

Preface: Proceedings of the 5th International Symposium on Lithographic Limestone and Plattenkalk

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The symposium

Following the former editions of the International Symposium on Lithographic Limestone and Plattenkalk “ISLLP” (Lyon, 1991; Cuenca, 1995; Bergamo, 1999; Eichstätt/Solnhofen, 2005), Switzerland was the host country for the 5th ISLLP in August 2009, jointly organised by the Natural History Museum Basel and the *Paléontologie A16* (Office de la culture, Porrentruy, Canton Jura). The Naturmuseum Solothurn (Switzerland) and the Staatliches Museum für Naturkunde Karlsruhe (Germany) were involved in the organization of the fieldtrips.

The symposium was attended by 60 researchers including established palaeontologists and sedimentologists, as well as young PhD students and post-docs from different European countries but also from the USA and Brazil (Fig. 1a, b). We wish to express our gratitude to the International Association of Sedimentologists (IAS) for sponsoring student travel grants, and for general support of the Swiss Palaeontological Society (SPS), the International Palaeontological Association (IPA), and the European Association of Vertebrate Palaeontologists (EAVP).

An international conference on Lithographic Limestone and Plattenkalk organized by the Natural History Museum Basel and the *Paléontologie A16* (Office de la culture, Canton Jura), and held in Basel from August 17th–22nd 2009.

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Excellent keynote lectures, generously sponsored by the Commission of the Swiss Palaeontological Memoirs (KSPA), were given by Derek E.G. Briggs on molecular taphonomy, Eberhard “Dino” Frey on pterosaurs, Walter G. Joyce on Late Jurassic turtles, and by Adolf “Dolf” Seilacher on the role of biomats for the formation of lithographic limestone. The latter started the famous research initiative “Sonderforschungsbereich 53” on palaeoecology and Fossil Lagerstätten in Tübingen back in the 1980s, which was the renaissance of the Lithographic Limestone and Black Shale research.

During the oral and poster sessions (August 18th to 20th), 23 talks and 8 poster contributions focused on new and exciting discoveries, palaeoecological and ichnological issues, but also on geochemical aspects of sedimentation rates or the importance of microbial mats during the formation and preservation of Lithographic Limestone. The studied localities are situated in Europe, South and Latin America, the Middle East, and Asia and range in age from the Middle Cambrian to the Early Oligocene. During coffee, lunch, and tea breaks, there was plenty of time for interesting and animated discussions in a familiar atmosphere, the occasion to make new acquaintances, to visit the collections of the Natural History Museum Basel, or even to take a swim in the river Rhine. The latter was highly recommended because of the unusual high outside temperatures.

The three field trips benefited from ideal summer conditions. On Monday 17th we visited the Oligocene clay pit of Frauenweiler (Southern Germany) (Fig. 1c), which is famous for fossil fishes (Micklich, 1998) and birds (Mayr & Micklich, 2010), notably the discovery of the oldest hummingbird (Mayr, 2004). This important quarry will finally not be landfilled and excavations can still go on for



Fig. 1 **a** Group photo of the attendants of the 5th ISLLP in front of the Natural History Museum Basel. **b** Group photo during the fieldtrip to the dinosaur tracksite Courtedoux—Béchat Bovais near Porrentruy (Canton Jura). **c** Nocturnal view of several sauropod trackways at the Courtedoux—Béchat Bovais tracksite, excavated by the *Paléontologie A16* prior to the construction of Swiss federal highway A16. In summer 2011 this site was covered up by the highway. **d** Adolf “Dolf” Seilacher pointing to a pes footprint of the trackway left by a

large sauropod. Reuchenette Formation (Late Kimmeridgian), Lommiswil quarry near Solothurn (Switzerland). **e** Christian A. Meyer and Silvan Thüring show the collection of the excavations in the Late Jurassic Solothurn Turtle Limestone, housed in the Natural History Museum Solothurn. **f** Derek E.G. Briggs and Samuel Giersch looking for fossil fishes and early humming birds in the Early Oligocene Frauenweiler (S Germany) clay pit. Photos **b**, **c**, and **e** by Patrick Dumas

many years, as announced by Eberhard “Dino” Frey, our field trip leader. On Friday 21st, active excavations of Late Kimmeridgian deposits (Marnes à *virgula*; dinosaur

tracksites) and a quaternary sinkhole along the future course of the Swiss federal highway A16 near Porrentruy (Canton Jura, NW Switzerland) were visited, and the most important

discoveries (dinosaur tracks, turtles, crocodylians, mammals) were presented (Billon-Bruyat, 2005; Marty, 2008). The highlight of the day was a splendid aperitif and barbecue (suckling pig) in immediate vicinity of a huge dinosaur tracksite, followed by the stunning observation of dinosaur tracks and sedimentary structures at night using artificial illumination (Fig. 1d). The excursion on Saturday 22nd, finally, led to the Late Kimmeridgian Lommiswil dinosaur tracksite near Solothurn (Meyer, 1990) (Fig. 1e), to the grave of Amanz Gressly (1814–1865) who introduced the term “facies” into geology (Gressly, 1838; Cross & Homewood, 1997), to outcrops of the well-known Solothurn Turtle Limestone in the Zetter quarry (Meyer, 1994), and to the Naturmuseum Solothurn, where an important collection of Late Jurassic invertebrates and vertebrates (notably fishes, turtles, and crocodylians) is housed (Fig. 1f).

The “Abstracts and Field Guides” volume was published by the *Société jurasienne d’émulation* (Billon-Bruyat et al. 2009) and we acknowledge the sponsoring by Paléojura (Office de la culture, Canton Jura).

The proceedings Supplementary Issue

The present full-colour Supplementary Issue of the Swiss Journal of Geosciences assembles 13 proceeding papers of the 5th ISLLP. The volume was financed with the full support of the Commission of the Swiss Palaeontological Memoirs (KSPA), and we heartily acknowledge this funding, without which, the present volume could not have been realized.

Another indispensable point to guarantee the high quality of the original research articles is the great investment of time and support by the reviewers, who we warmly thank: N. Bardet, T.K. Baumiller, C. Bennett, V. de Buffrénil, L. Cavin, G. Cuny, W. Etter, R. Feldmann, J. Kriwet, H.-J. Kuss, M.G. Lockley, M. Maisch, O. Otero, O. Rieppel, G. Rössner, H.-P. Schultze, G. Schweigert, C.J. Underwood, G. Viohl, A. Wetzel, several anonymous reviewers, and associate editor Michael J. Benton.

The contributions are highlights from the Symposium and they are from active researchers and research-groups. They cover a wide range of topics with the main focus on vertebrate palaeontology (Mesozoic fishes, sauropterygians, pterosaurs, artiodactyls) and invertebrate palaeontology (developmental biology of crustaceans, limulid locomotion, functional morphology of *Saccocoma*, trace fossils). In addition to this, other papers focus on palaeoenvironments and carbonate sedimentology (terminology & classification, role of microbial mats) as well as descriptions of new occurrences of Lithographic Limestone and Plattenkalk (Cambrian of China, Eocene of Croatia). The studied

material includes exceptionally well-preserved fossils, classical palaeontological approaches (history of palaeontology, taxonomy (description of several new taxa), faunal reviews, tooth histology, relative warp analysis, ichnology) and new methods such as composite-fluorescence imaging microscopy. The high diversity of these up-to-date papers highlights the importance of interdisciplinary scientific congresses and studies. Furthermore, it confirms that Lithographic Limestone and Plattenkalk deposits are amongst the most important Fossil Lagerstätten in the world and remain a major source for palaeobiological data. This volume will be useful for palaeontologists, palaeobiologists, and sedimentologists alike that are involved in studies of Lithographic Limestone and Plattenkalk Fossil Lagerstätten.

Conclusion and perspective

In conclusion, the 5th ISLLP and the present volume clearly demonstrate that research on Lithographic Limestone and Plattenkalk is alive, that these deposits are spatially and stratigraphically widespread, and that they are major Fossil Lagerstätten continuing to reveal exciting palaeontological discoveries and important palaeobiological data. Different preservational, sedimentological, and palaeoenvironmental aspects of many Lithographic Limestone and Plattenkalk deposits are still poorly understood and disclose interesting fields for future research projects. This may be stimulated by the recent growing interest in the role of microbial mats within the sedimentological and geobiological research communities (Noffke et al. 2001; Paction et al. 2008; Seilacher, 2008).

Terminology and classification of Lithographic Limestone and Plattenkalk was discussed in detail in the Symposium volume of the 1st ISLLP held in Lyon (France) in 1991 (Bernier & Gaillard, 1994). Nonetheless, in the near future, issues of terminology and classification need to be re-addressed, because of the increasing use of terms such as “(bio-)laminites” and “biolaminated deposits” (Gerdes & Krumbein, 1987), or “biolaminoid facies” and “platy limestone/dolomite” (Brehm et al. 2002). Chu et al. (this volume) make a first step by proposing an updated classification scheme for Lithographic Limestone, Plattenkalk, and platy limestone.

We are looking forward to the next 6th ISLLP, which will be held from March 4th to 8th 2013 in Saltillo (Sierra Madre Oriental, Coahuila, NE Mexico) at the Museo del Desierto (<http://www.museodeldesierto.org/>) with fieldtrips to Vallecillo, Cuatro Ciénegas, and possibly Tlayuas. The symposium will be co-organised by the University of Heidelberg and the contact person is Christina Ifrim (ISLLP2013@geow.uni-heidelberg.de).

List of included articles

- CHU, G. KOCH, R. & WEISS, C.: Compaction-formed platy limestone from the Middle Cambrian Zhangxia Formation (Western Hills, China)—towards a new classification for bedded limestone
- ELGIN, R.A. & FREY, E.: A new azhdarchoid pterosaur from the Cenomanian (Late Cretaceous) of Lebanon
- FREY, E., MEYER, C.A. & TISCHLINGER, H.: The oldest azhdarchoid pterosaur from the Late Jurassic Solnhofen Limestone (Early Tithonian) of Southern Germany
- GAILLARD, C.: A giant limulid trackway (*Kouphichnium lithographicum*) from the Lithographic Limestones of Cerin (Late Kimmeridgian, France): ethological and environmental implications
- GIERSCH, S., FREY, E., STINNESBECK, W., IFRIM, C. & PADILLA GUTIERREZ, J.M.: *Scombroclupea occidentalis* sp. nov. (Clupeiformes, Teleostei) from the Cenomanian (Cretaceous) Plattenkalk deposits of NE Mexico
- HAUG, J.T., HAUG, C., WALOSZEK, D. & SCHWEIGERT, G.: The importance of lithographic limestones for revealing ontogenies in fossil crustaceans
- HESS, H. & ETTER, W.: Life and death of *Saccocoma tenella* (GOLDFUSS)
- KRIWET, J. & KLUG, S.: A new Jurassic cow shark (Chondrichthyes, Hexanchiformes) with comments on Jurassic hexanchiform systematics
- MENNECART, S., BECKER, D. & BERGER, J.-P.: *Iberomeryx minor* (Mammalia, Artiodactyla) from the Early Oligocene of Soulce (Canton Jura, NW Switzerland): systematics and palaeodiet
- MÜLLER, M.: The fish fauna of the Late Jurassic Solothurn Turtle Limestone (NW Switzerland)
- SCHEYER, T.M. & MOSER, M.: Survival of the thinnest—rediscovery of Bauer's (1898) ichthyosaur tooth sections from Upper Jurassic lithographic limestone quarries, south Germany
- SEILACHER, A. & MRINJEK, E.: Benkovac Stone (Eocene, Croatia): a deep-sea Plattenkalk?
- STOCKAR, R. & RENESTO, S.: Co-occurrence of *Neusticosaurus edwardsii* and *N. peyeri* (Reptilia) in the Lower Meride Limestone (Middle Triassic, Monte San Giorgio)

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