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*The Hangenberg Sandstone event proposed for a new definition of the D/C boundary.*

A stratigraphic boundary must be defined on a criterion, which allows to recognize and correlate it throughout geological sections as much as possible indifferently of the environment. The ICS recommends the use of the evolutionary sequences of marine organisms to do so, as it was done for the present D/C boundary, with the *praesulcata–sulcata* conodont evolutionary sequence. However, because of repeated difficulties encountered in the recognition of the conodont taxa, the doubts on their phylogenetic relationships, and their scarcity/lack in shallow-water facies, their use was disappointing for the recognition of the boundary.

On the other hand, the collapse of the marine faunas during the Hangenberg interval and their slow renewal afterwards, have not allowed to find any other evolutionary sequence in conodonts or in other fossil groups, closed to the historical position of the boundary.

For all these reasons, it is necessary to dare select a new criterion for the definition of the boundary. The Hangenberg extinction event(s) should constitute an opportunity rather than an impediment. Therefore, we recall that the use of biostratigraphy is not mandatory and that other criterion though biostratigraphically constraint can be used.

The Hangenberg extinctions developed in two main stages: the first is linked to a rise of the sea level and the development of the Hangenberg Black Shale (HBS) and the second to a “sudden” drop of the sea level and the Hangenberg Sandstone (HSS).

The HBS event is variously developed in thickness and in duration, and sometimes not marked lithologically as is the case on shallow platforms. This local absence has often been interpreted as a stratigraphic gap. It is however more likely that the anoxic facies, corresponding to a high sea-level event, never spread or only exceptionally into shallow-water environments (e.g. the Namur–Dinant Basin, where carbonate facies rich in benthic fossils continued to develop). Consequently, the extinctions linked to the HBS event are local – even if they can affect wide areas and whole basins – and diachronous.

On the contrary, the sea-level drop corresponding to the following HSS event, is easily recognizable and traceable everywhere, both in shallow and deep water facies. It caused a major extinction even in the areas, which did not suffer previously from the HBS, and was responsible for the final demise of the so-called late Devonian faunas.

The HSS occurs sharply in the stratigraphic record and does not correspond to the long sea-level fall of a third-order sequence boundary, but probably to a short out-of-sequence event. Its position is easy to constrain by the use of guide taxa among conodonts, foraminifers, corals, brachiopods, spores and others.

Therefore, the HSS, is a key level for correlation between shelf and basin (Hangenberg Shale/HSS boundary), close to the former D/C boundary, which can be recognized everywhere and located by any biostratigraphic mean. It is, in our opinion, the best and only reliable criterion for the definition of the D/C boundary, as it was already done with other events, such as the K/T boundary. It has the advantage of being facies independent, global and isochronous and therefore more precise than any biostratigraphic marker, which are by definition biological and thus not isochronous, and strongly facies dependent.