

Mid Palaeozoic Black Deaths: Hypoxia, Extinction and Diversification

¹ HOUSE, M.R. and ²BECKER, R.T. ¹University of Southampton, Southampton, UK. ² Humboldt University, Berlin, Germany.

The marine Devonian of Laurussia and northern Gondwanaland is characterised by intermittent hypoxic pulses each associated with sharp faunal change: these are well-documented in ammonoid and conodont biostratigraphy. Some sixteen such events have been named after type localities. Only the Kellwasser Event at the end Frasnian has been well documented globally in the literature. The Taghanic Event in the late Givetian may be the most important in taxon terms and the terminal Famennian Hangenberg Event is also major. Precise documentation is now available of ammonoid extinctions and post-event recovery. Study of all events and for all taxa is needed for an embracing explanation. Earth-bound processes, such as climatic fluctuation and ocean overturn seem well documented. Convincing evidence of meteoric effects is minimal and events are often staged with evidence of increasing stress in the environment, often with a successive or sudden extinction, a time of still stand, then a slow recovery with a gradual recoupment by those stocks that survive. Between events ammonoids usually show a progressive size increase with sutural complications: these extremes are usually lost at the event. Sometimes, as with the Annulata Event, there is a sudden global spread of critical taxa, rather than a marked taxon loss. Documentation over these events for corals, brachiopods and other groups is needed associated with more international study. Half the Devonian globe was ocean and most known developments are along a broad Proto-Tethys belt. The Kellwasser hypoxic events, which are widely distributed show as extinction events within a fully oxic succession in the Canning Basin of Western Australia. In Old Red Sandstone terrestrial facies there is some indication that certain of the high mortality fish beds may correlate with the marine events.