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## Silurian graptolite biostratigraphy of the Röstånga-1 drill core, Scania : a standard for southern Scandinavia

Maletz, Jörg; Ahlberg, Per

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LUND UNIVERSITY

PO Box 117  
221 00 Lund  
+46 46-222 00 00

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Department of Geology  
Lund University  
Sölvegatan 12  
SE-223 62 Lund  
Sweden

<http://www.geol.lu.se>

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## Foreword and acknowledgements

This abstract volume has been prepared for the 3<sup>rd</sup> annual meeting of the IUGS/UNESCO International Geoscience Programme Project 591 *The Early to Middle Palaeozoic Revolution*. The meeting was hosted by the Department of Geology, Lund University, in June 9–19 2013 and followed the successful annual meetings held in Madrid/Ludlow (2011) and Cincinnati (2012). The Lund conference was arranged jointly with the annual meetings of the Cambrian, Ordovician and Silurian subcommissions on stratigraphy, and included a post-conference excursion to key geological localities in Skåne, Västergötland and the Oslo Region. The conference was a focus for cutting-edge research in Lower and Middle Palaeozoic geology and palaeontology, and the presentations covered a wide range of topics from morphology and taxonomy of various fossil groups through advances in geochemistry and stratigraphy to biogeography, palaeoecology and palaeoclimatology. We would like to express our sincere gratitude to Anders Lindskog and Kristina Mehlqvist for their meticulous editing of the meeting proceedings. We are also grateful for valuable input from the organization and scientific committee associated with the meeting. We acknowledge financial support from the Swedish Research Council (grant D0013001 to MC), the Geological Survey of Sweden, the Geological Society of Sweden, the Department of Geology at Lund University, and the municipality of Lund.

Lund on 8 May 2013

Mikael Calner (meeting chair)

Oliver Lehnert (vice chair)

Per Ahlberg

# Silurian graptolite biostratigraphy of the Röstånga-1 drill core, Scania – a standard for southern Scandinavia

JÖRG MALETZ<sup>1</sup> AND PER AHLBERG<sup>2</sup>

The Lower Palaeozoic of Scania, southern Sweden, has long been a focus for research into the Ordovician and Silurian graptolite biostratigraphy of Scandinavia and provides the most complete successions available for the palaeo-continent of Baltica throughout this interval. The ratified Global Stratotype Section and Point (GSSP) for the Sandbian Stage of the Upper Ordovician Series is located in the Fågelsång area east of Lund, south-central Scania (Bergström et al. 2000; Bergström & Ahlberg 2004). The Silurian graptolitic strata of Scania are, however, less well known as little work has been done since the early investigations of Törnquist and Tullberg in the late 19<sup>th</sup> century, and hence additional research is sorely needed.

The Röstånga-1 core from west-central Scania, drilled in 1997 (Bergström et al. 1999), provides the most complete succession of the lower Upper Ordovician through lower Silurian (Llandovery, Telychian) of southern Scandinavia. The drilling was stopped at a depth of 132.59 m and penetrated a seemingly continuous succession with little tectonic disturbance. The sediments have a dip of ca. 35 degrees and the stratigraphic thickness of the sedimentary column was estimated to be about 96 m (Bergström et al. 1999). The core diameter is 71 mm (between 0 and 40.13 m) and 52 mm (between 40.13 and 132.59 m), thus providing enough sedimentological and palaeontological information for a detailed analysis.

The drill core has provided significant information on the Upper Ordovician–lower Silurian stratigraphy in Scania and serves as an important reference standard for this interval in southern Scandinavia. The lowermost part of the core comprises the upper part of the Sandbian Sularp Shale (?*Nemagraptus gracilis* to *Climacograptus bicornis* biozones), in which numerous K-bentonite beds were recorded (Bergström et al. 1999). The base of the Sularp Shale, with the Fågelsång Phosphorite Bed, and the base of the *Nemagraptus gracilis* Biozone ca. 1.4 m below (the base of the Sandbian Stage), was not reached. Above the Sularp Shale, the Skagen Formation, Mossen Shale, Fjäcka Shale and Lindegård Mudstone were differentiated in the Ordovician interval and a small number of graptolites of the *Pleurograptus linearis* and *Dicellograptus complanatus* biozones have been identified and support the estimated ages of the intervals (Pålsson 2002).

The Upper Ordovician (Katian–Hirnantian) Lindegård Mudstone grades into the Kallholn Formation, the base of which is Hirnantian in age and can be referred to the *Metabolograptus persculptus* Biozone. The sedimentology of the succession, unfortunately, has never been described in detail and a comparison with the Kallholn Formation of Dalarna (Llandovery, upper Rhuddanian to Telychian) is not possible at the moment. The mudstones of the Lindegård and Kallholn formations in the Röstånga-1 drill core include a variety of lithologies, predominantly black to dark brown, reddish and greenish mudstone and shale with intercalations of 1–15 mm thick siltstone layers in certain intervals. Lamination, cross bedding and bioturbation is common, except in some of the coarser sediment types. The upper part of the Kallholn Formation is dominated by dark to light greenish shale with lamination; coarser layers are usually lighter in colour. Some bioturbation can be found. Fossils are largely restricted to graptolites, but a few phosphatic and calcitic brachiopods and even trilobite fragments have also been encountered. Beds crowded with current-oriented graptolites are common in the lower, darker part of the Kallholn Formation, where graptolites are often preserved in full relief, filled with pyrite. The *Metabolograptus persculptus* Biozone (58.50–?52.70 m) can be recognized in the Hirnantian. The Rhuddanian, (Llandovery) *Akidograptus ascensus* (52.70–50.50 m), *Parakidograptus acuminatus* (50.50–46.70 m), *Cystograptus vesiculosus* (46.60–37.30 m) and *Monograptus revolutus* (37.30–35.40 m) biozones are preliminarily differentiated. A considerable gap may be present here comprising the lower Aeronian, as the oldest graptolite fauna of the Aeronian interval belongs to the *Lituigraptus convolutus* Biozone (35.40–31.05 m). It is followed by the *Monograptus sedgwicki* Biozone (31.5–28.45 m). The *Rastrites linnei* (28.45–24.12 m), *Spirograptus turriculatus* (24.12–21.70 m) and *Streptograptus crispus* (21.70–11.16 m) biozones belong to the Telychian interval. A finer subdivision of these biozones may be possible.

<sup>1</sup>*Institut für Geologische Wissenschaften, Freie Universität Berlin, Malteserstrasse 74-100, 12249 Berlin, Germany; yorge@zedat.fu-berlin.de*

<sup>2</sup>*Department of Geology, Lund University, Sölvegatan 12, SE-223 62 Lund, Sweden; per.ahlberg@geol.lu.se*

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