

CONODONT COLOUR ALTERATION INDEX (CAI) INVESTIGATIONS IN THE SOUTHEASTERN BERCHTESGADEN ALPS AND EVIDENCE FOR THE EMPLACEMENT OF THE HALLSTATT MÉLANGE AND THE „BERCHTESGADEN NAPPE“

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The emplacement of the Hallstatt Mélange and of the „Berchtesgaden nappe“ in the southeastern Berchtesgaden Alps is in the moment discussed controversially (Oxfordian, Tithonian or Barremian). The most important argument for an emplacement of the Hallstatt Mélange and of the „Berchtesgaden nappe“ in Barremian are the Hallstatt slides (Ahornbüchsenkopf and Klingereck slide) on top of the Roßfeld Fm. This interpretation is in contradiction of the general tectonic evolution in the late Middle and early Upper Jurassic.

In the late Middle Jurassic a significant increase in sedimentation rate occurred with the deposition of radiolarian chert (Ruhpolding Fm.) by the formation of new, elongate basins (Lammer Basin, Tauglboden Basin) with carbonate clastic radiolaritic flysch, separated by a structural high (Trattberg Rise). These radiolarite basins formed in sequence indicating migration of tectonic activity due to the closure of parts of the Tethys Ocean: only the older Lammer Basin (Early Callovian to Middle/Late Oxfordian = Strubberg Fm.) contains mass-flows and slides originated in the former Hallstatt Zone (= Hallstatt Mélange).

On base of these CAI investigations it is possible to demonstrate, that the Hallstatt slides on top of the Roßfeld Fm. are remobilized from southerly zones (area of the Torrener-Joch-Zone) with a moderate diagenetic overprint (late Upper Jurassic/early Lower Cretaceous).

These CAI zonations in the southern Berchtesgaden Alps are equivalent to the CAI zonations to the east (southern Salzburg Alps)

with a slight decrease of the diagenetic overprint from CAI 2.0 in the south, CAI 1.5–2.0 and CAI 1.5 northerly, CAI 1.0–1.5 and CAI 1.0 in the north. The CAI zonation strikes generally east-west crossing nappe boundaries between the Tirolicum and the Hallstatt nappe: the northern boundary of the CAI zone CAI 1.5 strikes from Kuchlbach in the east to Bluntatal and Jenner, than to the northwest to Krautkaser valley and Schönau north of Königssee and than to the west to Zauberwald north of Ramsau. To the north follows the CAI zone CAI 1.0–1.5 and CAI >1.0. This zone strikes from Unterscheffau in the east to Hohes Brett, from there to the northwest to Scharitzkehl and southern Berchtesgaden. North of this area only CAI values of CAI 1.0 occur. The southern boundary of this zone strikes from the Golling Hallstatt zone in the east to Hoher Göll, from there to the northwest to the centre of Berchtesgaden and than to the west of Hirscheck. An exception are the CAI values (CAI 1.0–1.5) on base of the “Berchtesgaden nappe” in the area of the Gschirrkopf window and the slides of Pötschen Fm. in the Gschirrkopf window. The Ahornbüchsenkopf slide on top of the Roßfeld Fm. shows also CAI values of CAI 1.0–1.5. A slide with strong alteration (CAI 6.0) occur in the area of Bad Dürnbreg south of the Jakobberg gallery. Another described slide with strong alteration (CAI 6.0 – BRAUN 1998) on the base of the salt mine of Berchtesgaden can not be confirmed by own reinvestigations and show CAI values of CAI 1.0. Conodonts of this slide are partly strongly corroded (?evaporitic fluids) with no thermal overprint.

The emplacement of the Hallstatt slides in this area are dated by component analysis and radiolarian stratigraphy as Late Callovian to Lower Oxfordian (Strubberg Fm.; Lammer Basin) with a remobilization in Late Kimmeridgian (Sillenkopf Fm.; Sillenkopf Basin). The diagenetic overprint of the Hallstatt Mélange can be dated as younger than Kimmeridgian. But the Ahornbüchsenkopf slide on top of the Roßfeld Fm. was remobilized in Barrêmian. The upper limit of the diagenetic overprint can be dated as older than Barrêmian.

The "Berchtesgaden nappe" itself has a paleogeographic position (in Late Jurassic to Early Cretaceous) southwest of its recent position and can be demonstrate in the area northeast of Königssee by the transection of CAI zones. In this area a sinistral lateral tectonic movement of CAI zones occurs along a fault zone striking from Königssee to Hellbrunn related to Miocene lateral tectonic extrusion.

The Hallstatt slide with strong alteration in the area of Bad Dürnberg is transported and pre-dates Upper Jurassic gravitational tectonic emplacement of Hallstatt Mélange onto the

Upper Tirolicum. High CAI values are related to tectonic burial in an accretionary wedge formed during the closure of the Tethys Ocean.

The CAI data from area of the southern Berchtesgaden Alps confirm the polyphase diagenetic history of the Northern Calcareous Alps (GAWLICK et al., this volume).

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References

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