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PROGRAM AND ABSTRACTS

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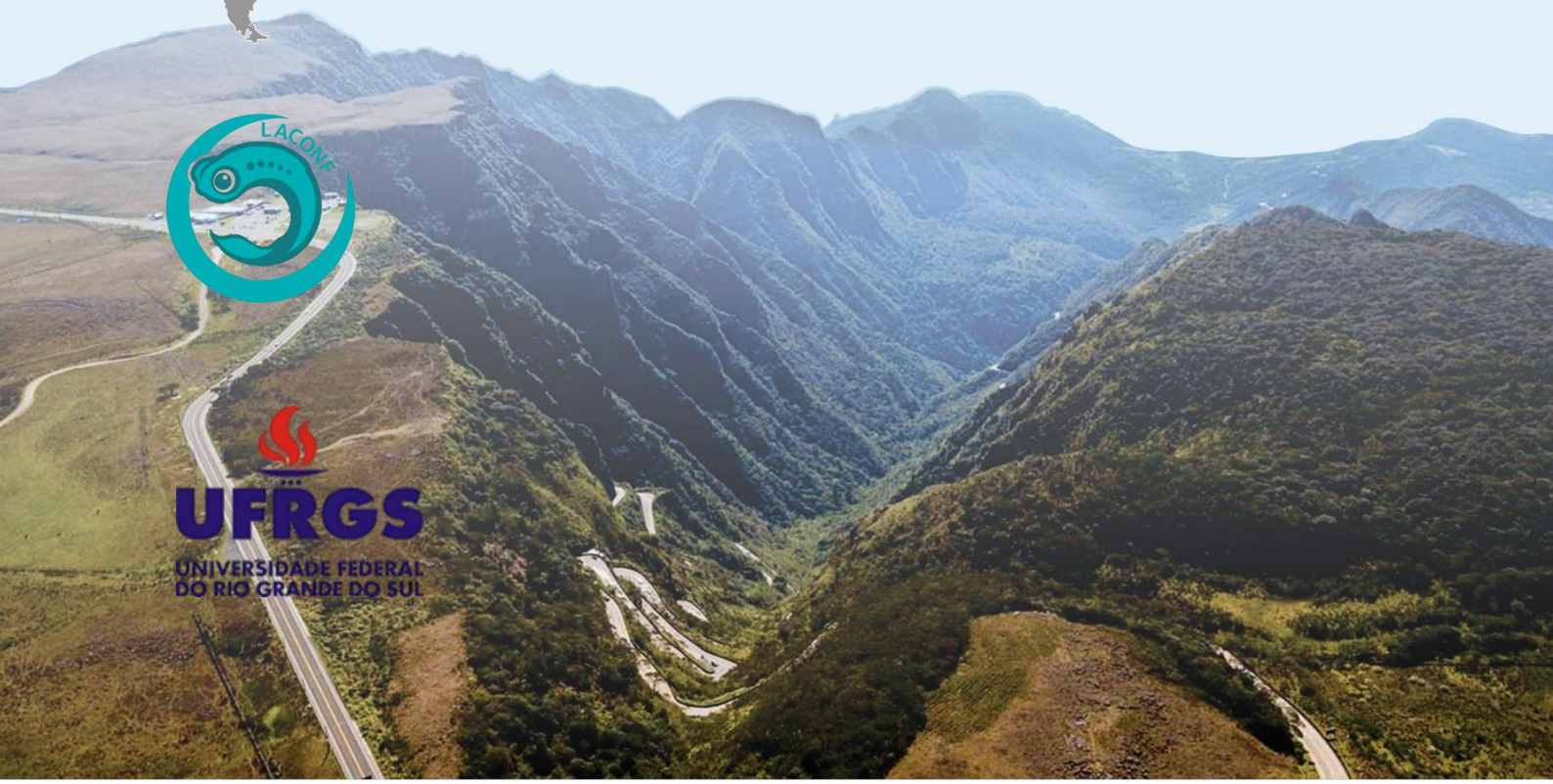
ABSTRACTS



LOWER AND MIDDLE ORDOVICIAN CONODONT BIOSTRATIGRAPHY OF THE AIZPUTE-41 CORE (LATVIA): A DEEP-WATER PERSPECTIVE ON BALTOSCANDIAN ZONATION

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Abstract: The Baltoscandian area is considered one of the world's most important regions for the study of Ordovician biostratigraphy. In addition to being the region where conodonts were first discovered (Pander 1856, Sweet & Cooper 2008), Baltoscandia preserves a remarkably complete and diverse succession of conodont assemblages from this period. Pioneering studies of conodonts from this region by Lindström (1971) and Bergström (1971) demonstrated that these microfossils as excellent biostratigraphic tools for the Ordovician period (summarised by Bergström & Ferreti 2017). Subsequently, numerous drill cores from the region have undergone lithostratigraphic and biostratigraphic analysis, primarily of conodonts. These works have revealed depth-related faunal trends (Rasmussen et al. 2011, Rasmussen & Stouge 2018), with habitat deepening from the eastern Baltic region towards the west (Sweden and Norway).
However, research in the Baltic region has historically focused on the shallower, limestone-dominated successions of North and Central Estonia. In contrast, the deeper-water successions have been studied primarily in Scandinavia, with limited direct comparison with data from the Baltic region.
This study presents the conodont biostratigraphy from the Aizpute-41 core section, Latvia, representing a deeper-water environment. We analyse the evolution of conodont assemblages through the Lower and Middle Ordovician and compare the results with data from Sweden and Estonia. The studied interval, characterised by a well-preserved and almost continuous succession of conodont biozones, starting from the early Floian Acodus deltifer Subzone of the Paroistodus proteus Zone and ends within the late Darriwilian Pygodus anserinus Zone. The fauna in this interval is dominated by the genera Baltoniodus, Drepanodus, Drepanoistodus, Paroistodus, and Protopanderodus, all common also in the earlier studied sections from North Estonia and Sweden (Löfgren 1994, Männik & Viira 2011, Rasmussen et al. 2011). The Conodont Colour Alteration Index (CAI) of the studied specimens ranges from 1.0 to 1.5, indicating burial temperatures below 90 °C (Epstein et al. 1977). Colours of the specimens vary from translucent pale yellow to dark orange. Abundance of the specimens in samples (calculated per kilogram of rock) is highly variable, particularly in those from the Floian, and ranges from 400 to almost 12,000.
The base of the Floian stage is defined as the FADs of graptolites Tetragraptus approximatus and T. phyllograptoides (Maletz et al. 1996). However, as the lowermost part of the studied section is represented by red-coloured deposits lacking any organic-walled fossils, including graptolites, precise location of Tremadocian-Floian boundary is not possible. The Baltoniodus triangularis and B. norrlandicus zones, not recorded in the Estonian sections, are well represented in the Aizpute-41 core. The FAD of B. triangularis marks the base of Dapingian at 1147.49 m, and the appearance of Lenodus antivariabilis at 1124.29 m allows to locate the base of Darriwilian. The Yangtzeplacognathus protoramosus Subzone was not

identified due to the absence of the eponymous species. As the B. robustus Subzone is directly overlain by the Eoplacognathus lindstroemi Subzone, it is possible that a gap corresponding to the Y. protoramosus Subzone exists in the Aizpute-41 core sections. However, more likely, the Subzone could be very thin like in Estonian sections (Hints et al. 2012) and lies within the unsampled interval of less than one meter separating the B. robustus and E. lindstroemi Subzones. Here, we interpreted this section as complete, albeit compressed, and the Y. protoramosus Subzone as unsampled. Aside from these specific issues, the standard conodont zonation is present with no identifiable gaps in it.

In conclusion, the Aizpute-41 core provides a remarkably well-preserved and more complete conodont zonation for the Lower and Middle Ordovician than is typically found in the sections in North Estonia, thereby complementing these classical successions. Its deeper-water character permits more detailed analysis of composition, species diversity and evolution of the Lower and Middle Ordovician conodont faunas, particularly, as together with the taxa known from the shallower environments in North Estonia occur those characteristic of deeper water conditions. However, the absence of organic-walled microfossils in the studied interval raises new questions regarding the precise dating of the strata and their depositional environment that warrant further investigation. Still, the completeness of the fossil record in Aizpute-41 core section also offers an opportunity for future paleoclimatic studies based on O-isotopes from conodont apatite, potentially enabling a more detailed reconstruction of climatic trends during the Early and Middle Ordovician.

Keywords: Conodonts, Ordovician, Baltoscandia, Biostratigraphy, Lithostratigraphy

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