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Discovery of shallow-marine biofacies conodonts in a bioherm within the Carboniferous–Permian transition in the Omolon Massif, NE Russia near the North paleo-pole: Correlation with a warming spike in the southern hemisphere☆

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ABSTRACT

The conodont genera *Hindeodus* and *Streptognathodus* are reported for the first time within the Carboniferous–Permian transition in the northern high latitudes of the Paren' River, Omolon Massif, NE Russia. Several fossil groups, including brachiopods, bivalves, scaphopods and microgastropods were found to be prolific in the invertebrate-dominated bioherms. These bioherms occur within predominantly siliciclastic sequences with extremely poor fauna, whereas in the studied bioherms the diversity of the bivalves and brachiopods exceeded observed diversity elsewhere in coeval facies in NE Russia. The bioherms are biostratigraphically constrained as uppermost Pennsylvanian to lowermost Cisuralian based on ammonoids. The very unusual peak of bivalve and brachiopod diversity and the occurrence of conodonts that require minimum sea water temperatures of at least 10–12 °C indicate a short lived, but significant warming event at that time, at least of provincial significance. This event most likely corresponds with a short-lived warming event recently discovered in the east of the southern hemisphere, in Timor and Australia. Thus, the event is possibly of global significance.

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1. Introduction

High latitudes in the northern hemisphere during the Late Paleozoic are areas that are quite poorly studied. The only data from the mid- to high latitudes (30–50°N paleolatitudes) are known from Spitsbergen, North Greenland and the Canadian Arctic (Beauchamp, 1995; Davydov et al., 2001; Stemmerik and Worsley, 2005; Reid et al., 2007). Information is lacking on areas around the northern paleo-pole (60–80°), especially in the regions in northeastern Russia in Verkhoyansk, Kolyma–Omolon and Chukotka (Zavodovsky, 1960; Andrianov, 1966; Zavodovsky, 1966; Zavodovsky et al., 1970; Ganelin, 1984, 1997). In the Russian literature, however, more data has become available in the last couple of decades (Kashik et al., 1990; Biakov, 2004; Klets, 2005; Biakov, 2006; Ganelin and Biakov, 2006; Klets et al., 2006; Biakov, 2007, 2010, 2011; Biakov and Shi, 2010; Biakov, 2012). The Carboniferous and Permian shallow- and deep-water sequences in the subpolar areas, such as Southern Verknoyansk and Okhotsk regions around 60–70°N, near the paleo-pole (Cocks and Torsvik, 2007) are predominantly sandstones, siltstones and mudstones with very few and rare horizons that are enriched with a carbonate matrix. The successions there are divided and correlated on the basis of bivalves, rare brachiopods and very rare ammonoids (Ganelin, 1984, 1997; Biakov, 2004; Klets, 2005; Ganelin and Biakov, 2006; Klets et al., 2006; Kutygin, 2006; Biakov, 2007, 2010). In the latitudes at the Omolon Massif, Pre-Kolyma and the Omulevka Blocks, the shallow-water Late Paleozoic rocks become more calcareous, with a relatively diverse fauna including abundant foraminifers, brachiopods, bivalves, gastropods, rare ammonoids, solitary rugose corals, bryozoans, ostracods, and crinoids (Zavodovsky et al., 1970; Kashik et al., 1990; Ganelin and Biakov, 2006). Obviously, the shallow-water fauna in these regions are highly endemic and used mostly for local–regional correlation. Extremely rare ammonoids, although endemic, were the only fossils that provided wider correlation with mid-latitudinal sections in the Canadian Arctic, Primorie (south Far East of Russia), Russian Platform, Urals, N. America, Australia and other sections in Peri-Gondwana (Glenister and Furnish, 1961; Nassichuk, 1970; Andrianov, 1985; Kutygin, 2006).

☆ Collection of all fossils reported in this paper housed in the Museum of North-East Interdisciplinary Scientific Research Institute n. a. N.A. Shilo, Far East Branch of the Russian Academy of Sciences, 16 Portovaya, Magadan, 685000, Russia, collection number 02-06.103.

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