

CONTINENTAL ICHNOLOGY – INTRODUCTION TO THE VOLUME

Ichnofossils from continental depositional environments have been established as an important tool for palaeobiology, palaeoecology, palaeogeography and stratigraphy. While tetrapod footprints generally provide data about trackmakers, their evolution, and palaeogeographic-stratigraphic distribution, continental invertebrate traces are better indicators of the specific ecology of the fluvial, lacustrine, aeolian or marginal marine habitats of their producers. This is, in part, due to their low mobility and restricted niche space when compared to the high mobility of tetrapods, though they have longer stratigraphic ranges and their producers are more difficult to be identified. Because both vertebrate and invertebrate traces often occur within the same layers or on the same bedding planes, the combined information from both these ichnological sources contributes to the better understanding of the complex interaction between organisms, their environment, and its depositional processes. Numerous localities originally only known for their vertebrate footprints, have subsequently been re-studied in light of the conjunctive invertebrate trace record. In so doing, this furthers our insight into the palaeoecology of these sites.

In the last several decades, continental vertebrate ichnology has increasingly attracted attention as a biostratigraphic and biochronologic tool. Characteristic morphotypes and ichnoassemblages, where tetrapod footprints show a restricted stratigraphic and wide geographic distribution,

are used for subdivision and correlation of depositional sequences, solely or in addition to the body fossil record.

Methodologically recent studies in vertebrate ichnology have largely benefited from the use of 3D photogrammetric and laser scan technologies for documentation of footprints and trackways. In particular, photogrammetry can now be considered a standard method by which more objective documentation and description of footprint morphology are enabled, additional to the photographic illustration and alternative or additional to the classic interpretive outline drawing. Also, this opens entirely new possibilities to use vertebrate tracks to reconstruct the locomotion and biomechanics of the producers.

The powerful progress in the understanding of continental ichnofossils and their environment as well as advances in the re-evaluation of processes involved in their origin and formation are reflected in the papers published in this volume. The discussed topics include: Carboniferous arthropod herbivory on plant remains, Cretaceous invertebrate ichnoassociations, Pliocene insect burrows, Carboniferous reptile tracks, Permian therapsid tracks, Triassic archosauromorph tracks and Cretaceous dinosaur tracks. They follow trails and horizons outlined during the 3rd International Conference of Continental Ichnology (ICCI 2019, presented by a dedicated contribution within the volume) in Halle, Saale, Germany, and might be the basis for future investigation and discussion.

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Guest Editors

