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Early Cambrian eocrinoids from Guizhou Province, South China

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Abstract

Numerous specimens of *Guizhoueocrinus yui* n gen. et sp. occur in the middle-upper parts of the Lower Cambrian Balang Formation, eastern Guizhou, and are the earliest well preserved gogiids. Mature specimens are larger than most comparable gogiids, thecal plates are very numerous and sutural pores are smaller. Stalk is polyplated, conical and long; brachioles (up to 10) are spirally coiled. The species comprises a significant component of the Balang Fauna. It is distinctly different than *Sinoeocrinus lui* and *Sinoeocrinus globus* from the Middle Cambrian Kaili Biota in the adjacent region in Guizhou. This new gogiid expands the geographic range of Lower Cambrian eocrinoids and provides significant new data on gogiid evolution.

Keywords: *Guizhoueocrinus yui* gen. et sp. nov.; eocrinoid; gogiids, Lower Cambrian; Balang Formation; Guizhou Province, China

1. Introduction

Gogiids are the largest eocrinoid (Echinodermata) order. By the early 1990s at least 23 gogiid species had been described (Walcott, 1917; Robison, 1965; Ubaghs, 1968; Sprinkle, 1973, 1976; Paul and Smith, 1984; Ubaghs and Robison, 1985; Robison, 1991) and were mainly known from the Middle Cambrian strata of North America and Europe. Research on gogiid Eocrinoidea started late in China. In the 1980s they were discovered in the Lowermost Middle Cambrian Kaili Formation at Balang village, Taijiang (now Jianhu), Guizhou Province (Huang et al., 1985) and subsequently were studied by Zhao et al., 1994, 1999, 2002a,b. These eocrinoids *Sinoeocrinus* (Zhao et al., 1994, 1999; Parsley and Zhao, 2006) and *Sinoeocrinus globus* (Zhao et al., 1999) occur in greenish-gray, silty shale of the middle to upper parts of the Kaili Formation. [*S. globus* was named and illustrated by Zhao (1999) but was not described. Under ICZN rules the name is invalid but currently there is no other name that identifies this important species]. They are the characteristic members of the abundant coelomate invertebrates in the Middle Cambrian Kaili Biota. Several thousand well-preserved specimens of each species are in the collections of Guizhou University. These eocrinoids are associated with Burgess Shale-type components (*Ottoia*, *Marrella*, *Wiwaxia*) (Zhao et al., 2002a,b).

In April 2004, a new Burgess Shale-like fauna, the Balang Fauna, was discovered in gray and gray-greenish silty shale, and calcareous, silty mudrock in the upper part

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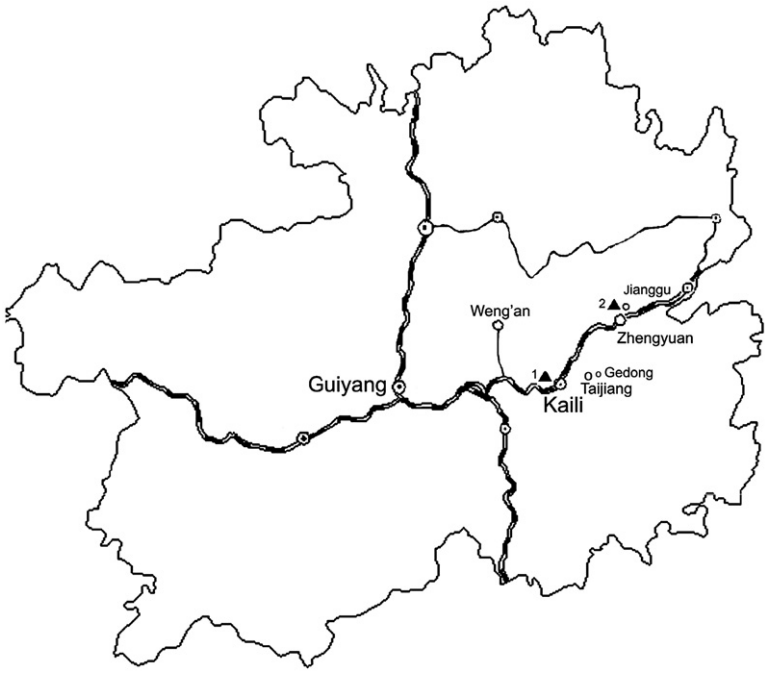

Fig. 1. Map showing the Early Cambrian Balang Fauna localities in eastern Guizhou Province, yielding *Guozhoueocrinus* fossils.

of the Lower Cambrian Balang Formation to the northwest of Kaili City, Guizhou Province (Peng et al., 2005). The significant components of the Early Cambrian Balang Fauna, as in the Kaili Biota, are abundant, well-preserved gogiid eocrinoids. Several hundred are currently in museum collections. In May 2005, the same fossil assemblage as in the Kaili City locality was discovered in the middle and upper parts of the Balang Formation at Jianggu Town, Zhenyuan County, in eastern Guizhou Province. This new locality of the Balang Fauna also includes a large number of gogiid eocrinoid fossils (Fig. 1). These Early Cambrian gogiids are closely related to the gogiids of the Kaili Biota but because of significant evolution through time, they are distinct. The Early

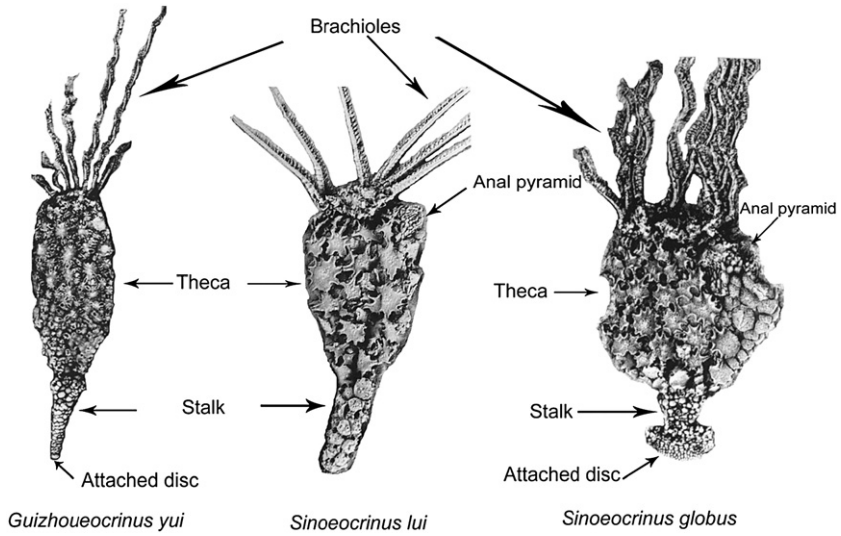

Fig. 2. Figure showing morphological differences of the Cambrian eocrinoids from Guizhou Province, China.