



## Late Devonian plant communities of North Russia

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### ABSTRACT

The article summarizes researches on the Late Devonian vegetation based on rich palaeobotanical collections from different localities of northern Russia (North Timan). The composition and the structure of the land plant communities are described. Changes in the vegetation are reported during the Frasnian and Famennian. The most diverse palaeovegetation included 29 taxa and occurred in the late Frasnian (Ust'besmohitsa Formation). It was followed by a floral decrease (6 taxa) in the latest Frasnian (Kamenka Formation). The taxonomic composition of the Famennian vegetation (12 taxa) was much poorer than that of the Frasnian. Differences between the archaeopteridean assemblages of the studied region and the coeval assemblages of the surrounding areas (Russia, Ukraine and Belarus) are discussed. In North Timan, the highest archaeopterid diversity occurred in the Frasnian whereas, in the Donetsk Region of the Ukraine, it occurred in the Famennian.

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### 1. Introduction

Late Devonian plants of the European part of Russia are poorly known among the foreign palaeobotanists. It is difficult to compare and correlate data on the Late Devonian plants from Russia and Western Europe because correspondence between their respective Miospore Zones is unknown. The Late Devonian floras from the north of the European part of Russia (especially North Timan) are hardly known because their monographic studies were not carried out. Our knowledge of these plants is restricted to uncorrected taxonomic lists and brief biostratigraphic analyses in different publications (see Kossovoj, 1959; Petrosjan, 1988, 1991, etc.).

Sporadic researches on the Late Devonian floras of North Russia started in the 1930–40s. The first data about the Late Devonian plant remains of North Timan (NT<sup>3</sup>) were shortly published by Krishtofovich (1937, 1939) and Zalesky (1948). Later, after first broad-scaled geological field trips, the geologist Kossovoj (1959, 1966, 1971) reported lists of fossil plants from various Upper Devonian deposits and localities of the area studied in this paper. Since 1960, several new taxa of Late Devonian plants have been described from NT (Petrosjan and Radczenko, 1960; Senkevich, 1960; Lepekhina, 1968; Petrosjan, 1968). Special mention should be made of the finding of a unique new heterosporous lycopsid (*Kossoviella timanica* Petrosjan), which was described by

Petrosjan (Petrosjan and Kossovoj, 1984) from the Frasnian deposits of several localities in NT. The Devonian plant assemblages of NT were previously proposed by Petrosjan (1988, 1991). Jurina (1988) summarized known Devonian floras from USSR and gave a list of the Late Devonian plants from the Northern part of Russia. Later Snigirevsky (1997a) attempted to revise the Late Devonian floras of NT. Reproductive organs with in situ spores were studied by Tschibrikova et al. (1998, 1999), Telnova and Meyer-Melikyan (2002) and Snigirevsky et al. (2007). Some new lycopsid strobili with in situ spores are currently studied (Orlova et al., in progress). Besides, some probable brown algae (*Caudophyton fasciolus* (Penhallow) S. Snig.) were described from the Upper Devonian deposits of NT (Snigirevsky, 2001). The anatomical structure of Frasnian (Orlova et al., 2011; Orlova and Jurina, 2014) and Famennian (Snigirevskaya, 2012) plants of the Northern part of Russia was studied recently. For the historical review of palaeobotanical researches in NT, see Snigirevsky (1997b). In the present paper, we provide updated Late Devonian plant lists and revise plant floras from NT with illustrations of some representative taxa. The identification and nomenclature of fossil plant macroremains and miospores are revised when necessary.

### 2. Materials and methods

The present paper is based on the analysis of the palaeobotanical collections housed at the Palaeontological museum of the Sedimentary Geology Department, Institute of Earth Sciences, Saint Petersburg State University (Petrosjan and Snigirevsky collection); the Department of Palaeontology, Geology Faculty, Lomonosov Moscow State University; the Earth Science Museum of Lomonosov Moscow State University; and the Komarov Botanical Institute, St Petersburg.

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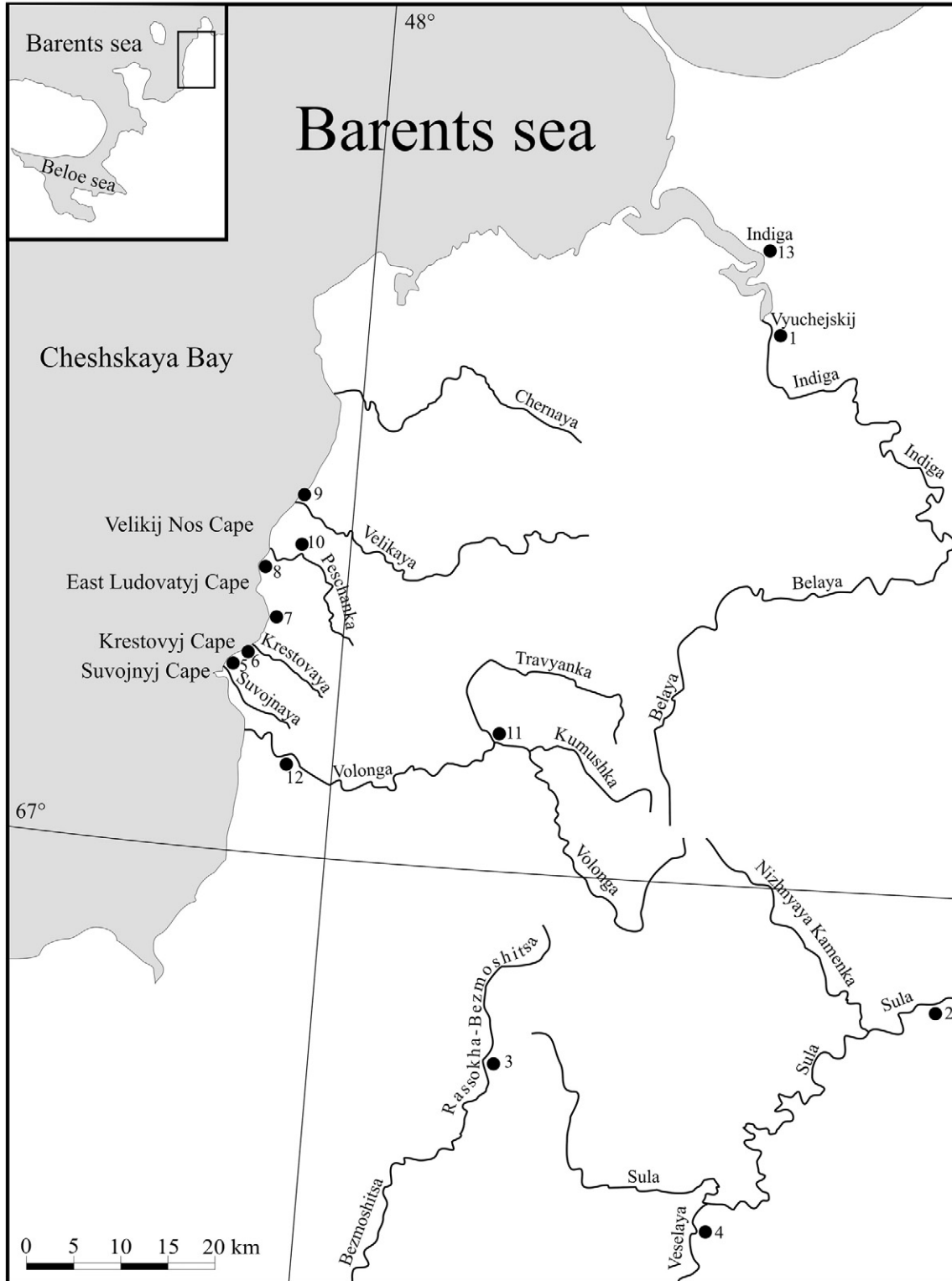
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<sup>3</sup> NT - North Timan.

The material has been collected since 1931 by different geologists. The richest fossil plant collection from NT has been found by Kossovoy between 1957 and 1964. Some samples were also collected by Egorov, Chernov, Menner, and Petrovsky (Snigirevsky, 1997a). Jurina found several wood samples from the Volonga River locality of Famennian age

(Snigirevskaya, 2012). The major collection of late Frasnian plants from various localities on the eastern coast of the Barents Sea (NT) was collected by Snigirevsky in 1993.

The material was studied and photographed using a Leica MZ16 light stereomicroscope, and an Olympus CX 31 light microscope. Fragments



**Fig. 1.** Geographic position of the Late Devonian localities of NT. 1—the Vyuchejskij borehole; 2—the Sula River; 3—the Rassokha-Bezmoshitsa River; 4—the Veselaya River; 5—the Suvojnaya River (Frasnian and Famennian localities); 6—Suvojnij field (area between the Suvojnij Cape and the Krestovij Cape); 7—Krestovij field (area between the Krestovij Cape and Ludovatyj Cape); 8—Ludovatyj field (area between the East Ludovatyj Nos Cape and the Velikaya River mouth); 9—the Velikaya River; 10—the Peschanka River; 11—the Travyanka River (1–4, 6–11—Frasnian localities); 12—the Volonga River (Frasnian and Famennian localities); 13—the Indiga borehole (Famennian deposits).

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