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# RADIOLARIAN BIOSTRATIGRAPHY, COMPONENT ANALYSIS AND GENESIS OF THE MIDDLE TO UPPER JURASSIC CARBONATE CLASTIC RADIOLARITIC FLYSCH BASINS IN THE CENTRAL NORTHERN CALCAREOUS ALPS

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The sedimentation pattern in the Alpine-Carpathian region changed around the Middle/Upper Jurassic boundary. A significant increase in the sedimentation rate occurred with the deposition of radiolarian chert (Ruhpolding Fm.) in the Early Callovian and the formation of new, elongate, W-E striking basins (Lammer Basin, Tauglboden Basin) separated by a structural high (Trattberg Rise). Another radiolarite basin (Sillenkopf Basin) is formed in the southern part of the Lammer Basin and south of it. All basins contain carbonate clastic radiolaritic flysch.

The basins be can clearly distinguished by radiolarian biostratigraphy and component analysis.

**Lammer Basin**: Early Callovian to middle Oxfordian. The Lammer Basin contains a more than 1.5 km thick series of Callovian/Oxfordian deep-water cherts and shales intercalated with breccias, mega-olistoliths and slides (Strubberg Fm.). This trough was formed in the former area of the Upper Triassic lagoonal carbonate platform and shows a migration of the basin axis to the north during Callovian to early Oxfordian times. The redeposited rocks were derived from the continental margin along the southern rim of the Northern Calcareous Alps (Dachstein reef tract and Hallstatt Zone).

The basin fill is composed of Callovian/early Oxfordian deep-water sediments, which contain different types of mass-flow deposits and large slide masses. Examination of the stratigraphy and facies of the resedimented clasts and blocks suggests that the Hallstatt Zone and adjacent facies strips (Dachstein reef tract, Pötschen Fm, Hallstatt limestones, Meliaticum) were destroyed and that their Triassic to Liassic sediments were eroded or mobilized as slides and redeposited in the Lammer Basin. Contemporaneous with the emplacement of the reef tract slidesmetamorphic slides derived from the Hallstatt Salzberg facies zone also occur , indicating late-stage out-of-sequence thrusting. Sediment redepostion ended in the Lammer Basin in the late Oxfordian, contemporaneous with the formation of the Trattberg Rise and the Tauglboden Basin to the north. The Lammer Basin stretches from the Berchtesgaden area in the west (former Berchtesgaden-Kühroint Basin) to the area of Bad Mitterndorf in the east.

**Tauglboden Basin**: Oxfordian/Kimmeridgian boundary to Tithonian. In the Tauglboden Basin, the lower part of the radiolarien chert (black and red radiolarite) is unaffected by gravitative resedimentation. The gravitative resedimentation from the Trattberg Rise in the south started in the Kimmeridgian. The Kimmeridgian to early Tithonian Tauglboden Fm. attains a thickness of about 500 m near the depocenter in the southern part of the asymmetric Tauglboden Basin. Including the Oberalm, Schrambach and Roßfeld Fms., the thickness of the sedimentary succession is nearly 2000 m. The Tauglboden Fm. consists of resedimented and pelagic limestones, turbidites, grain flow deposits, and slides. They contain clasts of Upper Triassic to Oxfordian age derived from the adjacent Trattberg Rise to the south = local material (e.g. Dachstein limestone, Kössen beds, Adnet limestone, Klaus limestone, limestones of the Allgäu Fm., radiolarite). The mass flows show a south-to-north change from

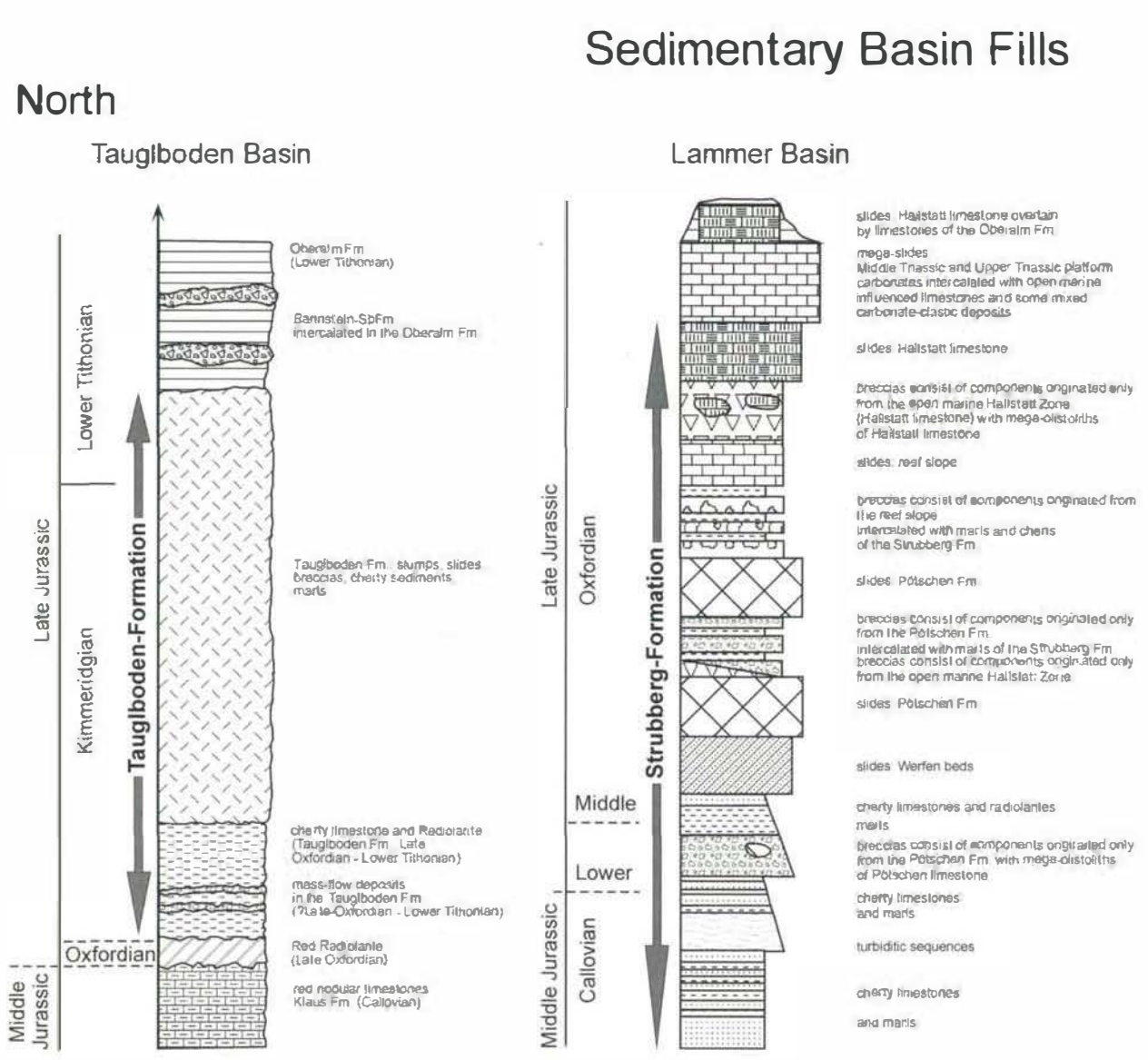


Fig. 1: Sedimentary sequences of the Lammer, Tauglboden and Sillenkopf Basin

proximal to distal facies. Flute casts, imbrications, and slumping also indicate transport from southerly directions. The Tauglboden Basin stretches from the Unken area in the west to the area of Bad Ischl in the east.

**Sillenkopf Basin**: Early Kimmeridgian to Tithonian. The Sillenkopf Basin contains mass-flow deposits in the late Kimmeridgian (dated by resedimented shallow-water components) with: 1. Dolomites and limestones of the Upper Triassic Pötschen Formation. 2. Cherty sediments of the Ruhpolding Fm. 3. Late Kimmeridgian shallow-water carbonates. 4. Protoglobigerina-wackestones, Klaus Formation. 5. Carbonate-cemented sandstones. 6. Phyllites. 7. Haselgebirge (salt-clay mudstone, gypsum), Permian. 8. Metamorphic and volcanic quartz. The stratigraphic range of the cherty sediments of the Sillenkopf Fm. is therefore equivalent to the Tauglboden Fm. The pebbles of these mass-flow deposits are completely different to those of the Tauglboden Fm., where the components

derived from the Trattberg Rise. The Sillenkopf Basin is exposed in the southern Berchtesgaden Alps and southern Salzburg Calcareous Alps.

In the central Northern Calcareous Alps the Lammer and Tauglboden basins formed in sequence, indicating migration of tectonic activity. The Sillenkopf Basin is related to out-of-sequence shortening. All basins are interpreted as deep-sea trenches in front of advancing nappes as a result of soft collision related to the closure of parts of the Tethys Ocean. The tectonic structures (basin and rise formation), which are related to the closure of the Tethys Ocean, are sealed by latest Jurassic pelagic and shallow-water carbonates representing a period of tectonic quiescence (Plassen and Oberalm Fms.: late Kimmeridgian-Berriasian).

The Upper Jurassic configuration was generally stable during the Cretaceous, although tectonic rejuvenation occurred partly in late Lower Cretaceous time. Tertiary shortening and lateral extrusion destroyed this configuration and produced the block puzzle of the Northern Calcareous Alps.

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