Clim. Past Discuss.,
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Climate of the Past Discussions

Interactive comment on "Mid-Cretaceous paleoenvironmental changes in the western Tethys" *by* Cinzia Bottini and Elisabetta Erba

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We thank the Reviewer for evaluating our manuscript and providing helpful comments which improved the quality of the revised manuscript. In the following, we list all referee comments and our response.

RC: I suggest to use the same scale (percentages, e.g. 0 – 50% or 0 – 25>%) in all figures where you show nannofossil percentages (Fig. 2-4). This gives the reader the possibility to assess which species dominates the signal in which interval.

REPLY: We modified figures 2, 3 and 4 accordingly.

RC: Line 190: I am a bit unhappy with smoothing the records between Furlo and Le Brecce section differently. Did you use a simple running average or what do you mean

with smoothing (e.g., Stineman function, weighted curve fit, . . .)? I suggest treating the records in the same way.

REPLY: In the revised version of the manuscript, the TI and NI of each studied site was smoothed applying a moving average on a different number of data points in order to obtain smoothed TI and NI curves on comparable time-windows. This approach was necessary since: 1) The sedimentation rate changes from the Late Albian to the Cenomanian, 2) The sampling rate differs among the studied sections and, at Furlo, also throughout the section itself. The new curves take into account the sedimentation rates calculated for the studied sites by Gambacorta et al. (in review). At Le Brecce section, the sampling rate is each 20 cm corresponding to ca. 24 kyrs. The Monte Petrano section was sampled each 50 cm corresponding to ca. 60 kyrs in the Late Albian and to ca. 50 kyrs in the Cenomanian (up to the Bonarelli Level base). At Furlo, the sampling rate is 20 cm corresponding to 20 kyrs in the interval 0-5.8 m and, and ca. 10 cm corresponding to 10 kyrs in the interval 6-30 m. In order to apply the smoothing to equivalent time-intervals (of ca. 120 kyrs across the Late Albian and of ca. 100 kyrs across the Cenomanian), we calculated a: 3 point moving average at Monte Petrano, a 5 point moving average at Le Brecce, a 6 point moving average in the lower part of the Furlo section (0 to 5.8 m) and a 11 point moving average in the interval 6-30 m of Furlo. The description of the smoothing method adopted has been revised in chapter 3.3. Figures 5 and 6 were revised and their captions were updated accordingly. Remarks: - Line 190 of the Discussion paper: the TI and NI of Monte Petrano were smoothed with a 3 points moving average and not using a 2 point moving average as stated. This part has now been updated in the revised version of the manuscript. - The new smoothed TI and NI curves show only very minor differences from those presented in the Discussion paper (see revised figures 5 and 6). Consequently, no changes were made to the description of the results and to the Discussion chapter.

RC: Line 195: "and a few minor cooling intervals (c, d, e?)." The intervals with a "?" indicating cooler intervals. How significant are the presented peaks? I feel that this

might be a little bit overinterpreted and I suggest deleting them from the discussion and the figures.

REPLY: A similar comment was made by Reviewer 2. We agree with both Reviewers: most of the intervals were not identifying significant peaks or proper spikes. We have therefore deleted all the letters labelling the TI and NI peaks in figure 5 since some of the labels were not identifying significant peaks (given by one or two single data points) or they were referring to specific temperature/fertility intervals rather than spikes. The text has been modified accordingly (Chapter 3.3.).

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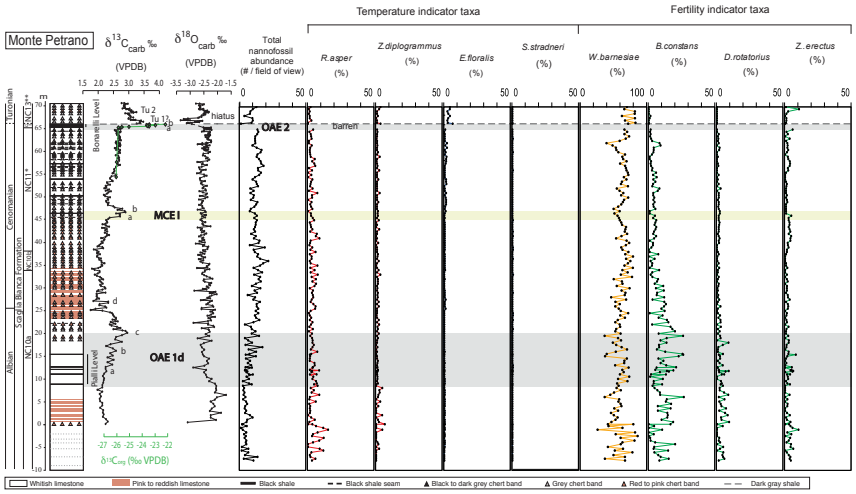

Fig. 1. Revised Figure 2 - Monte Petrano. Individual species abundances were plotted with the same scale

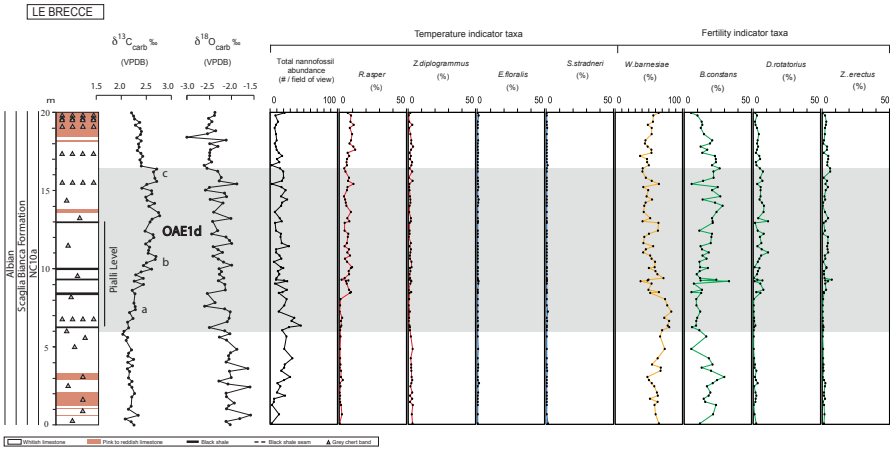

Fig. 2. Revised Figure 3 - Le Brecce. Individual species abundances are plotted with the same scale

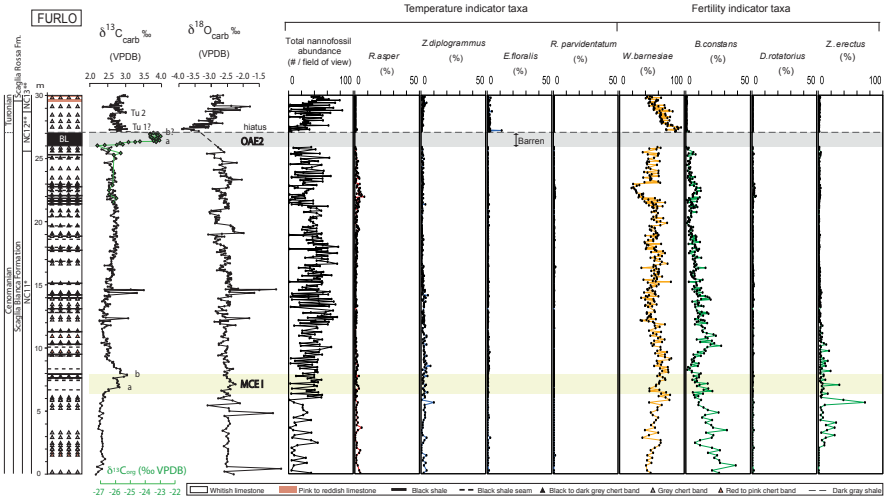

Fig. 3. Revised Figure 4 - Furlo. Individual species abundances are plotted with the same scale

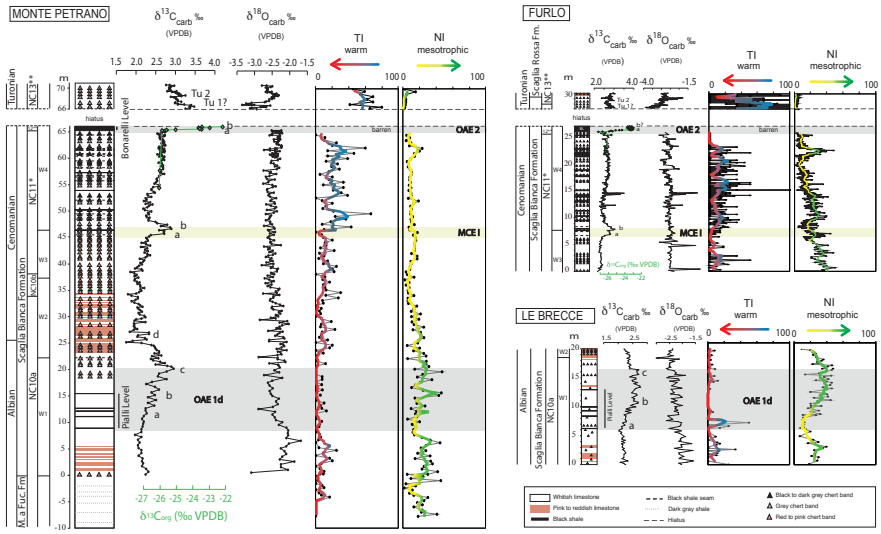

Fig. 4. Revised Figure 5 - All the letters labelling the TI and NI "peaks" were deleted. The TI and NI moving averages were re-calculated.

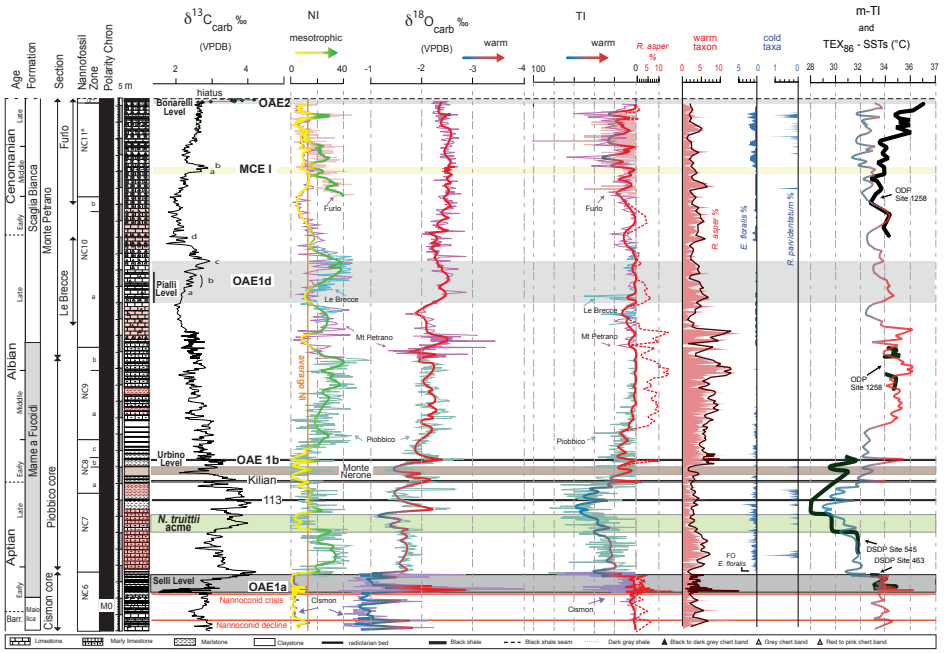

Fig. 5. Revised Figure 6 - The smoothed NI curve of Furlo was changed as explained in the text.