

Merksem Member (Lillo Formation)

Unit name: Merksem Member**Hierarchical unit name:** Lillo Formation**Type:** Member**Code:** LiMe**Author(s):**

- Compiling authors: Deckers Jef & Louwye Stephen
- Modification of: De Meuter & Laga (1976)

Alternative names: /, including 'Sables à Corbula'**Origin of the name:** Merksem suburb, situated north-east of Antwerpen**Status:** Formal**Date:** 01/05/2022**How to refer:** Deckers, J., & Louwye, S., 2023. The Merksem Member, 01/09/2023. National Commission for Stratigraphy Belgium. <http://ncs.naturalsciences.be/lithostratigraphy/Merksem-Member>**Characterizing description**

The Merksem Member, redefined by De Meuter & Laga (1976), is a grey-green fine-grained to medium fine-grained glauconiferous quartz sand. Coarse-grained sandy intercalations occur. The lower part of the unit is characterised by cross-bedded stratification and thin (1 up to 20 cm) clay layers, while the upper part is horizontally to subhorizontally stratified with rare clay lenses. Sandstone and siderite concretions have been observed. The bivalve *Corbula gibba* is the characteristic fossil in this member. The Merksem Member as defined here includes the Sables à Corbula described in boreholes of the Antwerp Campine in the Archives of the Geological Survey of Belgium.

Type section, type locality, type borehole, type CPT and/or type geophysical borehole

The type locality is the village Merksem near Antwerp, and the type section was in a temporary outcrop of a fortification at Merksem at 4.4 m depth. In the type section in the Tunnel Kanaaldok (GSB 015W0304; DOV [BGD015W0304](#)) the member lies between 12 m and 3 m depth (Laga, 1972; Figure 0-1). On the nearby CPT (DOV [GEO-20/034-S5](#)), the Merksem Member is characterised by relatively low friction ratios (generally below 2% in the basal part towards 1% in the upper part) and fluctuating cone resistance values between 15 and 40 MPa.

Type geophysical borehole is borehole Stabroek (GSB: 015W0216; DOV [kb7d15w-B296](#)) with the Merksem Member from 10 to 21 m depth (Figure 0-2).

Description upper boundary

In its southernmost areal, it is overlain by Quaternary strata. Further north, it is overlain by either the Zandvliet Member of the same formation, or by the Malle Formation. The contact with the Zandvliet Member is characterized by the upwards disappearance in carbonate and the contact with the Merksplas Formation with the upwards decrease in shell-content and glauconite, coarsening of the grain-size and discoloration (grey-green to grey). On Cone Penetration Tests, the boundary with the

Zandvliet Member frequently coincides with a sharp upwards decrease in cone resistance (Deckers et al., 2021; Figure 0-3). On geophysical borehole logs, the boundary with the Zandvliet Member is not obvious (Figure 0-2). The boundary with the Malle Formation is on Cone Penetration Tests very similar to the boundary with the Zandvliet Member, and on geophysical borehole logs it is expressed by an upwards decrease in gamma-ray values and increase in resistivity values.

Description lower boundary

It overlies the Kruisschans Member of the same formation. This boundary is not distinct, and the main criteria as defined by De Meuter & Laga (1976) is the downwards increase in the number of clay layers. On Cone Penetration Tests, the boundary is more obvious by a downwards decrease in cone resistance and increase in friction ratio (Deckers et al., 2020; Figure 0-1 and Figure 0-3). On geophysical borehole logs, this boundary coincides with an upwards decrease in gamma-ray values and increase in resistivity values (Figure 0-2).

Thickness

Up to 15 m. At the Zandvlietsluis, a decrease in thickness resulted in an increased thickness of the overlying Zandvliet Member (Deckers et al., 2021).

Occurrence

From the Waasland area in the west, across the Port of Antwerp areas into the western Campine area. It presumably covers the western Campine area up to roughly the SW-NE line between Beerse and Weelde in the east. Here, the transition towards the time-equivalent Poederlee Member can be assumed (Louwye et al., 2020).

Regional correlations

It probably correlates with the lower part of the Maassluis Formation in the Netherlands.

Age

Late Pliocene. See Louwye et al. (2020) and references therein.

Dataset

Data in the LIS are part of the [DOV-Neogene data collection, including links to the GSB-collection data sheets](#):

Name	GSB name	DOV name	GSB Collections URL	DOV URL
Outcrop Tunnel Kanaaldok	015W0304	BGD015W0304	http://collections.naturalsciences.be/ssh-geology-archives/arch/015w/015w0304.txt	https://www.dov.vlaanderen.be/data/boring/1999-161693

Extra data:

Name	GSB name	DOV name	GSB Collections URL	DOV URL
CPT Tunnel Kanaaldok		GEO-20/034-S5		https://www.dov.vlaanderen.be/data/sondering/2020-079300
Borehole Stabroek	015W0216	kb7d15w-B296	http://collections.naturalsciences.be/ssh-geology-archives/arch/015w/015w0216.txt	https://www.dov.vlaanderen.be/data/boring/2016-147541

Borehole Zandvlietsluis	014E0153	GEO-79/205-A	https://collections.naturalsciences.be/ssh-geology-archives/arch/014e/014e0153.txt	https://www.dov.vlaanderen.be/data/boring/1979-027043
CPT Zandvlietsluis		GEO-79/202-SIII		https://www.dov.vlaanderen.be/data/sondering/1979-007441

References

Deckers, J., Louwye, S. & Goolaerts, S., 2020. The internal division of the Pliocene Lillo Formation: correlation between Cone Penetration Tests and lithostratigraphic type sections. *Geologica Belgica*, 23/3-4, 333-343. <https://doi.org/10.20341/gb.2020.027>

Deckers, J., Verhaegen, J., Vergauwen, I., 2021. Characterization by Cone Penetration Tests of the decalcified Zandvliet Sand (Lillo Formation, North Belgium). *Geologica Belgica*, 24/3-4, 159-167. <https://doi.org/10.20341/gb.2021.006>

De Meuter, F. & Laga, P., 1976. Lithostratigraphy and biostratigraphy based on benthonic Foraminifera of the Neogene deposits of northern Belgium. *Bulletin van de Belgische Vereniging voor Geologie*, 85/3-4, 133-152.

Laga, P., 1972. Stratigrafie van de mariene Plio-Pleistocene afzettingen uit de omgeving van Antwerpen met een bijzondere studie van de foraminiferen. Unpublished Ph.D. Thesis. Katholieke Universiteit Leuven - Faculteit Wetenschappen, Leuven. 3 vol., 252 p.

Laga, P., 1979. Borehole description Stabroek, GSB 015W0216. <http://collections.naturalsciences.be/ssh-geology-archives/arch/015w/015w0216.txt>, accessed 01/12/2021.

Louwye, S., Deckers, J. & Vandenberghe, N., 2020. The Pliocene Lillo, Poederlee, Merksplas, Mol and Kieseloolite Formations in northern Belgium: a synthesis. *Geologica Belgica*, 23/3-4, 297-313. <https://doi.org/10.20341/gb.2020.016>

Annexes

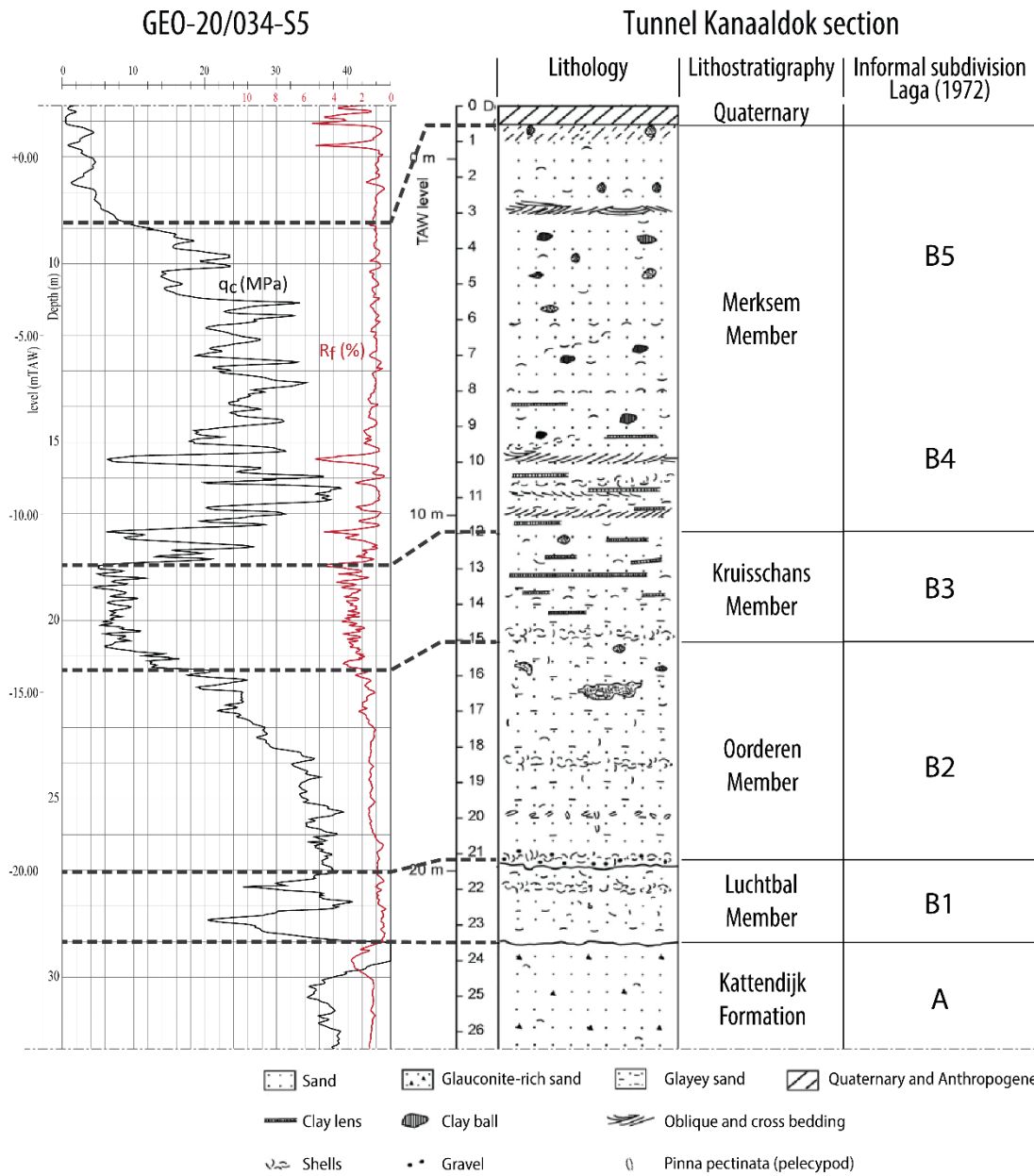


Figure 0-1: The Merksem Member at the Tunnel Kanaaldok section as described and interpreted by Laga (1972) and correlation with a nearby CPT by this study.

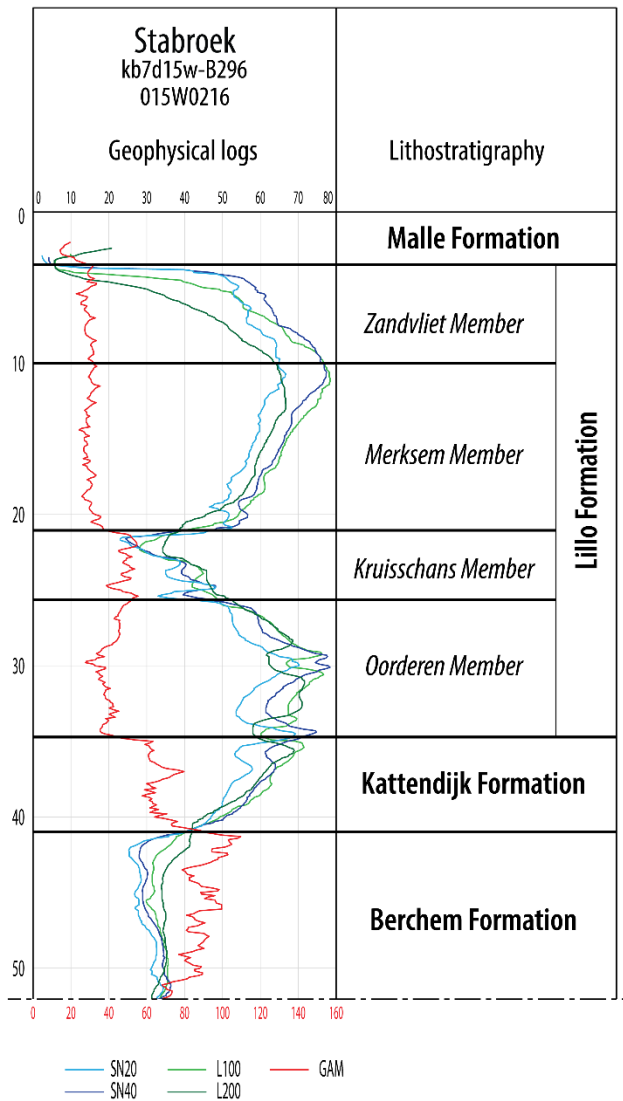


Figure 0-2: Log-expression of the Merksem Member in borehole Stabroek, modified after Laga (1979). The latter author located the upper boundary of the Merksem Member at 14 m depth. However, between 10 and 14 m, the presence of carbonate is mentioned which is why this interval is now re-interpreted as also belonging to the Merksem Member.

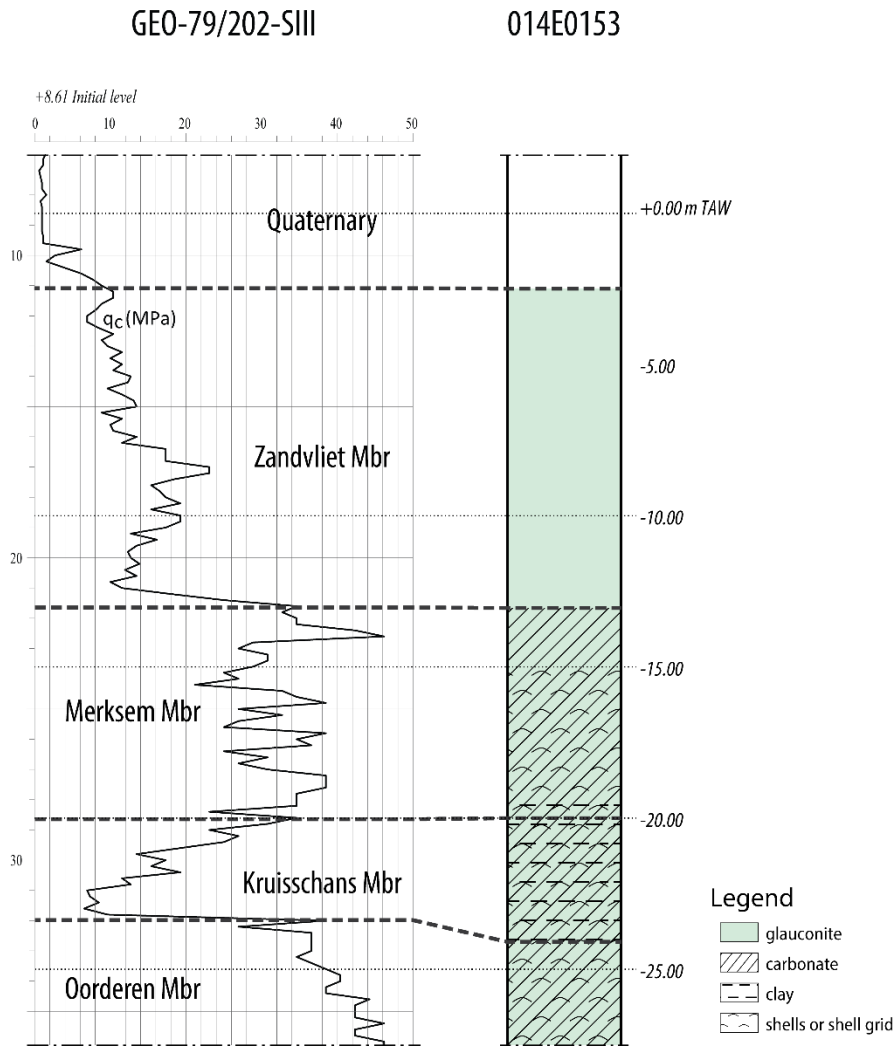


Figure 0-3: The boundary between the Merksem and Zandvliet Members as established in borehole 014E0153 (DOV [GEO-79/205-A](#)) and its correlation to a nearby CPT (Deckers et al., 2021).