

THE FAMENNIAN REGRESSION IN SOUTH CHINA

by

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(2 figures)

ABSTRACT. - During the Famennian, the regression was widespread throughout South China. This regression started more or less in the *rhomboidea* or *marginifera* conodont Zone. The acme was reached before the strunian time. (Abstracted by the editors).

RESUME. - Pendant le Famennien, la régression s'étendit largement à l'ensemble de la Chine méridionale. Cette régression a commencé plus ou moins dans les zones à conodontes *rhomboidea* ou *marginifera*. L'acmé fut atteint avant le Strunien.

Two large-scale cycles of transgressions and regressions took place in China within the Devonian period (Hou & Wang, 1985). The first (Middle Devonian) regression was a transitory one. The second regression, starting after the Frasnian transgression, persisted throughout the late Late Devonian (? Famennian).

However carefully biostratigraphic and sedimentologic analysis shows that this regression apparently reached its acme during the late Famennian, suggesting the equivalent regression in the type region of Belgium was a global event, not just a regional one.

This paper summarises the biostratigraphic data on the late Famennian regression in South China.

1. The late Devonian near-shore clastic deposits in South China mainly occur in the center of the Hunan province and the border area between the Hunan and Jiangxi provinces. Between the late Devonian Magunao Limestone yielding *Yunnanella-Yunnanellina* brachiopod fauna and the early Carboniferous Menggongao Limestone yielding *Cystophrentis* coral fauna, there is a sequence of sandy and muddy deposits. This was formerly called the Xuefeng Sandstone (s.l.) and was thought to represent littoral deposits. Huang Daxin (1978) subdivided the Xuefeng Sandstone into two members, the lower part being the Oujiaochong Member (or Xuefeng Formation s.s.) and the upper part the Shaodong Member (fig. 1).

It is worthwhile to notice that the Oujiaochong Member in the Xikuangshan area mainly consists of black, yellowish-green shales or silty shales with intercalated sandstones and siltstones. The fossils in this

member are mainly plants and fishes amongst which *Lepidodendropsis hirmeri* Lutz, *Cyclostigma kiltorkense* Haughton, *Lepidostrobus grabau* Sze, *Hamatophyton verticillatum* Gii & Zhi, *Sublepidodendron mirabile* (Nath.), *Bothriolepis* sp. . Sometimes *Lingula* sp. can be found. In the fish-bearing bed, 50 m above the Magunao Limestone, spores have been found. *Cymbosporites* abounds along with the important species *C. parvibasilaris* and *C. lasius minor*. Besides these, *Retispora lepidophyta*, *Vallatisporites pusillites* and *Calamospira microrugosa* also occur.

Down south to Jieling area, the Oujiaochong Member is only 12,5 m thick and represent a river mouth deltaic environment.

The Shaodong Member, just above the Oujiaochong Member also mainly consists of sandy and muddy deposits but the calcium content increases in the upper part of this member where often marlstone and sandy limestone are intercalated and yield marine benthic fossils such as *Caninia conucopiae*, *Zaphrentoides* sp., *Ptychomalotechia kinlingensis*, *Tenticospirifer vilis*, indicating an upper subtidal to lower intertidal environment.

Thus, two kinds of sediments were deposited in different environments between the Magunao Limestone (upper member of the Xikuangshan Formation) and the Menggongao Formation. The river mouth deltaic

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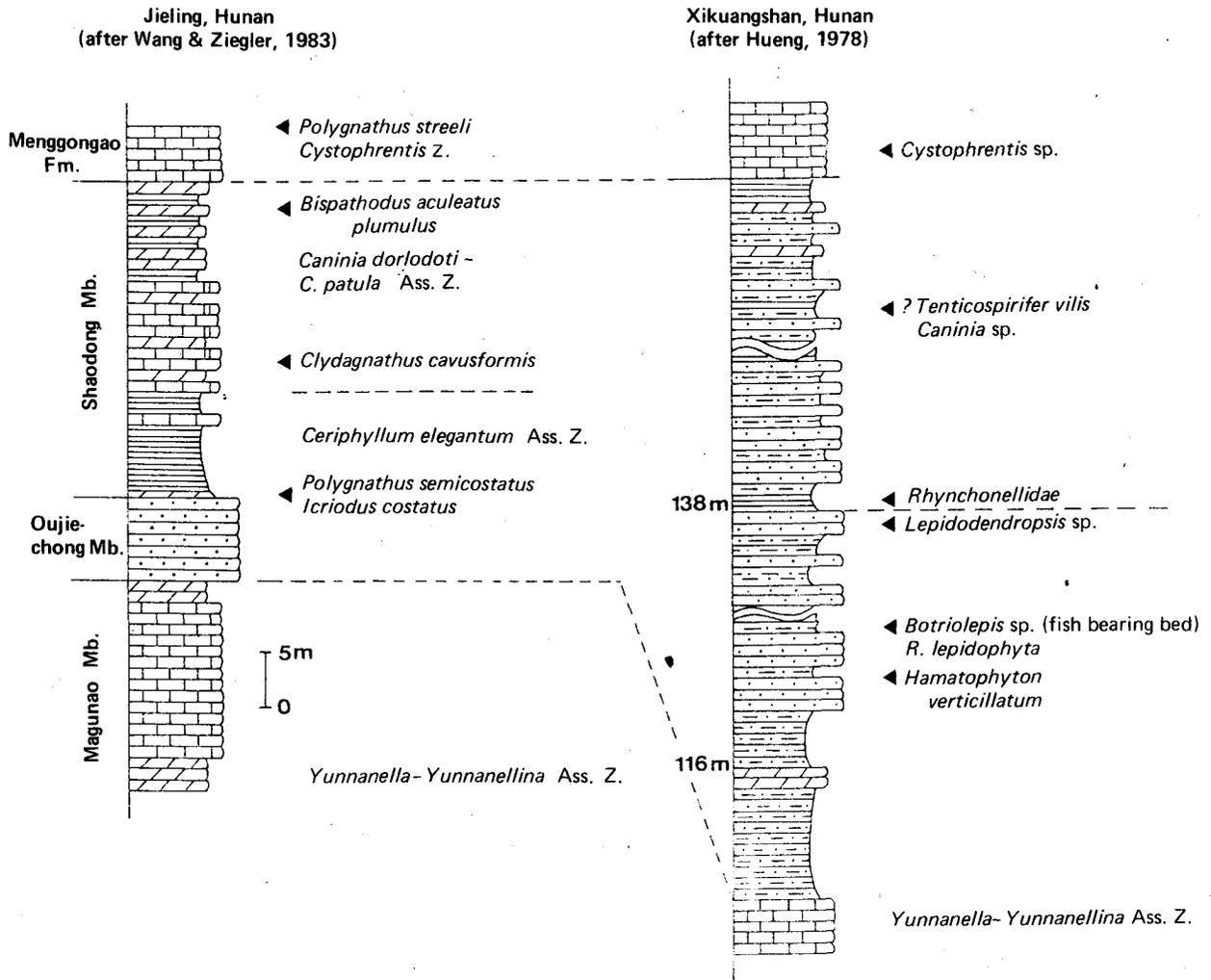


Figure 1. - The Famennian of Hunan.

sediments of the Oujiechong Member in the Jieliang area represent the acme of a regression whereas the Shaodong Member indicates the beginning of another transgression. Thus the top of the Oujiechong Member is in fact the starting point of a new cycle.

According to the study of conodonts, the *Yunnanella* fauna corresponds to the *Palmatolepis rhomboidea* conodont zone (Wang & Ziegler, 1983), and at least the lower part of the Shaodong Member is of strunian age. Hence the Oujiechong regression took place in between the *P. rhomboidea* Zone (Fa2a in Belgium) and the Strunian (starting with Fa2d in Belgium).

2. The dolomites of the late Late Devonian in the Dushan area of the Guizhou province represent a restricted environment on a carbonate platform. The transitional Devonian-Carboniferous beds are in descending order :

- Gelaohé Formation consisting of limestone with *Cystophrentis* (55 m),

- Zhewang Formation consisting of massive limestone with stromatoporoids (42 m),
- Yaosuo Formation with in the uppermost part ostracode limestones, in the upper part dolomitic limestones and dolomites with laminated cauliflower structure (180 m), and in the lower part finegrained dolomites (367 m).

The above sequence forms a tidal flat lagoon → intertidal → subtidal transgressional facies succession. The Yaosuo Formation was formed in a tidal flat lagoonal environment. Laminated structures are well-developed in the upper part of the formation. The same holds for the pseudomorph crystals after salt and desiccation cracks. These all reveal that the facies was very shallow, sometimes even supratidal. As the lower part of the Zhewang Formation is considered of strunian age (Hou *et al.*, 1982) the Yaosuo Fm environment may represent the acme of the late Famennian regression.

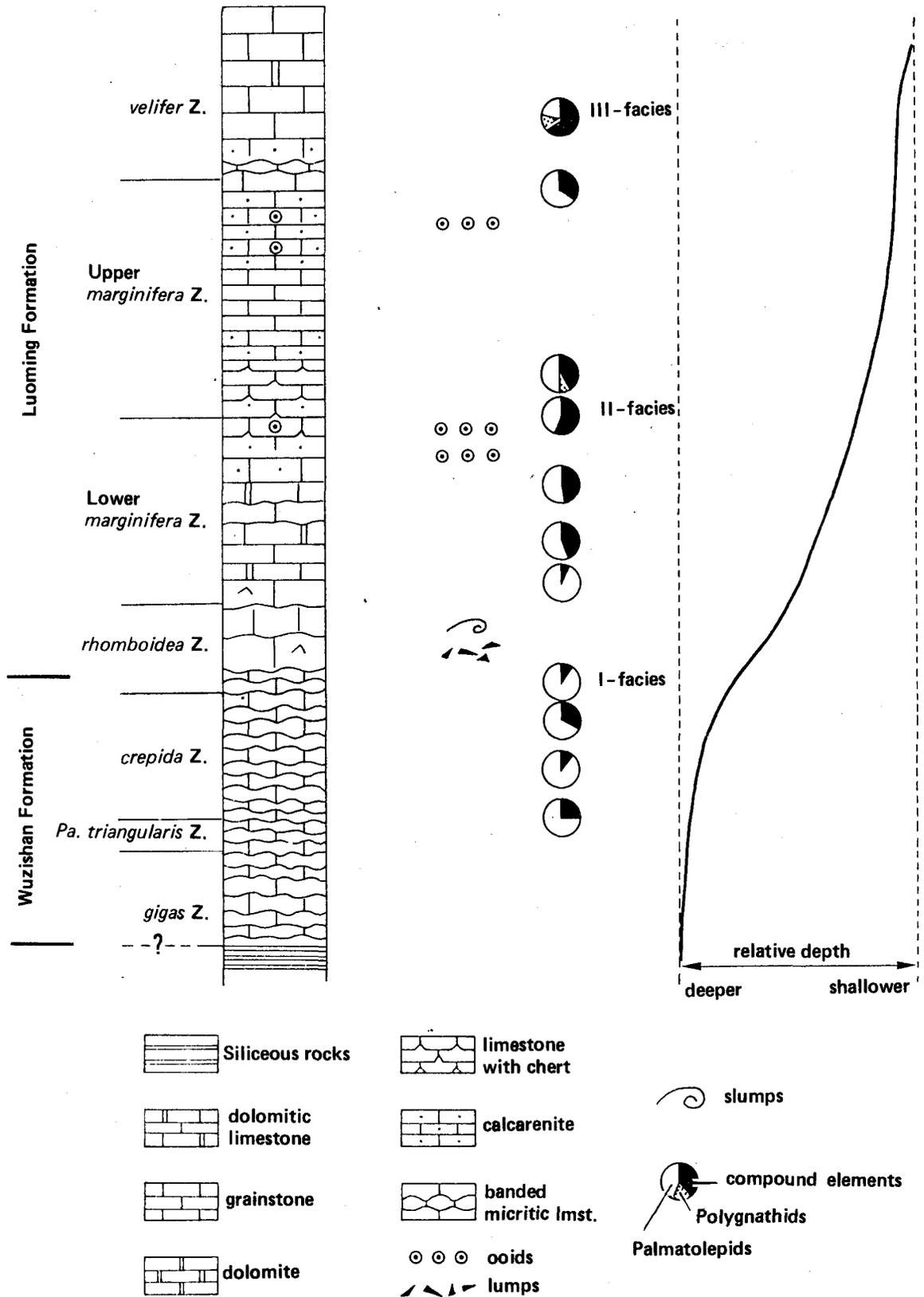


Figure 2. - The Famennian of the Guizhou Province.

3. Ammonoid-bearing nodular and banded limestones, deposited during the late Late Devonian in deep water (basin) environments, have been studied in the Guizhou province and in the south of Guilin in the Guangxi Zhuang Autonomous region. At Muhua (south of Guiyang in the Guizhou province), a sharp change in litho- and biofacies took place between the lower part of the Middle *praesulcata* Zone and the Upper *praesulcata* Zone consisting of a sudden shallowing of the sea level which corresponds in age to the same event occurring at the Hangenberg shales level in Western Germany (Hou *et al.*, 1985).

Near the basin margin in the Guilin area (Guangxi) the late Famennian regression can be detected through a careful biostratigraphic and sedimentologic study. The section of Yangdi, Guilin (fig. 2) is a very good example. This section, from the *gigas* to the *crepida* conodont zones (Wuzhishan Fm.) mainly consists of banded micritic limestones with rare megafossils. It yielded conodonts indicating a Palmatolepid biofacies. From the lower part of the *rhomboidea* Zone onwards, the lithofacies and biofacies change. Thick bedded Luoming limestones, sometimes dolomitic, gradually pass into psammitic limestones with chert nodules and numerous intercalated oolitic limestone beds. This suggests a gradual shallowing of the sea. The conodont assemblages include an increasing number of polygnathids and also elements of compound type. From the base of the *velifer* Zone onwards, Palmatolepids become rare and the elements of compound type reach 70 per cent, representing different conodont subfacies.

CONCLUSIONS

1. During the Famennian, the regression was widespread throughout South China. Changes in lithofacies and biofacies were more obvious compared with the Frasnian. The regression reached its acme in the late Famennian.
2. The intensification of the late Famennian regression started more or less at the *rhomboidea* or *marginifera* level. The acme was reached before the strunian time.
3. In the deep water facies, a sudden shallowing of the sea is noticed between the Lower-Middle *praesulcata* and the Upper *praesulcata* Zones.
4. These regressions exactly match in time the Famennian-Strunian regressions known in Western Europe.

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