



## **Biotic and abiotic control of Paleozoic reefs evolution in the north of the Urals**

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Upper Ordovician-Lower Permian massive biogenic carbonates of the Paleozoic in the north of Ural Mountains are traced more than for 1000 km from the Polar to Northern Urals inclusive.

Reef frameworks can be subdivided into six categories: 1) skeletal metazoan; 2) skeletal metazoan-microbial; 3) skeletal microbial; 4) non-skeletal microbial; 5) organo-biocementic and 6) biocementstone.

Skeletal metazoan (coral) and metazoan-microbial (sponge-stromatolitic, hydroid?-calcimicrobial) boundstones were the most common framework types in Late Ordovician, Silurian and Early Devonian reefs in the Polar, Subpolar and Northern Urals. Their structures were controlled largely by global biotic events (mass extinction in Ordovician-Silurian boundary, the Ireviken event in Llandovery-Wenlock boundary, the Lau event in Late Ludfordian) and a climate (arid). Duration and lateral development of skeletal frameworks were defined by regional and global tectonic events (intraplate rifting and subduction of the East-European continent margin).

Skeletal microbial (stromatolite) frameworks are distributed in the Late Devonian (the Pre-Ural foredeep) and Early Carboniferous (Subpolar and Northern Urals) in microbial mounds. Cyanobacteria and calcimicrobe morphologies are well preserved and distinguished. The abundance of frameworks formed by organisms of a pioneer stage ecological succession at that time has been caused by some global and regional terrestrial biosphere changes: evolution arborescent and deep-rooting vascular plants, increasing of pedogenesis, active intraplate rifting and often sea level fluctuations.

Non-skeletal microbial (thrombolite) frameworks occurred in a mud mound of the

organic reef base in the Northern Urals and a slope small buildup in the Polar Urals.

Organo-biocementic (bryozoans, paleoaplysinal, phylloid-algal) fabrics and biocementstone, in which small or delicate organisms serve as scaffolds for rigid cement crusts, made main framework types of Late Carboniferous-Early Permian skeletal mounds in the Northern and Subpolar Urals, and the Pre-Ural foredeep. Composition of the frameworks was controlled by global biotic (abundant phylloid algae, problematic organisms such as *Tubiphytes* and *Paleoaplysina*) and hydrochemical (aragonite regime of seawater), and also regional (extreme shallow water in the northernuralsian sea basin) factors.