

Voort Member (Veldhoven Formation)

Unit name: Voort Member

Hierarchical unit name: Veldhoven Formation

Type: Member

Code: VdVo

Author(s):

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Alternative names: Voort Formation, HCOVv2 hydrostratigraphic code (operated by VMM (2019)) for the Voort Member (named Voort zand 1): A0255.

Origine of the name: -

Status: Formal

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Characterizing description

Fine-grained and clayey, green glauconitic sands, often rich in macrofossils. The Geological Survey of Belgium holds a rich collection of predominantly molluscs from the coal mine shaft digging at Voort locality (062W 0226).

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

Original type section of Voort Formation (now Voort Member of Veldhoven Formation): Coal mine shaft at Voort-Zolder (062W0226); reference section from -21 m to -45 m (Van Straelen, 1923; de Heinzelin & Glibert, 1957, p. 202); geological map 25/3-4 (Beringen-Houthalen). Co-ordinates: X = 217.330, Y = 192.725, Z = + 48,5 m.

Belgian parastratotype borehole Molenbeersel; GeoDoc 049W0226, ground level +33 m; Lambert coordinates x 247660, y 207752, Voort Member 840 – 975 m below ground level.

A further threefold subdivision of the Voort member can be made, based on a clayey marker horizon in the middle of the member:

Voort Member above gamma-ray peak	840-920 m	S&T 07 to 09
Voort Member gamma-ray peak interval	920-940 m	S&T 06
Voort Member below gamma-ray peak	940-975 m	S&T 05

Lithostratigraphic subdivision of the Veldhoven Formation in the Molenbeersel borehole, with depth range and corresponding Schneider and Thiele hydrostratigraphic codes of the Lower Rhine Basin and Chattian age assignments based on correlation with type sections in the Lower Rhine coal and salt districts. Table 1 in Duser & Vandenberghe, 2020 (cf. Matthijs et al., 2016).

Description upper boundary

In the Roer Valley Graben where the Veldhoven Formation is fully developed, the Voort Member is succeeded by the Wintelre Member. The boundary is characterised by a steadfast increase in gamma-ray from Voort sands to Wintelre clays.

Outside the graben the younger Wintelre and Someren members are absent and the top of the Voort Member is progressively deeper eroded towards the edges of the subcrop area.

In the eastern Limburg Campine the Veldhoven Formation, represented by the Voort Member only, is covered by the more greenish clayey Houthalen Sand Member, with high gamma ray reading at the base of the Bolderberg Formation. The contact between both units coincides with a gravel layer (known as the Elsloo gravel).

The Veldhoven Formation in the western Antwerp Campine, also represented by the Voort Member only in the Mol area, is covered by the Berchem Formation, characterised by dark green to black glauconitic sands with gamma-ray peak, which correspond to the Groote Heide Formation across the boundary in the Netherlands (Buffel et al., 2002). Residual deposits consisting of Chattian age sediments occur as far west as the Antwerp harbour area (Ekeren borehole). However, the boundary criteria between the Veldhoven and Berchem Formations are matter for debate.

Description lower boundary

The Voort Member covers the Eigenbilzen Formation without noticeable erosional phase (absence of gravels or reworked deposits). The boundary can be recognised by a change in colour of grey to green (due to a higher glauconite content), a lower clay content and a slightly greater grain size and the occurrence of shell beds (or their fragments in destructive boreholes).

Thickness

The Voort Member reaches a thickness of 135 m in Molenbeersel borehole in the Roer Valley Graben. In the eastern Limburg Campine its maximum observed thickness is 75 m, gradually thinning towards the erosive edges of the subcrop area. This thinning is partly due to gradually diminishing accommodation space around the strongly subsiding Roer Valley Graben, rather than to internal hiatuses, as shown by the regular occurrence of the S&T 06 marker bed.

Occurrence

The Voort Member has the widest geographical extension of all units of the Veldhoven Formation and is the only recognizable member of the Veldhoven Formation outside the Roer Valley Graben. Current subcrop boundaries are of erosive nature, making discovery of additional outliers plausible, e.g. in the Antwerp harbour area.

The Voort Member probably correlates with the Boncelles Sands on Tertiary sand outliers in the Hesbaye and Condroz areas.

Regional correlations

A clayey unit persistently identified within the Voort member (e.g. 906-945 m interval in borehole Molenbeersel), is tentatively correlated with Schneider & Thiele (1965) hydrostratigraphic code S&T 06, defined in the Lower Rhine Graben. The gamma-ray peak associated with this level serves as a marker horizon for regional correlations.

This clayey marker horizon within the Voort Member, for convenience associated with its Lower Rhine counterpart S&T 06, occurs at a rather constant distance of about 15 to 30 m above the base of the Veldhoven Formation. In the eastern Limburg Campine, where it is thickest it has been misinterpreted

in the past for the Wintelre Member, previously described as Veldhoven clay in that area. In the Antwerp Campine (Mol area) progressive thinning/erosion of the Veldhoven Formation underneath the black sands of the Berchem Formation brings this S&T 06 gamma ray peak ever closer to the gamma ray peak on the black sands of the Berchem Formation till both peaks are confounded and the S&T 06 peak will disappear.

Age

Chattian ages established for the Veldhoven Formation in Belgium all refer to the Voort Member. No dating is available inside the Belgian Roer Valley Graben.

In the Antwerp Campine the age of the deposits above the gravel layers encountered in the Weelde and Mol boreholes (or more in general between the gamma ray peaks of the Chattian S&T 06 and the Burdigalian Berchem black sand) is controversial: Chattian for Van Simaey (2004) and De Man et al. (2010), hence assigned to the Veldhoven Formation vs Aquitanian to Burdigalian for Munsterman & Deckers (2020), hence assigned to the Berchem Formation and corresponding to the Edegem (and possibly Kiel) Member(s) of the Berchem Formation.

Dataset

Data in this LIS are part of the DOV-Neogene data collection, including links to the GSB-collection data sheets, more specifically in the data subset NCS Neogene 2020 Duser and Vandenberghe, 2020.

Name	GSB name	DOV name	GSB Collections URL	DOV URL
Belgian parastratotype borehole Molenbeersel	049w0226	kb18d49w-B226	https://collections.naturalsciences.be/ssh-geology-archives/arch/049w/049w0226.txt	https://www.dov.vlaanderen.be/data/boring/1987-042705
Mol-1 borehole	031w0314	ON-MOL-1	https://collections.naturalsciences.be/ssh-geology-archives/arch/031w/031w0314.txt	https://www.dov.vlaanderen.be/data/boring/1997-160115
Weelde borehole	008e0159	kb8d8e-B161	https://collections.naturalsciences.be/ssh-geology-archives/arch/008e/008e0159.txt	https://www.dov.vlaanderen.be/data/boring/1996-098751
Voort shaft	062W 0226	kb25d62w-B228	https://collections.naturalsciences.be/ssh-geology-archives/arch/062w/062w0226.txt	https://www.dov.vlaanderen.be/data/boring/2016-124351

References

Buffel, Ph., Van Barel, L. & Gullentops, F., 2002. Geologische kaart van België, Vlaams Gewest: Turnhout-Meerle, kaartblad 8-2. 1/50 000. Belgische Geologische Dienst en Afdeling Natuurlijke Rijkdommen en Energie, Brussel. <https://www.vlaanderen.be/publicaties/tertiairgeologische-kaart-van-belgie-kaartblad-2-8-meerle-turnhout>.

de Heinzelin, J. & Glibert, M., 1957. Lexique Stratigraphique International. Vol. I. Europe, Fasc. 4a: France, Belgique, Pays-Bas, Luxembourg. Fasc. 4a VII: Tertiaire. 217 p., 15 maps. Congrès Géologique

International - Commission de Stratigraphie, Mexico, 1956. Centre National de la Recherche Scientifique, Paris, VIIe, 1957.

De Man, E., Van Simaey, S., Vandenberghe, N., Harris, W.B. & Wampler, J.M., 2010. On the nature and chronostratigraphic position of the Rupelian and Chattian stratotypes in the southern North Sea basin. *Episodes*, 33/1, 3–14. <https://doi.org/10.18814/epiiugs/2010/v33i1/002>

Dusar, M. & Vandenberghe, N., 2020. Upper Oligocene lithostratigraphic units and the transition to the Miocene in North Belgium. *Geologica Belgica* 23/3-4 - The Neogene stratigraphy of northern Belgium: 113-125 URL : <https://popups.uliege.be/1374-8505/index.php?id=6836>.

Matthijs, J., Deckers, J., Broothaers M. & De Koninck, R. , 2016. A new lithostratigraphic and seismostratigraphic interpretation of the Cenozoic strata for the Molenbeersel well (049W0226) in the Roer Valley Graben, NE Belgium. In: J.M. Baele, S. Papier, X. Devleeschauwer, N. Dupont, P. Goderniaux, M. Hennebert & O. Kaufmann, eds. 5th International Geologica Belgica 2016 Congress. Mons, 26-29 January 2016. *Geologica Belgica Conference Proceedings*, vol. 2, p. 257. <https://popups.uliege.be/2593-6670/index.php?id=116>.

Munsterman, D.K. & Deckers, J., 2020. The Oligocene/Miocene boundary in the ON-Mol-1 and Weelde boreholes along the southern margin of the North Sea Basin, Belgium. *Geologica Belgica*, 23/3-4. <https://doi.org/10.20341/gb.2020.007>

Schneider, H. & Thiele S., 1965. *Geohydrologie des Erftgebietes*. Ministerium für Ernährung, Landwirtschaft und Forsten Land Nordrhein-Westfalen, Düsseldorf, pp. 185.

Van Simaey, S., 2004. The Rupelian-Chattian boundary in the North Sea Basin and its calibration to the international time-scale. *Netherlands Journal of Geosciences / Geologie en Mijnbouw*, 83/3, 241–248. <https://doi.org/10.1017/S0016774600023532>

Van Straelen, V., 1923. Observations sur le Néogène et l'Oligocène en profondeur dans la Campine Limbourgeoise. *Bulletin de la Société belge de Géologie* 33: 58-65.

VMM, 2019. HCOV coding, <https://www.dov.vlaanderen.be/page/hydrogeologische-codering-van-vlaanderen-hcov-versie-2>, accessed 13/12/2021.
