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The new GSSP, base of the Triassic: some consequences.

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The base of the Triassic was proposed by Yin et al. (1996a) at Meishan (S China) section D, bed 27c with the FAD of the conodont *H. parvus*. This Global Stratotype Section and Point (GSSP) has been adopted by the International Commission on Stratigraphy (Yin et al., 2001). It has been unveiled by an opening Ceremony of the GSSP Monument, August 11 2001, in the Meishan Quarry, during the International Symposium on the Global Stratotype of the Permian-Triassic Boundary and the Paleozoic-Mesozoic Events (10-13 August 2001, Changxing, China). Thanks to our Chinese colleagues for an impressive organization.
According to Yin et al. (1996b) in their proposals for global correlation based on ammonoids and conodonts, the Permian-Triassic boundary interval can be subdivided in 6 units (PTBU) from the lower Changhsingian (PTBU 1) to the upper Griesbachian (PTBU 6). The base of the Triassic corresponds to the base of PTBU 5.
The PTBU 4 corresponds to the interval separating the base of the boundary clay to the FAD of *parvus* (beds 25 to 27b in Meishan).

The upward shift of the boundary from the base of bed 25 proposed twenty years ago to the base of the bed 27c formally adopted in Meishan Quarry (shift which corresponds strictly to the PTBU4), plus recent discoveries, new datations and correlations bear numerous consequences. We will set out below some of them.

1- Following the discovery by C. Henderson of key conodonts in the Otto Fiord area (Ellesmere Island, Arctic Canada) and according to Henderson & Baud (1997), there is an overlap between the upper Changhsingian and the lower Griesbachian (sensu Tozer, 1967). It is why A. Baud, B. Beauchamp and C. Henderson are preparing a redefinition of the Griesbachian substage (abstract: Baud & Beauchamp, 2001).
2- Consequently, the *Otoceras concavum* and *borale* fauna of the Arctic ranging below the *Ophiceras* fauna, are latest Permian in age (partly PTBU 4) and older than the *Otoceras woodwardi* fauna of the Himalayas which co-occurs with *Ophiceras*(PTBU 5).
3- Consequently, due to the normal up to high sedimentation rate in the boreal area (Sverdrup Basin, E. Greenland, Barents Sea, Spitzberg, Verkoyansk area), the base of the Triassic has to be shifted upward by several to tens of meters. The Permian-Triassic boundary (Erathem boundary) occurs within a monotonous shaly facies of great thickness containing impoverished biota with ammonoids (*Otoceas*, *Glyptophiceras*, *Hypophiceras*, *Tompophiceras* and *Ophiceras*), bivalves (*Claraia*) and conodonts (*Hindeodus*, *Neogondolella*). The palynological boundary, with the appearance of the Triassic key palynospecies occurs in the latest Permian (Cirilli et al. 2001).
4- According to Chen and Komatsu (2001), the first Claraia zone or assemblage with *C. baoqingensis*, *C. griesbachi* and *C. bioni* appear in the latest Permian (PTBU 4).
5- The main extinction pulse (top of bed 24 in Meishan, Jin et al. 2000) with an age > 254My, occurs more than 1 million year before the GSSP (= 253My, new data from Mundil et al. 2001).
6- The so called « boundary clay » and the associated volcanic ashes event in Meishan do not occur at the boundary (GSSP) but below and before, in the Late Changhsingian (PTBU 4).

7- Except for the Tethys Himalaya (Spiti, Central Himalaya, Nepal), the well-known base of Triassic transgression is starting in the Late Changhsingian (PTBU 3 to PTBU 4).
8- The sharp negative shift of the carbon isotope profiles (Baud et al. 1989, 1996) occurs in the late Changhsingian (upper part of the PTBU 3 to the lower part of the PTBU4), before the boundary and not at the boundary. The GSSP occurs within a positive rebound following the main negative shift.
9- According to Zhu et al. (1999), the GSSP occurs within a reversal magnetic zone and does not coincide with the base or within a normal magnetic zone as largely accepted (review in Jin et al., 2000).

Part of the misinterpretation or wrong correlations of the boundary is due to the highly condensed nature of the Stratotype (see Baud, 1996) and the apparent short interval deduced from the nearness of the Sequence boundary, the event boundary and the biochronological boundary (GSSP). But we have to remind that proximity (few centimeters) does not mean short time interval.
Measuring the thickness, the PTBU 4 is only twelve centimeters in Meishan, section D. Its duration is more than one million years (see point 5). The PTBU 4 is about 4m thick in Shangsi, 2,8m in Guryul Ravine (Kashmir), one meter in Salt Ranges (Pakistan), 0.6m in Abadeh and 0.4 to 4-6m in the Southern Alps. In the Arctic, with high sedimentation rates, the PTBU 4 has up to some hundred times the thickness of the Meishan one and up to ten times the thickness of the Shangsi one (Figure 1) and values are between 10 and 50m according to the area and sections.
High rate of sedimentation during this time interval can occur in continental area. We have to take care about this when fixing the boundary, which is not an event boundary as mass extinction nor a collapse of terrestrial ecosystems or a so called “fungal spike”, nor a physical boundary as a reversal magnetic zone or abrupt facies change.

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