Brunssum Member (Kieseloolite Formation)

Unit name: Brunssum Member

Hierarchical unit name: Kieseloolite Formation

Type: Member with Beds Brunssum I , II and Pey Sand Bed

Code: KzBr, KzB1, KzB2, and KzPe

Authors:

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Alternative names:

In the geological map sheet 18-10 Maaseik + Beverbeek (Sels et al., 2001) as in the Maaseik (049W0220) borehole interpretation (Vandenberghe et al., 2005), 2 levels with Brunssum Clay are identified and labelled I and II ; Van der Sluys (2001) labelled these two levels respectively upper and lower.

The Brunssum Member defined as a formal unit in the present LIS is the interval between the base of the Brunssum II Bed and the top of the Brunssum I Bed. The Pey Sand Bed occurs in between both Brunssum Beds and is discussed in a separate LIS.

In the hydrostratigraphy of the H30-project (Vernes et al., 2018 ; Dusar et al., 2014) the upper Brunssum I is labelled Ki-k-2 and the lower Brunssum II is labelled Ki-k-3. These authors have also introduced an additional uppermost clay level Ki-k-1 still included in the Kieseloolite Formation as defined by these authors (see LIS Kieseloolite Formation).

Origin of the name: -

Status: Formal

Date: 01/05/2022

How to refer: Vandenberghe, N., & Dusar, M., 2023. The Brunssum Member, 01/09/2023. National Commission for Stratigraphy Belgium. http://ncs.naturalsciences.be/lithostratigraphy/Brunssum-Member

Characterizing description:

The Brunssum Beds are layered dark lignitic clay and lignite horizons. Brunssum I can be more than 5 m in thickness and composed of several layers and contain larger wood fragments. Brunssum II is generally thinner and then consisting of a single clay layer. Root traces are visible in the clay. A few very thin sand layers can occur. The clayey intervals have marked gamma-ray signals. In between the 2 Brunssum Beds occurs a sand unit, the Pey Bed that can be a few meter to 30 m thick.

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

The Bocholt borehole (033W0153 / kb18d33w-B160) contains two intervals with Brunssum Member clay beds and lignite : 115,20 -133 m and 137,70-143,70 m. In between occurs the Pey Bed. The borehole is cored, sedimentological and mineralogical analyses are available as well as geophysical well logs and also palynological investigations are reported (Van der Sluys, 2000). The combination of marked high natural radioactivity and low resistivity signals allows a clear identification of the Brunssum Beds with respect to surrounding sand units.

Regional profiles suggest the consistent existence in the area of at least two Brunssum Beds , labelled I and II (Vandenberghe et al. , 2005; Vernes et al. , 2018 , annex D fig. 7.5 in which the same beds are labelled B1 and B2), while the profile presented by Dusar et al. (2014) shows also continuity of an additional uppermost clay bed labelled as Ki-k-1 indicating the incorporation of this bed in the Kieseloolite Formation.

Description upper and lower boundaries

The boundaries of the Brunssum beds with the overlying and underlying sand units is generally sharp and the boundaries can therefore be picked rather well on gamma and resistivity logs.

If thinner clay or lignite horizons occur in the overlying sand, the exact boundary can be subject for discussion. This is well illustrated by the interpretation of the Maaseik (049W0220) borehole in Vernes et al. (2018, annex D fig.7.3) that leads to the upwards extension of the Kieseloolite Formation top (see LIS Kieseloolite Formation). The Kl-k-2 Kieseloolite-clay, corresponding to the upper Brunssum I clay bed in Vandenberghe et al. (2005), is overlain by a thin 2,4 m sand layer (73,6-76 m) followed by a thicker clay zone (63,2 -73,6m) with a clearly lower natural gamma ray signal and higher resistivity signal than the Kl-k-2 Brunssum bed. This lower gamma ray signal clay zone is included in the overlying Jagersborg/Schinveld sand in the interpretation by Vandenberghe et al. (2005) but in Vernes et al. (2018, annex D fig.7.3) this thicker clay zone (63,2 -73,6m) is labelled as Kl-k-1 and interpreted to belong to the Kieseloolite Formation and marking the latter's top (in contact with overlying Stramproy Formation). The Kl-k-1 interval is described in the cores of the Maaseik (049W0220) borehole as fine sand with systematic presence of 5 to 10 cm thick clay layers some of which some are dark stained by lignite particles; also a 40 cm lignite layer occurs (Vandenberghe et al., 2005).

Thickness

In the reference borehole Bocholt the upper Brunssum I clay bed is almost 18 m and the lower Brunssum II clay bed 6 m. However thicknesses are variable as can be expected from the depositional conditions of the Brunssum clay in floodplain swamps and lakes and from its occurrence in an actively faulted block area in the west of the Roer Valley Graben (RVG). In the Maaseik borehole (049W0220) the upper Brunssum I bed is 12 m thick and the lower Brunssum II bed 5,6 m. Maximal thicknesses are observed in the Kinrooi (049W0230 /kb18d49w-B230) borehole: slightly more than 30 m for the lower clay unit and 20 m for the upper unit. The two Brunssum I and II clay beds can be separated 30 m apart by Pey Sand Bed (see Vandenberghe et al., 2005, fig. 10).

Occurrence

The Brunssum Member and the Brunssum Beds in Belgium are only recognised in the RVG area east of the Reppel-Heerlerheide faults.

Regional correlations

The Brunssum clay beds in Belgium are the lateral extension of the clays of the Brunssum Member (or Brunssum Laagpakket) in the Dutch RVG (TNO-GSN, 2021).

Age

In the Dutch part of the RVG, the Brunssum Member is considered Pliocene in age (Wong et al., 2007; TNO-GSN 2021).

Palynological interpretations of Vanhoorne in Vandenberghe et al. (2005) seem to confirm a Pliocene age. However palynology reported from the Bocholt borehole by Van der Sluys (2000, 2.1.5) compares the pollen in the upper Brunssum I bed with the early Pleistocene clays of the Weelde Formation in

Belgium and the Tegelen Member in the Netherlands. Donders et al. (2007) have demonstrated that stratigraphic correlations based on palynology need caution.

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
Maaseik borehole	049W0220	kb18d49w-B220	https://collections.naturalsciences.be/ssh-geology-archives/arch/049w/049w0220.txt	https://www.dov.vlaanderen.be/data/boring/1980-025921
Bocholt borehole	033W0153	B/7-0356	https://collections.naturalsciences.be/ssh-geology-archives/arch/033w/033w0153.txt	https://www.dov.vlaanderen.be/data/boring/1995-025169
Kinrooi borehole	049W0230	kb18d49w-B230	https://collections.naturalsciences.be/ssh-geology-archives/arch/049w/049w0230.txt	https://www.dov.vlaanderen.be/data/boring/1995-102445

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