

EXCURSION 3**The Dachstein-reef of the Gosaukamm - An Upper Triassic carbonate platform margin**Gerhard W. MANDL ¹ & Leopold KRYSTYN ²¹ Geological Survey of Austria, Neulinggasse 38, Wien, A-1030gerhard.mandl@geologie.ac.at² Department of Palaeontology, University of Vienna, Althanstrasse 14, Vienna A-1090leopold.krystyn@univie.ac.at

The Gosaukamm massif forms the northwestern extension of the central Dachstein mountains, separated by the deep furrow of the Gosau lakes. Both mountain ranges belong to the Dachstein nappe, which was part of the large Upper Triassic carbonate platform of the Austroalpine sector of the Tethyan shelf. The general investigation and mapping was done by SCHLAGER (1966, 1967), additional refinements have been contributed by TOLLMANN & KRISTAN-TOLLMANN (1970) and MANDL (1984). Palaeontological and microfacial research of the Dachstein reefs was done by the reef working group from University Erlangen, summarized in FLÜGEL (1981); details from the Gosaukamm have been reported by WURM (1982). Short reports on the macrofauna are given by ZAPFE (1962, 1967). A recent study of corals was done by RONIEWICZ (1995).

Whereas the Dachstein and the adjacent karst plateaus consist to a large extent of the lagoonal interior of this platform, the Gosaukamm mostly represents a marginal fore reef tract, facing toward the deeper marine Hallstatt basinal facies – similar to the palaeogeographic model of ZANKL (1971), developed for the Hohe Göll area south of Salzburg, see Fig. 1.

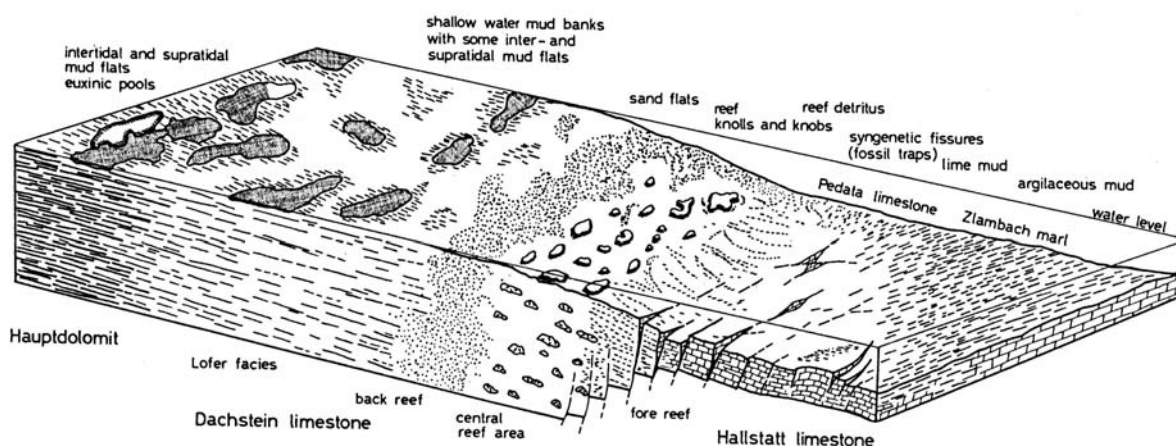


Fig. 1: Palaeogeographic interpretation of the depositional environments in the Salzkammergut region during Norian-Rhaetian, after ZANKL (1971; not to scale).

The former platform margin has been dissected during orogenesis by several dextral strike slip faults, see Fig. 2. The northwestern front part of the moving block was squeezed into the deformed basinal sequences of the Törleck- and Zwieselalm-anticlines. In this way the syncline of Roßmoos was formed, where Rhaetian Zlambach marls are preserved below a thin layer of the overturned Dachstein Limestone of the Kesselwand.

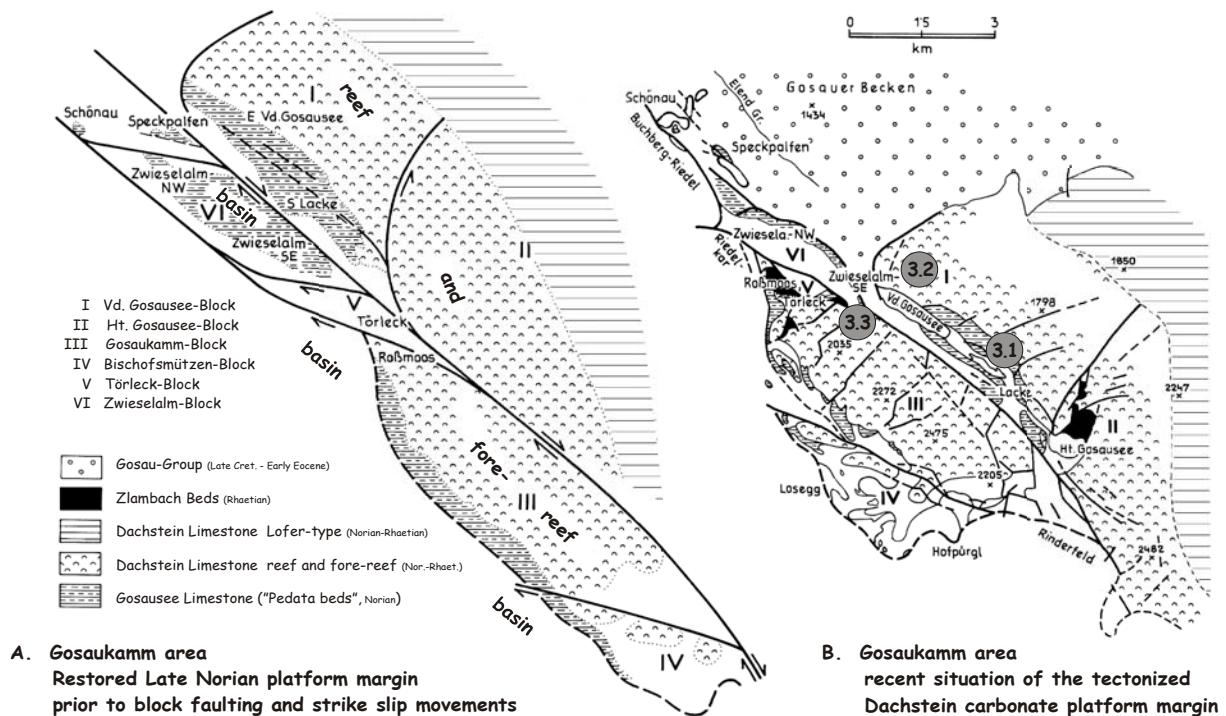


Fig. 2: Facies zones of the Dachstein platform margin in the Gosaukamm area. Restored geometry before strike-slip faulting, after MANDL (1984).

Transitional beds of slope- and nearby basin-facies are characterized by carbonatclastic sedimentation, derived from the platform as well as from the slope. These sediments are summarized under the term „Gosausee Limestone“, in literature often referred as „Pedata Schichten“ according to the locally abundant brachiopod *Halorella pedata*. Exposures can be found mainly around the Gosau lakes and on the southwestern slopes of the Gosaukamm. Details of sedimentology and cyclicity of this bedded calciturbiditic limestone are given by REIJMER (1991). According to him the variations in turbidite composition can be attributed to fluctuations in sea level and resulting flooding and exposure of the platform. The so caused variation of platform sediment production could be matched with Milankovitch quasi-periodicities. The section of REIMERS (1991) has been investigated for conodonts and shows a more than 100m thick sequence with top-middle and late Norian conodonts at the base, a 2m thick *Monotis salinaria* interval above and conodonts representing the Norian-Rhaetian boundary at the top (Fig. 3).

Gosau-Lacke section

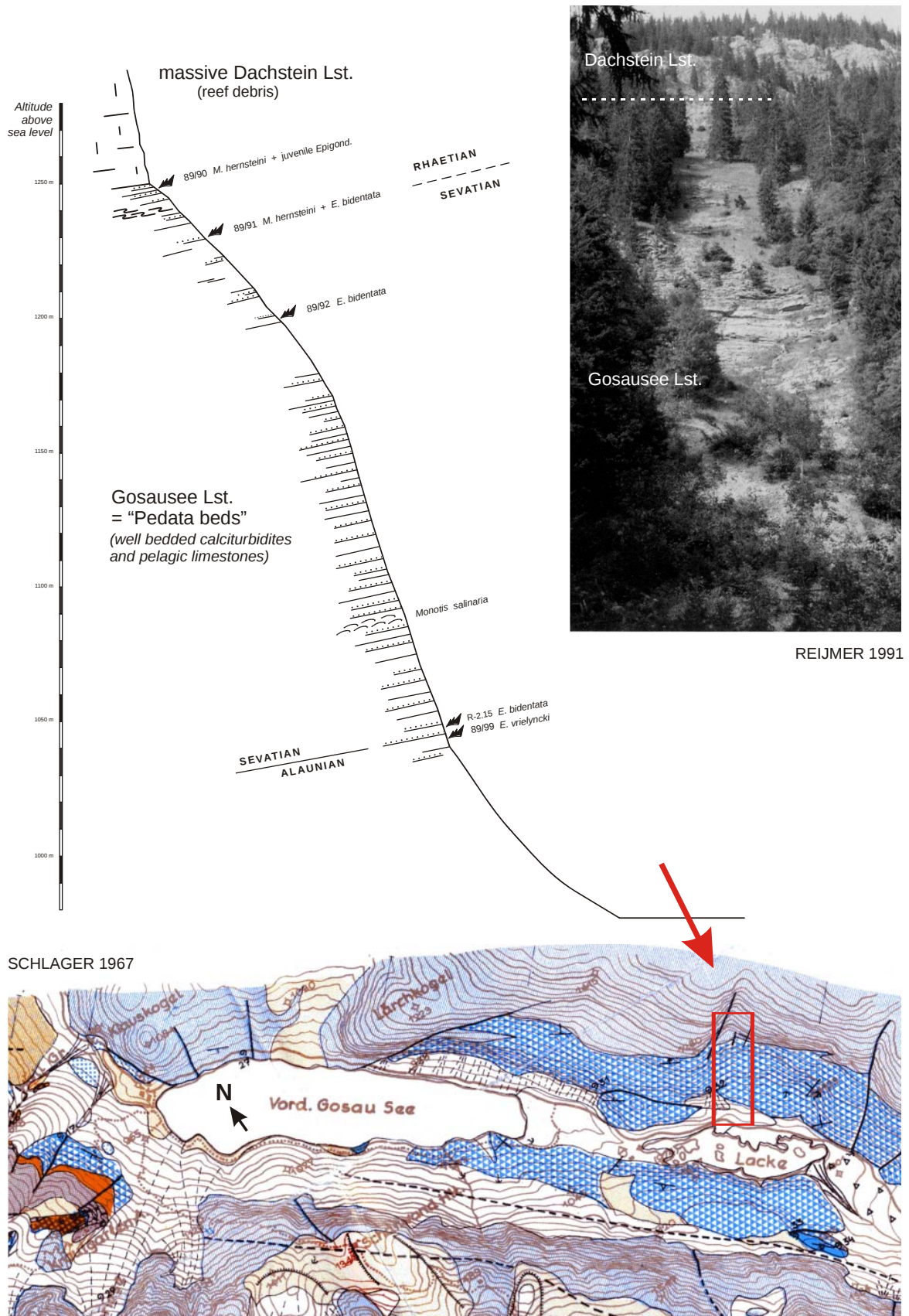


Fig. 3: Log and biostratigraphy of the Gosau-Lacke section.



(Fauna according to SCHAUER 1983, revised):

Niveau 4 = SW dipping summit surfaces - *M. hernsteini*, *M. posthernsteini*, *O. paucidentata*

Niveau 2 - *N. steinbergensis*, *E. bidentata*, *E. slovakensis*

Niveau 1 - *E. spatulata*

Fig. 4: View of Steinriese-Donnerkogel (Loc. 3.3 in Fig.2) with location of time diagnostic conodont bearing flooding levels within the Dachstein reef limestone.

The Dachstein reef limestone of the Donnerkogel group dominantly is composed of coarsegrained rud/floatstones and reef debris with only small, widely distributed patch reefs. The microfacies may be subdivided into up to 10 types – WURM (1982). A large scale bedding (some 10 meters) can be seen. The original dip of the reef slope was not 30° as today, but about 10-15° concerning displaced geopetal fabrics. The patch reefs show a dominance of non-segmented calcareous sponges as main framebuilders. Branched corals are less frequent. Fauna and flora of the patch reefs and the detrital limestones is very rich.

More than 50 species contribute to the construction of the reef framework, more than 60 species must be regarded as benthonic reef-dwellers. Pelagic elements from the open sea are known with *Heterastridium* and rare ammonoids. Stratigraphically significant conodonts occur along certain thin flooding intervals throughout the Gosaukamm and have been mapped and dated by SCHAUER (1983). The respective faunas (Fig. 4) provide a late Lower Norian to early Rhaetian age for the Steinriese section. Reef and platform margin have been drowned at the base of the Middle Rhaetian and are sealed with a thin hemipelagic cover of gray crinoidal-brachiopod bearing or red finegrained limestone also containing Rhaetian conodonts (*Misikella posthernsteini*).

The central reef front of the Dachstein platform is exposed over several kilometers along the northern margin of the Lake Gosau and easily accessible along the Ebenalm forest road (excursion point 3.2 in fig. 2). The facies differs from the Gosaukamm fore reef by a more fine-grained matrix with in situ frame builders and the rare occurrence of sedimentary breccias.

The marls and limestones of the Zlambach Formation at the locality Roßmoos are well known for a rich coral fauna – FRECH (1890). Additional elements are non-segmented calcareous sponges, spongiomorph hydrozoans, bryozoans, brachiopods, ammonites (*Choristoceras haueri* MOIS.), echinoderm, serpulids, solenoporaceans.

Flügel (1962) interpreted the environment as off-reef shoals within a muddy basin somewhat deeper as and near to the fore reef of the Gosaukamm reef. The deeper and distal part of the Zlambach basin facies is not preserved at the Gosaukamm, but several kilometers to the northeast, at the type region within the Hallstatt unit of Ischl-Aussee – for details see BOLZ (1974), PILLER (1981), MATZNER (1986).

References

- BOLZ, H. (1974): Die Zlambach-Schichten (alpine Obertrias) unter besonderer Berücksichtigung der Ostrakoden. 2. Zur Stratigraphie und Fazies der Zlambach-Schichten. - Senckenberg. Lethaea, **55**, 325-361, 2 Abb., 4 Taf., Frankfurt/M.
- FLÜGEL, E. (1962): Untersuchungen im obertriadische Riff des Gosaukammes (Dachsteingebiet, Oberösterreich), III. Zur Mikrofazies der Zlambach-Schichten am W-Ende des Gosaukammes. - Verh. Geol. B.-A., **1962/1**, 138-146, 1 Abb., 5 Taf., Wien.
- FLÜGEL, E. (1981): Paleoecology and facies of Upper Triassic Reefs in the Northern Calcareous Alps. - Soc. Econ. Paleont. Min. Spec. Publ., **30**, 291-359, 6 Figs., Tulsa (Oklahoma).
- FRECH, F. (1890): Die Korallen der Trias. - I. Die Korallen der juvavischen Triasprovinz. - Paläontographica, **37**, 1-116, 21 Taf., Stuttgart.
- MANDL, G. W. (1984): Zur Tektonik der westlichen Dachsteindecke und ihres Hallstätter Rahmens (Nördliche Kalkalpen, Österreich). - Mitt. österr. geol. Ges., **77** (1984), 1-31, 7 Abb., 1 Taf., Wien.
- MATZNER, CH. (1986): Die Zlambach-Schichten (Rhät) in den Nördlichen Kalkalpen. Eine Plattform - Hang - Beckenentwicklung mit allochthoner Karbonatsedimentation. - Facies, **14**, 1-104, 71 Abb., 13 Taf., Erlangen.

- PILLER, W. (1981): Upper Triassic (Norian-Rhaetian) Basinal Facies. - (In:) Flügel, E. (ed.): Guide book, Internat. Symposium on Triassic Reefs, 185-206, Erlangen.
- REIJMER, J.J.G. (1991): Sea level and sedimentation on the flanks of carbonate platforms. - Diss. Geol. Inst. Univ. Amsterdam, 162 S., Amsterdam.
- RONIEWICZ, E. (1995): Upper Triassic Solitary Corals from the Gosaukamm and other North Alpine Regions. - Sitzber. österr. Akad. Wiss., math.-natwiss. Kl., Abt. 1, **202** (1995), 3-41, i fig., 8 pl., Wien.
- SCHAUER, M. (1983): Zur Altersstellung obertriadischer Dachsteinriffkalke. - Anz. Österr. Akad. Wiss., math.-natw. Kl., **120**(1983), 127-137, 2 Abb., Wien.
- SCHLAGER, W. (1966): Fazies und Tektonik am Westrand der Dachsteinmasse. I. Zlambachschichten beim Hinteren Gosausee (Oberösterreich). - Verh. Geol. B.-A., **1966**, 93-106, 2 Abb., 1 Taf., Wien.
- SCHLAGER, W. (1967): Fazies und Tektonik am Westrand der Dachsteinmasse (Österreich) II. - Mitt. Ges. Geol. Bergbaustud. Wien, **17** (1966), 205-282, 8 Abb., 3 Taf., Wien.
- TOLLMANN, A. & KRISTAN-TOLLMANN, E. (1970): Geologische und mikropaläontologische Untersuchungen im Westabschnitt der Hallstätter Zone in den Ostalpen. - Geologica et Palaeontologica, **4**, 87-145, 20 Abb., 8 Taf., Marburg/L.
- WURM, D. (1982): Mikrofazies, Paläontologie und Palökologie der Dachsteinriffkalke (Nor) des Gosaukammes, Österreich. - Facies, **6**, 203-296, Taf. 27-41, 32 Abb., Erlangen.
- ZANKL, H. (1971): Upper Triassic Carbonate Facies in the Northern Limestone Alps. (In:) Müller, G. (ed.): Sedimentology of Parts of Central Europe, Guidebook, 147-185, 20 Abb., 1 Tab., Frankfurt.
- ZAPFE, H. (1962): Untersuchungen im obertriadischen Riff des Gosaukammes (Dachsteingebiet, Oberösterreich). IV. Bisher im Riffkalk des Gosaukammes aufgesammelte Makrofossilien etc. - Verh. Geol. B.-A., **1962**, 346-361, 2 Abb., Wien.
- ZAPFE, H. (1967): Untersuchungen im obertriadischen Riff des Gosaukammes (Dachsteingebiet, Oberösterreich). VIII. Fragen und Befunde von allgemeiner Bedeutung für die Biostratigraphie der alpinen Obertrias. - Verh. Geol. B.-A., **1967**, 13-27, Wien.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Berichte der Geologischen Bundesanstalt](#)

Jahr/Year: 2008

Band/Volume: [76](#)

Autor(en)/Author(s): Mandl Gerhard W., Krystyn Leopold

Artikel/Article: [Excursion 3: The Dachstein-reef of the Gosaukamm - An Upper Triassic carbonate platform margin 111-116](#)