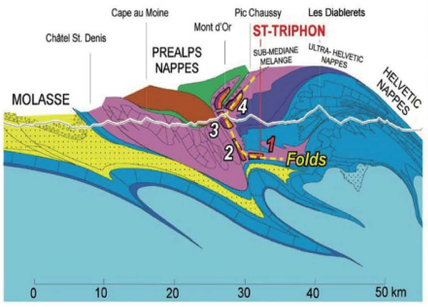
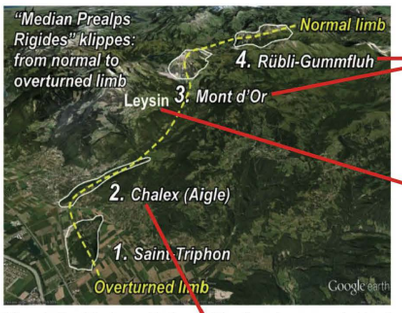
Poster for the conference/workshop Microbialites (M-FED 2023) Leysin, Switzerland, October 11-13, 2023, Abstract book, p. 44.

Approach to the middle Triassic microbial mats to sponge-microbial buildups links to the Permian–Triassic crisis aftermath, with outcrops around Leysin resort (Switzerland).

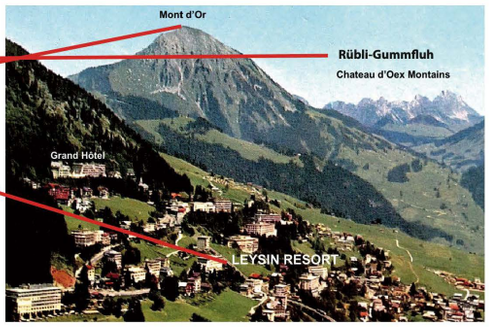
A. Baud Institute of Earth Sciences, Lausanne University, Switzerland



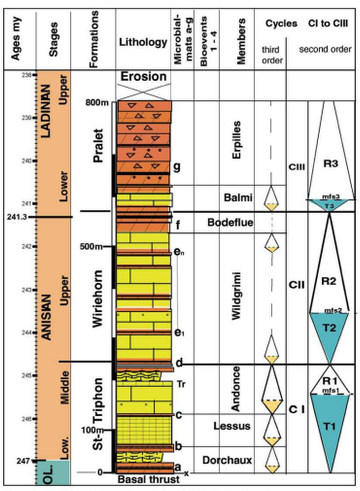
Geological cross-section from Molasse (North) to Helvetic nappes (South). The Saint-Triphon hills are lying in the overturned limb and the Mont d'Or Mountain on the normal limb of the large Sub-Mediane melange fold.



"Google Earth" view with the position Leysin surrounded by the Mediane klippes from normal to overturned limb (adapted from A. Escher, in Baud et al., poster, 2012).



Leysin resort view NEward with Mont d'Or and Château d'Oex Mountains



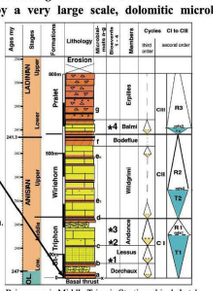
Stratigraphical sketch of the Middle Triassic succession of the Briançonnais domain in Western Switzerland with microbial mats levels noted a to g. **Captions**: limestone in yellow and dolomite in braun. T=transgressive system-track; R=regressive s-t; mfs=main flooding surface; Absolute ages in millions of years (My) according to recent chronostratigraphic charts (Baud, 2022).

The Triassic marine transgression and dolomitic microbialites a

The microbialites of Chalex

A first marine transgression occurred during the Lower-Middle Triassic transition about 247 My ago, characterized by a very large scale, dolomitic microbial mat deposition (level a).

View on microbial dolomite level a, overlying the wineyard of Chalex sur Ollon, close to Saint-Triphon.



Briançonnais Middle Triassic Stratigraphical sketch.

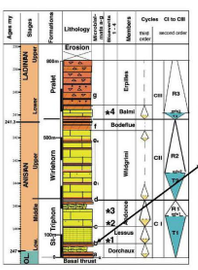
The Triassic marine transgression and dolomitic microbialites a

The microbialites of Chalex

Detailed view on microbial dolomite level a, with microbial laminites and domal structures

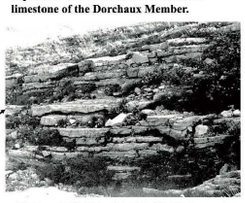
Looking on the so called "algal mats, crypto-sponge and mudmound" of our published works on the middle Triassic carbonate of the neighboring Briançonnais epeiric sea (Baud, 1987; Baud et al., 2016) the outcrops of Chalex and Mont d'Or (Baud, 2022) near Leysin (fig. above) well recorded a first marine transgression, that occurred during the Lower-Middle Triassic transition about 247 My ago, characterized by a very large scale, dolomitic microbial mat deposition (a in stratigraphic sketch), showing a first similarity with the post extinction basal Triassic stromatolites of the Tethys described in Baud et al., (2007).

The following, younger dolomitic microbialites b: the microbialites of the Dorchaux section in the Mont d'Or



Briançonnais Middle Triassic Stratigraphical sketch.

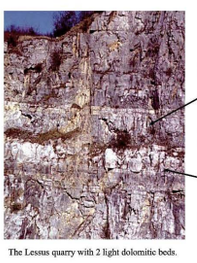
During the Lower Anisian time (247-246 My), a new, large scale dolomitic microbial mat, caps (b, fig. below) the open shallow marine deposition of the 20m thick vermicular limestone of the Dorchaux Member.



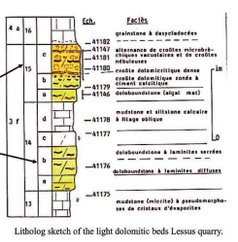
View on microbial dolomite level b at the Dorchaux section type locality of the Dorchaux Member.

The following, younger dolomitic microbialites c: the light colored microbialites of Saint-Triphon in the Lessus quarry

At the top of the Lessus Member (middle Anisian about 246 My ago), a local dolomitic microbial mat was well recorded (c, fig.).



The Lessus quarry with 2 light dolomitic beds.

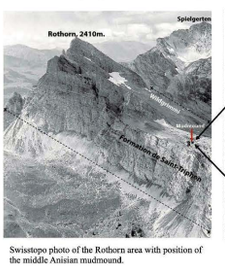


Litholog sketch of the light dolomitic beds Lessus quarry.

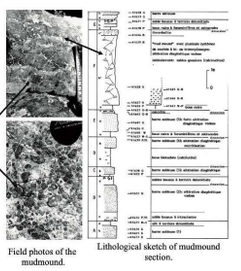
The Rothorn section of Diemtigtal (Central Switzerland), described in Baud, 1987,

The Anisian "sponge-microbial buildup

In the *cadoricus* zone, a level of a thrombolitic buildup up to 4 m thick were found in the Rothorn section, a 4 m. thick "mudmound" showing similarity to the post extinction basal Triassic sponge microbial buildups.



Swisstopo photo of the Rothorn area with position of the middle Anisian mudmound.

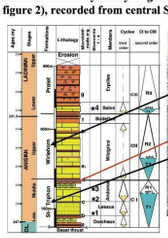


Field photos of the mudmound.

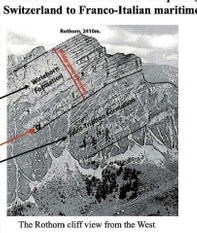
Lithological sketch of mudmound section.

The microbialites at the middle-upper Anisian transition

Between 245 and 244 My ago, the regressive top of the Saint-Triphon Formation is characterized by a very large scale dolomitic microbial mats deposit (d in figure 2), recorded from central Switzerland to Franco-Italian maritime Alps.



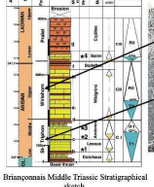
Briançonnais Middle Triassic Stratigraphical sketch.



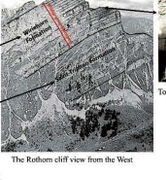
The Rothorn cliff view from the West

The upper Anisian Wildgrimmi cyclic sedimentation

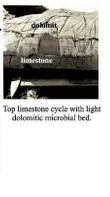
The overlying upper Anisian Wildgrimmi Member of the Wiriehorn Formation consists of a 220 to 340 m succession of peritidal carbonate deposits with a shift to pluri-metric scale shallowing-upward cycles, each topped by a dolomite bed possibly of microbial origin. We found same type in same age Latemar cyclic sedimentation.



Briançonnais Middle Triassic Stratigraphical sketch.



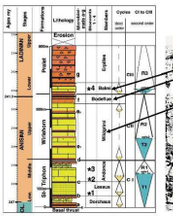
The Rothorn cliff view from the West



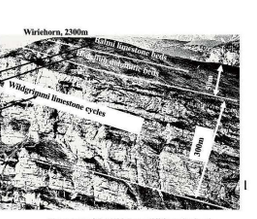
Top limestone cycle with light dolomitic microbial bed.

The upper Anisian microbialite Bodefluh Member

The upper regressive part of the Wiriehorn Formation, the Bodefluh Member, is characterized by dolomitic beds built by microbialites (f on fig.).



Briançonnais Middle Triassic Stratigraphical sketch.



Upper part of the Wiriehorn cliff from the South.

To resume:

-The microbial blooms with a strong dolomite biomineralization capacity are at the origin of the dolomite beds numbered a to g in the 600m thick skeletal limestone succession.

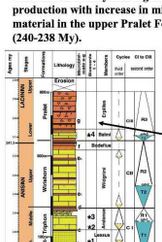
-In the start of the late Anisian time, the oxic carbonate environement shift to a retricted cyclic carbonate succession.

-During younger Ladinian time, restricted, sulfate rich and anoxic environement favorized microbial blooms and dolomite deposition.

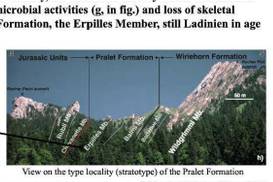
The Pralet Formation defined in Château d'Oex Mountains

The microbialites of the lower Ladinian Pralet Formation

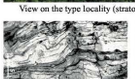
Then due to aridity and higher salinity, the carbonate factory moves to dolomitic production with increase in microbial activities (g. in fig.) and loss of skeletal material in the upper Pralet Formation, the Erpilles Member, still Ladinien in age (240-238 My).

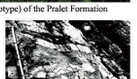


Briançonnais Middle Triassic Stratigraphical sketch.



View on the type locality (stratotype) of the Pralet Formation





Microbial dolomite and microbial dolomite breccia of the Erpilles Member of the Pralet Formation.

References

Baud, A., 1987. Stratigraphie et sédimentologie des calcaires de Saint-Triphon (Trias, Préalpes, Suisse et France). Mémoires de Géologie, Lausanne, 1, 1- 322.

Baud, A., 2022. Paleoecology and timing of the middle Triassic microbial mats to sponge-microbial buildups, and bio- events in the Briançonnais epeiric sea, links to the Permian--Triassic crisis aftermath. 20th Swiss Geoscience Meeting Lausanne, abstract book 6.1, 210-211

Baud, A., 2023. Local Triassic outcrops, from carbonate platform to evaporite. Field trip guidebook. Mémoire de Géologie (Lausanne), 50,

Baud, A., Escher, A., Epard, J.-L., Jaboyedoff, M. & Masson, H. 2012: La géologie des collines de Saint-Triphon. Poster-panneau réalisé pour le site d'escalade de la carrière des Fontenailles à Saint-Triphon.

Baud, A., Plasencia, P., Hirsch, F., & Richoz, S. (2016). Revised middle Triassic stratigraphy of the Swiss Prealps based on conodonts and correlation to the Briançonnais (Western Alps). Swiss Journal of Geosciences, 109, 365-377.

Baud, A., Richoz, S., & Pruss, S. (2007). The lower Triassic anachronistic carbonate facies in space and time. Global and Planetary Change, 55(1), 81-89.

Baud, A., Richoz, S., Brandner, R., Krystyn, L., Heindel, K., Mohtat, T., Mohtat- Aghai, P., and Horacek, M., 2021. Sponge takeover from End-Permian mass extinction to early Induan time: Records in Central Iran microbial buildups, Front. Earth Sci., 9, 1-23.