Mount Rettenstein southwest of the Dachstein Massif – a structurally controlled, isolated occurrence of Jurassic strata at the southern rim of the Northern Calcareous Alps

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Mount Rettenstein (also called Rötelstein) is a conspicious, 2246 m high mountain southwest of the Dachstein massif, rising from the rather smooth "Werfener Schuppenzone" landscape nearby the small town Filzmoos. Mt. Rettenstein is the southernmost major incidence of Late Jurassic Plassen carbonate platform rocks in quite a distance to all the other prominent Plassen Formation occurrences, the closest of which is the type-locality Mount Plassen approx. 12 km to the NNE. The geological situation of Mt. Rettenstein is quite amazing: the Plassen limestone is stratigraphically underlain by a Jurassic basin succession that lacks its primary substratum. This Jurassic panel is surrounded/underlain by Scythian-Anisian rocks of the Werfen-Reichenhall succession with a melange of predominantly Hallstatt facies rocks intercalated in between. Whereas the Early to Middle Jurassic basinal sediments of the Rettenstein succession have recently been studied, there have not been any modern investigations of the transitional sequence from basinal to shallow water sedimentation or of the Plassen Formation itself. Whilst that issue will be introduced in more detail separately (see Schlagintweit et al., this volume), in this contribution new stratigraphic data from the sequences below and some thoughts about the structural situation of Mt. Rettenstein are presented.

The Weitenhausgraben cirque between 1650 and 1820 m at the southern flank of Mt. Rettenstein exposes a nice section from the uppermost Werfen Formation of the "Werfener Schuppenzone" substratum to the basal Plassen Formation (Kimmeridgian) of the Rettenstein massif, which, however, is no complete primary stratigraphic succession. In short the profile can be described as follows: Siliciclastic rocks of the Scythian Werfen Formation are stratigraphically overlain by rauhwacke of the ?Werfen or Reichenhall Formation. The dark crinoid-rich dolomitic limestones above are problematic in both their stratigraphical and tectonic affiliation. Laterally discontinuous gypsum-bearing claystones between the rauhwacke and the crinoidal limestone reported by Ganss et al. (1954) might be a stratigraphic peculiarity within the Reichenhall Formation or they might be tectonically intercalated Permian Haselgebirge indicating a major structural borderline. A steeply N-dipping fault (070/70N) juxtaposes the crinoidal limestones against an incomplete, at least 50 m thick succession of Hallstatt facies origin mainly made up of stratified gypsum-bearing Haselgebirge and smaller amounts of Hallstatt limestone and Zlambach Formation in its uppermost part. From the two latter formations conodonts could be separated, evidencing firstly Alaunian (Hallstatt limestones) and

Rhaetian (Zlambach marls) ages and secondly the fact that the Hallstatt facies sequence cannot be primary since very large parts of the Triassic sedimentary column are missing. In analogy to other localities, this assemblage is considered to represent Hallstatt Melange-type slide masses of Middle to Late Jurassic age although as yet no evidence in forms of Jurassic matrix rocks has been found. The basinal Jurassic strata above show similar shallow to moderate northnorthwesterly dip like the Hallstatt Melange rocks, however, originate from a paleogeographically different depositional area without the emplacement and/or preservation of Jurassic mega-slides. The Early Jurassic succession consists of approx. 60 m thick marly limestones of mainly greenish beige colour with an up to 10 m thick sequence of fossiliferous nodular red limestones on top. The up to 2 m thick *Bositra*-rich ?Middle Jurassic marls above are truncated by a laterally continuous debris flow mainly consisting of shallow water carbonate clasts with ooids as the by far predominant components. The Plassen Formation of the Rettenstein massif follows with a slightly tectonically modified, however, nevertheless primary contact above a 1,5 to 2 m thick interval of variously coloured radiolarites.

At the present knowledge two major faults of regional significance must be assumed to have modified this profile, one of which between the "Werfener Schuppenzone" substratum and the Hallstatt Melange and a second one between the top of the Hallstatt Melange and the continuous basinal to shallow water Jurassic succession. The lower of these faults, located either at the top of the rauhwacke or the top of the crinoidal limestones, not only separates individual stratigraphic successions but also juxtaposes units with remarkable difference in thermal overprint: the CAI of 1.0 acquired for the Hallstatt facies rocks and the excellent state of the radiolarians in the radiolarites reflect only low diagenetic conditions in contrast to the generally high diagenetic to low-grade metamorphic overprint of the southern "Werfener Schuppenzone" rocks (Ganss et al. 1954). The most eye-catching fault between the crinoidal limestone and the Haselgebirge, however, is apparently only of minor importance since it does not significantly displace the rauhwacke band stretching along the (south-)western margin of the Rettenstein massif.

Around the Rettenstein massif, some as yet unknown stratigraphic occurrences have been detected, e.g. Early Jurassic red limestones in the SE, semi-outcrops of Hallstatt limestone and Late Jurassic red radiolarite in the NW and Haselgebirge in the NW and N. Whilst the Hallstatt facies rocks constitute a more or less circular frame around the massif, the distribution of the upper structural unit is clearly asymmetrical: in the north and east there are no older rocks than the Plassen Formation, in accordance with the predominant northerly dip of strata. Although the tectonic situation of Mt. Rettenstein is far from being resolved, looking at the thermal imprint and the geometries it can be stated that a (today) subhorizontal normal fault (system) must have played a major role for its structural emplacement. Supposedly this fault (system) modified an existent tectonic wedge with genetically different Jurassic successions already juxtaposed against each other during earlier contraction. As a working hypothesis these post-metamorphic normal fault movements are paralleled with Late Cretaceous large scale extension reported from the central Alps.

Ganss, O., Kümel, F. & Spengler, E. (1954): Erläuterungen zur geologischen Karte der Dachsteingruppe. – Wissenschaftl. Alpenvereinshefte, **15**: 1-82.