Early Aptian anoxic basin of the Russian Plate as a response to OAE1a: $\delta^{13}C$ chemostratigraphy and palaeoecological changes of cephalopod communities

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Lower Aptian black shales (4–9 % of C_{org}) are are very widespread in the central part of the Russian Platform (GAVRILOV et al., 2002), but their linkage to OAE1a remains controversial in the absence of carbon isotopic signatures. In contrast to the Southern Europe, mid-Cretaceous succession of the Russian Platform is poor in pelagic and benthic carbonates, and the Lower Aptian sediments are mainly siliciclastic. Here we are providing first results of the systematic stable isotope ($\delta^{13}C$) study on ammonites, sampled across the contact of the black shale and underlying mudstone. Sampling covers 3 m of mudstone top and 2.5 m of the lower black shale, exposed in few outcrops near Balakovo (Saratov region, European part of Russia). 12 specimens of well-preserved shells of *Deshayesites*, mostly *D. volgensis*, were proved to be suitable. X-ray diffraction analysis suggests that 99–100 % of nacreous layer is made of aragonite. The obtained $\delta^{13}C$ values vary from -1.9 to +2.4‰. They are negative in the mudstone and demonstrate a drastic positive turnover near the mudstone–shale boundary, with a maximum values at the base of black shales. This positive excursion of +3–4 ‰ in magnitude, shows a good correlation with C3-C4 segment of $\delta^{13}C$ curve, characterized the onset of OAE1a (MENEGATTI et al.,1998). But above, within black-shale member the gradual return to negative values (-1-1,4 ‰) is in a strong contradiction with the profile of $\delta^{13}C$ curve, showing a prolonged positive excursion C4-C5 at the course of OAE1a.

Abrupt environmental changes coinciding with onset of black shale deposition strongly influenced on cephalopods. In few sections, characterized by facies typical for near-shore and offshore parts of the basin, we have recognized simultaneous changes in ammonite and belemnite successions. Belemnites, which are common in a siltstone or mudstone, became virtually missing within black shales, as in many European sites (BODIN et al., 2015). An obvious shell size reduction across the mudstone – black shale boundary (maximum shell diameter reduced from ~20 cm to ~7–8 cm) is observed for the *Deshayesites*. Some other ammonites became numerous (*Sinzovia*) or show a first occurrence particularly in the black shales (*Koeneniceras* and *Volgoceratoides*). We propose to delimit factors, influenced on belemnites and on ammonites. Absence of belemnites in the black shales was possibly influenced by oxygen decrease, while diminishing of the ammonite shell size was caused by coupling of progressive warming and ocean acidification.

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