

Landslides

Several examples of landslides (the majority of which can be referred to be of translational-rotational type) can be identified in the surveyed area. The small examples display an elongated irregular outline and vary in length roughly from 100 to 200 m. They are characterized, in general, by a main scarp, which is followed downslope by numerous lobes each of which is in the scale of a few meters in length. The largest landslide, with an area of ~ 0,628 km², occurs just north of the ridge of Sankt Georgen in der Klaus. The scarp of this landslide is roughly C-shaped with the concavity facing to the north. The southwest–north-east extension of this landform is 1.4 km. The northern limit coincides with the creek running towards the village of Au.

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Bericht 2024 über geologische Aufnahmen im Gebiet von Kritzendorf auf Blatt NM 33-12-19 Tulln an der Donau

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The surveyed area is situated west of the Kritzendorf Nord railway station in the district of Tulln (Lower Austria). It is bounded to the north by a forest road south of Hundsberg, which connects the villages of Hadersfeld and Kritzendorf. The Weißer Hof marks the southwestern corner of the area, while the southern border is delineated by the forest road linking Weißer Hof and Kritzendorf. The Waldandacht area

lies immediately north of this road. The eastern edge of the surveyed area is heavily urbanized, yet one of the largest outcrops of the Altlenzbach Formation can be found on the cliffs adjacent to the Kritzendorf Nord railway station.

This study area belongs to the Greifenstein Group of the Rhenodanubian Flysch nappe system and is located at the easternmost corner of the Wienerwald (EGGER, 2013; EGGER & WESSELY, 2014). Three lithological units trending approximately SW–NE have been identified from northwest to southeast: the Greifenstein Formation, the Irenental Formation and the Altlenzbach Formation.

Altlenzbach Formation

The Altlenzbach Formation is present in the southern half of the study area, primarily south of the creek that delineates the northern boundary of the Weißer Hof hill, which flows eastward towards Kritzendorf. Much of the area attributed to the Altlenzbach Formation has been identified based on Lesesteine, with only a few notable outcrops. The most significant outcrops are located near the cliffs adjacent to the Kritzendorf Nord railway station.

At this latter locality, the stratigraphic succession is characterized by thick beds (1.5 to 2 m) of amalgamated, fine-grained, homogeneous calcareous sandstones, with a dip orientation of 146/57°. Crude parallel lamination is occasionally observed, and some beds thin out before merging laterally with the main bed. These primary beds are interbedded with thin layers (approximately 2–5 cm thick) of dark clay, which do not react with a 10 % HCl solution. All pelite samples examined were devoid of nannofossils.

Approximately 200 m southwest of the Kritzendorf Nord railway station, there are well-exposed variegated marls in shades of beige, dark grey, bluish, and dark brown, arranged in thin beds (around 5 cm thick). Interspersed within these marls are several sandstone layers (approximately 35 cm thick). Evidence of slumping and syndimentary faulting, occurring at scales of about 30 cm, is common throughout this section. The marls exhibit trace fossils, with *Chondrites intricatus* being the most dominant.

Nannofossil analysis from this formation indicates an association consistent with zone NP8. This is supported by the prevalent occurrence of *Discoaster mohleri*, *Heliolithus riodelii*, and the absence of *Discoaster nobilis*. Other notable species within this association include *Toweius eminens*, *Heliolithus kleinPELLI*, *Fasciculithus tympaniformis*, *Calciosolenia aperta*, *Zeughrabdodus sigmoides*, and *Prinsius martinii*. The presence of *Discoaster multiradiatus* suggests proximity to the base of zone NP9; however, this is inconsistent with the absence of *D. nobilis*. This pattern may indicate an early occurrence of *D. multiradiatus* prior to its widespread presence.

Additionally, approximately 1 km southwest of the Kritzendorf Nord railway station, there are outcrops predominantly composed of marly sediments interspersed with thin sandstone layers (about 3–4 cm thick) exhibiting ripple marks. While most samples analysed for nannofossil content were barren, one sample indicated an Upper Maastriachian age (biozone UC20a), based on the identification of *Lithraphidites quadratus*. Other species in this association include *Lithraphidites praequadratus*, *Cribracorona gallica*, *Ceratolitho-*

ides aculeus, *Eiffellithus parallelus*, and *Arkhangelskiella cymbiformis* among many others. Some authors suggest that the presence of *C. gallica* indicates an UC20b age as an alternative marker to *Micula murus*.

The predominance of marls over sandstone banks is characteristic of the Acharting Member and aligns with an Upper Maastrichtian–Thanetian age (EGGER, 1995). Notably, in the southeastern corner of the surveyed area, Lesesteine consisting of polymict microconglomerate (primarily quartz along with other clasts including mica schist) are commonly found. While most clasts are angular in shape, some rounded clasts are also present. These rounded clasts provide evidence of transport processes typically associated with river or beach environments.

Greifenstein Formation

With the exception of five old quarries, the entire surface attributed to the Greifenstein Formation has been determined based on Lesesteine. A key diagnostic feature of the typical lithofacies of this formation is its lack of carbonate content in the sandstones. This unit predominantly occurs in the northern half of the surveyed area, relatively close to its type locality at the Strombauamt quarry, located between Greifenstein and Höflein (HÖSCH, 1985).

The stratigraphic and sedimentological characteristics of this unit are best observed in an old quarry approximately 700 m southeast of Hundsberg, which intersects the 300 m a.s.l. contour line. Within this quarry, notable features include a surface of approximately 3 m² representing the base of a turbidite (dip orientation 138/64°) with flute marks indicating paleocurrents flowing southeastward.

The southern margin of the quarry reveals an amalgamation of siliciclastic turbidites, showing horizons Ta, Tb, Tc, and Te arranged in asymmetric cycles. This sequence is truncated at the top by a new turbidite bed consisting of a thick Ta unit (2 m), characterized by a type IIb traction carpet at its base, followed by crudely stratified layers of rip-up mud clasts. These two intervals constitute the first 40 cm of the bed, which then transitions from microconglomerate in the basal fourth to coarse sandstone at the top.

The quarry is unique among Greifenstein Formation outcrops in the investigated area for containing pelitic sediments, which appear as thin (1–3 cm) interbeds (horizons Te) between fine-grained sandstone beds (10–30 cm thick), exhibiting either parallel lamination (horizons Tb) or climbing ripples (horizons Tc). Unfortunately, smear slides prepared from these pelitic samples revealed the absence of nanofossils.

The knowledge regarding the age of the Greifenstein Formation is primarily derived from literature. The association of larger benthic foraminifera studied by PAPP (1962) at the Strombauamt quarry suggests that sedimentation occurred during the Ypresian (Lower Eocene). Specifically, PAPP (1962) identified an “early Cuisian” age, corresponding to Shallow Benthic Zone SBZ-10, which aligns with NP12 nannoplankton zone. However, according to EGGER & ČORIĆ (2017), the Greifenstein Formation correlates with nanofossil biozones NP10 and NP11.

Irenental Formation

The Irenental Formation was introduced by SCHNABEL (1997) in the GK58 Baden map sheet. However, it has never been formally defined, nor has a type section been designated, and the boundaries of this unit remain unspecified. Consequently, this formation is considered invalid (PILLER, 2022). In this report, I will therefore use the term “Irenental Formation” informally.

The Irenental Formation occurs adjacent to the southern margin of the Greifenstein Formation throughout its extent within the surveyed area, forming a relatively narrow band oriented SW–NE. It is characterized by greenish and grey marls and calcareous sandstones arranged in beds approximately 0.2 to 2 m thick. Lithologically, this formation is challenging to distinguish from marl-dominated intervals of the Aitlengbach Formation (e.g., the Acharting Member (EGGER, 1995), which is similarly characterized by marls and calcareous sandstones), particularly when only small, disconnected outcrops or Lesesteine are available for examination. The author recognized that these sediments did not belong to the Aitlengbach Formation only after analyzing the calcareous nanofossil content of five samples collected along a transect of about 2 km. The analysis revealed an Upper Ypresian age (biozone NP13) based on the abundant presence of *Discoaster lodoensis*, and *Reticulofenestra dictyoda*, along with the absence of *Tribrachiatulus orthostylus*. Additionally, the frequent occurrence of *Blackites praeinflatus* suggests an Upper Ypresian age. This latter species was only recently described and is currently known from a single locality in Belgium, where it was found at the Ypresian/Lutetian boundary. However, it cannot be ruled out that the samples from Kritzendorf may indicate that the first known occurrence of this species happened during zone NP13.

An outcrop displaying a direct contact between the Irenental and Greifenstein formations could not be located. The approximate contact represented on the map has been inferred from the distribution of Lesesteine along a SW–NE transect.

According to FAUPL (1996), the age of this unit corresponds to zones NP12 to NP13 (Eocene, Ypresian). The earliest description of this unit known to the author is from SCHNABEL (1988: 414), who provided a geological mapping report for GK58 Baden. Although Schnabel did not specifically use the term “Irenental”, he noted that this formation overlies the Greifenstein Formation and is characterized by green, occasionally red, massive marls with only a few thin layers of calcareous sandstone. The formation is particularly well exposed on the western side of the valley between Riedanleiten and Troppberg, near the village of Irenental, just northeast of Pressbaum. Based on nanofossil evidence available back then, the stratigraphic age of this unit was then determined as Lower Eocene (NP12). SCHNABEL (1988) also indicated that the unit may correspond to the “Oberen Coccolithenschiefern” of HEKEL (1968).

Löss

Löss outcrops are abundant, forming impressive cliffs that can reach heights of 5 to 6 m, particularly evident in road cuts. The sediment is primarily silt-sized, typically exhibiting a beige coloration, and demonstrates a vigorous reac-

tion to a 10 % HCl solution, which serves as a key diagnostic criterion. A notable characteristic of these outcrops is the frequent presence of terrestrial gastropods embedded within the sediment. These outcrops are predominantly located along the northern margin of the creek north of Weißer Hof, which flows eastward toward Kritzendorf. The first occurrences can be found approximately 900 m north-east of Weißer Hof, and they extend continuously for about 1 km along a band immediately west of the road connecting Kritzendorf and Höflein an der Donau.

Tectonic Measurements

In the study area, only a limited number of localities were suitable for measuring the strike and dip of strata. The measurements indicate a folded structure occurring in the centre of the study area with an axis oriented approximately N80° E, as determined from plotted great circles. The fold plunges at an angle of about 60°.

Mass Movements

Laser scan maps reveal three prominent escarpments located approximately 600 m southwest of the Kritzendorf Nord railway station, which can be attributed to small translational-rotational landslides. These escarpments are situated on a heavily vegetated private property that remains inaccessible. The central escarpment measures approximately 85 x 63 square meters. The wall marking the southern edge of the street exhibits varying degrees of displacement and tilting on the order of several centimetres, suggesting that the mass movement may still be active.

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