Deurne Member (Diest Formation)

Unit name: Deurne Member

Hierarchical unit name: Diest Formation

Type: Member

Code: DiDn

Author(s):

- Compiled by: Goolaerts Stijn

- Modification of: De Meuter & Laga (1976), after Glibert & de Heinzelin de Braucourt (1955a,b)

Alternative names: /

Origin of the name: temporary exposures in Deurne, Antwerp

Status: Formal

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Characterizing description

The Deurne Sand Member, originally introduced by De Meuter & Laga (1976) revising the 'Sables de Deurne' of Glibert & de Heinzelin de Braucourt (1955a, b) is according to the revised description of Goolaerts et al. (2020) to be characterised as a complex of facies deposited in trough-shaped structures with intensely bioturbated foresets and remnants of bryozoan reefs in the lower part. The sediment consists of heterogenous glauconiferous fine-grained sand with a much lower number of fines (<125µm 15%), a larger amount of coarse grains (>250 µm 21–33%) and glauconite (39–49%) than that of the underlying Borsbeek Member. The color ranges from bluish-green to whitish-grey, depending on the amount of carbonate particles originating from the abrasion of the remains of the inhabitants of the bryozoan reefs that are incorporated in the sediment. Locally, the sediment is very fossiliferous, especially in the lower part. The macrofauna is generally small-sized, with bryozoans, serpulids (e.g. Ditrupa), decapod and cirripede crustaceans, bivalves and gastropods, echinoids and brachiopods. Terebratulids are locally abundant in the lower part and can be found both loose in the sediment as well as encased in sandstone. These terebratulids can also be encrusted by bryozoans. The brachiopod Cryptopora nysti is locally abundant. Shell fragments of lingulid brachiopods (Glottidia dumortieri) occur throughout. Trace fossils Macaronichnus segregatis, M. s. degiberti and Scolicia occur abundantly, and allow to ascribe the member to the Cruziana ichnofacies. Yellowish- to orange-colored clayey-limestone concretions and light-colored calcareous sandstone with bryozoans, terebratulids and small-sized mollusks in mold preservation are locally abundant above the basal gravel. The basal gravel generally contains small quartz and flint pebbles, reworked elasmobranch teeth, fish bones and fragments of marine mammal bones, and sometimes also larger sized concretions and bones that are reworked from the Borsbeek Member.

Type section, type locality, type borehole, or type geophysical borehole

De Meuter & Laga (1976) only named 'Deurne' and 'temporary exposures of shallow excavations at Deurne' as the type section, while Glibert & de Heinzelin de Braucourt (1955a) only gave a composite section based on the observations of Mourlon (1876) at four outcrops at Deurne and Borgerhout. Bosselaers et al. (2004) identified VII BR Borgerhout Rivierenhof described by De Meuter et al. (1967, fig. 2, Section A), De Meuter & Laga (1970, text-fig. 1) and De Meuter et al. (1976, fig. 17) as the most relevant of all the studied sections, and designated it as the stratotype. However, as discussed by Goolaerts et al. (2020), this proposed stratotype presents several shortcomings and the Middelares section of Bosselaers et al. (2004) could be a better stratotype section, but additional documentation for its microfossil content, namely dinoflagellates and Bolboforma is necessary.

Description upper boundary

The Deurne Member is erosively overlain by Pliocene deposits. Rather frequently, sandstone reworked from the Deurne Member is incorporated into the base of these Pliocene deposits.

Description lower boundary

The Deurne Member is the upper member of the Diest Formation in the Antwerp area. Its lower boundary is an erosive contact with the Borsbeek Member, locally scouring through and fully removing the Borsbeek Member. In these cases, the Deurne Member directly overlays Berchem Formation deposits.

Thickness

The Deurne Member has a fairly limited thickness; in many of the documented sites it has a thickness well below 1 m. Locally, when it scours deep into the underlying Borsbeek Member, it may reach up to more than 5.5 m. The presence of reworked sandstones from the Deurne Member at the base of overlying Pliocene deposits implies that an unknown interval of the Deurne Member was eroded prior to the deposition of these Pliocene deposits.

Occurrence

The Deurne Member occurs in the shallow subsurface of the Antwerp area. Its possible extension towards the Campine needs further study.

Regional correlations

Its possible occurrence and correlation with Diest Formation deposits outside the Antwerp area still needs to be resolved. It is possibly correlative to the coarse-grained Diest Sand of the Hageland and southern Campine areas (Goolaerts et al., 2020; Houthuys et al., 2020).

Age

The age of the Deurne Member is middle Tortonian (upper Miocene). Dinoflagellates indicate Amiculosphaera umbraculum Zone of Dybkjær & Piasecki (2010) and the upper part of the DN8 Zone of de Verteuil & Norris (1996) (Goolaerts et al., 2020). According to King (2016), and based on De Meuter & Laga (1970), De Meuter (1974, 1980), King (1983) and Hooyberghs & Moorkens (2005), the presence of the Foraminifera Elphidium dopperti (Elphidium antoninum), Uvigerina pygmaea and Uvigerina venusta (hosiusi) deurnensis, together with the common presence of dextral Neogloboquadrina atlantica ('Globigerina pachyderma') are indicative of Zone NS40 of King (2016). The presence of Bolboforma metzmacheri, indicative of the Bolboforma metzmacheri Zone (De Meuter, 1974; Willems, 1976; Spiegler, 2001), allows to refine the latter positioning to King (2016)'s Subzone NS40b and to date it in the interval between 9.54 and 8.8 Ma (Goolaerts et al., 2020).

Dataset

Data in the LIS are part of the DOV-Neogene data collection, including links to the GSB-collection data sheets: https://www.dov.vlaanderen.be/data/opdracht/2020-023222

Subset of the Diest Formation: https://www.dov.vlaanderen.be/data/opdracht/2020-021774

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