Gondwana Research xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Gondwana Research

journal homepage: www.elsevier.com/locate/gr

# First paleomagnetic data for the New Siberian Islands: Implications for Arctic paleogeography

D.V. Metelkin [a,b,*], V.A. Vernikovsky [a,b], T.Yu. Tolmacheva [c], N.Yu. Matushkin [a,b], A.I. Zhdanova [a,b], S.A. Pisarevsky [d,e,f]

[a] Novosibirsk State University, 2, Pirogova st., Novosibirsk 630090, Russia
[b] A.A. Trofimuk Institute of Petroleum Geology and Geophysics SB RAS, 3, prosp. ak. Koptyuga, Novosibirsk 630090, Russia
[c] A.P. Karpinsky Russian Geological Research Institute (VSEGEI), Sredny pr. 74, St. Petersburg 199106, Russia
[d] Australian Research Council Centre of Excellence for Core to Crust Fluid Systems (CCFS), Australia
[e] The Institute for Geoscience Research (TIGeR), Department of Applied Geology, Curtin University, GPO Box U1987, Perth, WA 6845, Australia
[f] School of Earth and Environment, University of Western Australia, Crawley, WA 6009, Australia

ARTICLE INFO

*Article history:*
Received 18 September 2014
Received in revised form 20 July 2015
Accepted 12 August 2015
Available online xxxx

Handling Editor: J.G. Meert

*Keywords:*
Paleozoic
Paleomagnetism
Paleogeography
Arctida
New Siberian Islands
South Anyui suture

ABSTRACT

In this paper we present new paleomagnetic and paleontological data from the Ordovician and Silurian carbonate rocks of Kotelny Island (the Anjou Archipelago), and from the Ordovician turbidities of Bennett Island (the De Long Archipelago). It is assumed that both archipelagos belong to the NSI (New Siberian Islands) terrane — a key tectonic element in the Arctic region. Ages of the studied rocks have been established by paleontological data and lithological correlations. Our new data on conodonts combined with those from previous studies of Ordovician and Silurian fauna indicate a biogeographic similarity between the shelves of the Siberian paleocontinent and the NSI in the Early Paleozoic. Three new paleomagnetic poles for the NSI (48.9°N, 13.8°E, $A_{95}$ = 18.1° for 475 Ma; 45.5°N, 31.9°E, $A_{95}$ = 11.0° for 465 Ma, and 33.7°N, 55.7°E, $A_{95}$ = 11.0° for 435 Ma) fall between the south-eastern part of Central Europe and the Zagros Mountains. The similarity of paleomagnetic directions from Kotelny and Bennet islands confirms that both the Anjou and De Long archipelagos belong to the same terrane. Calculated paleolatitudes indicate that in Ordovician–Silurian times this terrane has been located between 30° and 45°, possibly in the northern hemisphere. Based on this observation, we suggest a linkage between the NSI and the Kolyma–Omolon superterrane. Comparison of apparent polar wander paths (APWPs) of the NSI, Siberia and other cratons/terranes suggests that the NSI drifted independently. We demonstrate that the structural line between Svyatoy Nos Peninsula and Great Lyakhovsky Island is the continuation of the Kolyma Loop suture on the Arctic shelf, and expect that the continuation of the South Anyui suture is to be found east of the NSI.



## 1. Introduction

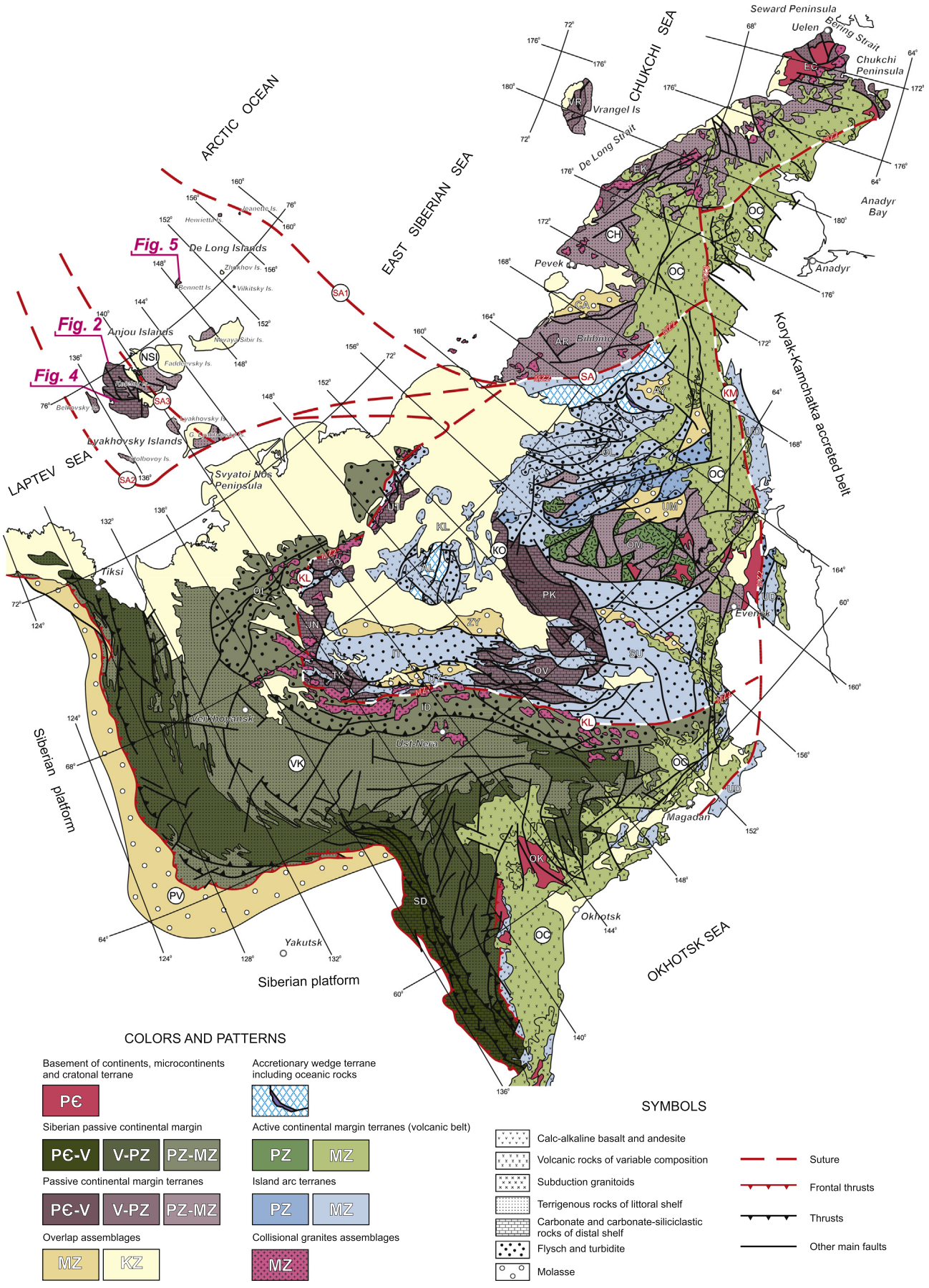
The NSI (New Siberian Islands) terrane is located on the Siberian Arctic shelf. The terrane includes the Lyakhovsky (Great Lyakhovsky, Little Lyakhovsky and Stolbovoy islands), Anjou (Kotelny, Faddeevsky, Belkovsky and Novaya Sibir islands) and De Long (Bennett, Vilkitsky, Zhokhov, Henrietta and Jannette islands) archipelagos (Fig. 1). The geological history of the NSI, its formation and initial affinity (Siberia vs Laurentia; Khain et al., 2009) are widely debated. For example, there is little consensus on the position of the western margin of the Alaska–Chukchi terrane, which may include the NSI (e.g. Fujita, 1978; Drachev et al., 1998; Drachev, 2002; Filatova and Khain, 2007; Kuzmichev, 2009). Therefore, the NSI terrane is a valuable target for paleomagnetic and geochronological studies, which may provide important clues for a better understanding of the main geological structures of NE Asia and their traces on the shelves of Laptev and East Siberian seas.

The presence of Precambrian metamorphic complexes within the main structures of the Arctic Ocean has led to an idea of a large continental mass between Laurentia, Baltica and Siberia in the past (Shatsky, 1963; Khain, 1979; Zonenshain and Natapov, 1987). This ancient continent is sometimes referred to as Hyperborea (Shatsky, 1963) or Arctida (Zonenshain and Natapov, 1987). The tectonic history of Arctida is not clear, but after its breakup various fragments have been probably accreted to larger continents of the Arctic realm (Zonenshain and Natapov, 1987; Lawver et al., 2002, 2011; Metelkin et al., 2015).

The final accretion of Arctida's fragments to other continents occurred in the Late Carboniferous–Early Permian (Zonenshain and Natapov, 1987) after the closure of the Paleo-Asian and Paleo-Urals oceans (Zonenshain et al., 1990; Dobretsov, 2003). At the same time

* Corresponding author at: Novosibirsk State University, 2, Pirogova st., Novosibirsk 630090, Russia. Tel./fax: +7 3833308244.
*E-mail address:* MetelkinDV@ipgg.sbras.ru (D.V. Metelkin).

http://dx.doi.org/10.1016/j.gr.2015.08.008
1342-937X/




Please cite this article as: Metelkin, D.V., et al., First paleomagnetic data for the New Siberian Islands: Implications for Arctic paleogeography, Gondwana Research (2015), http://dx.doi.org/10.1016/j.gr.2015.08.008