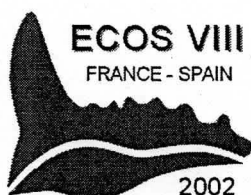
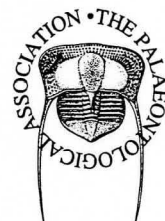


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CONODONT RESEARCH IN A DISCONTINUOUS WORLD : STRATIGRAPHIC SEQUENCES, OCEANIC EPISODES, BIOTIC EVENTS AND SILURIAN CONODONTS

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The marine stratigraphic record is basically discontinuous, broken up into discrete units by eustatic events and their interaction with the local processes that determine accommodation space and sediment supply. Superimposed on the discontinuous stratigraphic record are oceanic episodes and short-lived events, as identified by geochemical excursions and biotic extinction or origination events. Any of these episodes and events may or may not be tied to eustatic events, but none is completely independent of the others. In this model of the marine record, any assumption of stratigraphic or biological continuity is suspect, as evidenced by the search for continuous sections in which to place boundary stratotypes. These are the same assumptions that have been routinely invoked to justify conodont zonations and interpretations of conodont phylogeny. If we also incorporate the lack of faunal continuity at any one point in time because of paleoecologic and paleobiogeographic factors, then is it unlikely that any one stratigraphic section or small geographic area contains all the information needed to create a global conodont zonation or to resolve phylogeny. The fossil record of conodonts, and other organisms, is more like a confusing mosaic that must be carefully assembled than a series of intergrading homogeneous time slices that only need be placed in the correct order.

The effects of a mosaic record of conodont evolution can be seen in how our understanding of Silurian conodonts has developed. The first conodont succession and conodont zonation for the Silurian was based on the section at Cellon. Workers assumed that the Cellon section was a fairly complete record of Silurian conodonts and attempted to fit their faunas into the Cellon succession. Only after some time did the incomplete record of conodonts at Cellon become apparent. Stratigraphic gaps in the Cellon succession were inferred and the "missing" conodont faunas interposed either through new zones or by graphic correlation. Some apparent stratigraphic gaps inferred from faunal discontinuities, however, were instead short-lived biotic events triggered by oceanic events. Some zones at Cellon do not occur in time-equivalent sections elsewhere because of paleoecological or paleobiogeographic reasons and competing local zonations appeared. Ranges of conodont were modified based on correlations from other areas, which altered interpretations of species-level evolution. A few intervals of time and conodont evolution could only be examined in detail in small geographic areas, *e.g.* the *Pterospirifer* lineages in Estonia. The difficulties of synthesizing a global Silurian conodont record became apparent in the discussions of potential zonations for a Silurian standard, and through comparable problems in assembling a composite standard using graphic correlation.

Resolution of the global pattern of conodonts during the Silurian may be achieved by assembling faunas relative to global events that have produced the discontinuous stratigraphic record. These could be stratigraphic sequences produced by eustatic events as done in the Devonian, or oceanic episodes and events represented by geochemical excursions and extinction levels. These events may comprise the natural global units of geologic time that conodonts can be used to recognize and correlate.