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A new subdisarticulated machaeridian from the Middle Devonian of China: Insights into taphonomy and taxonomy using X-ray microtomography and 3D-analysis

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Machaeridians are an extinct group of armoured annelids, which are mainly known from isolated sclerites present from the Ordovician to the Permian. Based on articulated specimens with preserved soft-tissues and trace fossils, derived machaeridians are interpreted to have an infaunal burrowing mode of life. However, the taphonomy of sclerite associations is still largely unstudied. We herein investigated associated sclerites from the Middle Devonian of China using micro-computer tomography and 3D-analysis. These sclerites belong to a single individual and lie in close proximity. The absence of indications for current alignment, major bioturbation or other processes causing a disarticulation as reflected in the randomly arranged dacryoconarids suggest that the sclerites became disarticulated in the course of the normal decay processes, perhaps aided by scavenging and incomplete burial. The unique morphology of the sclerites indicates that the specimen presented here belongs to a previously undescribed species, which we describe herein as *Lepidocoleus kuangguoduni* sp. nov.

Key words: Annelida, Lepidocoleidae, tomography, SPIERS, taphonomy, Devonian, Nandan-Formation, Guangxi, China.

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