
Short Note about ethical publishing - and about the temperature change around the Permian-Triassic Boundary (PTB)

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Our recent comment (Horacek et al., 2021a) was submitted at the latest possible date for acceptance in *Permophiles* without sufficient time to adjust the Acknowledgement in the article. We would like to address this issue now. Our article was a comment about the paper by Chen et al., 2020: "Abrupt warming in the latest Permian detected using high-resolution in situ oxygen isotopes of conodont apatite from Abadeh, central Iran.", but at the time of submission we did not note that the editors of *Permophiles* were among the authors of the article we commented on, and thus potentially created an awkward position for them. Even more we appreciate their competent, scientific and ethical behaviour in

handling our manuscript and its quick publication. In our opinion, the editors of *Permophiles* demonstrated an outstanding level of professionalism as well as scientific integrity, something we deem worthy to and we thus want to underline.

We have now produced a correlation figure (Fig. 1) of the Abadeh and Meishan sections to demonstrate the better fit with the biochronology proposed by us in Horacek et al., 2021a. For a detailed explanation see the figure caption. Furthermore, we

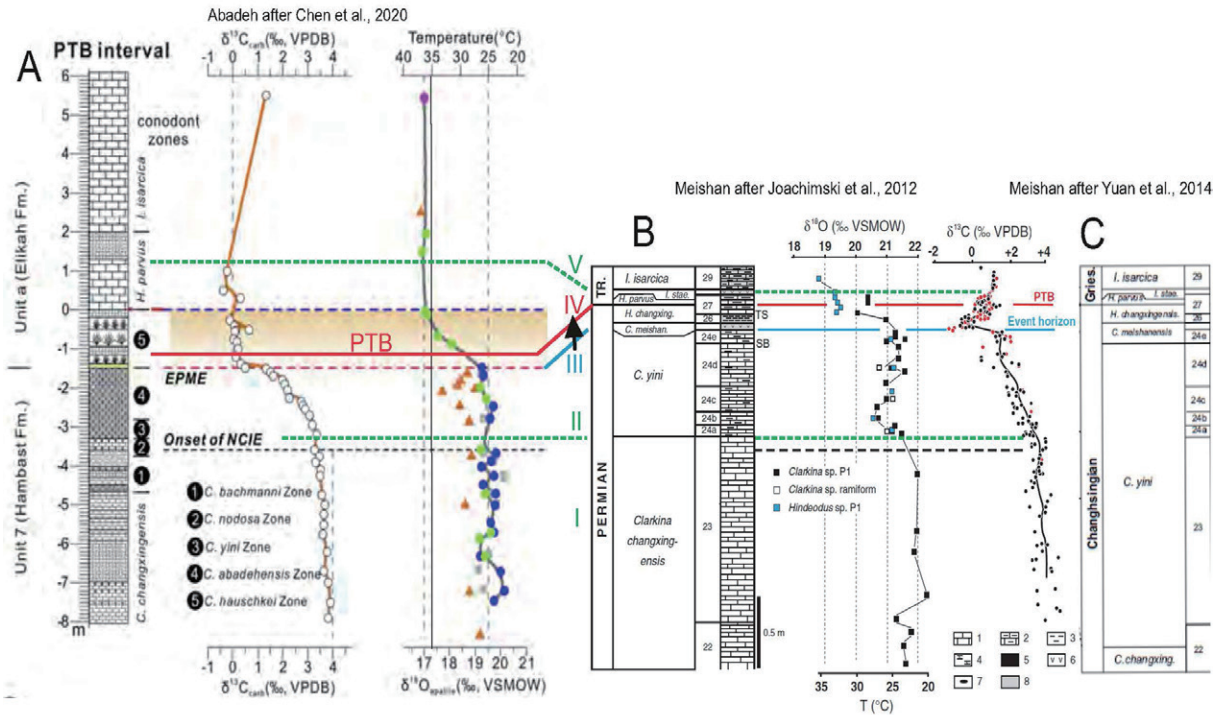


Fig. 1. Correlation of the PTB-interval of Abadeh (modified after Chen et al., 2020: A) and Meishan (modified after Joachimski et al., 2012: B, and the conodont stratigraphy after the revision by Yuan et al., 2014: C) sections. By applying the (in our opinion) correct biochronology there is an excellent agreement of the temperature curves showing values mainly below 30°C beneath the extinction event, and a strong and steady increase in temperature from the extinction event with maximum temperatures in the upper *parvus* or the *isarcica* Zones. Note that Chen et al., 2020, show additional conodont zones that have not been identified in South China. The horizontal black dashed line shows the start of the negative carbon isotope excursion (NCIE), as described in Chen et al., 2020. Green “I” denotes *Clarkina* (*C.*) *changxingensis* Zone sensu Zhang et al., 2009. First green dashed line (II) identifies the correlation of base of *C. yini* Zone sensu Zhang et al., 2009. The uppermost part of the *C. abadehensis* Zone in the Abadeh section, immediately below the red dashed/blue line (III) identifying the End-Permian Mass Extinction Event (EPME, Event Horizon) contains the *C. hauschkei* Zone, which has been incorrectly assigned to the interval above the mass extinction event by Chen et al., 2020 (shown as Nr. 5). The *C. hauschkei* Zone can now also be identified in the Meishan section spanning bed 24e, see below. Above this line (III) indicating the mass extinction event follows the latest Permian immediate post-extinction interval, marked in the Abadeh section by a boundary shale, and in Meishan section by beds 25, 26 and 27ab (a volcanic tuff layer, followed by a thin shale layer, succeeded by two thin carbonate layers, respectively). In the uppermost shale in the Abadeh section and at the base of bed 27c in Meishan section the Permian-Triassic Boundary (PTB) has been identified by *Hindeodus* (*H.*) *parvus* (Abadeh: Richoz et al., 2010, Horacek et al., 2021a: also see discussion therein; Meishan: Zhang et al., 2009, Yuan et al., 2014) marked by the red line (IV). The blue dashed line marks the PTB position of Chen et al., 2020. The green dashed line (V) marks the base of the *Isarcicella* (*I.*) *isarcica* Zone in Abadeh (after Taraz et al., 1981, Richoz et al., 2010, Baud et al., 2021) and Meishan section (Joachimski et al., 2012). Chen et al., 2020, identified *I. isarcica* in Abadeh section slightly further upwards. Note that the conodont stratigraphy in Meishan has been revised by Yuan et al., 2014, (C). In the latter work *C. yini* was revised and its range downwards enlarged and now includes a substantial part of the former *C. changxingensis* Zone. While we see the reasoning for this revision, we think it beneficial to also keep the definition of *C. yini* sensu Zhang et al., 2009. The latter is regarded by Yuan et al., 2014, as transition form to *C. meishanensis*, but represents the *C. yini* and *zhangii* forms found in Abadeh and generally the western (Neo-) Tethys, enabling a direct correlation. Yuan et al., 2014, also enlarge the range of *C. meishanensis* downwards below the extinction horizon to the base of Meishan bed 24e. As *C. meishanensis* also has (rarely) been found in Iranian sections below the extinction horizon in the *C. hauschkei* Zone, this zone can now be identified also in the Meishan section and in analogy encompasses Meishan bed 24e. There is a discrepancy concerning conversion of $\delta^{18}O$ -values into temperature data due to different calculations, but both studies use the same seawater $\delta^{18}O$ -value. TR, Triassic; SB, sequence boundary; TS, transgressive surface; 1, limestone; 2, marly limestone; 3, claystone; 4, siliceous marl; 5, black shale; 6, volcanic ash; 7, chert; 8, dysaerobic to anaerobic facies.

noted in our mentioned comment that also in a second recent work on the temperature change around the Permian-Triassic Boundary (PTB) (Joachimski et al., 2020, investigating the Chanakhchi section, Armenia), the exact position of the PTB is debated. We have further delved into this matter and the outcome is a second comment (Horacek et al., 2021b). By amending the biochronology we now obtain an improved agreement between the two PTB sections (Abadeh, and also Chanakhchi) and the GSSP section Meishan with respect to the seawater temperature evolution. In short: According to our interpretation, the temperature change/increase started at the end-Permian Mass Extinction and ended slightly above the PTB in all investigated sections – instead of quickly after the extinction event and before the PTB in the Iranian and Armenian sections.

The problem of precise identification of the PTB in Iran and Armenia may exist in other regions, too, and should encourage us to further continue our efforts to obtain detailed descriptions of PTB boundary sections, including easily identifiable definitions of marker and index fossils, extensive collaboration and open-minded discussion on the interpretation of the results.

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