Contributions of International Symposium

13th ISOS

NOVOSIBIRSK 2019

TROFIMUK INSTITUTE OF PETROLEUM GEOLOGY AND GEOPHYSICS
RUSSIAN ACADEMY OF SCIENCES
SIBERIAN BRANCH
NOVOSIBIRSK NATIONAL RESEARCH STATE UNIVERSITY

13TH INTERNATIONAL SYMPOSIUM ON THE ORDOVICIAN SYSTEM NOVOSIBIRSK, RUSSIA (JULY 19-22, 2019)

Contributions

Edited by
O.T. Obut, N.V. Sennikov and T.P. Kipriyanova

Novosibirsk
Publishing House of SB RAS
2019

УДК 551.733
ББК 26.323
Т67

DOI 10.15372/INTERNATIONAL2019OOT

13th International Symposium on the Ordovician System: Contributions of International Symposium. Novosibirsk, Russia (July 19-22, 2019) / Eds O.T. Obut, N.V. Sennikov, T.P. Kipriyanova; Trofimuk Institute of Petroleum Geology and Geophysics SB RAS; Novosibirsk National Research State University. – Novosibirsk : Publishing House of SB RAS, 2019. –263 p.

13-й Международный Симпозиум по Ордовикской системе: Материалы Международного симпозиума. Новосибирск, Россия (19–22 июля, 2019) / Ред. О.Т. Обут, Н.В. Сенников, Т.П. Киприянова; Институт нефтегазовой геологии и геофизики им. А.А. Трофимука СО РАН; Новосибирский национальный исследовательский университет. Новосибирск : Изд-во СО РАН, 2019. – 263 с.

Organization

International Commission on Stratigraphy

Subcommission on Ordovician Stratigraphy

IGSP 653 “The onset of the Great Ordovician Biodiversification Event”

Trofimuk Institute of Petroleum Geology and Geophysics SB RAS

Novosibirsk National Research State University

Siberian Branch of Russian Academy of Sciences

Russian Foundation for Basic Research (RFBR)

Translated by N.N. Mzhel’skaya, O.T. Obut, N.V. Sennikov

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Doctor of Sciences in Geology A.V. Dronov
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ISBN 978-5-7692-1657-2

ALPHA, BETA AND GAMMA DIVERSITY CONTROLS ON ORDOVICIAN-SILURIAN BRACHIOPODS OF THE BALTIC BASINS

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Brachiopods are a major component of the fossil record of the early Palaeozoic sediments of the Baltic Basin, their skeletons have a high preservation potential and they are comparatively well studied. Brachiopods underwent a major diversification during the Great Ordovician Biodiversification Event (GOBE). The role of spatial and environmental heterogeneity for the diversification process is discussed controversially among scholars.

We estimated alpha, beta and gamma diversity of the brachiopods of the Baltic basin and compared them with sediment thickness estimates and proxies of sediment heterogeneity in order to find dependencies. We used a combined dataset from the Database of Geoscience Collections of Estonia (SARV) and the Paleobiology Database (PBDB), comprising c. 13.000 occurrences from more than 800 localities, binned the occurrences into time bins of c. 4-8 Myr length, ranging from the Early Ordovician – Late Silurian and placed them into standardized 0.3° latitude-longitude squares. Additionally, we compiled localized bed thicknesses and counts of lithological and stratigraphical units.

We found dependencies of the gamma diversity with the number of lithological units and of the beta diversity with our proxy of lithological heterogeneity. We conclude that the massive brachiopod diversification was locally associated with an increase in the heterogeneity of the depositional environment.