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PRELIMINARY NOTE ON THE HELVETIC UNITS AT GEOTOPE LANGER KÖCHEL DISTRICT GARMISCH-PARTENKIRCHEN, SOUTHERN BAVARIA, GERMANY) AND THE FIRST DISCOVERY OF FOSSIL RESIN IN THE FRESCHEN BEDS (LATE APTIAN–ALBIAN)

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Introduction: The Helvetic Units present at Langer Köchel are part of the external zone of the Northern Alpine fold and thrust belt (Schmid et al. 2004: Eclogae geol. Helv., 97, 93–117, Basel) in Southern Bavaria. According to Roeder & Bachmann (Mém. Mus. natn. Hist. nat., 170, 263-284, Paris, 1996), these Helvetic Units form narrow slivers, consisting of steep-flanked, tight and faulted antiformal stacks of thrusted sheets between the detached folded Molasse Units (footwall) to the North and Flysch Units (hanging wall) to the South.

In 1998, for the first time, a cm-sized pebble of fossil resin was found in glauconitic quartzsandstone, exploited at the quarry Hartsteinwerk Werdenfels, which was active from 1927–1999 at the southern flank of the hump Langer Köchel.

Stratigraphy: It starts at the base with monotonous, dark grey and black colored, slightly bituminous, thinly bedded and laminated marlstones attributed to the Drusberg Formation. The presence of *Conorotalites* sp.- probably *Conorotalites bartensteini* intercedens - indicates an early late Barremian age. The stratigraphic passage to lithologies comparable to the Grünten Member - basal part of the Garschella Formation (Linder et al. 2006: Eclogae Geol. Helv., 99/3: 327–341) – is set, where the first intercalation of dark grey colored, dm-thick, marly limestone layers occurs. The sequence is made up of dark grey, laminated marlstone beds up to 1,3 m thick, alternating with grey to dark grey colored, often nodular and in places burrowed, marly limestone strata (max. thickness 70 cm). A late early Aptian age of this unit is supposed. The thickness of this sequence diminishes from ca. 90 m at the western part of Langer Köchel to only a few meters at the eastern side. The stratigraphic contact at the upper boundary of this member signalizes an important and sharp erosional unconformity. The lithologies above - comparable to the Freschen Beds – are made up of medium to coarse grained, dark olive, grey to dark grey colored, medium to very thick bedded, moderately sorted, calcareous and glauconitic quartzsandstone layers (maximum thickness 3,6 m), which are rarely separated by dark grey marlstone layers up to 27 cm thick. The strata, often laminated on mm- and cm-scale, are confined by plane or hummocky super- and subfaces. Close to the base of the upper quarter of this unit, an incompletely graded, 49 cm thick quartzsandstone layer was observed. Above, dm- to m-thick horizons – laterally persistent on 10 m-scale – with significant features of redeposition (cm- to dm-scaled, rounded intraclasts in intensely convoluted quartzarenaceous matrix) are present. The macrofossil content of this unit consists of *Birostrina concentrica* and ammonites, which are still under examination. Ichnolites (*Palaeophycus*, *Thalassinoides*) are common.

The microfauna from the basal layer of the unit yielded *Lenticulina* sp., *Novalesia* sp., *Marsonella* sp. and *Gaudryina* sp. According to correlatives present in the distal Helvetic realm, the age of the Freschen Beds is probably late Aptian to Albian; its thickness is ca. 140 m. It is supposed that its lithologies represent redeposited matter from the Brisi-, Gamser- and Rankweiler depositional areas on the adjacent platform and slope. The passage to the Seewen Formation (Cenomanian - Santonian) is marked by an erosional unconformity. It starts with amalgamated redeposits < 1m (Götzis Beds), which are overlain by pelagites consisting of grey limestone layers, followed by an alternance of brick red and beige colored, marly limestones.

Fossil resin and paleoenvironment: Gas chromatographic and mass-spectroscopic analysis of the fossil resin revealed the total defunctionalization and dealkylation of its constituents. Only traces of a few biomarkers have survived – for instance agathalene –, which indicates its botanic origin from agathic acid: The conifer species *Agathis dammara* and *A. australis* containing this resin at present only occur in the montane subtropical-tropical forests. It is therefore supposed that the paleogeographic provenance of the Werdenfels fossil resin has been a distant mainland positioned further to the east or southeast at low latitude, from where it was transported – attached to driftwood – by surface currents across the late Aptian - Albian Tethys to the Helvetic Realm. It is pointed out that transport and deposition of this fossil resin pebble is linked up with the Cretaceous paleoenvironmental development: The Aptian climate change, which proliferated continental fluvial runoff and the flux of terrigenous matter into westbound longshore currents contouring the Southern European continental margin (Puceat et al. 2005: Earth and Planetary Science Letters, 171/1, 149–156), enhanced the likelihood of dropstone deposition.