# The Cerithium Limestone a Witness to the K/Pg Mass extinction

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## Introduction

The Cretaceous–Paleogene (K–Pg) mass extinction 66 Ma ago was one of the largest mass extinction events in Earth's history. The iridium anomaly marking the extinction level was recognized in the Fiskeler Member of the Stevns Klint succession (eastern Denmark) and confirmed the asteroid impact theory. A peculiar carbonate layer was globally deposited just after the extinction and is found at Stevns Klint. It is known as the Cerithium Limestone Member (Mb) of the Rødvig Formation. The Cerithium Limestone Mb is pale yellow, partly cemented with a dense network of burrows and numerous flint nodules. This rock unit contains more variability than expected from its overall homogeneous appearance at the macroscopic scale and tells a fascinating history on biodiversity recovery after the mass extinction.

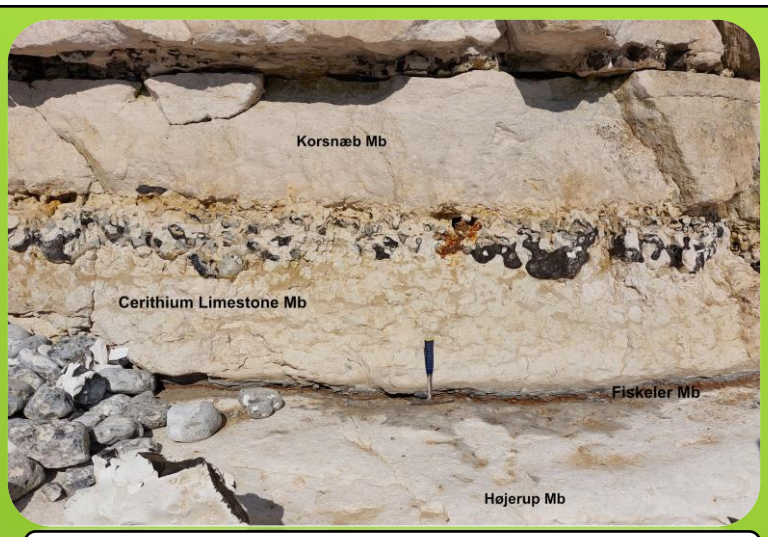
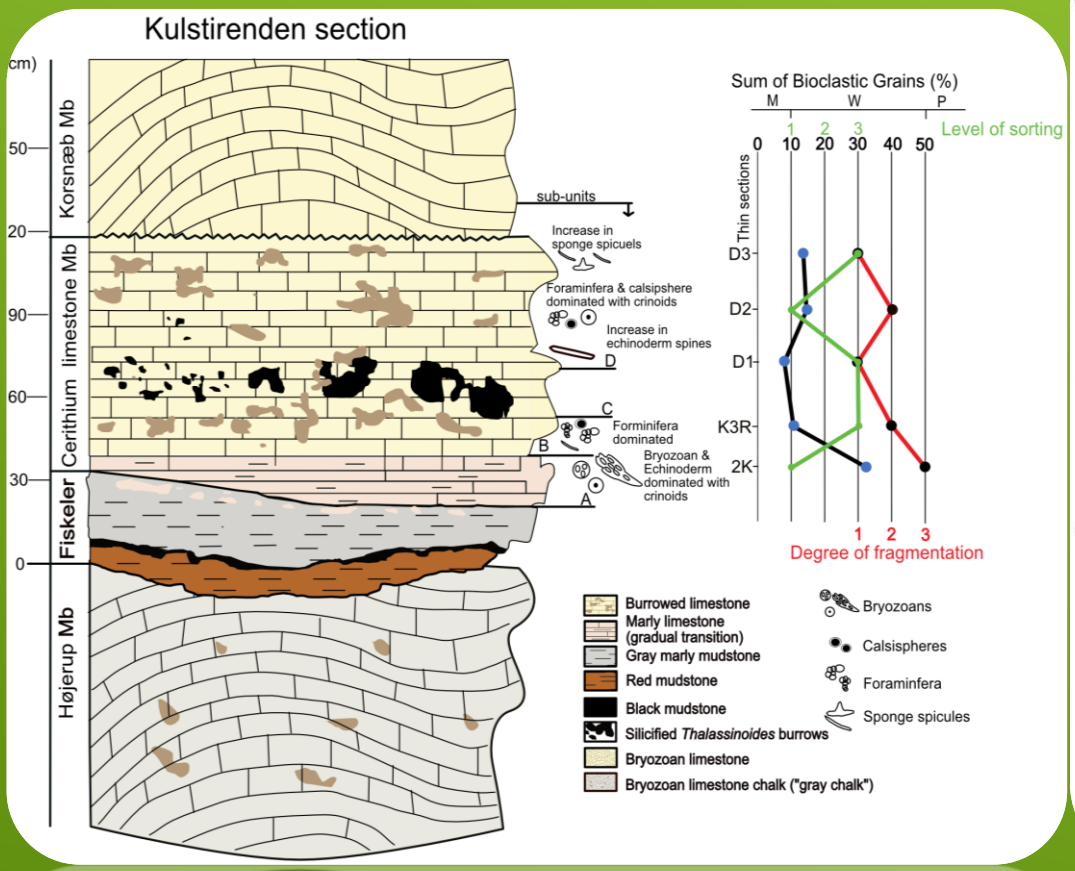


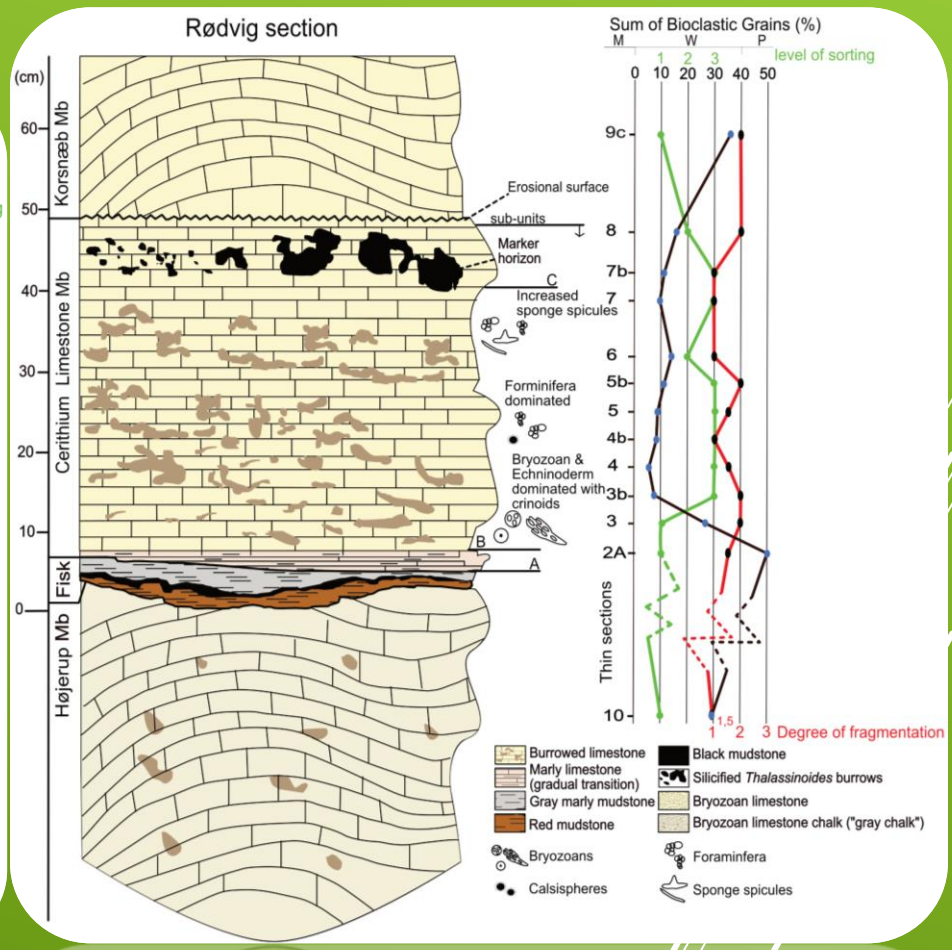

Fig. 1: Overview photo showing the Rødvig locality, just north-east of Rødvig, showing the Cerithium Limestone Mb and enclosing units.


Fig. 2: Overview photo of the Kulstirenden locality, showing the Cerithium Limestone Mb and enclosing units.

## Aim and method

In this thesis, I petrographically characterize and analyze thin sections from the Cerithium Limestone Mb at two different localities (Figs 1 and 2). I use point-counting to quantify the different elements constitutive of the different microfacies. This quantification allow me to describe the vertical and lateral extent of the different microfacies and understand the genetic origin of the many burrows visible at the sites. This study brought further our understanding of the depositional environment and the recovery of carbonate production after the K-Pg.




Figs. 3 and 4. Detail log over Rødvig and Kulstirenden showing the different members to the left of the log, Fisk and Fiskeler stands for Fiskeler Mb. Point counting data and thin section petrographic descriptions are shown to the right of the log with the samples matched with the log's vertical scale. The point counting results are plotted with bioclastic amounts (black), estimated degree of fragmentation (red line) and level of sorting (green line). The percentage bioclastic amounts are grouped by Dunham's classification with mudstone (M) wackestone (W) and packstone (P) respectively. The exact height of sample 10 within Højerup Mb is not known and there is no data in between marked dashed lines. This discontinuity between 10 and 2A is marked by a dotted line. The degree of fragmentation is classified between 1-3: 1 = slightly, 1,5 = slightly moderate, 2 = moderate, 3 = high. The level of sorting is classified 1-3: 1 = poor 1,5 poor-moderate 2 = moderate 3 = well. The Subunit divisions of the Cerithium Limestone Mb A-C are shown to the right of the log. The 0 in the section is the base of the Rødvig Formation located approximately 1 m above sea level for Rødvig and 4m for Kulstirenden. The extent of the Højerup Mb at the site is not measured. Highlights of the general fossil content from the samples are shown next to the log.

## Conclusions

- The Cerithium Limestone is a highly bioturbated, heterogenous partly cemented limestone.
- The main microfacies are foraminiferal dominated mudstone, foraminiferal dominated bioclastic poor wackestone (<25% bioclast content) with large amounts of ostracods and bivalve fragments, bryozoan and echinoderm dominated bioclastic rich wackestone (>25% bioclastic content) /packstone.
- There is a consistent layer of reworked Maastrichtian material at the base of the Cerithium Limestone.
- The microfacies has gradual transitions with some sharp transitions caused by bioturbation.
- A slight trend is visible in sections B-D showing a wackestone/mudstone mixed limestone with slightly increasing bioclast upsection
- There are thickness differences between the two sites showing and extra unit at Kulstirenden (unit D) and a more condensed B unit