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Artikel: A correlation of the Tethyan Maiolica Formation of the Breggia section (southern Switzerland) with Early Cretaceous oozes of Site 534A, DSDP Leg 76 in the western Atlantic

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who collected aptychi systematically and indicated their position within the Breggia section. This collection was used for the contribution in Volume 76, DSDP (p. 639–644). Additional material was collected by the present authors in the Breggia section. The authors have endeavoured to include in the present publication illustrations of all representative fossils collected by them and by WEISSERT. An improved stratigraphic succession of Early Cretaceous aptychi has been established. This will serve as an indispensable base for a realistic taxonomy of this hitherto little known group of fossils.

B. Initial Reports of the Deep Sea Drilling Project, Leg 76, Site 534A in the Blake-Bahama Basin

Hole 534A of Leg 76 was drilled in the Blake-Bahama Basin, about 500 km east of Florida (latitude 28°20.6′ N; longitude 75°37.00′ W), from where remains of cephalopods were also obtained. The purpose of Hole 534A was to reach the oceanic basement and to determine the oldest sediments deposited over it, assumed to be of Middle Jurassic age.

a) Late Jurassic Cat Gap Formation

In DSDP Hole 534A the limit separating Jurassic from Cretaceous sediments coincides about with a change in facies from red-greyish claystones into light grey calcareous siltstones and claystones. The sequence is little altered diagenetically.

The limit separating red from greyish sediments seems to be connected with a regionally synchronous event, reflected in several holes in the Atlantic, as well as in Tethyan surface sections in southern Europe (BERNOULLI 1972).

In the western Atlantic the brick-red to purplish sediments are referred to as the Cat Gap Formation (Core 51 to Core 91 in Hole 534A). The type section is situated east of the Bahama Banks. The formation attains a thickness of 153 m in Hole 534A. Conchs of ammonites are destroyed by solution, aptychi on the other hand show no indication of being dissolved. Water depth was greater than the Aragonite Compensation Depth.

In the upper part of the Cat Gap Formation, in Core 96, *Lamellaptychus beyrichi* (OPPEL) was recovered. It represents a characteristic form, indicating a Late Jurassic (Tithonian) age. Identical specimens occur abundantly in the Breggia section and in the Apennines (KÄLIN et al. 1979, p. 748, Fig. 11) in lithologically very similar sediments.

b) Early Cretaceous Blake-Bahama Formation

The red Tithonian sediments of the Cat Gap Formation in Hole 534A are followed by the Blake-Bahama Formation, covering the interval between Core 51 to Core 91 (360 m). The sediments consist predominantly of soft, laminated, light grey to whitish pelagic marls, calcareous siltstones and claystones, which are little altered diagenetically.

Lamellaptychi are scattered all over the formation. 15 different forms were isolated. Ammonites are represented by four species, of which two are of considerable value for regional correlation. From the top of the formation, in Core 51, a small-sized *Pulchellia*, indicating a late middle Barremian age, was obtained. In previous publications the respective interval was interpreted as Hauterivian. Furthermore, a fragment of *Neo-*

comites in Core 80, indicating Valanginian, is of great help in interpreting the Berriasian–Valanginian limit.

It is interesting to note that aptychi in the Atlantic are conspicuously accumulated within the interval considered to represent the Valanginian. This coincides also with the distribution of aptychi observed in the Breggia section (Fig. 2).

C. The Breggia section of southern Switzerland

a) Late Jurassic to Barremian post-rift sediments of the southern Tethyan margin

The Late Jurassic and Neocomian sediments of the Southern Alps formed part of the southern continental margin of a narrow Tethyan ocean. Three lithological units, all of them deep water sediments, are distinguished. In ascending order, these are: The Radiolarite Group, the Rosso ad Aptici Formation, and the Maiolica Formation. In a plate tectonic context, these sediments are part of the "Apulia" or "Adria" Plate which according to BIJU-DUVAL (1977) had been detached from the African mother plate in Early Jurassic. The rifting process at the northern end of the Apulian Plate resulted in the birth, probably during Middle Jurassic, of a narrow Tethyan ocean. Crustal stretching of its complex southern margin had been accompanied by the drowning of its shallow-water carbonate platforms during Late Triassic, Early and Middle Jurassic. By Late Jurassic, after the birth of the Tethyan ocean, a post-rift situation had been created with strike slip faulting becoming prominent, possibly due to the rotation of the Adria Plate. The Late Jurassic Tethyan ocean, perhaps subdivided by elongate cordilleras, lasted throughout the remainder of Jurassic time but ceased to widen during the Tithonian (WINTERER & BOSELLINI 1981) and Early Cretaceous. The great ophiolite masses of the Piemont, the Valais, Graubünden and the Malenco Valley – now incorporated in the Penninic and lower Austroalpine nappes – provide ample evidence of its existence. The absence of Mesozoic ophiolites in the Ticino sector is obviously due to later tectonics, such as large-scale uplift of the Penninic Ticino Alps during Late Tertiary and associated compression and strike-slip movement. Most prominent among these faults is the "Insubric line" which separates the Penninic and lower Austroalpine Alps from the Southern Alps with a down-to-the-south vertical offset estimated at 20 km in the Ticino sector (TRÜMPY 1980). The amount of alpine compression, too, seems to reach a maximum in this sector (SPICHER 1980).

The post-rift character of the Radiolarite Group, of the Rosso ad Aptici- and of the Maiolica Formation is reflected in their uniformly moderate thickness corresponding to slow subsidence and a calm tectonic regime (KÄLIN & TRÜMPY 1977, WEISSERT 1979, WINTERER & BOSELLINI 1981).

b) Water depth during Late Jurassic and Early Cretaceous

The Radiolarite Group was deposited below the Calcite Compensation Depth (BERNOULLI & JENKYNS 1974), the Rosso ad Aptici and the Maiolica Formation between the Aragonite Compensation Depth (ACD) and the Calcite Compensation Depth (CCD). The end-Jurassic ACD may have been at 1400 m, the CCD at 4200 m (WINTERER & BOSELLINI 1981); but the uncertainties inherent in their model preclude an exact