

The dawn of marine vertebrate biodiversity: conodont radiation

Microfossil acquisition, literature mining and diversity analyses

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Project description

Conodonts were the first vertebrates that produced a mineralized skeleton, marking a key moment in evolution: the appearance of teeth that sparked an arms race between predators and their prey. This arms race is believed to have been one of the major drivers behind vertebrate radiation and to have led to the establishment of complex, resilient trophic networks of today's seas. Conodonts left behind toothy microfossils, which are extremely abundant in marine sedimentary rocks. Thanks to their large numbers, they can be analyzed quantitatively to understand how ecosystems were structured. This relies on two components:

1. isolating conodont microfossils from rocks, separating them under microscope, and taxonomic identification,
2. literature mining and quantitative analyses using the Paleobiology Database framework (<https://paleobiodb.org>), which is an Open Science repository used to track biodiversity and palaeobiogeography through time

This project will focus on the origins of conodont radiation in the early Palaeozoic. Depending on the interests of the student, it can focus on:

- the data acquisition component, i.e. microfossil work at the light and scanning electron microscopes and taxonomic training,
- on collecting and integrating geoscience literature data and using it to carry out biodiversity analyses using R Software and Paleobiology Database,
- or offer a balanced mixture of both components so the student can try themselves in different sets of skills.

The second component is Covid-proof and can be carried out from home with regular MS Teams meetings. Microscopy work can be adapted e.g. to reduced occupancy and shift work or, under strict lockdown, a microscope can be lent.

Job requirements

Requirements depend on the student's focus: those interested in data acquisition would need to work on site at the Department and enjoy handling delicate specimens. This task requires patience and a steady hand.

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Students interested in literature mining and biodiversity analyses would be able to work remotely; previous experience with R Software is not required, but would be desirable. They should have an interest in sedimentology and stratigraphy to be able to integrate data from scientific literature.