

## Preface



The main objective of IUGS/UNESCO International Geoscience Programme (IGCP) Project 591 *The Early to Middle Palaeozoic Revolution – Bridging the Gap between the Great Ordovician Biodiversification Event and the Devonian Terrestrial Revolution* is to significantly

improve our ability to correlate the stratigraphic record of Early to Middle Palaeozoic climate, biodiversity and planetary change so that we may better understand the cause-and-effect relationships within the ocean-atmosphere-biosphere Earth System (aims and activities on [www.igcp591.org](http://www.igcp591.org)). As part of the activities for 2014 of IGCP Project 591, the 4th Annual Meeting was hosted by the Department of Geology of the University of Tartu and organized in cooperation with the Institute of Geology at Tallinn University of Technology, the Geological Society of Estonia and the Geological Survey of Estonia in Tartu, Estonia on 10–19 June 2014 (Bauert et al. 2014). Full details of the meeting are available on the IGCP 591 website ([www.igcp591.org](http://www.igcp591.org)).

This thematic set of papers published as a Special Issue of the *Estonian Journal of Earth Sciences* arises from the presentations given at the meeting and also includes a few contributions from non-attending IGCP participants. Due to the large number of contributions the Special Issue will be published in two parts: part 1 as No. 4 of volume 63 (2014) and part 2 as No. 1 of volume 64 (2015). As the focus of IGCP Project 591

activities in 2014 is on evolutionary palaeoecology and palaeobiogeography, the 23 case studies presented in this first part of the Special Issue are timely and relevant with 16 regarding recent advances in Ordovician research and seven on the Silurian. A significant number of contributions are from researchers from developing countries, women geoscientists, early career scientists and students.

Several papers concentrate on studies of brachiopods, such as **Bauer and Stigall**, who explore aspects of the phylogenetic palaeobiogeography of Late Ordovician Laurentian brachiopods, while **Huang and Zhan** provide species-abundance models for brachiopods across the Ordovician–Silurian boundary of South China. **Zhan et al.** discuss the implications of the Darriwilian *Saucrorthis* Fauna for the Great Ordovician Biodiversification Event. Conodonts are the main focus of papers by **Ferretti et al.**, who have studied the composition and significance of the Katian (Upper Ordovician) conodont fauna of the Vaux Limestone (‘Calcaire des Vaux’) in Normandy, France, and **Chen et al.**, who examine the Llandovery (Silurian) conodont diversity on the Upper Yangtze Platform, South China. **Slavík** gives an interesting study of Silurian conodonts from the Prague Synform. **Radzevičius et al.** provide a novel integrated study on Upper Wenlock  $\delta^{13}\text{C}$  chemostratigraphy, conodont biostratigraphy and palaeoecological dynamics in the Ledai-179 drill core from Eastern Lithuania. A range of faunas from diverse geographical areas have been investigated in other papers. **Göncüoğlu et al.** discuss Ordovician graptolites from the basal part of the Palaeo-



Participants in the 4th IGCP 591 Annual Meeting in Tartu, Estonia (June 2014).

zoic transgressive sequence in the Karadere section, Istanbul–Zonguldak Terrane, NW Turkey, **Raevskaya and Dronov** provide new data on acritarchs from the Upper Ordovician of the Tungus basin, Siberian Platform, while **Thomka et al.** have studied a swollen crinoid pluricolumnal from the Upper Ordovician of northern Kentucky (USA). An online resource for bringing palaeontology to a greater audience is the topic of **Stigall et al.**, who discuss the Digital Atlas of Ordovician Life: digitizing and mobilizing data for palaeontologists and the public.

Chemostratigraphy is of central importance to determination of oceanic change and many papers concentrate on this important field. **Lehnert et al.** examine in detail the isotopic carbon excursion in the upper Tremadocian through the lower Katian (Ordovician) carbonate succession of the Siljan district, central Sweden, and **Fřyda and Štorch** highlight aspects of the carbon isotope chemostratigraphy of the Llandovery in northern peri-Gondwana with new data from the Barrandian area, Czech Republic. **Bauert et al.** provide new data on the chemostratigraphy of the Middle and Upper Ordovician succession in the Tartu-453 drill core, southern Estonia, and discuss the significance of the HICE.

Detailed knowledge regarding sequences of events is fundamental to unravelling minute climatic and oceanic oscillations. The study by **R. Hints et al.** on the centimetre-scale variability of redox-sensitive elements in Tremadocian black shales from the eastern Baltic Palaeobasin highlights this aspect. Precise timing of events is even more crucial. The contributions from **Huff et al.** on traces of explosive volcanic eruptions in the Upper Ordovician of the Siberian Platform and **T. Kiipli et al.** on geochemical discrimination of the Upper Ordovician Kinnekulle Bentonite in the Billegrav-2 drill core section, Bornholm, Denmark, are significant for the study of this stratigraphic interval. **Isozaki et al.** examine zircon chronology from the Cambrian of Estonia in order to clarify the tectono-sedimentary history of Palaeozoic Baltica.

Determination of palaeodepth is dependent on a variety of factors. The study by **Zhang et al.** on the

reconstruction of the mid-Hirnantian palaeotopography in the Upper Yangtze region, South China, provides a nice example of the utilization of available data for understanding the distribution pattern of the Hirnantian marine terrains.

Recognition of glaciation events is complex, and the findings of a facies association study by **Clayer and Desrochers** regard the stratigraphic imprint of a mid-Telychian (Llandovery, Early Silurian) glaciation on far-field shallow-water carbonates on Anticosti Island, Eastern Canada. **E. Kiipli et al.**, by examination of mean grain size fluctuations of the siliciclastic component in the Aizpute-41 core from West Latvia, provide important implications for the end-Ordovician glaciation event.

Carbonates and their formation are the focus of other studies. **Päbler et al.** examine the aphanitic buildup from the onset of the Mulde Event (Homerian, middle Silurian) at Whitman's Hill (UK) and thus open up discussion on the significance of microbial fabrics. **Kröger et al.** have studied the early Katian (Late Ordovician) reefs near Saku, northern Estonia, and attempt to determine the age of the Saku Member of the Vasalemma Formation using different lines of evidence.

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The staff of the *Estonian Journal of Earth Sciences* is thanked for publishing this Special Issue. Most of all thanks to the numerous reviewers who gave freely of their time and expertise in commenting on and correcting the papers in order to further improve their quality.

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Bauert, H., Hints, O., Meidla, T. & Männik, P. (eds). 2014. *4th Annual Meeting of IGCP 591, Estonia, 10–19 June 2014. Abstracts and Field Guide*. University of Tartu, Tartu, 202 pp.

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