

FIELD WORKSHOP AND CONFERENCE UNDER IGCP-467 — TRIASSIC TIME

A workshop at Manali, followed by a Field Conference in the Spiti Valley, under IGCP-467 (Triassic Time), was held during 26 June and 6 July, 2004. It was co-sponsored by the UNESCO, Geological Survey of India, Austrian Academy of Science and Subcommittee on Triassic Stratigraphy. Sixteen European and nine Indian geologists attended the workshop. However, only four Indian geologists participated in the field conference.

Following papers were presented at the workshop

- 1 The continental Permian-Triassic boundary interval, Central Germany. Evidence for long-term cosmic influx by G H Bachmann, H Kozur and M Szurlies
- 2 Late Scythian to Carnian conodonts from Spiti by D K Bhatt and R K Aora
- 3 Towards an integrated Upper Triassic magento-biostratigraphy time scale by Y Gallet, L Krystyn, J Besse and J Marcoux
- 4 Conodont fauna from the Raibl Beds of Karavanke Mts, Slovenia and its stratigraphic significance by Tea Kolar-Jurkovsek and Jurkovsek
- 5 Conodont fauna at the Ladinian boundary interval in the Southern Alps by S Manco, P Mietto, A Nicora, N Preto, M Rigo and M Tognon
- 6 Selected ammonoid fauna at the Ladinian/Carnian boundary interval in the Southern Alps by P Mietto, Smanfrin, N Preto and P Gianolla
- 7 Upper Triassic conodont biostratigraphy in the Logonegro Basin (Southern Apennines) work in progress by M Rego and P Mietto
- 8 Brief outline of the tectonic history of the NW Himalayas with emphasis on Spiti by E Draganits, B Grasemann, C Janda and G Wiesmayr
- 9 Revised litho- and sequence stratigraphy of the Spiti Triassic by O N Bhargava, L Krystyn, M Balini, R Lein and A Nicora
- 10 Lower and Middle Triassic stage and substage boundaries in Spiti by L Krystyn, M Balini and A Nicora

Abstracts of papers no 1-7 and full papers at Serial no 8-10 were published in Supplement (30) of *Albertiana* to act as a guidebook to this field conference.

In the Spiti Valley, Lower and Middle Triassic sequence was examined in the Lalung (old spelling Lilang), Guling (old spelling Kuling) and Mud (old spelling Muth), Upper Triassic including the Mid Norian Coral Reef (Hangrang Formation) was examined in Lower Pin (close to its confluence with the Spiti river) and Ratang valleys. As some sedimentological gaps are anticipated in the Triassic sequence, it has been designated as the Lilang Supergroup, divisible into four groups and eleven formations. These are the Mikin, Kaga, Chomule (Tamba Kurkur Group), Rama, Rongtong (Sanglung Group), Rangrik, Hangrang, Alaror, Nunuluka (Nimoloksa Group) Para and Tagling (Kioto

Group). These subdivisions have been delineated on the basis of sequence boundaries.

A ferruginous horizon is developed along the contact of the Permian Gungri Formation and at the base of the Lilang Supergroup. From the upper part of the Gungri Formation *Waagenoconcha* of Dorashmian age was recovered. Prof Kozur opined that only a small hiatus, if at all may exist between Permian and Triassic and that too may be a submarine break. However, a final conclusion could be drawn only after the study of conodonts.

The lowermost Triassic ammonoids were abundantly found in the Guling and Mud sections, where a good section of the *Otoceras* beds (Lower Limestone Member of the Mikin Formation) is developed. The *Otoceras* beds represent 10 well-defined limestone beds up to 90 cm thick. Older to *Otoceras woodwardi*, the parvus zone was discovered in the Guling section. The *Otoceras* beds are divisible in four biostratigraphic zones. The name *Meekoceras* beds was found to be misleading as the fauna therein has no *Meekoceras* affinity. This level is dominated by gyronitids and compared to true Mid Smithian *Meekoceras* level it is much older and represents a pre-Olenekian level. The Induan (Brahmanian)-Olenekian boundary is located in the Limestone-Shale Member of the Mikin Formation and placed above the *Rohilltes rohilla* and below the *Flemingites flemingianus* ammonoid levels. It is best demonstrated in the Mud section. The Olenekian-Anisian boundary is located in the Niti Member (Mikin Formation), one metre below the top of this member at the first appearance of *Chiosella timorensis* in the Lalung section (about two kilometres NE of Lalung). A conspicuous hard ground is developed at the top of the Niti Limestone Member, though no palaeontological break is apparent. The Ladinian-Carnian boundary is identifiable in the lower half of the Chomule Formation.

It was agreed by all that the Lower and Middle Triassic of the Spiti, more particularly the former, are unique in the sense of being condensed and enclosing rich ammonoid and conodont fauna. This attribute makes the Tamba Kurkur Group ideal for an integrated biostratigraphy and delineation of various boundaries. The Spiti section, therefore, is a strong candidate for the global type section of the Lower and Middle Triassic.

103, Sector 7
Panchkula - 134 109
Email: onbhargava@yahoo.co.in

O N BHARGAVA