CZECH IGCP NATIONAL COMMITTEE

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COMPREHENSIVE ANNUAL REPORT 2016

Prague 2016

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2016

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2. Members of the Czech IGCP National Committee (2016-2017)

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RNDr. Jaroslav Zajíc, CSc. *(Institute of Geology AS CR, v.v.i., Prague)*

3. Number and title of projects in which the Czech Republic has participated

- **IGCP 587 – IDENTITY, FACIES AND TIME – THE EDIACARAN (VENDIAN) PUZZLE**

Duration: 2010-2014
Project Leader: P. Vickers-Rich (Australia)
Czech Representatives: R. Mikuláš (mikulas@gli.cas.cz)

The main activities and results of the project in 2016, with the summary of the whole project:

The mysterious Ediacaran biota (i.e. the oldest macroscopic, multicellular biota, discovered chiefly in shallow marine platform sediments of most paleocontinents) has several times attracted the Czech national paleontological community, regardless no convincing finds of "Vendobionta" have so far been found in the Czech Republic. The reasons of this interest are twin: 1, the presumption that certain portion of the Neoproterozoic sediments of the Teplá-Barrandian Unit of the Bohemian Massif are shallow marine, fine-grained and negligibly metamorphosed; thereby, they could provide finds of "classical" Ediacaran taxa. The expectations have been increased by recent radiometric dating of the respective strata, putting the age of siltstones, fine-grained greywackes and clayey shales close to the Ediacaran-Cambrian boundary; 2, the theory that Ediacaran organisms did not extinct during the Cambrian Explosion and some of them might survive to the Lower Palaeozoic time in suitable settings. If the theory is valid, then it is advisable to search for Ediacaran-type type taphonomic windows for non-shelly biota. It means, among others, that the surviving Ediacaran forms could preserve in settings with minimum bioturbation and little fungal/bacterial activity. One of the possibilities is pure quartz sands that slowly accumulated in partly protected, most probably lagoonal settings. Such taphonomic windows could be repeatedly opened in Ordovician of the Barrandian area.

In the Neoproterozoic of the Barrandian area, several localities were studied in detail to assess the sedimentary settings and possible biotic features or fossils. No macroscopic fauna was fond, but three of the sites (Kocába River at Stará Huť, Pustověty, Praha-Zbraslav) yielded structures that can be interpreted as microbial mats. There do not represent the evidence of shallow marine settings, potentially inhabited by multicellular organisms; even in the Neoproterozoic, heterotrophic (e.g., fungal) MISS (microbially induced sedimentary structures) are presumed to exist. Introduction to the topic and popular science information was given by Mikuláš (2015a, b) and Vavrdová (2015), aimed to attract non-specialists and fellow workers to search for the MISS phenomena and potentially also macrofossils. Possible MISS described from the Ediacaran of the Barrandian area were subsequently described in a specialized, peer-reviewed journal (Vavrdová, 2016).

The team focused on possible Ediacaran-type taphonomic windows in the Cambrian of the Skryje area. The studied sequences contain undoubted microbially induced sedimentary structures but the previous reports on non-shelly fauna comparable to *Cyclomedusa* were not confirmed; instead, the proposed *Medusites* radiates was re-interpreted as a trace fossil (Mikuláš and Fatka, in press).

The probable Ediacaran biota was recorded in the Late Ordovician of the Barrandian area. Because the collected material is still increasing and diversifying, its publication is to be postponed after the finish of the fieldwork.

To summarize, the Ediacara-related material from the Bohemian Massif has not substantially contribute to the general knowledge of the topic, but the IGCP 587 Project was a welcome motivation to refresh and increase the regional knowledge; further contributions are to expected during the several next years.

References

Mikuláš, R. (2015a): Nejstarší doklad existence svalové tkáně? Nové zkameněliny z konce starohor. – *Vesmír*, 94, 1: 31–34.

Mikuláš, R. (2015b): Stromatolity. Edice Věda kolem nás No 35, Academia, Praha: 1-20.

Mikuláš, R. and and Fatka, O. (in press): Ichnogenus *Astropolichnus* in the middle Cambrian of the Barrandian area, Czech Republic. *Ichnos*.

Vavrdová, M. (2015): Existovala v Čechách ediakarské fauna? – *Vesmír*, 94, 1: 26–30.

Vavrdová, M. (2016): Ediakarské mikrobiality z okolí Nového Knína (tepelsko-barrandienská oblast) / Ediacaran microbialites from the Town of Nový Knín surroundings (Teplá-Barrandian Unit). *Gescience Research Reports*, 49: 37-41.

- **IGCP 591 – THE EARLY TO MIDDLE PALAEOZOIC REVOLUTION**

Duration: 2011-2015

Project Leaders: B.D. Cramer (USA), Ž. Žigaitè (Lithuania), T. R.A. Vanderbrouke (France), K. Histon (Italy), R. Zhan (China), G.L. Albanesi (Argentina), M.J. Melchin (Canada), M. Calner (Sweden)

Czech Representatives: Š. Manda (stepan.manda@geology.cz) and **Z. Tasáryová** (zuzana.tasaryova@geology.cz)

The list of publications in peer-reviewed journals with dedication to the project:

Štorch, P., Manda, Š., Slavík, L. & Tasáryová, Z. 2016. Wenlock-Ludlow boundary interval revisited: new insights from the offshore facies of the Prague Synform, Czech Republic. *Canadian Journal of Earth Sciences, 53*, 7, 666–673.

Chadimová, L., Vacek, F., Sobien, K., Slavík, L. & Hladil, J. 2015. Petrophysical record of the Late Silurian shallow-water carbonate facies across the Lau Event (Prague Synform, Czech Republic) and dynamic time warping alignment of the magnetic susceptibility logs. *Geological Society, London, Special Publications, 414*, 1, 133–155.

Slavík, L. 2015. Revision of the conodont zonation of the Wenlock-Ludlow boundary in the Prague Synform. *Estonian Journal of Earth Sciences, 63*, 4, 305–311.

- **IGCP 640 – S4LIDE (SIGNIFICANCE OF MODERN AND ANCIENT SUBMARINE SLOPE LANDSLIDES)**

Duration: 2015-2020
Project Leaders: L. Moscardelli (USA), A. Micallef (Malta), M. Strasser (Austria), J. Chaytor (USA), J. Mountjoy (New Zeland), D.C. Mosher (USA), S. Krastel (Germany), C. Lo lacono (United Kingdom), M. Vanneste (Norway), Y. Yamada (Japan),
Czech Representative: J. Stemberk (stemberk@irsm.cas.cz)

The main activities and results of the project in 2016:

Year 2016 was the first year when Czech representatives joined to this project. Main work was focused on upgrading a monitoring network on a megalandslide on El Hierro Island, Canaries, Spain. The monitoring network consists of three TM-71 3D dilatometers installed in the scarp area of the megalandslide. This megalandslide was supposed to be an aborted landslide. However, recent measurements show that it is still creeping and the rate of the creep reflects the seismicity and volcanic activity in the area. Fieldwork costs were covered by the Junior grant project of the Czech Science Foundation (GA16-12227Y). Results of the monitoring were presented by Jan Blahůt during ECORD Summer School on "Submarine Geohazards: Mapping, Monitoring, and Modelling" at University of Bremen, MARUM, Germany.

- **IGCP 649 – DIAMONDS AND RECYCLED MANTLE**

Duration: 2015-2019
Project Leaders: J. Yang (China), Y. Dilek (USA), W.L. Griffin (Australia), P.T. Robinson (Canada), I. Milushi (Albania), M.M. Abu Anbar (Egypt)
Czech Representative: Jana Kotková (jana.kotkova@geology.cz)

The main activities and results of the project in 2016:

Microdiamonds of North Bohemia are confined to discrete lithological layers within diamond-free rocks equlilibrated under HP granulite-facies conditions [1]. This suggests an internal carbon source for diamond formation. SEM, AFM, TEM and SIMS techniques allow characterization of diamond-forming media. Felsic UHP gneiss contains exclusively individual well-shaped diamond octahedra with smooth faces, enclosed in garnet, kyanite and zircon. In contrast, clusters of diamond cuboids with rough faces occur in garnet and zircon in the intermediate UHP garnet-clinopyroxene rock. Well-preserved diamond, and graphite in separate multiphase inclusions, are associated with quartz, rutile, apatite, and Ca-Mg carbonate in both rock types. A TEM study shows that octahedral diamonds are single crystals with regular interface towards the host phase, whereas cuboids are polycrystalline and their interface is

irregular. Amorphous quenched fluid/melt occurs in rare cavities located close to, or at, the diamond interface, and in triangular cavities delimited by numerous newly-formed (111) crystal faces due to dissolution of diamond cuboids. In contrast, octahedral diamond dissolution is restricted to individual funnel-shape cavities located at the oucroping dislocation array (TEM), and similar-sized negative trigons (AFM) with symmetric and pointed-bottom depth profiles on (111) faces. Such trigons form during HP-HT experiments using fluid/melt with H2O:CO2 ≥ 50:50 mol. %. Negative δ13C values in both diamond types (-21 to - 33 ‰) correspond to organogenic carbon source. We conclude that both diamond types formed from high-density hydrous fluid/melt containing carbonatitic, silicic, saline, sulphate and phosphate components. The constrasting diamond morphology results from different degree of supersaturation, growth rate, and carbon species in the protolith.

Reference

Kotková, J. – Fedortchouk, Y. – Jakubová, P. – Whitehouse, M. – Wirth, R. (2016): Bohemian Microdiamonds: Diamond-forming Media and Carbon Source. Acta Geologica Sinica, 90: 217-219.

4. Combined and planned projects

SIDA/UNESCO/IGCP Program "Environmental & Health Impacts of Abandoned Mines in Sub-Saharan African Countries" (2015- 2019)

Leader of the project is Theophilus Clavell Davis Mangosuthu, University of Technology, Durban; Head of the Scientific Committee: **Bohdan Kříbek**, Czech Geological Survey, Praha

The project is organized to understand: 1. How the mining activities and particularly abandoned mines negatively affect the ecosystem and the health of the neighboring communities; 2. What are the most appropriate rehabilitation technologies and remedial actions for contaminated sites; 3. How to promote a peaceful mining atmosphere through education and outreach.

The project is funded by the Swedish International Development Cooperation Agency (SIDA). The core participants of this project are built on UNESCO-IUGS International Geoscience Programme (IGCP), namely IGCP-594 and IGCP-606, but the network is growing rapidly. In 2015 the project was focused on the establishment of the organization network and selection and monitoring of individual topics in African countries. Based on the recommendation of the Scientific Committee of the project, over 20 sub-projects in many African countries (Namibia, Burkina Faso, Cameroon, Mali, Nigeria, Senegal, Zimbabwe, South Africa, Cote d´Ivoir and Zambia) were selected to be funded in next years. Throughout the 2015 initial phases of individual projects were continuously monitored.

More information on the Project 606 can be obtained at:

http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/earth-science-education-in-africa/earthscienceeducation02/

In 2016, the evaluation of individual projects is scheduled for February 2016 within the IGCP/UNESCO Board meeting in Paris. Presentation of partial results of individual sub-projects and meeting of the scientific committee of the project is planed within the 35th Geological Congress in Cape Town, South Africa.

5. Sponsors of IGCP projects in the Czech Republic in 2016:

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