

Late-Barremian – early-Aptian climate of the northern middle latitudes: stable isotope evidence from bivalve and cephalopod molluscs of the Russian Platform

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The late Barremian to early Aptian temperature succession for the Russian platform was obtained for the first time on the basis of oxygen isotopic analysis of well-preserved bivalve molluscan (*Corbiculidae?* and *Neocomiceramus*) and ammonoid (*Dashayesites*, *Sinzovia*, *Proaustraliceras*, *Volgoceratoides*, and *Arioceras?*) shells, and belemnite *Oxyteuthis* rostra from the Ulyanovsk area. Palaeotemperatures obtained from the aragonitic planispiral and heteromorph ammonoid and bivalve shells from the early Aptian Volgensis-Schilovkensis, Deshayesi-Tuberculatum, and Deshaesi-Renauxianum zones are: 26.7–33.2°C, 29.2–33.1°C, and 27.0–29.5°C, respectively. A heteromorph *Helicancylus?* shell from the end-early Aptian Bowerbanki Zone was even secreted in somewhat higher temperature conditions (32.8–35.2°C). High delta¹³C values (up to 5‰) were encountered in the mentioned heteromorph shell. In contrast, the late Barremian molluscs (bivalve *Corbiculidae?* and belemnite *Oxyteuthis*) of the Ulyanovsk area demonstrate significantly lower palaeotemperatures: 16.9–18.5° and 7.9–17.8°C, respectively, which is in accordance with the palaeogeographic data from the Russian platform. Data obtained agree with the palaeobotanical results from the Russian platform, Caucasus, Crimea, and Far East, which show that a distinct climatic optimum seems to have occurred during the Aptian. The new isotopic data on the Russian platform and some evidences from other areas suggest that the end-early Aptian climatic optimum, corresponding to the *Tropaeum bowerbanki* Zone of the Russian platform, seems to be the most prominent one within the limits of the Phanerozoic time. This work is a contribution to UNESCO-IUGS IGCP Project 555 and financially supported by the Russian FEB grant 12-III-A-08-024, grants RFBR (10-05-00276, 10-05-00308), and FCB grant “Pedagogical science personnel of innovative Russia”.