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### ABSTRACT

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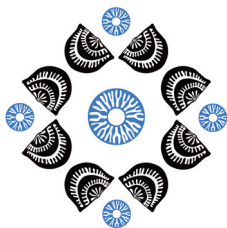
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# The detailed Middle to early Late Ordovician faunal succession and $\delta^{13}\text{C}_{\text{carbon}}$ chemistry of the Kårehamn drill core, offshore eastern Öland, Sweden: implications for stratigraphy and correlation

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The Middle to lower Upper Ordovician stratigraphy of the Kårehamn core, drilled ca 7 km offshore to the east of the Kårehamn village, northeastern Öland, is presented. The investigated core is one of four drill cores obtained during the preparation of the Kårehamn offshore wind farm. It is ca 41 m long and has a diameter of 10 cm. The lithostratigraphy, faunal (conodonts and chitinozoans) succession and  $\delta^{13}\text{C}_{\text{carbon}}$  isotope chemistry pattern are built upon this complete core. The drilling stopped at 64.5 m b.s.l. in the Swedish Orthoceratite limestone, within the upper *Lenodus variabilis* Conodont Zone. The horizon is largely equivalent to the strata that in Sweden were previously named “limestone with *Asaphus ‘raniceps’*”, which is within the Orthoceratite limestone. It is characterized by and composed of mainly light-grey, highly fossiliferous and stylonitic limestone with little clay material. The next unit includes the *Yangtzeplacognathus crassus* and lower *Lenodus pseudoplanus* conodont zones. The upper *Lenodus pseudoplanus* (with *Microzarkodina ozarkodella* late form *sensu* Lindström), *Eoplacognathus suecicus* and *E. foliaceus* conodont zones are recorded from the overlying succession of the upper Orthoceratite limestone. This interval corresponds to the Segerstad, Skärlov and Seby topoformations of Jaanusson, all of which are included in the upper part of the Swedish Orthoceratite limestone. The prominent  $\delta^{13}\text{C}_{\text{carbon}}$  isotope MDICE peak recorded from the Kårehamn drill core is biostratigraphically precisely assigned to the upper part of the newly redefined *Eoplacognathus suecicus* Conodont Zone. The conformably overlying Folkeslunda Limestone is the top unit of the Orthoceratite limestone; it is composed of lime mudstone and grey bedded wackestone. Biostratigraphically, it is referred to the *Eoplacognathus reclinatus* Subzone of the *Pygodus serra* Conodont Zone corresponding to the lower part of the *Laufeldochitina striata* Chitinozoan Zone.

The Furudal Limestone – on Öland known as the Källa Limestone and Persnäs Limestone – overlies the Orthoceratite limestone and represents an important change of the depositional environment in the Baltic Basin. The Källa Limestone contains the *Eoplacognathus robustus* Conodont Subzone of the *Pygodus serra* Conodont Zone and the *Laufeldochitina striata* Chitinozoan Zone. *Pygodus protoanserinus* Zhang is the transitional taxon from *P. serra* to *P. anserinus* and is securely and precisely recorded for the first time in the region.

The important conodont species *Pygodus anserinus* Lamont and Lindström is recorded from the Persnäs Limestone (= upper Furudal Formation) from which also the *Laufeldochitina striata* Chitinozoan Zone is documented. *Pygodus anserinus* extends into the overlying Dalby Formation, in which it is succeeded by the lower *Amorphognathus tvaerensis* Conodont Zone. The diagnostic chitinozoans *Eisenackitina rhenana*, *Laufeldochitina stentor*, *Conochitina savalaensis*, *Belonechitina intonsa* and *Conochitina viruana* are well documented from the same formation. The top of the core is within the *Baltoniodus variabilis* Conodont Subzone of the *Amorphognathus tvaerensis* Conodont Zone of the Bergström conodont zonation.

The precise integrated biostratigraphy of the conodonts and chitinozoans along with the carbon isotope curve are results of this study, which largely agree with those of previous research of the Baltic Basin and thus provide data for precise correlation across the Baltic Basin. The fossil assemblages are clearly related to the east Baltic chronostratigraphic scheme and to the new chronostratigraphic scheme of Scandinavia, and the succession is referred to the established stages of the two systems.