Geological Investigation of the Drill Core from Borehole TB2A: First results

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In the year 2013 a 240m deep well named TB2A was drilled near the summit of Trafelberg mountain, going right through the tunnel of the Conrad Observatory. The drill core was geologically investigated in November 2015 and eight samples were taken for thin section analysis. The well penetrated three different geological formations – Gutenstein Fm., Reifling Fm., Wetterstein Limestone - of predominantly Middle Triassic age (247.1 - 237 Ma), that are part of the Unterberg nappe.

The drilling operation started within light grey colored, massive to indistinctly bedded Wetterstein Limestone (Fig. 1). The rock near the drilling site contains numerous fragments of reef building organisms like corals, calcareous sponges and solenoporaceans (red algae). Two thin sections, one from a sample taken from the core at -4,9m, show a framework of corals and calcareous sponges encrusted and overgrown by characteristic microorganisms like *Ladinella porata* (Ott 1968) or a bioclastic sand. The components within both facies are bound together by different types of fibrous and blocky calcite crystals. Scattered rhombohedral dolomite crystals show the beginning dolomitization of the reef limestone.

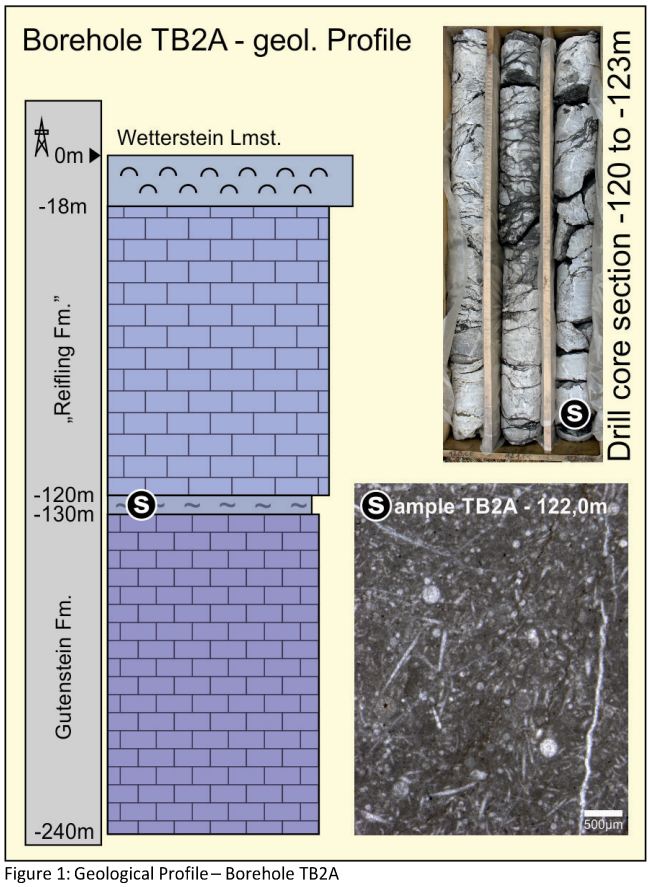

Figure 1: Geological Profile – Borehole TB2A

At a depth of 18m below the surface the Wetterstein Limestone is underlain by the Reifling Formation. The term is used in quotation marks, because the brownish-grey colored, slightly bituminous limestone contains no chert nodules and differs in its microfacies from the typical Reifling Fm. Under the microscope the main components of the Reifling Fm. can be identified as sand sized, dark micritic grains (partially of fecal origin) cemented by calcite or embedded in fine carbonate mud. The sediment contains fragments of thin shelled bivalves, echinoderms, rare foraminifers and radiolarians. Variations in packing density of grains and several burrows are the result of the activity of animals living in the sediment or on the original sediment surface. The described microfacies support the assumption that this part of the Reifling Fm. was deposited in a shallow shelf basin. From a depth of 120m down to 130m the drill core is composed of a dark grey to black colored, nodular limestone. Within thin sections the rock can be characterized as sediment consisting of calcified radiolarian tests and sponge needles. This microfacies is characteristic for basinal deep water environments with slow sedimentation. This nodular limestone is comparable with the "Knollenkalk Member" at the base of the typical Reifling Fm. and therefore maybe is of upper Anisian age.

From 130m to its maximum depth of 240m the well stayed within the thin bedded, dark brown to black coloured, highly bituminous limestone of the Gutenstein Formation. Thin sections of the limestone show a composition of massive to fine laminated calcareous mud with traces of animal activity – characteristic for a restricted depositional environment, maybe situated in a shallow basin.

With the Reifling Fm. the described lithological sequence penetrated by well TB2A contains the missing sediments of Ladinian age that are not shown in recent geological maps of the Trafelberg area. Additional biostratigraphical data and geological field mapping are necessary to confirm the achieved results.

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