

Lichtaart Member (Kasterlee Formation)

Unit name: Lichtaart Member

Hierarchical unit name: Kasterlee Formation

Type: Member

Code: KLi

Author(s):

- Compiled by: Verhaegen Jasper & Vandenberghe Noël

- Modification of: De Meuter & Laga (1976) after Dumont (1882)

Alternative names: type Kasterlee Sand (Vandenberghe et al., 2020), formerly part of the at the time not yet subdivided Kasterlee Formation sensu De Meuter and Laga (1976) and Laga et al. (2001).

Origin of the name: before the Kasterlee Formation was subdivided in members, the presently defined Lichtaart Member was meant to be the Kasterlee Formation in its type area (the Lichtaart-Kasterlee hill)

Status: Formal

Date: 01/05/2022

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Characterizing description

The Lichtaart Member consists of pale green fine sand with a moderate glauconite content. Reported modal grain size varies between 125 and 170 μm and a $<62 \mu\text{m}$ fraction of about 10 to 15% is present. The sand fraction is very well sorted. The colour varies from pale to darker green depending on the glauconite content; sparse glauconite grains can give the sand a speckled outlook. Glauconite pellet content can range from around 4% in the Lichtaart –Kasterlee hill outcrops, called the Hoge Berg Facies, up to 30% in boreholes north of the hill ridge, called the Oud-Turnhout Facies. Muscovite flakes are common. An exceptionally high content of hornblende in the heavy mineral fraction (55%) is reported in Lichtaart (TO-19990101B). The Lichtaart Sand Member contains neither calcareous fossils nor carbonates in general.

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

The occasional outcrops in the flanks of the hills between Herentals, Lichtaart and Kasterlee on the right bank of the Kleine Nete valley always expose the top part of the Kasterlee Formation. Therefore these outcrops are always part of the Lichtaart Member. They were selected as the type section for the Kasterlee Formation in the Lithostratigraphic scale of Belgium (2001) although the lower part of the formation was never exposed in the hill ridge. These outcrops in fact show the southern glauconite-poor Hoge Berg Facies.

Several boreholes in the Turnhout area contain reference data on the Lichtaart Member, where the northern glauconite-rich Oud-Turnhout Facies is present. The reference section selected for the Lichtaart Member is in the Rees borehole (017E0399; kb8d17e-B495). The full section described as

Kasterlee Formation between 25 and 33,5 m is interpreted as the Lichtaart Member. Cores, sediment analyses and dinoflagellate cyst analyses are available in this interval (Buffel et al., 2001; Vandenberghe et al., 2020). The Kasterlee Formation in the Gierle borehole (017W0158 ; Kb8d17w-B14) between 26 and 34 m is also identified as the Lichtaart Member and has detailed grain-size analyses (Gullentops and Huyghebaert, 1999). Although the base of the Lichtaart Member is not reached in the Oud-Turnhout borehole (017E 0401;kb817e-B497), a section of about 11 m of the Lichtaart Member between 39 and 50 m with sediment analyses is juxtaposed to a gamma-ray log of the similar interval in the nearby Turnhout borehole (017E0398; kb8d17e-B294) in Louwye et al. (2020 fig. 4).

Description upper boundary

In the reference areas of the Lichtaart–Kasterlee hill ridge and the Turnhout area boreholes, the Lichtaart Member is overlain by the characteristic Hukkelberg Gravel at the base of the Poederlee Sand (Louwye et al., 2020). The grain size of the Poederlee Formation is almost indistinguishable from the Lichtaart Member sand.

Description lower boundary

The lower boundary of the Lichtaart Member is not exposed. It is only known from boreholes. In the Turnhout area the boundary with the underlying Diest Sand Formation is located where the fine grain size of the Lichtaart Member abruptly changes to coarser sand in the Diest Formation. Under the Lichtaart-Kasterlee hill ridge a CPT (10-CPTe-138) log suggests that the clay-enriched Heist-op-den-Berg Member could be present underlying the Lichtaart Member with a sharp contact at + 4.25 m TAW (Schiltz, 2020; Vandenberghe et al., 2020; Verhaegen et al., 2020).

Thickness

In the type area Herentals-Lichtaart-Kasterlee a thickness of about 15 m is interpreted in sections drafted by Laga and Gulinck (Laga, 1976) and confirmed by a CPT log interpretation (10-CPTe-138).

In the boreholes of the Turnhout area, Gierle (017W0158/kb8d17w-B14), Rees (017E0399/kb8d17e-B495), Oud-Turnhout (017E 0401;kb817e-B497) and Turnhout (017E0398; kb8d17e-B294), the Lichtaart Member occurs underneath the Poederlee Sand and thickness is reduced to 8 to 11 m.

Towards the border with the Netherlands in the north of the Antwerp province, the Kasterlee Formation, probably the Lichtaart Member, is suggested to thicken in the profiles drafted by Laga (1976).

Occurrence

The Lichtaart Member occurs west of an approximate line Olen–Kasterlee. Due to the northwards dip of the Kasterlee Formation, south of Olen only the Hallaar, Beerzel and Heist-op-den-Berg members occur. East of this Olen-Kasterlee line the Lichtaart Member is geometrically replaced by the Retie Member of the Mol Formation (Schiltz, 2020; Vandenberghe et al., 2020; Verhaegen et al., 2020). West and northwest of an approximate Grobbendonk–Merksplas-Weelde zone, the Lichtaart Member wedges out, probably as a consequence of end-Miocene to earliest Pliocene erosion.

Regional correlations

Regional correlations need to respect the presence of the Messinian DN10 dinocyst biozone of de Verteuil & Norris in the Lichtaart Member in the Oud-Turnhout and Rees boreholes (Louwye & De Schepper, 2010; Vandenberghe et al., 2020). The limited available biostratigraphy of the Retie Member also contains the same DN10 dinocyst biozone suggesting that Lichtaart and Retie members are contemporaneous (Vandenberghe et al. 2020). The Lichtaart Member can be the more marine

facies lateral from the other lagoonal to near-shore members of the Kasterlee Formation. The transition to the Breda Formation in the Netherlands is not clear.

It is therefore probable that a transition area exists between the Lichtaart Member and the Retie Member, expressed by the loss of glauconite pellet content towards the Retie Member. West of an approximate Grobbendonk-Merkpslas-Weelde zone, the Lichtaart Member is geometrically replaced by the younger Kattendijk Formation.

Age

Dinoflagellate cyst biozone DN10 was identified in the Lichtaart Member (Rees borehole, 017E0399; [kb8d17e-B495](#)), attributing a late Tortonian to Messinian Miocene age to this member.

Dataset

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

Subset of the Kasterlee Formation: <https://www.dov.vlaanderen.be/data/opdracht/2020-021580>

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