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The 2014 International Course on Carbonate Microfacies (Erlangen, Germany) – a life-time benefit

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Carbonates are born, not made.
Noel P. James

From February 24 to 28, 2014, the 'Institut für Paläontologie, GeoZentrum Nordbayern' of the Friedrich Alexander Universität in Erlangen (Germany) hosted the so-called Flügel Course, an international course on carbonate microfacies. Microfacies analysis is a technique of detailed investigation of sedimentary rocks in thin sections under a petrological microscope. Forty years have passed since the eminent carbonate sedimentologist, the late Prof. Erik Flügel, first organised an informal course on microfacies; after his death, this was continued by Prof. Axel Munnecke and his team at the same place. The transfer of solid knowledge associated with a nice atmosphere and a perfect organisation have driven me to write this note. Its purpose is to highlight objectives of the course, benefits to participants and encourage others to apply for participation next year.

Thirty-seven participants (Fig. 1) came to Erlangen for the 2014 course. They came from Canada,

Fig. 1. Participants of the 2014 Flügel Course in front of the Law Faculty in Erlangen where this year's course was held. Photo courtesy Dr Barbara Seuss.

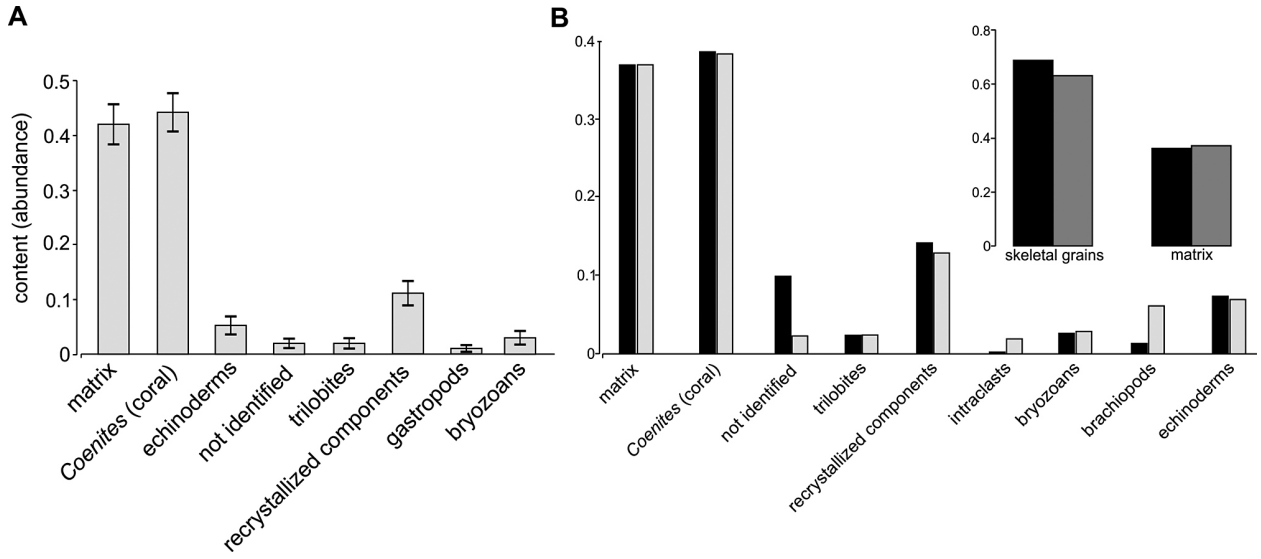

Fig. 2. Plots of point-counting results obtained by two different methods, namely points (n = 190) and lines (thread of the length of a print-out divided on 10 equal parts with unspecified number of replicates) applied to a thin section of floatstone with *Coenites* coral from the Silurian of Gotland (Haganäs locality). Note that both approaches lead to congruent results. All 2014 course participants should be credited for data used in this plot. Raw data available from the author upon request.
A: General plot showing the contribution of specific components to microfacies (whiskers denote the standard error); **B:** Bar graph showing microfacies components according to counting methods, generalized on the insert (black bars = line counting, grey bars = point counting).

the Czech Republic, France, Germany, Iran, Iraq, Poland, the Sultanate of Oman and the U.S.A., to mention only a few of their home countries. This created a great opportunity to exchange ideas and field observations, as well as to practice English, and interact with cultures from several continents. I enjoyed every lecture and exercise of the 45-hour intensive course, and it was a great pleasure talking and spending this week with knowledgeable and friendly lecturers.

Here I will focus on the few selected topics and events that, in my opinion, best represent the spirit of the event. Each course module was divided in two parts, a lecture and a practical hands-on exercise. A specially prepared compilation of materials was presented (charge included in the fee) and instructors were ready to assist with each new set of thin sections. Importantly, many of the thin sections were associated with host sediment, which facilitated a sedimentological interpretation and environmental inferences in a broader geological context. What is unique for this course, is the collection of thin sections from remarkable localities and settings. These include, for example, samples from deep-sea cold-seep carbonates from the subduction zone around Nicaragua, Proterozoic pisoids, very large sets of thin sections from cold polar and temperate environments as well as archeocyaths or microbial reefs of various ages.

Axel Munnecke gave a talk about limestone/marl alternations, Matthias López Correa did so about deep-sea reefs flourishing at several hundred to thousands of metres water depth, Max Wisshak about bioerosion and biocorrosion, Thomas Hammerich about the ever interesting cold-seep carbonates, and Emilia Jarochowska about point-counting and quantitative methods applied to microfacies. The last lecture was followed by a exciting practical based on an analysis of an A3 print-out of the same thin section by all participants working in pairs. The objective was to verify if the results achieved using two different methods of point counting are comparable (Fig. 2).

From my own perspective, the most valuable experiences during the whole workshop were our work on own thin sections with guidance from instructors, observations of thin sections displayed to the audience by means of a camera fitted on a microscope, the point-counting exercise and a visit to the Institute's preparatory lab together with Birgit Leipner-Mata, who showed us the back-stage process of thin-section preparation. Of course, I should not forget to mention evenings in the pub with great company or the mid-course party with delicious Bavarian food and unlimited beer (as I like). Participation in the Flügel Course also convinced me that we had a really good background provided during graduate studies of geology in Poland, particularly

with respect to palaeontology, sedimentology and microfacies analysis.

Participation in the course is rather inexpensive, even for a student budget (140 euros for students) and acceptance is based solely on the order of e-mails (no application forms are needed). I have really appreciated this kind of application process as in the current system, science funding and organisation are based on strong competition and a lot of paper work is usually involved, which is not the case in the recruitment for the Flügel Course. This year's course was, for the first time, followed by short summer workshop. This three-day long event in July was also held in Erlangen and organised by Prof. Axel Munnecke along with Prof. Michael Joachimski and Prof. Wolfgang Kiessling. Its objective was to link microfacies analysis with stable-isotope geochemistry and analytical palaeobiology. Another novelty is 'Flügel course on tour'; this year an additional course was organised for the first time outside Erlangen, namely at the China University of Geoscience in Wuhan. Next year's edition in China will probably be hosted in Nanjing.

It may be important for students that participation in this event is rewarded with 3 ECTS points and that a certificate is given. In geological disciplines such as palaeontology and sedimentology, there are much less activities like the Flügel Course than in, for instance, marine ecology or polar science. Consequently, I think that everybody interested in working in the field of sedimentology, carbonates or microfacies should consider to go at least once during their career to Erlangen. For those interested in participating, an official webpage (link: http://www.gzn.uni-erlangen.de/en/palaeontology/events/fluegelkurse/) or Facebook account (https://www.facebook.com/fluegelkurs) may be helpful. These contain details about the course, posting further calls and galleries of pictures from previous years.

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