Environmental differences on Lygra

How does the variation in pollen composition indicate differences in environments on Lygra in mid and late Holocene?

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Introduction

- The Holocene has changed the environment and geology in locations such as Lygra this past 12 000 years [1]. The island's geology has changed, where bogs have been left after the ice melted. Bogs contain an accumulation of pollen that has been preserved over time, it can be seen as a palaeoecological climate database [2].
- Pollen can be used to reconstruct the past environments [3]. When the vegetation of a location can be investigated through pollen samples, the past environment can be reconstructed through the properties of the vegetation [3].

Figure 1: Core sample from the bog on Lygra

Methods

- Core samples were taken from a bog on Lygra in 2018 using a russian peat corer
- The group looked at samples from 30-100 cm and 520-590 cm depth, which accounts for 1100-2800 and 7600-8300 years old respectively
- Pollen were counted and identified in the 16 different samples with light microscopes
- The counts were plotted into pollen diagrams using R

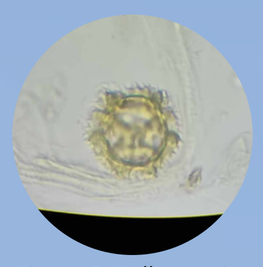


Figure 2: Pollen grain from Leontodon

Figure 3: Pollen grain from Fraxinus (left) and Calluna (right)

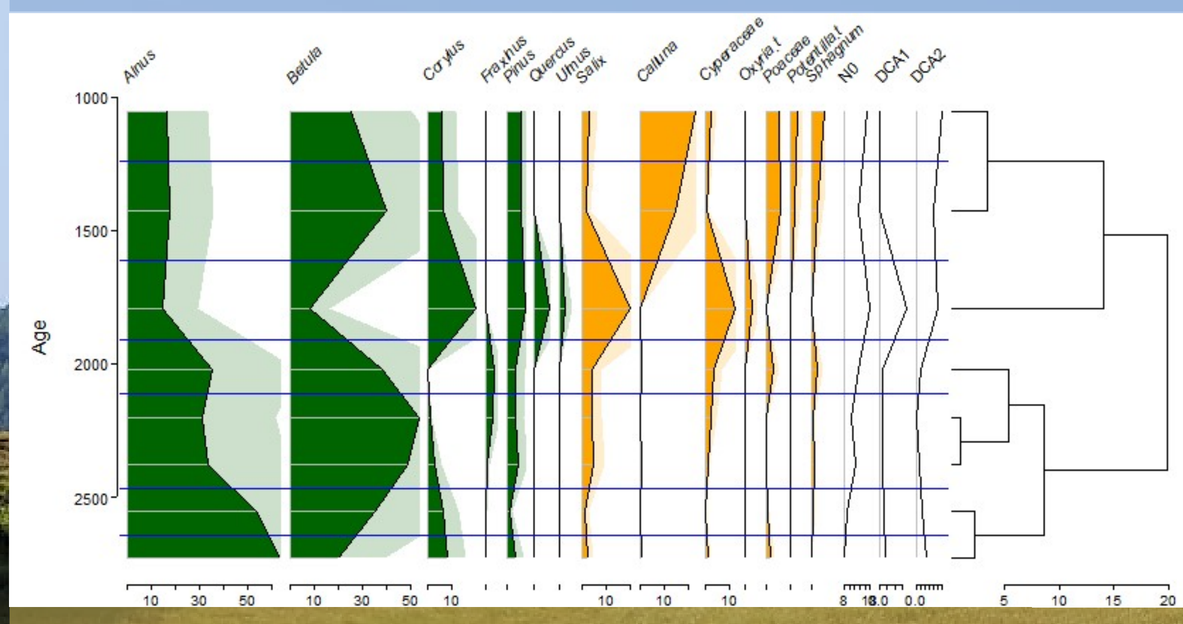


Figure 4: Pollen diagram between ages 1100-2800. Green=trees, orange=others.

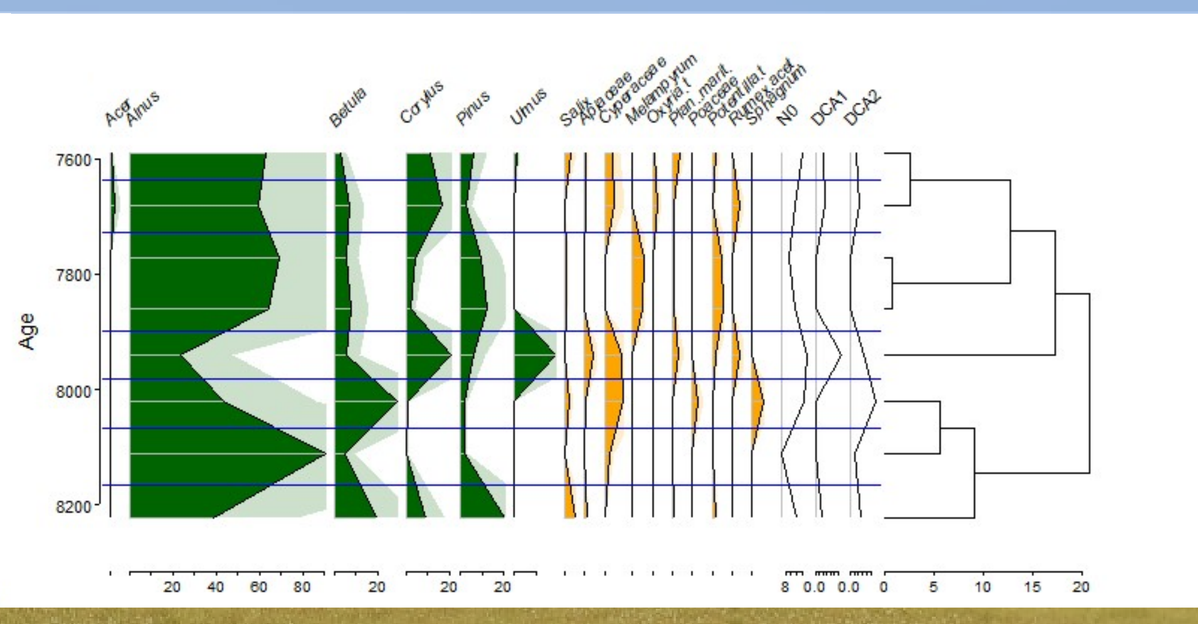
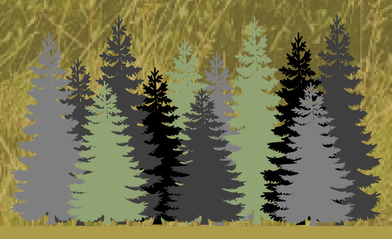


Figure 5: Pollen diagram between ages 7600-8300. Green=trees, orange=others.

Results

- The results show that there is a higher number of species groups in the shallow samples.
- In the shallow samples there are more herbs and shrubs present than in the deeper samples with a higher species diversity than the deep samples.
- The amount of Alnus seems to be declining in the shallow samples.
- Calluna seems to have had a steep increase in numbers starting around 1700 years ago.
- In the deep samples the species Melampyrum and Thalictrum were found to be unique for the time between 7600-8300 years ago.
- The pollen diagrams show that Alnus is dominant in the deep samples.



Discussion

- Melampyrum and Thalictrum present in the deep samples tolerate lower light conditions [4,5]. Along with the dominance of Alnus, this could indicate that between 7600-8300 years ago there could have been more tree cover.
- The abundance of herbs and shrubs in the shallow samples could indicate that between 1100-2800 years ago there was a more open field.
- The increase in Calluna could be induced by processes such as fire management. This fire management produces a patchwork of habitats and thereby establishing Calluna as a species in the environment [6].
- Limitation of the study: pollen can give a skewed view of the species that are present because some pollen can disperse accross great distances and some species produce more pollen [7]. In this case, including macrofossils can give a more realistic reconstruction of the vegetation that was present locally [7].

References:

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