



Equatorial Gondwanan History and Early Palaeozoic Evolutionary Dynamics



IGCP 668: Equatorial Gondwanan History and Early Palaeozoic Evolutionary Dynamics

1

Program and abstracts book

2021 Annual Meeting, JAPAN (Online)

16th to 19th July, 2021

PROGRAM AND ABSTRACT BOOK

2021 Annual Meeting
16th to 19th July 2021, University of Tsukuba, Japan



[Oral 16] The Guole Lagerstätte (Guangxi Province, China): Bridging the Furongian Gap of echinoderms

Bertrand Lefebvre^{a,*}, Xuejian Zhu^{b,c}, and Samuel Zamora^d

^a UMR CNRS 5276 LGLTPE, Lyon 1 University, Villeurbanne, F-69622, France.

^b State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing, 210008, China.

^c Nanjing Institute of Geology and Palaeontology, Nanjing, 210008, China.

^d Instituto Geológico y Minero de España, Zaragoza, E-50006, Spain.

* Corresponding author: bertrand.lefebvre@univ-lyon1.fr

ABSTRACT

During Cambrian Series 2 and Miaolingian, echinoderms underwent a major diversification leading to a wide palaeobiogeographic distribution and a particularly high morphological disparity, with the appearance of numerous distinct 'body plans' ('classes') in less than 20 Myr (e.g. cinctans, ctenocystoids, edrioasteroids, gogiid and columnal-bearing eocrinoids, helicoplacoids, helicocystids, imbricates, solutans, stylophorans). The Early Ordovician represents a second major burst in echinoderm diversity and disparity, with the onset of several additional clades, including the earliest representatives of the three extant classes Asterozoa, Crinozoa and Ophiurozoa. In marked contrast with these two time intervals yielding abundant and diverse echinoderm assemblages, very few echinoderm remains have been documented so far in the Furongian (Cambrian Stages Paibian–10). This lack of data from the late Cambrian is not unique to echinoderms, but is also observed for most other marine invertebrates. Until recently, few, low diversity Furongian echinoderm assemblages had been reported, mainly from Australia (Chatsworth Limestone), France (Montagne Noire) and the USA (mostly from Nevada and Utah). In the last 15 years, a new major echinoderm Lagerstätte, the Guole Biota, was discovered in the Sandu Formation (Jiangshanian) of Guangxi Province, South China. The sandstones and shales of the Sandu Formation yielded hundreds of extremely well-preserved, fully articulated echinoderms belonging to four distinct echinoderm classes: Edrioasteroidea, Rhombifera, Soluta and Stylophora. Edrioasteroids are rare and represented by the edrioblastoid *Cambroblastus guoleensis*, which is closely related to *C. enubilatus* from the Chatsworth Limestone (Australia). Rhombiferans are relatively common and consist of the glyptocystitid *Sanducystis sinensis*, which is morphologically close to Furongian taxa from Australia (*Ridersia*) and France (*Barroubiocystis*, *Velieuxicystis*). The Sandu Formation yielded rare specimens of solutans, all belonging to a new, yet undescribed species, which represents the earliest record of this class outside of Laurentia. Stylophorans are particularly abundant and diverse, with at least two distinct cornute taxa (*Drepanocarpus* sp. and '*Phyllocystis*' *jingxiensis*) and one mitrate ('*Nanocarpus*' *guoleensis*). The earliest hanusiid *Drepanocarpus* was previously known only from the Furongian of Australia. '*Phyllocystis*' *jingxiensis* is closely related to cornutes from the Tremadocian of Korea (Dongjeom Formation) and Morocco (Fezouata Shale). Finally, '*Nanocarpus*' *guoleensis* is the earliest known mitrate, with clear affinities with younger taxa from the Tremadocian of Korea, France and Morocco. Consequently, the Guole Biota has yielded one of the most diverse (four classes, seven taxa) and best preserved echinoderm assemblage known so far. Taxonomically, it is typical of the low diversity 'rhombiferan-stylophoran' assemblages documented worldwide in the late Cambrian. From a palaeobiogeographic point of view, affinities are highest with coeval Australian faunas, although links with other peri-Gondwanan areas are also relatively obvious (France, Korea, Morocco).

Keywords: China, Echinoderms, Furongian, Guangxi Province, Guole Biota.