Retie Member (Mol Formation)

Unit name: Retie Member

Hierarchical unit name: Mol Formation

Type: Member

Code: MlRt

Author(s):

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Alternative names: 'lower Mol' or 'Kasterlee-sensu-Gulinck' unit / including Dorperberg sand as discussed in Vandenberghe et al. (2020)

Origine of the name: -

Status: Formal

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Characterizing description

The Retie Member is a fine-grained pale grey sand unit, with a median grain size around 180 µm and only trace amounts of dispersed glauconite pellets, that occurs underneath the Donk Sand Member of the Mol Formation.

At the top of the Retie Member drilling mud is reported to start colouring slightly green, obviously on the condition that at the start clear water is used to make up the drilling fluid. By colour, the Retie Member can hardly be distinguished in boreholes from the overlying Donk Member. In the Retie-Geel-Kasterlee area only a notable size fraction >250 µm in the Donk Formation allows to detect the boundary between both members. Eastwards, in the Mol-Dessel area the grain size of the the Donk Member becomes coarser and the boundary with the underlying Retie Member is clear (Vandenberghe et al., 2020, fig.2). In the Poppel-Rauw Fault area and eastwards of it, a relatively thin but marked high gamma-ray clayey bed occurs on top of the Retie Member sand that is named informally the 'level 3 clay' bed and on top of which the drilling mud starts to become green.

Below the Retie Member occurs the much more clayey Heist-op-den-Berg Member of the Kasterlee Formation in the Retie-Geel-Kasterlee-Dessel area and the boundary is marked by a clear gamma-ray signal increase in the top of the Heist-op-den-Berg Member. In the Poppel-Rauw Fault area and eastwards of it, occurs a slightly coarser unit, the informal 'level 1-2 sand' of the Mol Formation. The top of the latter is indicated by the start of a trend in gamma-ray and resistivity signals whereas in the Retie Member these signals are stable. Although the few grain-size data available in the top of the 'level 1-2 sand' suggest a coarser grain size compared to the Retie Member, the gamma ray signal of the 'level 1-2 sand' unit is higher (Vandenberghe et al. , 2020) requiring further data.

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

The reference for the Retie Member is the section between 8 and 19,5 m in the ONDRAF-NIRAS ON-Retie-2 (031W0375) borehole, of which also geophysical data , sediment analyses and a CPT log are available (Vandenberghe et al., 2020). For the Retie Member occurring east of Kasterlee, gamma-ray logs are interpreted (ON-Retie-1; ON-Dessel-3; ON-Dessel-4; ON-Mol-2B).

An additional reference geophysical expression on the gamma-ray log of the Retie Member together with the informal 'level 3 clay bed' above it and the informal 'level 1-2 sand ' unit below it is the Postel SCK 13 borehole (032W0415 / kb17d32w-B385) between 69 and 92 m depth.

Description upper boundary

The upper boundary in the Kasterlee-Retie-Mol-Dessel area is the appearance of a notable >250 µm size fraction above it, or a notably increased >250 µm fraction above it in the Poppel-Rauw Fault area and eastwards of it.

In the Poppel-Rauw Fault area and eastwards of it, a relatively thin but marked high gamma-ray clayey bed occurs on top of the Retie Member sand that is informally named the 'level 3 clay' bed.

Description lower boundary

In the area between Kasterlee and Mol-Dessel the lower boundary is clearly marked by an increased gamma-ray signal at the top of the clayey Heist-op-den-Berg Member of the Kasterlee Formation. In the Poppel-Rauw Fault zone and eastwards of it the lower boundary of the Retie Member is marked by the start of a downwards increasing gamma ray signal of the 'level 1-2 sand' whereas in the Retie Member itself the gamma ray signal is more stable. In the Postel SCK 13 borehole (032W0415 / kb17d32w-B385) interpretation in Vandenberghe et al. (2020), the lower boundary of the Retie Member at level 2 occurs at 92 m depth.

Thickness

Between Kasterlee and Mol-Dessel the thickness varies between 7 and 22 m and from the Poppel-Rauw Fault zone and eastwards of it, the thickness is about 25 m.

Occurrence

The Retie Member occurs from the east of Kasterlee until the Reppel Fault in the east, across which the Kieseloolite Formation occurs (Buffel et al., 2001).

It is assumed that the 'Kasterliaan' as described in the Hechtel (kb17d47e-B186; 047E0192), Wijshagen (kb18d48w-B181; 48W 180), Helchteren (kb25d62e-B265; 62E 261) boreholes in the Archives of the Belgian Geological survey, as well as the so called Dorperberg sand in the Opitter Molen (GSB048e0151C) outcrop (geological map 26 Rekem) also belong to the Retie Member as discussed in Vandenberghe et al. (2020).

Regional correlations

Lithologically the Retie Member is related to the quartz-enriched sand of the Mol Formation and therefore it is ranked as member of the Mol Formation. At the same time geometry , CPT continuity with the type area Kasterlee Formation, and the albeit limited biostratigraphic data suggest that sedimentologically the Retie Member developed as a lateral facies of the Kasterlee Formation. In fact in the former tradition of borehole interpretation by the Geological Survey of Belgium, this unit was integrated within the Kasterlee Formation. This ambiguity was expressed in the provisional name 'lower Mol' or 'Kasterlee-sensu-Gulinck' unit used by Vandenberghe et al. (2020) in their analysis of this unit.

It is beyond doubt that the description 'in the type region, lower part very slightly glauconiferous' in the definition of the Mol Formation by Laga et al. (2001) is referring to the sand of what is now called the Retie Member. It is also this type of sand that is at the origin of the 'Mol inférieur' term, never precisely defined but used in borehole descriptions in the Archives of the Geological Survey of Belgium.

Age

It is suggested that chronostratigraphically the Retie Member occurs in the same time interval as the Lichtaart Member of the Kasterlee Formation but that lithostratigraphically it fits in the younger Mol Formation due to the westward migration of the continental over the marine facies during the Neogene (Louwye et al., 2020). See also LIS file Mol Formation for information on the age of this member.

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
SCK 13/Postel2 borehole	032W0415	kb17d32w-B385	https://collections.naturalsciences.be/ssh-geology-archives/arch/032w/032w0415.txt	https://www.dov.vlaanderen.be/data/boring/1982-022507
ON-Retie-2	031W0375	ON-Retie-2	https://collections.naturalsciences.be/ssh-geology-archives/arch/031w/031w0375.txt	https://www.dov.vlaanderen.be/data/boring/2008-160132
ON-Retie-1	031w0362	ON-Retie-1	https://collections.naturalsciences.be/ssh-geology-archives/arch/031w/031w0362.txt	https://www.dov.vlaanderen.be/data/boring/2008-157939
ON-Dessel-3	031W0354	ON-Dessel-3	https://collections.naturalsciences.be/ssh-geology-archives/arch/031w/031w0354.txt	https://www.dov.vlaanderen.be/data/boring/2008-162468
ON-Dessel-4	031W0353/0376	ON-Dessel-4	https://collections.naturalsciences.be/ssh-geology-archives/arch/031w/031w0376.txt and 0376.txt	https://www.dov.vlaanderen.be/data/boring/2008-160128
ON-Mol-2B	031E0440	ON-Mol-2B	https://collections.naturalsciences.be/ssh-geology-archives/arch/031e/031e0440.txt	https://www.dov.vlaanderen.be/data/boring/2014-160122

References

Buffel, P., Claes, S. & Gullentops, F., 2001. Toelichtingen bij de geologische kaart van België, Vlaams Gewest: kaartblad 26, Rekem [1/50 000]. Belgische Geologische Dienst en Ministerie van de Vlaamse Gemeenschap, Afdeling Natuurlijke Rijkdommen en Energie, Brussel, 56 p.

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