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DEFORMATION FEATURES IN PALEOGENE SANDS IN THE HOEGAARDEN AREA (BELGIUM)

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(15 Figures)

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ABSTRACT. During excavation works for the construction of the TGV track along the motorway Brussels-Liège (E40) near the interchange Tienen-Hoegaarden-Jodoigne a number of interesting, but only temporary outcrops were created. These outcrops offered not only the occasion to learn more about the stratigraphy, paleogeography and paleobotany of the Paleogene, but also revealed some particular deformation features.
The Outgaarden Section, SE of the interchange, showed chaotically deformed sands at the base of the Upper Paleocene Tienen Formation. The highly viscous deformation features originated in a high-energy depositional environment. Dewatering, mass movements and strong currents caused the syndepositional, probably gravitationally-induced sediment deformation.
The Goudberg Section, NW of the interchange, exposed the Overlaar Petrified Forest, of which part of the silicified tree-stumps were recovered to constitute the main feature of the planned GEOPARK HOEGAARDEN. In this section tectonically-induced faulting could be demonstrated. The fault shows a clear normal displacement. A sinistral strike-slip displacement is moreover supposed. Faulting occurred prior to the deposition of the Pleistocene loam cover but definitively postdates the deposition of the Ypresian clays. It is proposed that this faulting event in the Tertiary sediments may be caused by a reactivation of underlying master faults in the Lower Paleozoic basement of the Brabant Massif.

KEYWORDS: Paleogene, faulting, sediment deformation, Brabant Massif

RESUME. Structures de déformation dans les sables paléogènes de la région d'Hoegaarden (Belgique). Plusieurs affleurements de grande importance bien que temporaires ont été créusés dans les tranchées pour la ligne TGV, le long de l'autoroute Bruxelles-Liège (E40) près de l'échangeur Tirlemont-Hoegaarden-Jodoigne. Ces affleurements offraient l'occasion, non seulement, d'une meilleure compréhension de la stratigraphie, de la paléogéographie et de la paléobotanique du Paléogène, mais ont aussi mis en évidence de déformation particulières.
La section d'Outgaarden, située au Sud-Est de l'échangeur, contenait des sables déformés de manière chaotique à la base de la Formation de Tienen (Paléocène Supérieur). La déformation de haute viscosité observée trouve son origine dans un environnement sédimentaire de haute énergie. Des phénomènes tels que dessiccation, mouvements de masse et courants forts ont provoqué une déformation synsédimentaire , probablement induite par la gravitation.
La section de Goudberg, située au Nord-Ouest de l'échangeur, expose la forêt fossilisée d'Overlaar. Une partie des troncs d'arbre silicifiés a été exhumé pour constituer l'attraction principale du GEOPARK HOEGAARDEN. Dans cette section, des failles induites par déformation tectonique ont été mises en évidence. La faille révèle clairement un déplacement normal. Un déplacement senestre de décrochement est présumé. La mise en place des failles est antérieur au dépôt de la couverture limoneuse du Pléistocène mais certainement postdate le dépôt des argiles de l'Yprésien. La mise en place des failles dans les sédiments tertiaires est probablement provoquée par la réactivation des failles principales sous-jacentes dans le paléozoïque inférieur du Massif du Brabant.

MOTS-CLES: Paléogène, faille, déformation sédimentaire, Massif du Brabant

SAMENVATTING. Verschillende typen van vervormingstructuren in de Paleogene zanden in de omgeving van Hoegaarden (België). Tijdens de uitgravingswerken voor de aanleg van de HSL langsheen de autosnelweg Brussel-Liège (E40) in de omgeving van de verkeerswisselaar Tienen-Hoegaarden-Geldenaken zijn een aantal interessante, maar enkel tijdelijke ontsluitingen vrijgemaakt. Deze ontsluitingen vormden niet enkel de gelegenheid om meer te weten te komen over de stratigrafie, paleogeografie en paleobotanie van het Paleogeen, maar toonden bovendien enkele bijzondere vervormingsstructuren.

Ten zuidoosten van de verkeerswisselaar, in de Outgaarden sectie, waren de chaotisch vervormde zanden aan de basis van de Tienen Formatie (Boven Paleoceen) ontsloten. De uitermate viskeuze vervormingsstructuren ontstonden in een hoog-energetisch afzettingsmilieu. Ontwatering, massabewegingen en sterke stromingen veroorzaakten de hoogstwaarschijnlijk gravitair geïnduceerde sedimentvervorming.

In de Goudberg sectie, ten noordwesten van de verkeerswisselaar, was het versteend woud van Overlaar ontsloten. Een deel der versteende boomstammen werd bewaard voor het geplande GEOPARK HOEGAARDEN. In deze sectie kon een tektonisch geïnduceerde breuk worden aangetoond. Deze breuk vertoont een duidelijke normale verplaatsing. Een sinistrale laterale verplaatsing kon worden verondersteld. De breukwerking deed zich voor na de afzetting van de Ieper Klei maar voor de afzetting van de Pleistocene leem. Er wordt geopperd dat de breukwerking in de Tertiaire sedimenten veroorzaakt is door een reactivatie van het onderliggende breuksysteem in de Vroeg-Paleozoïsche sokkel van het Brabant Massief.

SLEUTELWOORDEN: Paleogeen, breukwerking, sedimentvervorming, Brabant Massief

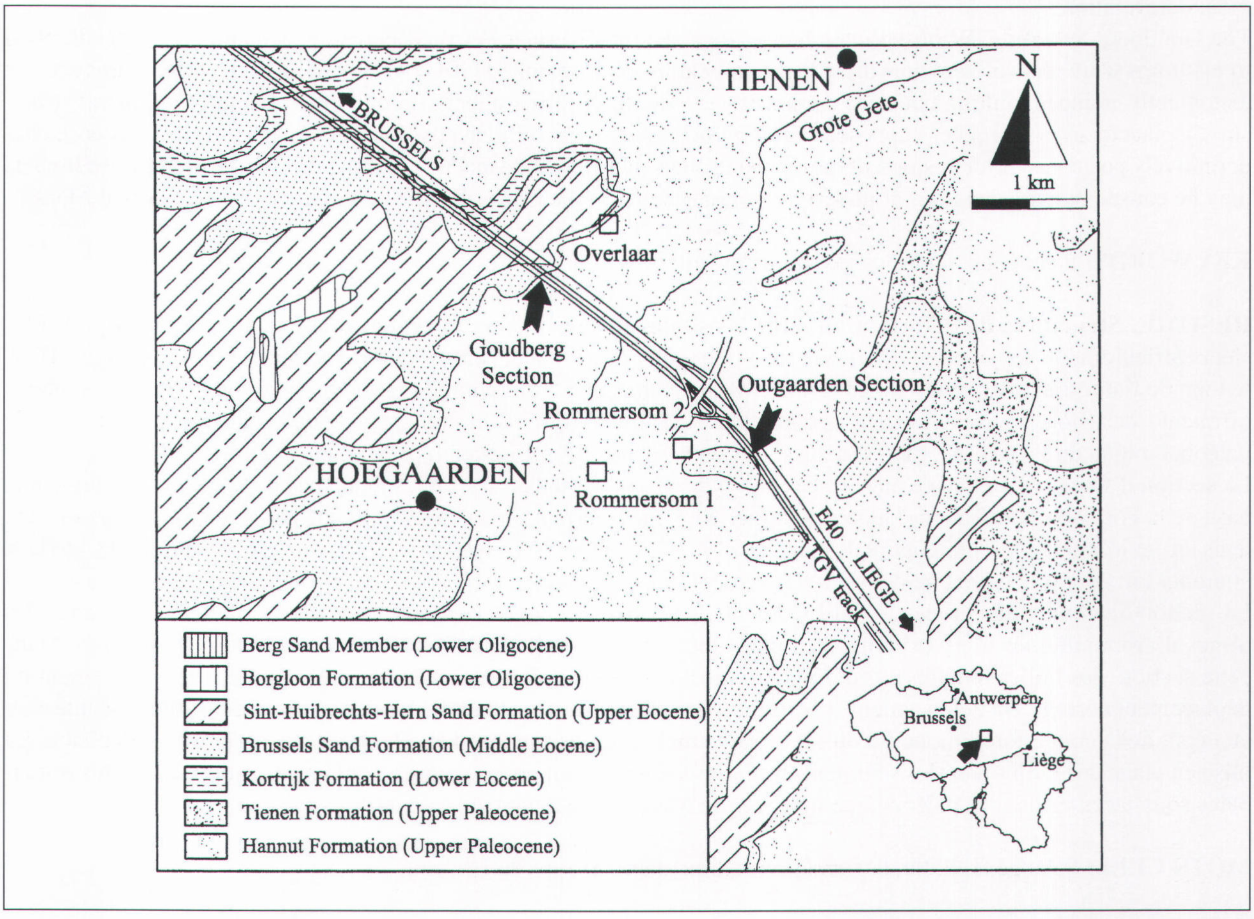


Figure 1. A simplified geological map of the Hoegaarden-Tienen area (after Gullentops et al. 1995). Both Outgaarden and Goudberg sections, the Rommersom-Outgaarden quarry (Rommersom 2), and the now-vanished Overlaar and Rommersom (Rommersom 1) quarries are indicated.

1. Introduction

Prospecting and excavation work for the construction of the TGV network in Belgium has to date produced many new data concerning the geology in Belgium. Particularly in areas relatively poor in outcrops the excavation of the TGV track offered new, often spectacular, but unfortunately only temporary, outcrops. These outcrops not only confirmed existing knowledge, they often provided new observations and insights.

The excavation of the TGV track along the motorway Brussels-Liège (E40) near the interchange Tienen-Hoegaarden-Jodoigne (NR. 25) was followed with particular attention because it would offer once more the unique opportunity to observe the Overlaar Petrified Forest in situ. This petrified forest has for the first time been described more than a century ago (Rutot 1887) in the now completely vanished quarry at Overlaar (some 2km SW of Tienen – fig. 1). During the excavation in 1970, cutting through the Goudberg (just a few hundred meters west of the Overlaar quarry – fig. 1), for the construction of the motorway E40, the petrified forest was again exposed. Because the TGV track runs parallel to and at the same level of the motorway, a new exposure of the Overlaar Petrified Forest could be expected. This expectation lead to an initiative to create a permanent exposition in situ of the Overlaar Petrified Forest. This GEOPARK HOEGAARDEN project is currently in progress.

In this paper we will not deal with new findings with respect to the Paleogene stratigraphy in the Hoegaarden area, nor with respect to the paleobotany of the Overlaar Petrified Forest. These matters are currently investigated at the Royal Belgian Institute of Natural Sciences. We will specifically focus on the different types of deformation features observed in two sections along the TGV track in the Hoegaarden area. On the one hand, the Outgaarden Section, situated SE of the interchange (fig. 1), exposed spectacular, most probably gravitationally-induced, sediment-deformation features at the base of the Tienen Sands. On the other hand, the Goudberg Section, situated NW of the interchange (fig. 1), not only exposed the Overlaar Petrified Forest, but also a tectonically-induced fault and flexure. It is our purpose to describe these deformation features and to discuss their paleogeographical and tectonic relevance.

2. Geological setting

The Hoegaarden-Tienen area is situated some 40km east of Brussels (fig. 1). The area is situated on sheet 32 (Leuven) of the geological map of Belgium (Gullentops et al. 1995). Paleogene formations of Thanetian to early Lutetian age are outcropping below the Quaternary loam cover. For a comprehensive description of the Tertiary stratigraphy we refer to Vandenberghe et al. (1998).

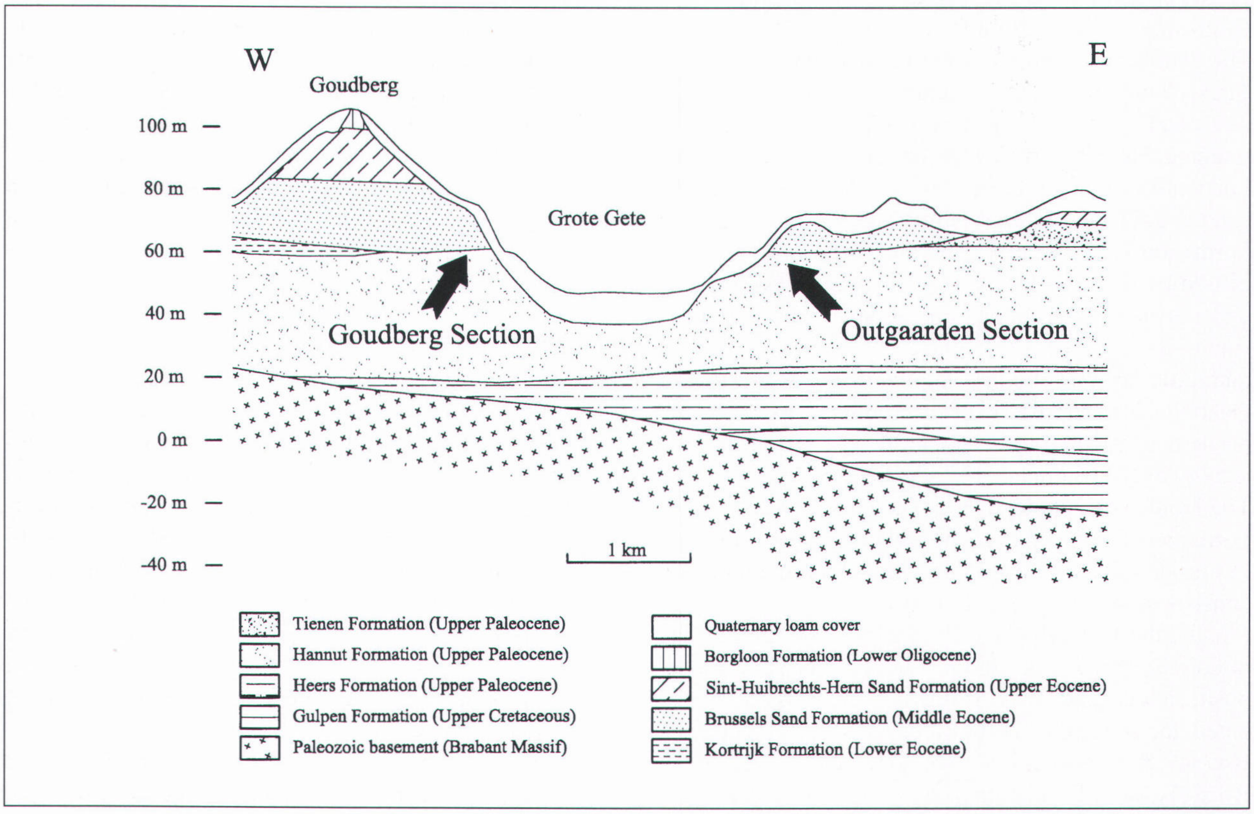


Figure 2. EW-oriented cross-section onto which both Outgaarden and Goudberg sections are projected (after Gullentops et al. 1995).

Figure 3. The Outgaarden Section: an example of a NE-SW oriented outcrop face with an antiformal disposition, showing a SW vergence, with folded and steepened erosive contacts and pockets of chaotically disturbed sediments. Zones lacking any laminae consist of rather mobile white sands.

The oldest Tertiary deposits in the area belong to the Landen Group. The Landen Group represents a Thanetian (~55Ma) cycle of marine deposits overlain by continental deposits. The Hannut Formation comprises the marine deposits of the Landen Group. The upper part of the Hannut Formation consists of yellowish-green, glauconitic, fine marine sands locally known as the Hoegaarden Sands. These sands reflect a gradually shallower deposition environment, heralding the continental deposits of the Landen Group. The Hoegaarden Sands are currently considered part of the Grandglise Member (Maréchal & Laga, 1988). In the study area an outcrop of these sands can be found in the Rommersom-Outgaarden quarry (Rommersom 2 on fig. 1).
The continental deposits of the Landen Group form the Tienen Formation. These, rather coarse grained, white sands and lignitic clays represent a fluvio-lagoonal environment. Fluviatile gullies cut into the underlying marine Landen deposits. At the base of the Tienen Formation a chaotic sand member can be distinguished. The Tienen Formation is characterised by significant silicification, caused by rising and evaporating silica-rich pore waters under dry and warm climatic conditions. This silicification lead to the petrified tree-stumps, as well as to a massive quartzitic layer at the top, known as the Rommersom Quartzite. The deposition of the continental Landen deposits is considered to be related to a period of tectonic activity in NW Europe (cf. Vandenberghe et al. 1998).
The Landen-Group deposits are covered by the Kortrijk Formation, forming part of the early Eocene Ieper Group (Ypresian - 54 to 49Ma). This formation predominantly consists of grey to blue-grey clays.
Finally, the Brussels Sand Formation, belonging to the middle Eocene Zenne Group (Lutetian), is a marine deposit, rich in glauconite, filling a large, NNE-SSW oriented, incised valley. In the Hoegaarden area, where the Brussels Sand Formation is wedging out, the base of the Brussels Sand Formation consists of true greensands, reflecting tidal conditions (Houthuys, 1990; Vandenberghe et al. 1998).

On an EW-oriented cross-section (Gullentops et al. 1995), onto which both the Outgaarden and Goudberg sections can be projected (fig. 2), it can be noticed that the Lower Paleozoic basement of the Brabant Massif is at a depth of only 60 m underneath the Goudberg, directly underlying the Hannut Formation. The basement plunges to the east. There the Upper Paleocene Heers Formation and the Upper Cretaceous Gulpen Formation onlap below the Hannut Formation. It should be remarked that at the Goudberg also the Kortrijk Formation is wedging out towards the east.

The Outgaarden Section is entirely situated in the chaotic sand member at the base of the Tienen Formation. In the Goudberg Section a succession of the Tienen, Kortrijk and Brussels Sand formations was exposed. On both map (fig. 1) and cross-section (fig. 2) the remaining thin layer of Tienen Sands, as observed in both Outgaarden and Goudberg sections and in the Rommersom-Outgaarden Qaurry, could not represented due to the scale of both map and cross-section.

3. Outgaarden section

The Outgaarden Section is situated SE of the interchange at km19.225 (TGV reference system) (fig. 1). These temporary outcrops were only visible during the excavation of the TGV track. Moreover, during excavations the ever-changing outcrop faces constantly enabled new three-dimensional observations of the chaotic sand member.
These chaotically deformed sands suggest a rather "viscous" behaviour of the sediments during deformation, which is most probably due to the high water content, inferring that the deformation occurred during or shortly after deposition of the sediments.
According to the orientation of the outcrops the type and degree of deformation is significantly different. The strongest deformation is observed on NE-SW oriented outcrop faces. The cross-section in figure 3 show

Figure 4a. The Outgaarden Section: an example of a NE-SW oriented outcrop face, showing an inverted gully fill; overview of the structure.

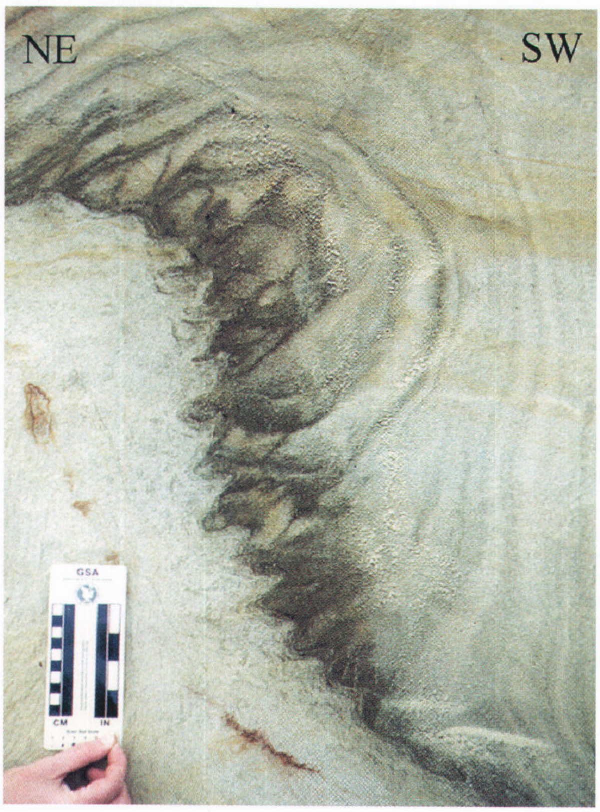


Figure 4b. The Outgaarden Section: detail of the southwestern limb.

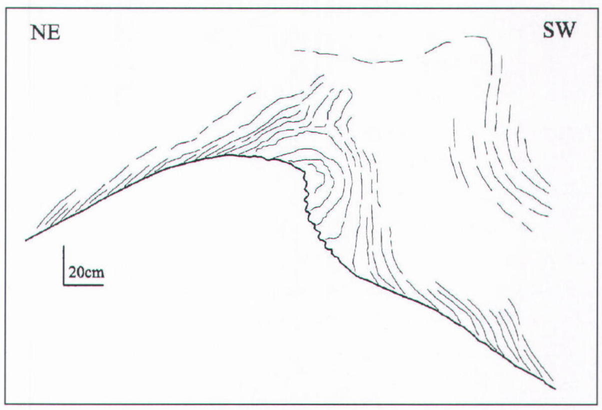


Figure 4c. The Outgaarden Section: line drawing of the structure.

a typical example. These outcrop faces are dominated by an overall "antiformal" occurrence. This antiformal occurrence is seemingly present on several, subsequent NE-SW oriented sections, indicating the presence of a NW-SE trending "antiformal" ridge. The core of this ridge is characterised by the presence at different levels of chaotically disturbed zones, most probably caused by intensive dewatering. On the southwestern side of this ridge a relatively large number of erosive contacts is present. Strikingly they are gradually more steeply dipping and more intensively folded towards the core of the ridge. The overall structure clearly shows an asymmetry to the SW. This asymmetry is observed on all scales.

Another example of such asymmetric structure is shown in figure 4. In the core of this antiformal structure homogeneous white sands are present. Above the contact finely laminated sands are present which are intensively folded. It is, however, remarkable that on both limbs of the asymmetric antiform the angle between the laminae and the contact is identical but opposite, both oriented towards the hinge zone of the antiform. In our opinion, this suggests that the finely laminated infill of a gully is completely inverted during antiformal folding of the mobile white sands. The steeply dipping part of the southwestern limb of the antiform does show another particularity. Contrary to the weakly dipping northeastern limb the contact in the steeper part of the southwestern limb shows small-scale folding, inferring a further compaction postdating the formation of the antiform. All these elements point towards a protracted history of syndepositional deformation and dewatering.

Figure 5. The Outgaarden Section: overturned cross lamination on a NW-SE oriented outcrop face.

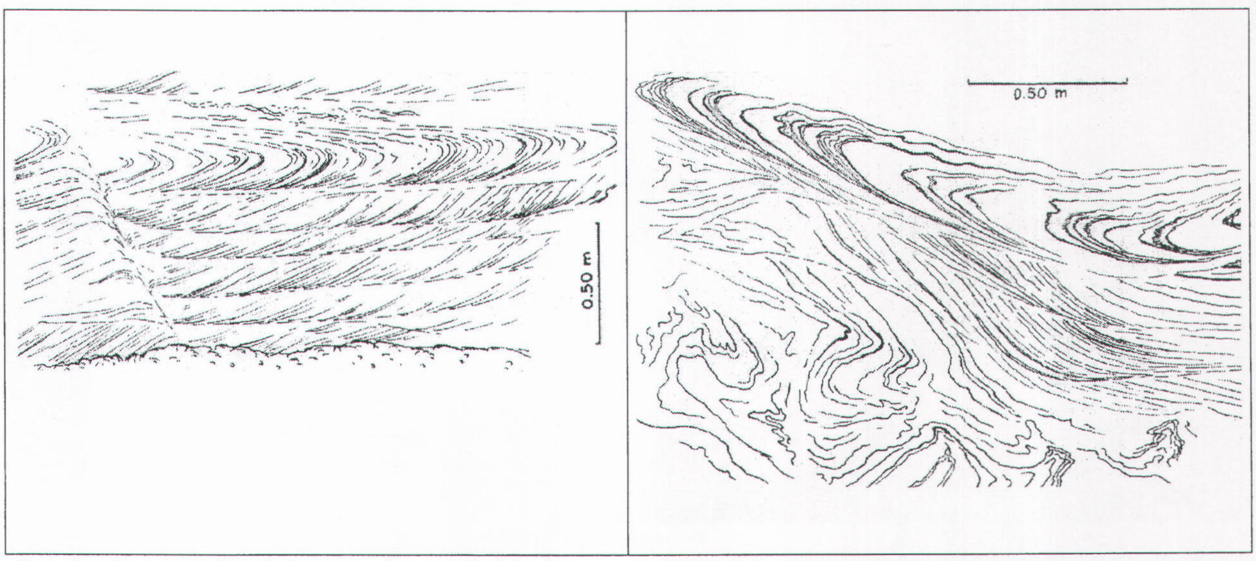


Figure 6. Examples of overturned cross lamination in the quarry at Linsmeau, situated between Tienen and Hannut (Gulinck 1963).

The NW-SE oriented outcrops, on the other hand, show much less deformation. Only on a smaller scale deformation features are present. Examples of these small-scale structures are cm-sized, NW-SE trending "sheat folds", most probably related to the dewatering of the sediments. The most typical structures are, however, the overturned cross-laminations. They all show an overturning towards the NW and are truncated by homogeneous white sands (fig. 5). Nice examples of these features are common in the area, as demonstrated by Gulinck (1963) (fig. 6). These overturned cross laminations are considered to be caused by powerful currents. Again the internal deformation in the finely laminated sands on top of the white sands indicates that post-dating the deposition of the finely laminated sands protracted deformation occurred by movements within the rather mobile white sands (fig. 7).

Figure 7a. The Outgaarden Section: overturned cross lamination on a NW-SE oriented outcrop face.

Figure 7b. The Outgaarden Section: same structure. Notice the deformed laminae on top of the mobile white sands.

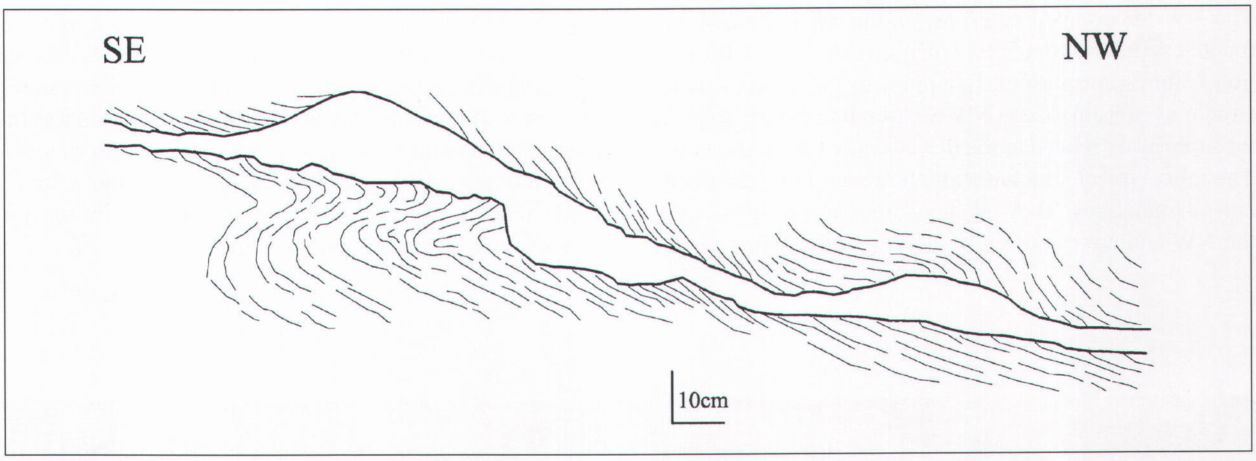


Figure 7c. The Outgaarden Section: synthetic line drawing of the structure.

4. Goudberg section

The Goudberg Section is situated NW of the interchange at km16.550 (TGV reference system) (fig. 1). The observations presented were made over several hundred meters on the WNW-ESE oriented, southwestern bank of the excavated TGV track, southeast of the GEOPARK theatre. On the floor of the TGV track the level of the silicified tree-stumps of the Overlaar Petrified Forest was reached. The following description primarily applies to that part of the Goudberg Section directly related to the observed fault (figs. 8 & 9).

Figure 8. The Goudberg Section: overview of the fault (indicated by arrows) with a silicified tree-stump in the foreground.

The following stratigraphical succession has been observed from bottom to top:
- the Tienen Formation, consisting of white sands topped with a ~30cm thick lignite horizon in which the silicified tree-stumps/trunks are embedded;
- the Kortrijk Formation, composed of a ~180cm thick layer of light-coloured clay, a ~10cm thick white horizon of yet unknown origin, and a ~400cm thick layer of dark-coloured clay;
- the Brussels Sand Formation, made up of finely laminated greensands (~140cm thick in the hanging wall of the fault; ~40cm in the footwall of the fault);
- Pleistocene loam (up to 8m thick).

The main deformation feature observed in the Goudberg Section, is a fault (figs. 8 & 9). Such fault has to date never been described in the area. This fault has a N50E trend, based on the fault trace, which could be followed on the banks and floor of the excavating TGV track, and a fault dip of 60 to 70° to the NW. The Pleistocene cover does not show any displacement. The truncation of the fault by this cover sequence excludes any Pleistocene or younger activity on the fault. An apparent normal dip-slip displacement of 80cm can be measured. This displacement is identical for all horizons (top and bottom of Kortrijk Formation), implying that fault activity definitively post-dates the deposition of the Ypresian clay.
At different levels some particular, rather small-scale, deformation features can be observed. In the Brussels Sand Formation a strongly disturbed wedge (fig. 10) is bounded by some antithetical faults. This highly deformed wedge may be indicative of a fault activity closely related in time with the deposition of the greensands.
In the lower part of the clay sequence (Kortrijk Formation) the upper fault plane disappears. Fault displacement

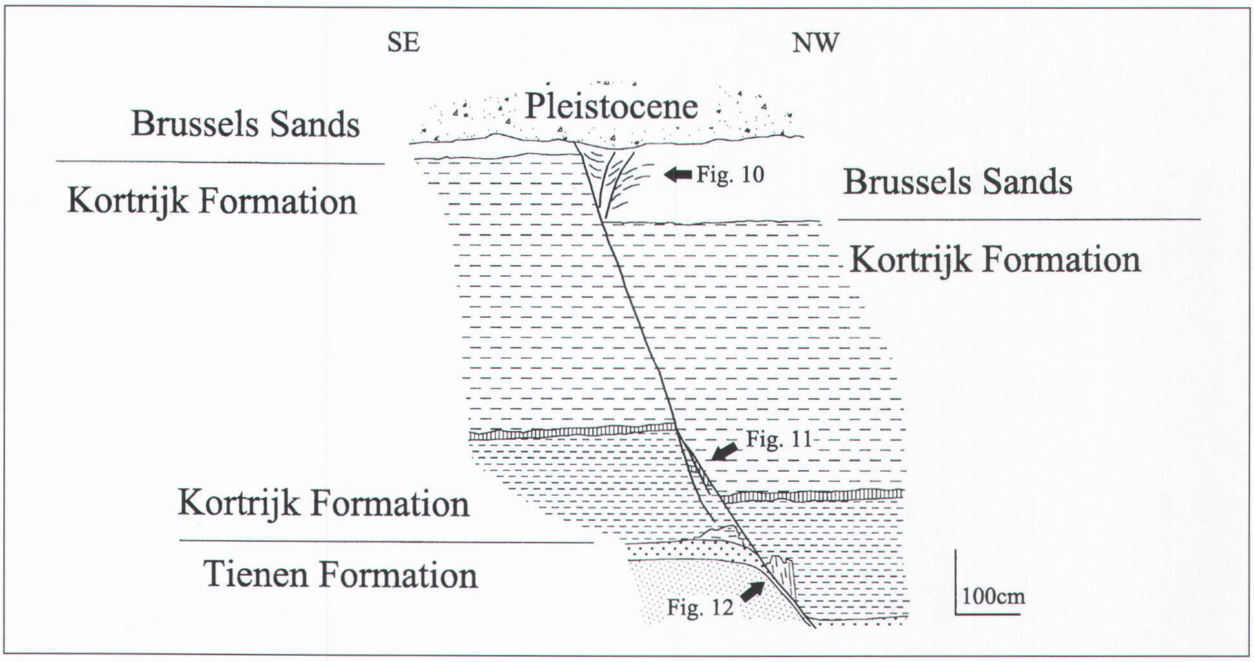


Figure 9. The Goudberg Section: schematic presentation of the fault.

Figure 10a. The Goudberg Section: strongly disturbed greensand (Brussels Sand Formation) with antithetical secondary faults.

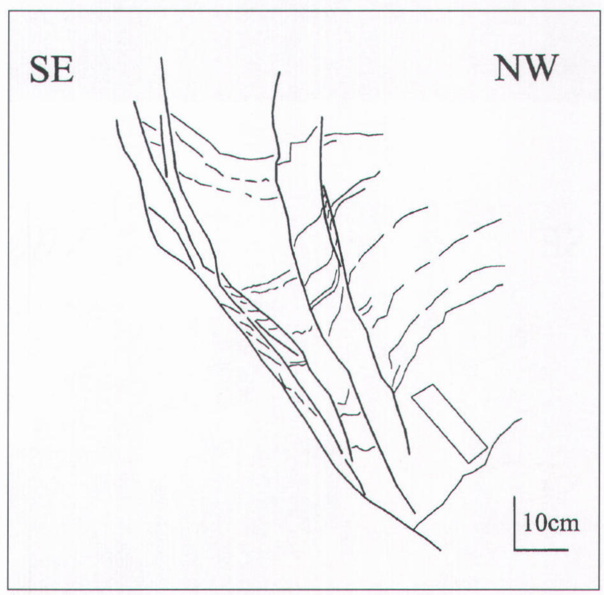
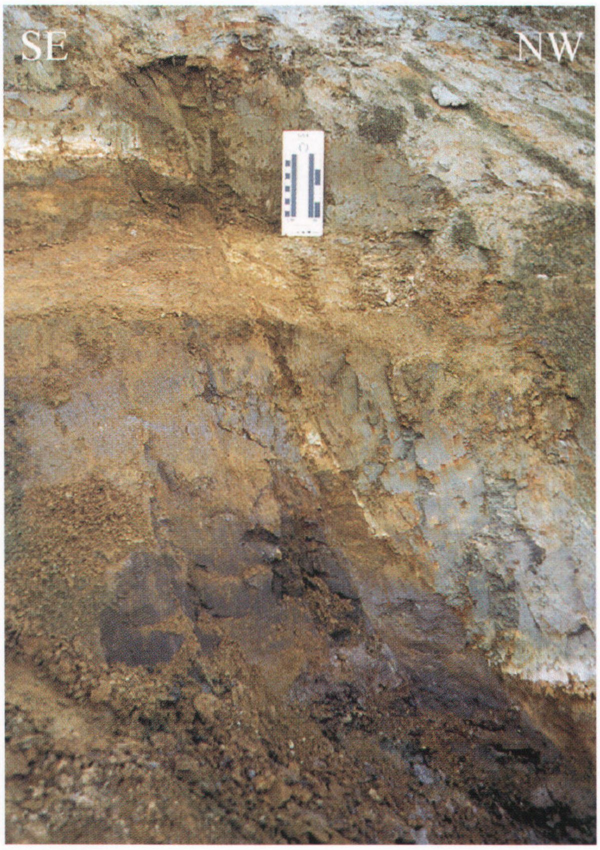


Figure 10b. The Goudberg Section: line drawing.

is transferred to another, less steeply dipping, lower fault plane (fig. 11). This fault continues downwards into the lignite horizon. The lignite horizon is smeared out into the fault. In both footwall and hanging wall a part of a tree-stump is found, both seemingly truncated by the fault (fig. 12). In the assumption that both parts belong to the same tree-stump, an apparent sinistral strike-slip displacement of 120cm has to be considered. Knowing the apparent normal and strike-slip displacement the true displacement vector can be calculated. The obtained displacement vector is 265/50 on a fault plane with a 320/60-70 orientation. Further to the SE, a flexure has been observed again showing a relative downwards movement of the northwestern block with respect to the southeastern block. The presence of both flexure and fault had the exceptional consequence that the Overlaar-Forest horizon is repeatedly encountered at the floor of the TGV track (fig. 13).



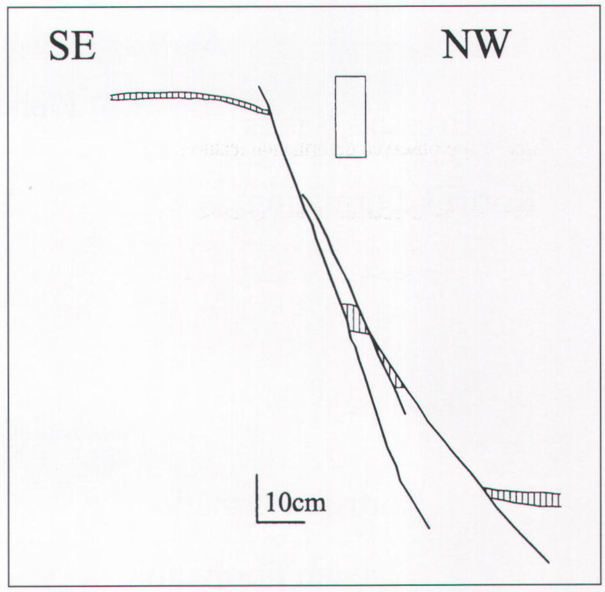
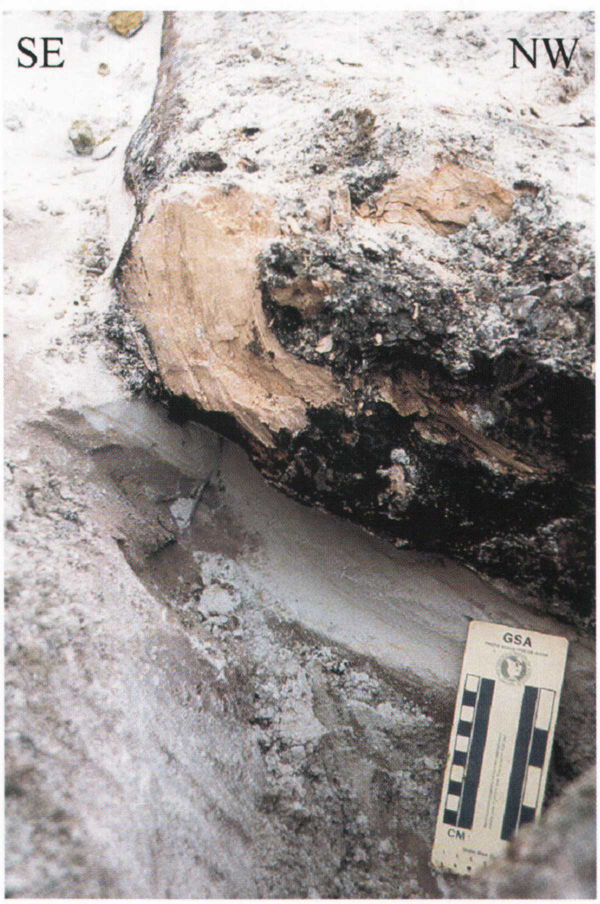


Figure 11b. The Goudberg Section: line drawing.

Figure 11a. The Goudberg Section: transfer zone in the clays of the Kortrijk Formation.



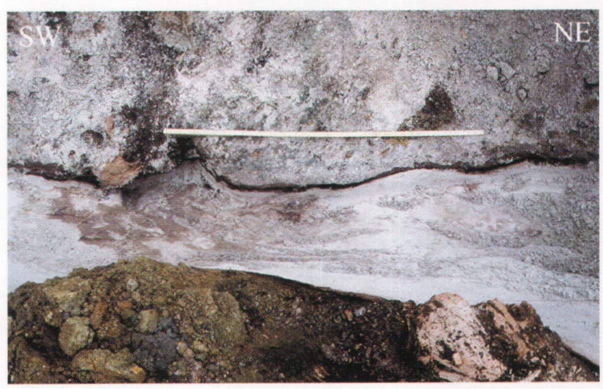


Figure 12b. The Goudberg Section: plan view with truncated tree-stump in both hanging wall (upper part of photograph) and footwall (lower part of photograph) of the fault, indicating an apparent sinistral strike-slip displacement (indicated by arrows). The fault trace trends N50E.

Figure 12a. The Goudberg Section: truncated tree-stump in the hanging wall of the fault (indicated by arrows); white Tienen Sands in footwall of fault.

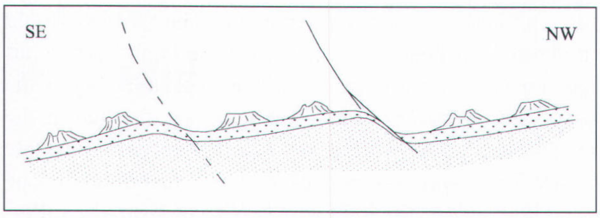


Figure 13. The Goudberg Section: schematic presentation of the entire section with both fault and flexure.

5. Discussion

5.1. Outgaarden section

The deformation features, described in the NE-SW oriented outcrops, should all be seen as part of the internal structural architecture of an "antiformal" ridge. The overall SW-vergence may be interpreted as indicative of SW-directed mass-movements. These mass-movements occurred progressively, gradually steepening and folding the erosive contacts, and were associated with unusual rapid dewatering of the sediment pile. This unstable, NW-SE elongated, sand body may have been situated on the northeastern slope of a NW-SE oriented channel. Unstabilities may have caused the water-rich sediment pile to move down-slope towards the centre of the channel.
Strong NW-SE directed currents within the channel might have caused the overturned cross laminations, as observed in the NW-SE oriented outcrops. They clearly indicate a high-energy depositional environment.

Many of these features have been described previously in the now vanished quarries in the area (e.g. Gulinck 1948, Gulinck 1963). The observations in the Outgaarden Section can, however, be fitted rather well into the paleogeographical reconstruction made by Gulinck (1948). From observations in both the Overlaar and the (old) Rommersom (1) quarries (figs. 1 & 14), Gulinck (1948) inferred a NW-SE trending fluviatile-estuarine channel. Moreover, in the Rommersom 1 quarry (currently near the INTERLEUVEN container park/old railway station of Hoegaarden), situated on the southwestern margin of the channel, Gulinck (1948) found indications for NE-directed mass-movements. In this scheme (fig. 14) the Outgaarden Section, with its NW-directed currents, its NW-SE elongated ridge and its SW-directed mass-movements, should be situated on the other side of the channel with respect to the Rommersom 1 quarry.

The question remains, however, whether or not these syndepositional deformation features are purely gravitationally induced. It can be expected that in a high-energy environment with rapid sedimentation of water-rich sediments gravitational instabilities occur. However, the deposition of the chaotic sands took place in a period of increased tectonic activity, related to the Artois uplift (cf. Vandenberghe et al. 1998). It is therefore fair to assume that earthquakes were regularly occurring. The above-mentioned mass-movements and dewatering, leading to the observed deformation features, so typical for the base of the Tienen Sands, could thus very well be seismically triggered. In that case the syndepositional deformation features are tectonically induced, and could be described as seismites.

5.2. Goudberg section

In the Goudberg Section a fault has been described with an apparent normal displacement of 80cm and a, rather hypothetical, sinistral displacement of 120cm. Fault activity occurred after the deposition of the Ypresian clays (younger than ~49Ma) but before the deposition of the Pleistocene loam cover (older than ~2Ma). The disturbed nature of the Brussels Sand Formation may be indicative of a fault activity during or somewhat later than the deposition of these greensands (during the Lutetian).

The key to assess the kinematic significance of this fault (and flexure) most probably lies within the Lower Paleozoic basement. At the Goudberg this basement is situated at a depth of only 60m underneath the discussed outcrops (fig. 2). On the subcrop map of the Brabant Massif (Legrand 1968), the Tienen-Hoegaarden area is situated in the so-called *Région de fractures de la Haute-Gette* (fig. 15). Also on the aeromagnetic map NE-SW trending breaks in the structural grain of the Brabant Massif can be recognized in the area concerned (Sintubin 1997). According to Legrand (1968), this NE-SW trending Gete Fault Zone has been reactivated during the Eocene, and more particular during the onset of the deposition of the Brussels Sand Formation. In this respect it could be assumed that the observed fault may be generated by the reactivation of one of the underlying NE-SW-trending master faults in the Lower Paleozoic basement. The timing inferred from the disturbed greensands very well complies with the conclusions of Legrand (1968).

When considering the occurrence of the Tertiary formations in this area affected by the Gete Fault Zone, it is striking that e.g. the occurrence of both the Tienen and Brussels Sands is limited to NE-SW trending throughs. The NE-SW oriented through containing the Tienen Sands continues in NNE-direction, at least till Mol, near the Belgian-Dutch border (Demyttenaere 1989). Width of the channel is approximately 12km. When crossing NW-SE Kimmerian faults, related to the Roer Valley Graben System, smaller incised gullies form with widths of approximately 1km. Incisions may reach 40m but never go into the Waterschei Clay Member at the base of the Landen Group. The base of the overlying upper Eocene Tongeren Group is always undisturbed. Also the wedging-out of the Kortrijk and Gulpen Formation is determined by this NE-SW direction. Finally,

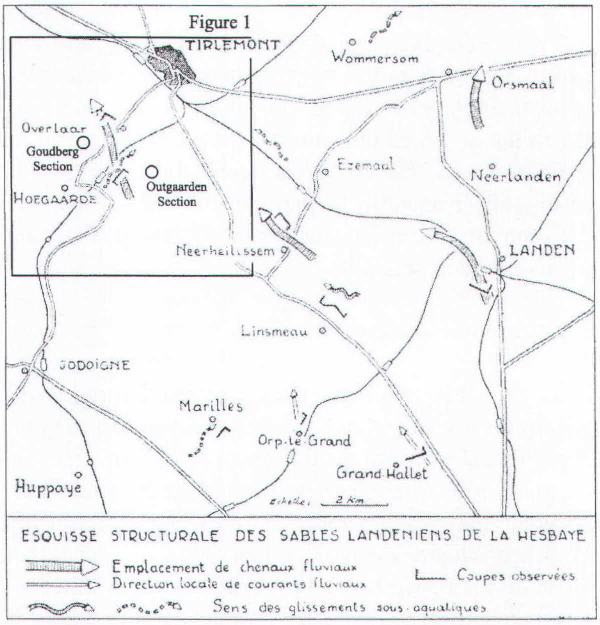


Figure 14. Map of the area with indication of channel orientation and orientation of mass movements as derived from observations in the quarries (Gulinck 1948). The position of both Outgaarden and Goudberg sections are indicated.

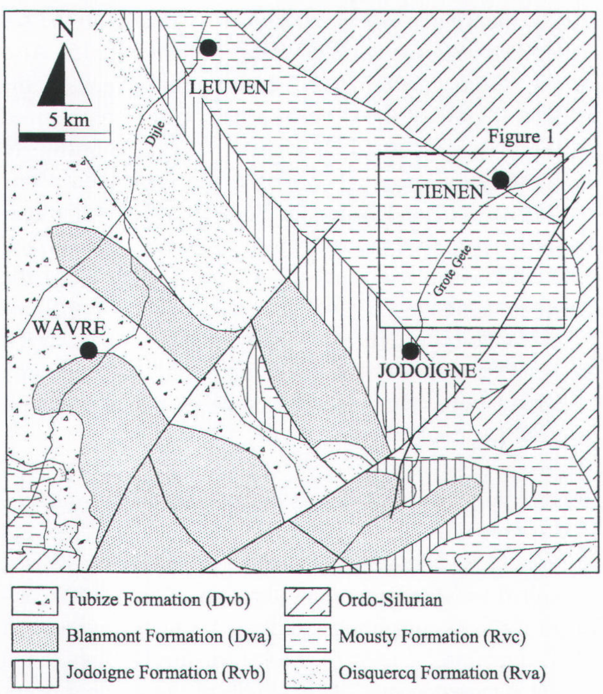


Figure 15. Simplified map of the subcropping Lower Paleozoic basement of the Brabant Massif (after Legrand 1968). The NE-SW trending faults in the Tienen-Jodoigne area compose the Gete Fault Zone.

also the Gete river runs in this direction. The question should therefore be asked if the Paleozoic Gete Fault System has had a persistent influence on the subsequent history of the area. The inverse could be considered, i.e. the fault is the result of slumping within the Goudberg towards the Gete valley. This hypothesis is questionable because, on the one hand, the fault is dipping to the NW away from the valley, and on the other hand, a strike-slip displacement is supposed, which should not be expected in the case of mass-movements towards the valley. Moreover, the Pleistocene loam cover remained undisturbed.

6. Conclusions

During excavation works for the TGV track in the Hoegaarden area, a number of temporary outcrops provided some new observations and insights in the local geology. In the case of the Outgaarden Section these new observations confirmed and completed the current knowledge on the paleogeography during the Thanetian in the area. The syndepositional sediment deformation features were caused by strong currents, dewatering and mass-movements during or shortly after the deposition of the Tienen Sands in a high-energy depositional environment on the northeastern slope of a NW-SE running channel. Although the depositional environment presumes that these deformation features are gravitationally induced, a tectonic trigger should not be excluded. In the case of the Goudberg Section a to date unknown presence of a fault was discovered. This fault showed a post-Ypresian activity. There is firm evidence of a dip-slip normal fault displacement. A strike-slip sinistral fault displacement is supposed. The fault is attributed to the reactivation during the Lutetian of master faults in the Lower Paleozoic basement belonging to the Gete Fault Zone.

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9. Addendum – Geopark Hoegaarden

GEOPARK HOEGAARDEN is an initiative of the Geological Survey of Belgium and TUCRAIL, on behalf of the VLM and the city of Hoegaarden, and with the scientific support of the geology departments at the Belgian universities (Liège, Gent, Leuven) and scientific institutes (KBIN/IRSNB).

The aim of the project is to valorise the unique geological patrimony of the Overlaar Petrified Forest. The GEOPARK consists in the first place of an excavated theatre where a stratigraphical cross-section across the above-mentioned Paleogene formations will be shown and where the tree-stumps can be seen in their original setting.

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