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## Late Devonian (latest Frasnian–Famennian) faunas from the ‘Hongguleleng Formation’ and the F–F boundary in northern Xinjiang, NW China

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We present a progress report, based on close-sampling of eight stratigraphic sections and numerous spot samples through the richly fossiliferous Late Devonian–Early Carboniferous ‘Hongguleleng Group’ – especially at Genaren, Yidimaodongeo and the type locality for what was originally referred to as the ‘Hongguleleng Formation’, on the west limb of the Boulonguer Syncline, north of Boulonguer Reservoir – c. 27 km NE of Hoxtolgay, NW Xinjiang, China.

The area has proved noteworthy for its astonishing faunal diversity; this has resulted in much discussion about stratigraphic alignments with other areas in China and elsewhere globally (e.g., XU *et al.* 1990, ZHAO & WANG 1990, XIA 1996 and 1997a), and whether or not the ‘Hongguleleng’ sequence had been part of a region that had escaped most of the impact of the Kellwasser events (e.g., WATERS *et al.* 1991 and 1995, MAPLES *et al.* 1996, LANE *et al.* 1996 and 1997, LIAO 2002, CHEN 2002, CHEN & LIAO 2006), in other words, had been a biological refugium and, because of this, had retained through much of Famennian time, a higher level of biological diversity than encountered in most other areas of the globe. Because of the taxonomic diversity, especially of the lower 95 m or so of the sequence, there have been numerous publications, exemplified by those on acritarchs (LU & WICANDER 1988), corals (LIAO & CAI 1987, CAI 1996, SOTO & LIN 2000), brachiopods (CHEN *et al.* 2002, CHEN & LIAO 2006 and CHEN *ms.* and under investigation), bryozoans, conodonts and microvertebrates (XIA 1997b), and above all, crinoids and blastoids (HOU *et al.* 1994, LANE *et al.* 1995 and 1997, WATERS *et al.* 2003). Because ages assigned to the ‘Hongguleleng Group’ have differed widely, we have attempted to obtain more precise data on lithologies, conodont biostratigraphy, biofacies and colour-alteration indices (CAI), as well as stable isotopes, faunal diversity (all taxonomic groups) and the succession of faunas through this richly fossiliferous sequence.

As far as ages are concerned, our prime focus has been on conodonts. Because the conodont faunules obtained by acid-leaching are shallow-water associations, consisting overwhelmingly of long-ranging forms we undertook bed-by-bed sampling. In the case of the stratotype sequence on the west limb of the Boulongour Syncline, we took 194 samples for conodonts and isotopic data. These have demonstrated:

1. The base of the ‘Hongguleleng Group’ rests on the volcanic and volcano-clastic Zhulumute Formation. A brief interval of *linguiformis* Zone occurs at the base of the ‘Hongguleleng Group’.
2. At 2.7 m, the upper limit of the *linguiformis* Zone is marked by the incoming of *Polygnathus triangularis* (ZIEGLER & SANDBERG 1990). In the *triangularis* Zone (from 2.7 to 22.7 m), the proportion of palmatolepids to other conodonts decreases, concurrent with an overall increase in diversity of conodont species.
3. The incoming of *Poly. crepida* at 22.7 m is taken as indicative of that zone.

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4. Because *Poly. subnormalis* VORONTOSOVA & KUZ'MIN is regarded as extending from mid- *rhomboidea* to early *trachyptera* zones, conodonts from 53.8 m with this species must be at least that age. *Note*: no conodonts were found in the 10-metre interval from 33.8 to 53.8 m.
5. Typical *marginifera* Zone conodonts occur in the interval 73.3 to 92.9 m.
6. At 94.2 m, the flaggy limestone-shale sequence gives way abruptly to a sequence of green and pink indurated siltstones.
7. At 113.9 m, a brief interval of flaggy limestone (c. 0.25 m) has produced a conodont faunule referable to the *trachyptera* Zone.

Because the stratigraphy of the 'Hongguleleng Group' is complex, involving new members and formations still requiring lithologic and faunal documentation as well as designation of stratotypes, we do not anticipate what their names will be nor the location of their type localities. Some workers have proposed that the 'Hongguleleng Formation/Group' extends into the Early Carboniferous (LAIO 1987, XU *et al.* 1990). Marine conditions appear to have indeed extended into the Early Carboniferous, but are not yet well documented in the area we have studied, though are documented from elsewhere (e.g., RUAN 1995). The previously proposed Hebukeke Formation, thought to be Early Carboniferous, is, however, a tectonically smashed sequence of the lowest 20-30 m. of the 'Hongguleleng Formation/Group', and a limestone lens on the east limb of the Boulonguer Syncline, thought to be Early Carboniferous (XIA 1997b), is lithologically and faunistically a basal sequence of the 'Hongguleleng Formation/Group'.

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