

## DEPOSITIONAL ENVIRONMENT OF CRETACEOUS SEDIMENTS OF THE CHIKKIM SYNCLINE (SPITI, NORTHERN INDIA)

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The Cretaceous sequence of the Chikkim Syncline (Tethys Himalaya, northern India) is represented by the Giumal and Chikkim formations. The age of the Giumal Formation in Spiti is expected to be Lower Cretaceous in age by a recently discovered ammonoid fauna (Lukeneder *et al.*, in prep.) and by planktonic foraminifera of the Chikkim Formation constraining the latter to range between Late Albian and Campanian (Bertle and Suttner, 2005).

The Giumal Formation measures about 350 m and consists of brown coloured sandstone and dark shale. Five cycles could be distinguished within the succession, of which each starts with a several metres thick interval of black shale intercalated by single beds of fine grained quartz arenites. Along the cycle, sandstone beds become more abundant and increased in thickness (decimetre-bedded), forming 10 to 40 metres thick intervals towards the top. Thickening upward of the beds as well as coarsening upward is observed in each cycle. Usually the uppermost bed of the sandstone-interval is composed of coarse grained matrix with several layers of disarticulated bivalve shells intercalated. While fine grained sandstone beds have a dark, micritic matrix, topmost coarse grained arenites are mature. Sandstone beds contain high amounts of quartz, yield glauconite grains and limonitic clasts. In the lower part of the sandstone-intervals of

cycle 2 and 5, ammonoids occur, comprising well preserved planspiral and criocone shell-types.

The Giumal Formation is overlain by the carbonatic sequence of the Chikkim Formation (minimum thickness: 65 m). The base of the Chikkim Formation starts with a relatively sharp contact of well bedded micritic carbonates to a strongly weathered interval of grey calcareous shale of the uppermost part of the Giumal Formation. Within the occurrence of the first limestone beds planktonic foraminifera occur (e.g., *Planomalina buxtorfi* and *Rotalipora appenninica*). Microfacies changes at the boundary of the Lower to the Upper Chikkim Member, where micritic limestone beds (20 cm in thickness) are replaced by thin-bedded carbonaceous marls.

The observed cyclicity of the Giumal Formation most probably represents a siliciclastic slope facies with distal to proximal turbidite fans. Micritic limestones, rich in planktonic foraminifera, hint to pelagic settings, at least for the deposits of the Lower Chikkim Member.

Bertle, R.J. & Suttner, T.J. (2005): New biostratigraphic data for the Chikkim Formation (Cretaceous, Tethyan Himalaya, India). – *Cretaceous Research*, 26 (6): 882–894.