IGCP 596, Mid-Paleozoic climate and biodiversity: Proceedings of the Opening Meeting in Graz, Austria (September 19–24, 2011)

Editorial preface by Erika Kido, Thomas J. Suttner, Peter Königshof & Johnny A. Waters

IGCP 596 (International Geoscience Programme, UNESCO; duration: 2011–2015) focuses on climate change and biodiversity patterns in the Mid-Palaeozoic. The Mid-Palaeozoic was a time of dynamic long-term climate change accompanied by substantial variations in biodiversity. During this project, we intend to increase the record of biodiversity, revise and update the Paleobiology database and clarify links between specific biodiversity patterns and climate change based on the application of additional methods for palaeoclimate modeling such as geochemistry and geophysics (in collaboration with IGCP 580). Currently, the global network of IGCP 596 consists of 135 scientists from 26 countries.

The Opening Meeting of IGCP 596 was organized in Graz from 19th to 24th of September 2011 (Fig. 1A). The general programme consisted of an indoor scientific session, which was followed by a field-workshop in the Carnic Alps (Austria-Italy). 36 delegates (among them 15 women in science and 5 PhD students) from 13 countries attended the initial meeting (Fig. 1B): Austria (6), Belgium (6), Bulgaria (1), Czech Republic (3), France (1), Germany (2), Japan (3), Mongolia (2), Poland (1), Russia (5), Spain (2), Turkey (2), and USA (2). A group of 18 participants joined the field workshop and visited the pre-Variscan sequences of the Carnic Alps (Fig. 1C).

The scientific session was divided into the four primary topics of interest to IGCP 596. Each topic was opened with a special keynote lecture given by an expert in the field:

1) Biodiversity patterns and evolution of fossils
   Keynote presented by Yarinpil Ariuchimeg (Mongolia) on Carboniferous fossils of Mongolia.

2) Climate perturbations: Effect on marine organisms
   Keynote presented by Michael Joachimski (Germany) on climate and ice volume history of the Mid-Palaeozoic: Insights from oxygen isotope proxies.

3) Multidisciplinary approach: Geochemistry and Geophysics
   Keynote presented by Anne-Christine da Silva (Belgium) on magnetic susceptibility evolution on Palaeozoic sedimentary settings, a clue for past palaeoenvironments.

4) Mid-Palaeozoic bio- and lithostratigraphy
   Keynote presented by Nadezhda G. Izokh (Russia) on biodiversity of Devonian conodonts from the West Siberia.

More details on keynote lectures and other presentations are provided in the conference abstract volume which is available online at http://erdwissenschaften.uni-graz.at/publikationen/zeitschrift/band16/index_de.php

The scientific part of the meeting was followed by a field workshop to Devonian and Carboniferous outcrops in the Carnic Alps. For the first day 3 stops were scheduled: the show-mine “Terra Montana”, the Geopark-Center in Dellach and the famous Ordovician to Devonian section in the Cellon Avalanche gully near the Plöcken Pass at the Austro-Italian border. On the second day we moved from the Valentinalm to Lake Wolayer (Fig. 1D). On both sides of the mountain-path, which is part of the Carnic Alps Geotrail, different depositional environments of pre-Variscan units are exposed. At the end of a long day full of discussions on biodiversity patterns of marine fossil groups present in Devonian deposits of this area, an evening talk on life and achievements of Otto H. Walliser was given by Hans Peter Schönlaub. On the third day we observed fossiliferous deposits of the Devonian shallow marine carbonates of Mount Seewarte on the way down to the village of Collina (Friuli, Italy) from where we returned to Graz.

We would like to thank all delegates for attending the IGCP 596 Opening Meeting and hope that the spirit of this conference will retain the enthusiasm of Devonian and Carboniferous workers in sharing their knowledge and experience with colleagues all over the world.
One result of this conference is this proceedings volume with a collection of 9 manuscripts concerning the Devonian and Carboniferous periods. Another paper dealing with Carboniferous epiphytic plants counts as a contribution to IGCP 575 (The Pennsylvanian terrestrial habitats and biotas of southeastern Euramerica). Because IGCP 596 shares the aim to increase and refine the documentation of biodiversity during the Palaeozoic with the closely related project IGCP 591 (The Early to Middle Palaeozoic Revolution: Bridging the gap between the Great Ordovician biodiversification event and the Devonian terrestrial revolution), additional three articles dealing with the Ordovician to Silurian time interval are included in this issue as contribution to the IGCP 591. In summary, the collection of 13 papers published in this issue of the *Bulletin of Geosciences* combine various topics related to geochemistry, palynology, ichnology and taxonomy (radiolarians, foraminifers, ostracods, bivalves and conodonts), having a strong focus on biostratigraphy, palaeoecology and the interpretation of palaeoenvironmental conditions.

The first contribution by Manchuk *et al.* (2013) concerns biostratigraphic ranges of late Silurian to early Devonian radiolarians paired with U-Pb SHRIMP data of magmatic zircons from tuffaceous rocks of the Fukuji area in Japan which allow an age-refinement of some radiolarian biozones. The manuscript shows that this technique might lead to a more precise radiolarian biostratigraphy, if applied in other radiolarian-bearing sequences globally.

Casier *et al.* (2013) provide a detailed study on the palaeoenvironmental development across the Givetian to Frasnian transition from the Dinant Synclinorium in Belgium which is based on ostracod-taxonomy and the analysis of rock facies.
temperature-related patterns. Their result shows that the morphology in some individual genera of Ordovician bryozoans is useful as proxy for cold-water setting (Mediterranean province) in order to test palaeogeographical patterns in Late Ordovician bryozoan faunas of Late Ordovician from warm-water settings (Avalonia, Baltic, and Laurentia-Siberian provinces) and on many indirect evidences and considerations by the authors.

Jiménez-Sánchez et al. (2013) undertook statistical analyses of the morphological differences between congeneric species of Late Ordovician bryozoans from warm-water settings (Avalonia, Baltic, and Laurentia-Siberian provinces) and cold-water setting (Mediterranean province) in order to test palaeogeographical patterns in Late Ordovician bryozoan morphology. Their result shows that the morphology in some individual genera of Ordovician bryozoans is useful as proxy for temperature-related patterns.

A detailed taxonomic study of the Middle Ordovician bivalves from Prague Basin (Czech Republic) is provided by Polechová (2013). The author describes a diversified bivalve fauna consisting of twelve species in nine genera indicating the palaeoecological aspect of each species. The fauna shows close affinities to bivalves, which occur in coeval deposits of Spain and France. Additionally the palaeogeographic distribution of the fauna is discussed.

Fryda & Manda (2013) provide an uninterrupted and complete stable carbon isotope record from the mid-Ludfordian (late Silurian) sequence in Barrandian area in Czech Republic. The authors compare the δ13C chemostratigraphic zonation with graptolite and conodont biostratigraphic zonations and propose an integrated δ13C, graptolite and conodont stratigraphy for the mid-Ludfordian. The study is an important contribution for better understanding of the geochemical event in the mid-Ludfordian.

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