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The Frasnian-Famennian brachiopod extinction events: A preliminary review

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Preliminary review of taxonomy of the brachiopod order Atrypida and its stratigraphic distribution in the late Frasnian Kellwasser Crisis of several regions of Laurussia, western Siberia and South China point to their moderate diversity and stepdown but irregular extinction pattern. The distinctive character of the late Frasnian atrypid fauna is emphasised by several relict genera, marked by recurrent and possibly aberrant characters (mainly in ornamentation types), tendency to size reduction and homeomorphy in some taxa. The transgressive/hypoxic Lower Kellwasser Event and preceding eustatic changes during the *Palmatolepis rhenana* Zone had only a regional destructive effect, and were linked rather to an enhanced dispersal of the last generic set of atrypids. The Variatrypinae, Spinatrypinae and *Iowatrypa*-group seem to belong to the latest surviving atrypids. The final demise of the remaining atrypids (and some other articulate brachiopods, e.g., gypidulids) coincided with the transgressive/hypoxic Upper Kellwasser Event, followed by catastrophic eustatic fall during the late *Palmatolepis linguiformis* Zone (F-F Event). This was probably exacerbated by accelerated submarine volcano-hydrothermal activity, and consequent progressive regional eutrophication, and climatic destabilization. The level-bottom rynchonellid-inarticulate biofacies crosses the fatal F-F boundary horizon without major changes. No reliable data exist for the presence of atrypids in the Famennian survival and recovery biota, even for the smooth lissatrypid *Peratos*. Sustained competition from radiating and diversiffing productid-cyrtospirifrid-athyrid faunas may have provide an additional biotic factor in the collapse of the Frasnian shelly benthos at the time of stress, as well as in a post-extinction offshore repopulation from inner shelf habitats.

Key words: Brachiopoda, Atrpida, Pentamerida, biostratigraphy, palaeoecology, biogeography, mass extinction, Kellwasser Crisis, Frasnian, Famennian, Devonian.

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