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The Olenekian (Early Triassic) Red Ammonoid Limestone, A Time-Specific Facies on the Gondwana Margin: Timor - Roof of the World - Oman Connection

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“Time-Specific Facies” (TSF) can be linked to biological crises (Brett et al., 2012). The lower Triassic red ammonoid limestone is one of them deposited during a recovery phase following the end of Permian great dying. This Olenekian TSF is similar to strongly condensed younger Triassic cephalopod limestone known as the Hallstatt limestone in the Austrian Alps (Marcoux & Baud, 1996).

We will introduce here three areas with localities on the former Gondwana margin, from Timor to Oman through the roof of the World (Plate, Fig. 1).

The first locality occurs near Basleo, in West Timor (Plate, Fig. 5 and 7) where a red ammonoid limestone Exotic block, Smithian (Lower Olenekian) in age according to H. Bucher, (oral communication), crops out within the Neogene Bobonaro melange. This exotic is originating from a detached Triassic seamount incorporated in the North Australian accretion prism, some blocks has been subsequently reworked during Neogene time and transported on West Timor Island.

Oman Exotic isolated blocks of same size and same age (Smithian) condensed red ammonoid limestone occur in Wadi Musjah (Plate, Fig. 4 and 6) about 100 km South of Muscat (Sultanate of Oman). The ammonoid faunas have been recently described by Bruehwiler et al. (2012).

The Olenekian TSF also occurs within a Permian to Jurassic stratigraphic succession of a large block, the Ba'id Exotic in Wadi Alwa area (Plate, Fig. 4, Oman Mountains). The microbial input in the red ammonoid limestone has been described by Woods & Baud, (2008), and an early Olenekian (Smithian) age is given by Bruehwiler et al., (2012). The Ba'id Exotic is interpreted as a tilted block of the distal margin (Pillecuit et al., 1997; Baud et al., 2001). As other Exotics, these blocks have been transported on the Arabian margin during the upper Cretaceous obduction of oceanic crust.

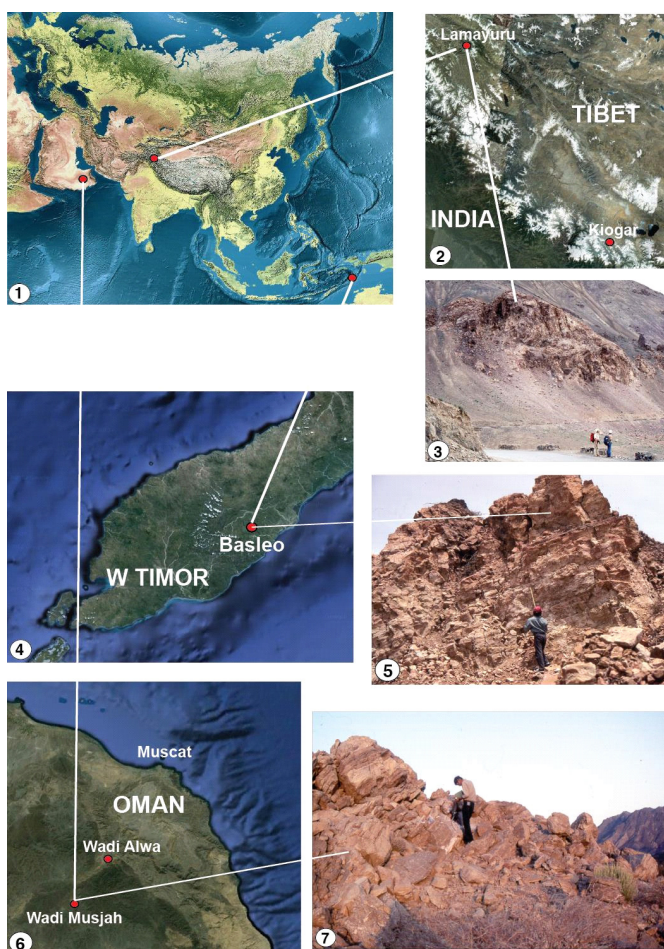


Fig. 1. Map with the three areas (red dots) described in the text. Fig. 2. Ladakh and Western Tibet map with TSF localities (red dots). Fig. 3. General view on Lamayuru Exotic. Fig. 4. W Timor map with TSF area (red dots). Fig. 5. View on a red ammonoid limestone section in Basleo (W Timor). Fig. 6. NE Oman map with TSF localities (red dots). Fig. 7. View on same age red ammonoid limestone section in Wadi Musjah (Oman).

Between Timor and Oman, this Olenekian TSF is present in the Indus Suture zone within the Lamayuru Exotic block (Plate, Fig. 2 and 3) described by Bassoullet

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et al. (1978). This Exotic comprises Late Permian to Triassic carbonate and volcanic rocks. The Olenekian pink ammonoid limestone is overlying and filling fissures at the top of the Permian shallow water limestone (Robertson, 1998).

According to Heim and Gansser (1939), Triassic red ammonoid limestone are cropping out in the Kiogar Exotics of Northern India and in the close Chitichun blocks of Diener (1987), within the Roof of the World, but until now there are no recent detail works on it. On the Tibetan side of this area, Shen et al. (2010) are reporting a Permian-Triassic exotic block built partly of red limestone, but without details on the apparently lime-grainstone Olenekian part.

In the Tethys Himalaya (distal Indian continental margin) Olenekian red ammonoid limestone also occurs in the Annapurna Nepal and in Tulong (S Tibet). But it differs from the more distal, Olenekian TSF of the Exotics by its high clay content, its nodular fabric and slightly younger age (Spathian, Bruehwiler et al., 2009).

This Olenekian Time-Specific Facies of red ammonoid limestone is interpreted to have been deposited on isolated seamounts, or on submarine rise and plateau. These condensed sequences can also occur on distal tilted blocks of continental shelves and slope.

Key words: Lower Triassic, Exotics, red ammonoid limestone, Time-Specific Facies

References

- Bassoullet, J.P., Colchen, M., Guex, J., Lys, M., Marcoux, J., Mascle, G., 1978. Permian terminal néritique, Scythien pélagique et volcanisme sous marin, indices de processus tectono-sédimentaires distensifs à la limite Permian-Trias dans un bloc exotique de la suture de l'Indus (Himalaya du Ladakh). *C.R. Acad. Sci. Paris* 287, ser. D, 675-678.
- Baud, A., Béchenec, F., Cordey, F., Krystyn, L., Le Métour, J., Marcoux, J., Maury, R., Richoz, S., 2001. *Permo-Triassic Deposits: from the Platform to the Basin and Seamounts*, International Conference on the Geology of Oman, Muscat, Oman, Field guidebook, 54 p.
- Brett, C.E., McLaughlin, P.I., Histon, K., Schindler, E., Ferretti, A., 2012. Time-specific aspects of facies: State of the art, examples, and possible causes. *Palaeogeography, Palaeoclimatology, Palaeoecology* 367-368, 6-18.
- Bruehwiler, T., Bucher, H., Goudemand, N., Galfetti, T., 2012. Smithian (Early Triassic) ammonoid faunas from Exotic Blocks from Oman: taxonomy and biochronology. *Palaeontographica Abteilung a-Palaeozoologie-Stratigraphie* 296, 3-107.
- Bruehwiler, T., Goudemand, N., Galfetti, T., Bucher, H., Baud, A., Ware, D., Hermann, E., Hochuli, P.A., Martini, R., 2009. The Lower Triassic sedimentary and carbon isotope records from Tulong (South Tibet) and their significance for Tethyan palaeoceanography. *Sedimentary Geology* 222, 314-332.
- Diener C. 1897. Himalayan fossils. The Permocarboniferous fauna of Chitichun n°1. Geological Survey of India, Memoirs, Palaeontologia Indica, 15, 1: 1-105.
- Heim, A., Gansser, A., 1939. Central Himalaya. Geological observations of the Swiss expedition 1936. *Mem. Soc. helv. Sc. nat.* 73, 1-247.
- Marcoux, J., Baud, A., 1996. Late Permian to Late Triassic Paleoenvironments. Three snapshots: late Murgabian, late Anisian, late Norian, in: Nairn, X., Ricou, L.E., Vrielinck, B., Dercourt, J. (Eds.), *The Tethys ocean*. Plenum Press, New York, pp. 153-190.
- Pillecuit, A., Marcoux, J., Stampfli, G., Baud, A., 1997. The Oman exotics : a key to the understanding of the Neotethyan geodynamic evolution. *Geodinamica Acta* (Paris) 10, 209-238.
- Robertson, A., 1998. Rift-related sedimentation and volcanism of the north-Indian margin inferred from a Permian-Triassic exotic block at Lamayuru, Indus suture zone (Ladakh Himalaya) and regional comparisons. *Journal of Asian Earth Sciences* 16, 159-172.
- Shen, S.Z., Cao, C.Q., Zhang, Y.C., Li, W.Z., Shi, G.R., Wang, Y., Wu, Y.S., Ueno, K., Henderson, C.M., Wang, X.D., Zhang, H., Wang, X.J., Chen, J., 2010. End-Permian mass extinction and palaeoenvironmental changes in Neotethys: Evidence from an oceanic carbonate section in southwestern Tibet. *Global and Planetary Change* 73, 3-14.