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## New data on the structure and age of the terminal Permian strata in the South Verkhoyansk region (*northeastern Asia*)

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### Abstract

We present new data on the structure and age of the upper Permian strata in the basin of the Setorym River (tributary of the Vostochnaya Khandyga River) in the South Verkhoyansk region, represented by the Imtachan Formation and the lower part of the Nekuchan Formation. Based on the new findings of bivalve fossils from the *Intomodesma costatum* Zone, as well as on the study of carbon isotopes in the shells and carbon isotopes of the organic matter of the host mudstones, we have for the first time proved the completeness of the Permian section. The detailed description of the contact between the Imtachan and Nekuchan Formations bears evidence for a certain continuity of the lithologic characteristics of the sandstones. The sharp lithologic contact between the formations reflects not a regional sedimentation hiatus but a shift of depositional settings from the upper parts of a delta to the deep shelf, caused by forced marine transgression. It is concluded that there was no long-term hiatus between the accumulation of the Imtachan and Nekuchan Formations. Images of the most characteristic species of bivalves and crinoids from the Imtachan Formation are presented.

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### Introduction

The lattermost part of the Permian Period was marked by dramatic events, which caused the unprecedented mass extinction of biota during the Permian–Triassic transition. Therefore discovering and detailed investigation of the terminal Permian sections, which potentially host this transition, become extremely important both for substantiation of the Permian–Triassic boundary based on various paleontological groups and other (nonbiostratigraphic) criteria, as well as for unraveling the sequence and character of these events in the interval.

South Verkhoyansk is the only region in eastern part of the Boreal biogeographic Superrealm with documented *Otoceras*-containing strata marking, accordingly to (Dagys and Dagys, 1987; Konstantinov and Klets, 2009; Konstantinov et al., 2013a; Shevyrev, 2006; Tozer, 1967), the base of Triassic System. In this paper we place however the base of the Triassic at the beginning of the *Tompophiceras pascoei* ammonite Zone based on results of previous investigations of the authors (Zakharov et al., 2014, 2015). Age interpretation of this Zone is based both on findings of conodonts *Hindeodus parvus* (Kozur et Pjatakova) at this stratigraphic level in the western part of the Boreal Superrealm, which are the official biomarkers for the lower boundary of the Triassic System in South China (Yin et al., 2001), as well as on carbon isotope data. The latter demonstrate that the *Hindeodus parvus*

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