Preliminary Report

Lithostratigraphic interpretation and paleontological observations of the Bascharage (Nidderkäerjeng) digsite 12-14 may 2022

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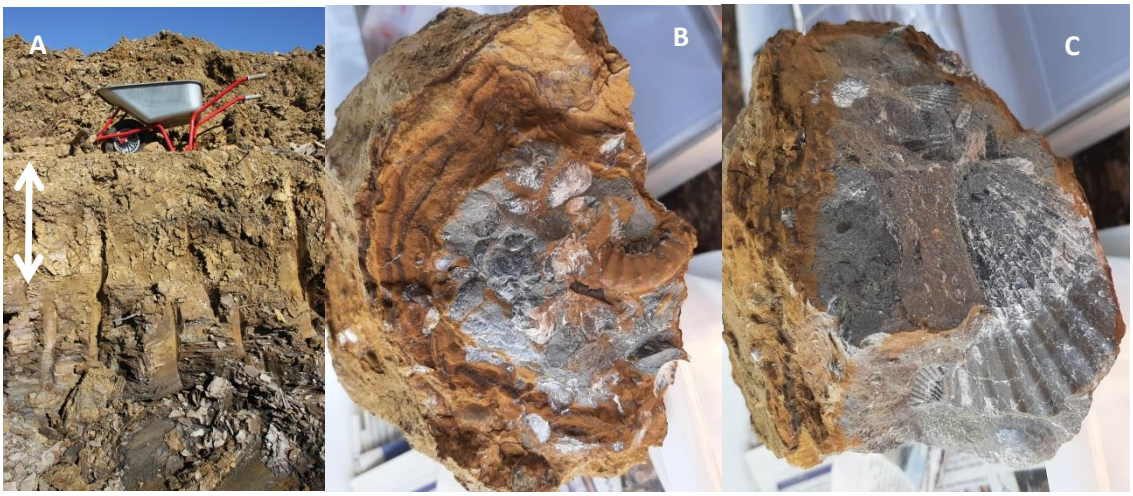
Introduction

From Thursday 12 till Saturday 14th May 2022 a visit was carried out to the temporary digsite openend by the Luxemburg Naturmusee in Bascharage (Nidderkäerjeng). The digsite is located within the Bommelscheuer industry park more specificly along the Rue Héierchen (N 49° 33' 58.91112" ; E 5° 56' 10.22676"). This report focuses on the lithological entities and paleontological observations made during the excavation of the digsite during the first week (10-14 may 2022).

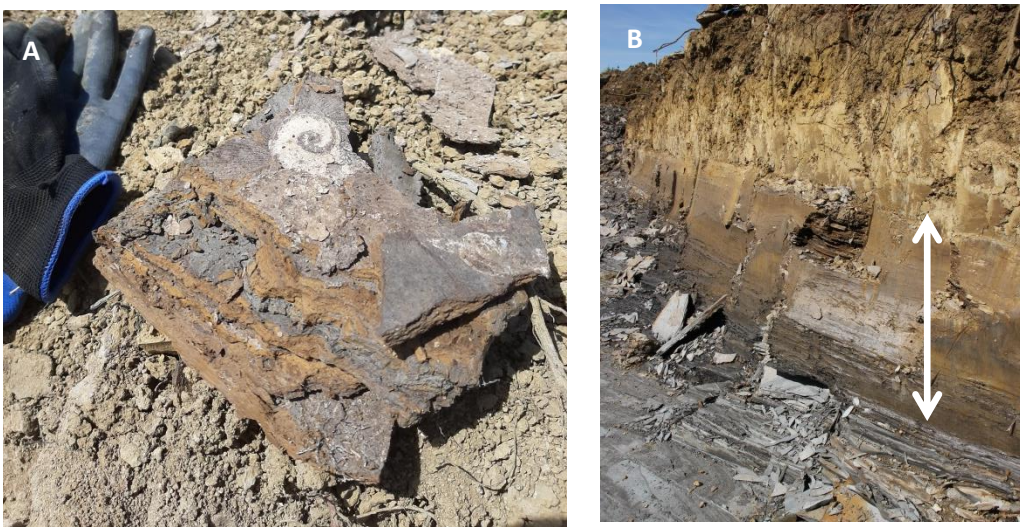
Description of the strata

A ca. 3 m deep trench, oriented in a NNE – SSW direction is located near the back of the digsite (SSW). Within this trench the deepest part of the profile could be observed (cf. **Fig 1**) the longitudinal continuation of the trench (ca. 15m) was discontinued on Thursday 12/05 as a result of groundwater hindering deeper extraction. A platform was made around 30 cm higher allowing the excavator more space to manoeuvre. The total depth of the section on 14/05 was 3.07m. The following strata were observed along the entire surface of the digsite:

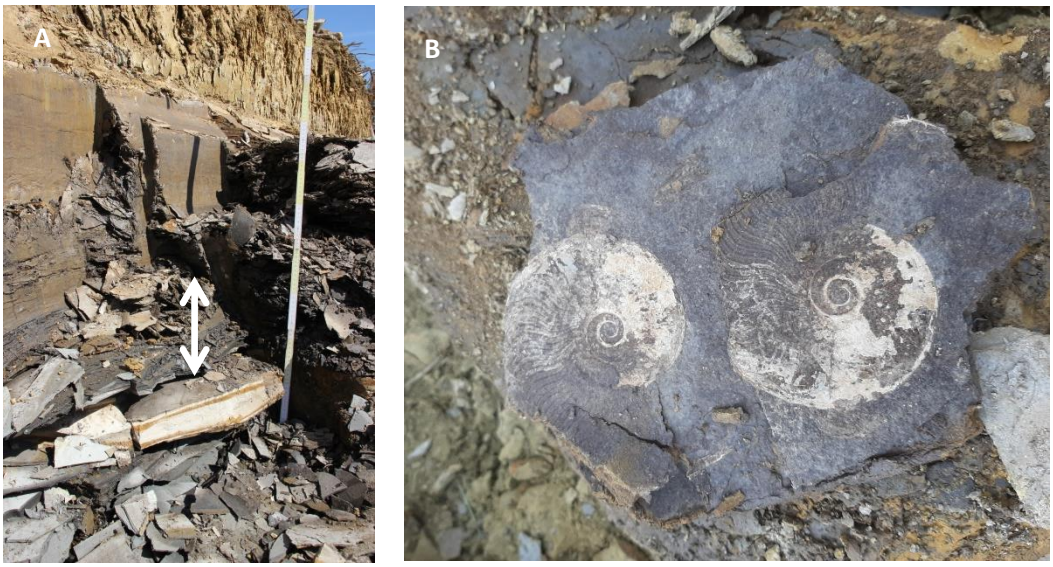
I) The top layer was excavated during the first days, and had a thickness that measured around 90 cm (Picture A). It These modern deposits however, contain reworked phosphatic nodules and thick iron concretions (Pictures: B, C) which containing very well preserved Pliensbachian marine fauna (ammonites, bivalves gastropods etc.). On the outside of the concretions weathered fossils were visible, often without any shell preservation or just negative imprints. The thinner concretions often contained lumachellas semi-encapsulated within the thick orange brown iron oxide coating. Often, some of the preserved bivalves were fossilised in live position.



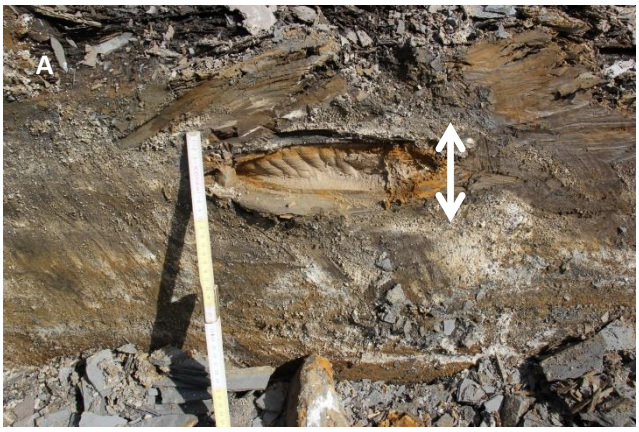
II) The second stratum, comprises a very plastic (pliable) variety of the Posidonia shales. This layer has obviously been (chemically) weathered and penetrated by very thin root structures of living plants looking for groundwater. These root structures were easily visible as an imprint on the matrix after extraction. The crystallisation of gypsum and anhydrites following the exact structure of the root system can easily be observed, after moisture evaporated, leaving a thin dendroid crust of anhydrite. Within this layer very thin dark orange (iron oxide) laminae are visible. A red discoloration often points to the presence of larger organic remains such as fish. We also observed very weathered ammonites (Fig. A) and some fibrous wood fragments. Unfortunately preserving them outside of their wet environment, forces the fossilised wood to immediately curl up and disintegrate. Especially lager fragments of wood with longitudinal grooves were observed h



III) The plastic and pliable feature of the Posidonia shale ends quite suddenly, when the water content within stratum (III) allows for much more rigid layers to emerge. Resulting in the typical large plates of shale that are broken up by the excavator. These finely laminated shales also contain wood fragments but seem to be more intensely coalified. Up to the point where the coal pulverizes into sharp conchoidal pieces, able to cut paper and skin. The plant remains were mainly found near the top side of this layer. Also ammonites are more present in this layer.



IV) The most rigid layer of the whole section, consists of a laterally consistent horizon of very large flattened kidney-shaped nodules who are internally laminated. These very large nodules can weigh up to a more than 100 kg's. and change colour while drying. Initially having a wet grey-green colour, they change to a yellow (outside) and pale white (internal) colour, when exposed to sunlight (Picture A). These concretions were gathered in large quantities, as they contain important remains of insect and other fauna (Picture B). Occasionally complete fish can be found within these concretions, but this is rather rare. The concretions are very elongated in shape and the internal lamination might give a clue to their formation and initial environment. We carefully suggest that these nodules did not necessarily form around large organic remains, as we often find no particular macroscopic fossils inside them when splitting them.

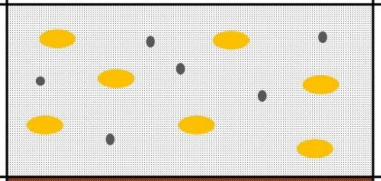
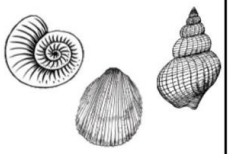
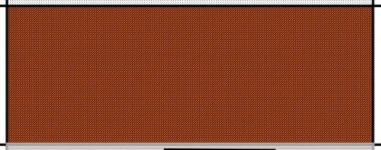
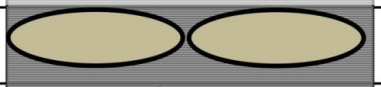
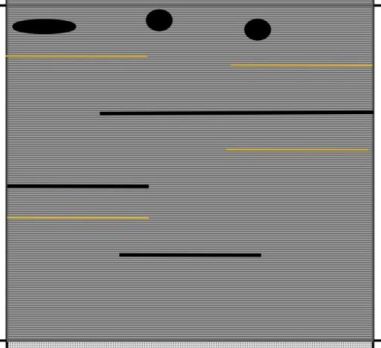
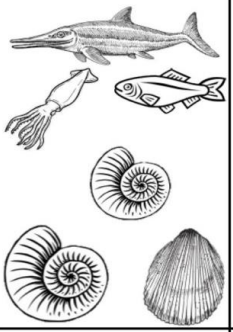
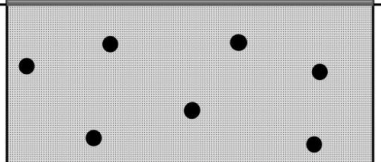
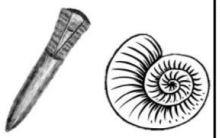


V) The largest stratum of the section are the classic Posidonia shales. On the top of the layer, located 10-15 cm below the large kidney-shaped nodules, we sporadically found concretions of different forms, almost every time containing well-preserved fossils (Picture A). In most cases three-dimensional ammonites were preserved in more spherical nodules (Picture C). In some cases only a part of the fossil was found three-dimensionally preserved within these nodules, whereas the rest of the animal was preserved in classic Posidonia shale. These seemingly variable modes of preservation for one and the same organism should be further examined from a taphonomical or sedimentological perspective. Other nodules within the upper part always contained extraordinary fossils. We found 2 fish skulls, 1 squid and the surangular? of a marine reptile (ichthyosaurid?). The rest of the stratum contains the classic horizons with mass accumulations of compressed ammonites (Picture B & D), and bivalves. Occasionally some fish remains, wood fragments can be observed as well.

VI) The lowermost accessible part of the digsite was difficult to reach and could only be observed by fragments on the debris heaps alongside the digsite. The visible layer measured 50 cm at the deepest available point of the section (Picture A). Contrary to the very compacted and compressed Posidonia shale above, this stratum of thick clay, houses a lot more belemnites and ammonites with a three-dimensional preservation. Often with (parts) of their original shell being present (Picture B). Unevenly distributed within this layer, we find small (10-15 cm) spherical nodules. Although they are very hard to split open, they containing interesting microscopic remains such as fish coprolites, scales, and other osteological material. Occasionally the nodules also contain burrows (sometimes filled up with ironoxide). The clay itself also shows a minor amount of bioturbation.

Conclusions

Further research could be focused on the origin of the different types of concretions and nodules. Also the relatively high variability in state of fossil preservation within this relatively undeep section of the digsite is worth to be researched. Especially the high amount of variation between strata III & IV should be investigated further.

AGE	FORMATION	STRATA	DEPTH (cm)	LITHOLOGY	FOSSILS	NOTES
HOLOCENE	REWORKED SOIL	I	90			Top soil with reworked phosphatic nodules and iron oxide concretions containing Ammonites, gastropods bivalves, belemnites etc (reworked Pliensbachien)
LOWER JURASSIC - TOARCIAN	GRANDCOURT FM. (BEL) - LO1 - LO2 ? (LUX)	II	42			Weathered, chemically altered Possidonia shales: Thinly laminated orange brown oxidation laminae. With sporadic fossils (ammonites and fish remains) high amount of Fe+ oxides and root structures of living plants within this plastic clay.
		III	10			(Dry) Possidonia shales, finely laminated, with coalified plant remains near top, displaying different stages of coalification
		IV	6			Horizon with yellow to white, flat and elongated kidney-shaped concretions (finely laminated), containing insect remains
		V	110			(Wet) Posidonia Shale: Grey to black bituminous shales very finely laminated with gypsum and anhydryte minerals (well developped within the joints), yellow discolorations, and sporadic concretions at the top containing ammonites, Fishes, Marine reptiles and soft body preservations. Horizons with mass accumulation of ammonites nearly all flattened (except the ones inside the concretions near the top of the layer)
	?	VI	50			Grey, thick, consolidated clay (conchoidal fractures), rich in Belemnites, not laminated and containing 15-20 cm large unevenly distributed (micrite?) nodules with remains of: Fish, Ammonites (with shell preservation) and microfauna
GROUNDWATER LEVEL						