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Discussion

Comment on "The mid-Oxfordian (Late Jurassic) positive carbon-isotope excursion recognised from fossil wood in the British Isles" by C.R. Pearce, S.P. Hesselbo, A.L. Coe, Palaeogeography, Palaeoclimatology, Palaeoecology 221: 343–357

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Pearce et al. (2005) provide new Oxfordian carbon-isotope data derived from fossil wood in the Boreal/Subboreal sections of Scotland (Isle of Skye) and England (Dorset). The presented data evidence the dual atmosphere–hydrosphere nature of the mid-Oxfordian carbon-isotope excursion, hitherto exclusively known from a marine record (cf. Wierzbowski, 2002, 2004). We find this study a valuable contribution to the recognition of secular $\delta^{13}C$ trends and a source of the Oxfordian environmental changes. We do not, however, agree with the stratigraphical conclusions of the paper, since they are based on inappropriate correlations of the data provided by Pearce et al. (2005: Figs. 1, 5) with those of Wierzbowski (2002, 2004). As a consequence, the correlations of the mid-Oxfordian $\delta^{13}C$ positive excursion between the Submediterranean and the Boreal/Subboreal Province as well as its datings under the framework of the Submediterranean ammonite zonation as presented by the mentioned authors are incoherent (cf. Pearce et al., 2005: Figs. 1, 5; Wierzbowski, 2004: Fig. 5). And this is despite the fact that both sides have studied the same carbon-isotope event, which they consider to be isochroneous and global.

Both Pearce et al. (2005: Fig. 2) and Wierzbowski (2004) recognized the carbon-isotope shift in the Isle of Skye section in the Boreal/Subboreal Densiplicatum Zone. However, Pearce et al. (2005) mark this excursion on their Fig. 1 in the overlying Tenuiserratum Zone.

On the other hand, Wierzbowski (2002, 2004) recognized the peak of the mid-Oxfordian positive excursion from the Submediterranean sections in the Platysphinctes event horizon (cf. Głowniak, 2000) within the Arkelli Subzone of the Plicatilis Zone. He dated his samples under the framework of the Submediterranean Middle Oxfordian zonal scheme based on the perisphinctid lineage (Głowniak, 2002, 2006a). Otherwise, Pearce et al. (2005: Fig. 5) employed the Submediterranean zonal scheme of Western Europe (Cariou et al., 1997) matching the maximum $\delta^{13}C_{carb}$ values of Wierzbowski (2002: Fig. 5) at the boundary

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between the Antecedens and Parandieri subzones, and thus at the boundary between the Plicatilis and Transversarium zones *sensu* Cariou et al. (1997) (Fig. 1). It is approximately one subzone higher than it really appears.

The correlation of the Submediterranean Middle Oxfordian zonal schemes of Głowniak (2002), and Cariou et al. (1997) with the zonal scheme of NW Europe (Sykes and Callomon, 1979) is presented on Fig. 1 (cf. Głowniak, 2006b). The emended boundary between the Middle Oxfordian Plicatilis and Transversarium zones as proposed by Głowniak (2002, 2006b) lies somewhat lower than the boundary between the Plicatilis and Transversarium zones in the Submediterranean zonal scheme of Cariou et al. (1997) and the equivalent Plicatilis and Pumilus zonal boundary in the zonal scheme of NW Europe (Fig. 1). It is defined by the phyletic first appearance of *Perisphinctes antecedens* Salfeld at the lower boundary of the Buckmani Subzone of the Transversarium Zone. In the zonal schemes of Cariou et al. (1997) and of NW Europe (Sykes and Callomon, 1979), the boundaries between the Plicatilis and Transversarium zones, as well as between the Plicatilis and Pumilus zones, respectively, are set up above the levels with *P.* (*D.*) *antecedens*. They are equivalent to the boundary between the Antecedens and Parandieri subzones (Fig. 1).

The Platysphinctes event horizon, where the $\delta^{13}C$ positive excursion peak occurs, lies in the Arkelli Horizon in the lower part of the Arkelli Subzone of the Plicatilis Zone (Fig. 1; cf. Głowniak, 2006b). The correlation of the Arkelli Subzone with the zonal schemes of NW Europe and the Submediterranean of Western Europe leads to different conclusions. The Callomon's (1964, p. 286) criterion based on the frequency of the Boreal cardioceratid ammonites, allows correlation of the Arkelli Subzone with the lower part of the Antecedens Subzone of NW Europe, as in the two mentioned subzones the Cardioceratid ammonites recede (for details see also: Matyja and Głowniak, 2003; Dembicz et al., 2006). Otherwise, the Arkelli Subzone (at least its lower Arkelli Horizon) should be correlated with the upper part of the Vertebrale Subzone of the Submediterranean Western Europe. It is substantiated by the appearance of *Perisphinctes arkelli* Głowniak (ex *P. rotoides* Arkell non Ronchadzé) — the index of the Arkelli Subzone, in the Vertebrale Subzone as indicated by Cariou et al. (1997, p. 83).

Despite the discrepancies in the correlation of the Arkelli Subzone with the zonal schemes of Sykes and Callomon (1979) and Cariou et al. (1997), the correlation of this subzone and the $\delta^{13}C_{carb}$ positive excursion peak recognized by Wierzbowski (2002, 2004) with the upper part of the Antecedens and/or lower part of the Parandieri subzones as concluded by Pearce et al. (2005: Fig. 5) is clearly erroneous.

The correlation of the Subboreal/Boreal Oxfordian zonation with the Submediterranean zonation as presented by Pearce et al. (2005) on their Figs. 1, 5 is also partly false (particularly in the Submediterranean Middle and Upper Oxfordian as well as at the Oxfordian/Kimmeridgian stage boundary). It resulted in the apparent stratigraphic shift of the $\delta^{13}C_{wood}$ curve from the Isle of Skye (black dots) in relation to the $\delta^{13}C_{carb}$ curve from the Submediterranean Province (shaded area) on the Fig. 5 by Pearce et al. (2005).

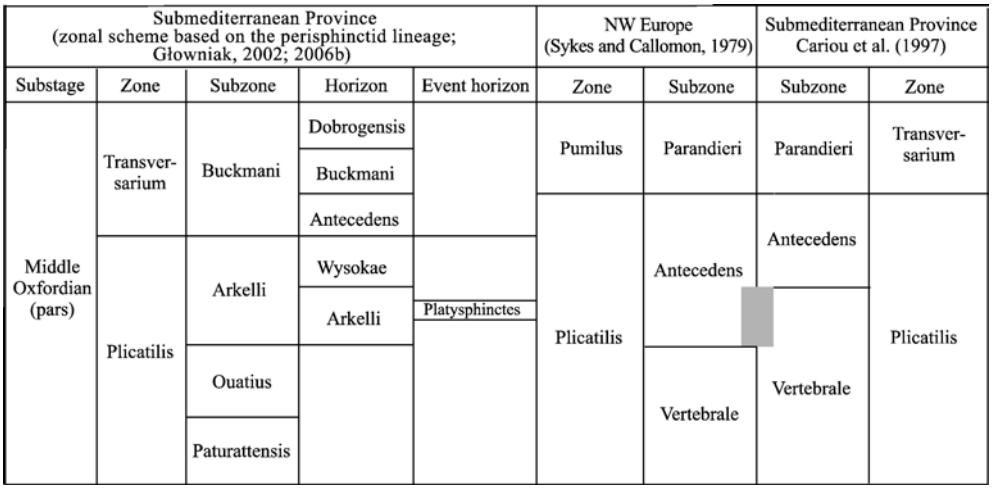

Fig. 1. Correlation of the Middle Oxfordian zonal schemes of the Submediterranean Province and NW Europe (after Głowniak, 2006b); shaded field indicates stratigraphical interval of uncertain correlation.