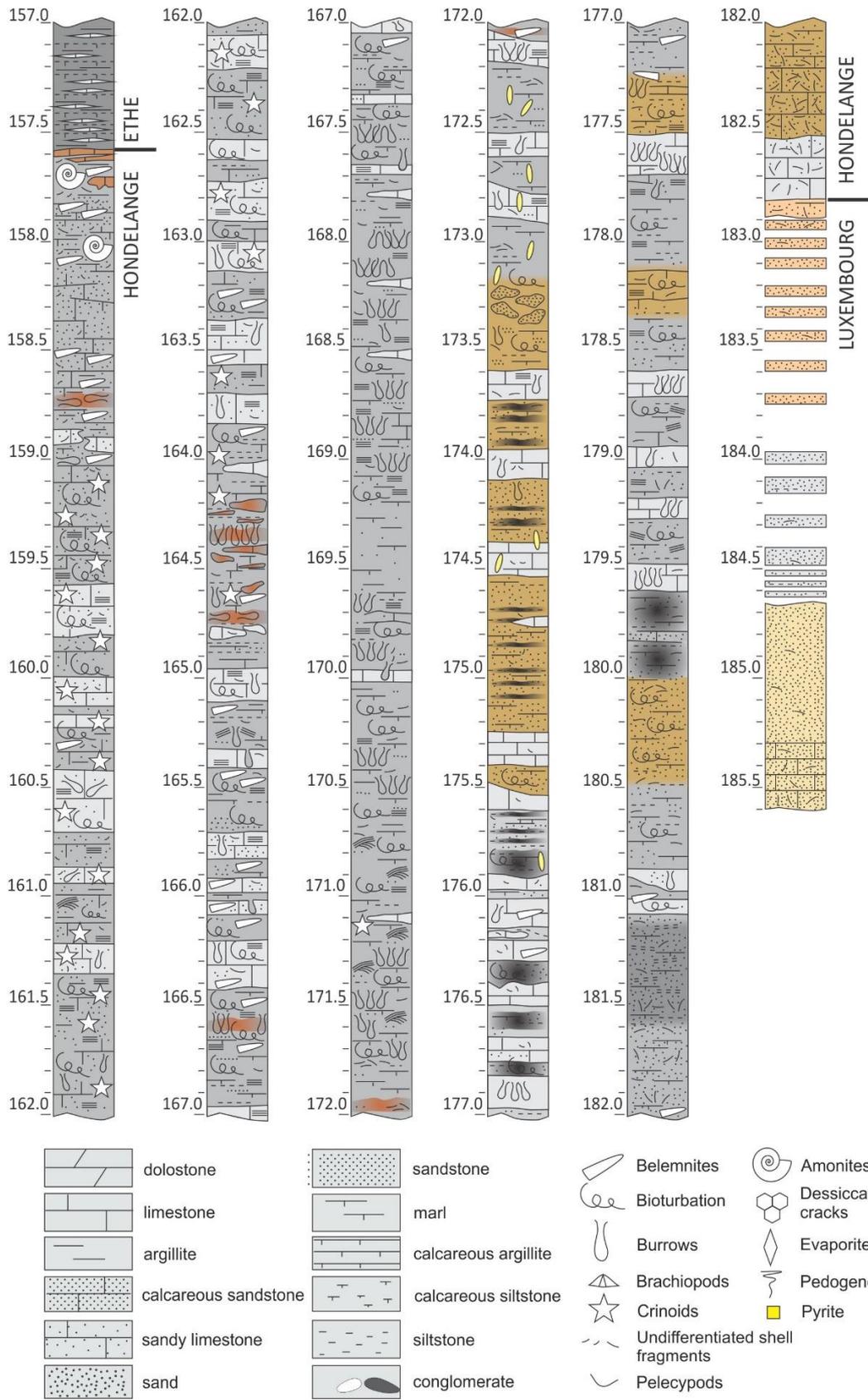


Figure 2. Lithologies and limits of the Hondelange Formation in the Latour borehole. Legend of symbols.