The 2.8 ka BP Event: a high-resolution multiproxy perspective from Diss Mere, Norfolk, UK.

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The 2.8 ka BP event is a cold spell thought to be driven by a grand solar minimum with potential impacts on atmospheric dynamics and hydrology across parts of Western Europe.

High resolution, independently dated records of this event are currently limited.

A multi-proxy study is being undertaken on the annually laminated sediments from Diss Mere (Norfolk, UK) to consider the impacts this climatic oscillation had on ecosystems in the region.

Proxy records are integrated through a highly constrained age model (see Martin-Puertas *et al.*, EGU, 2020).

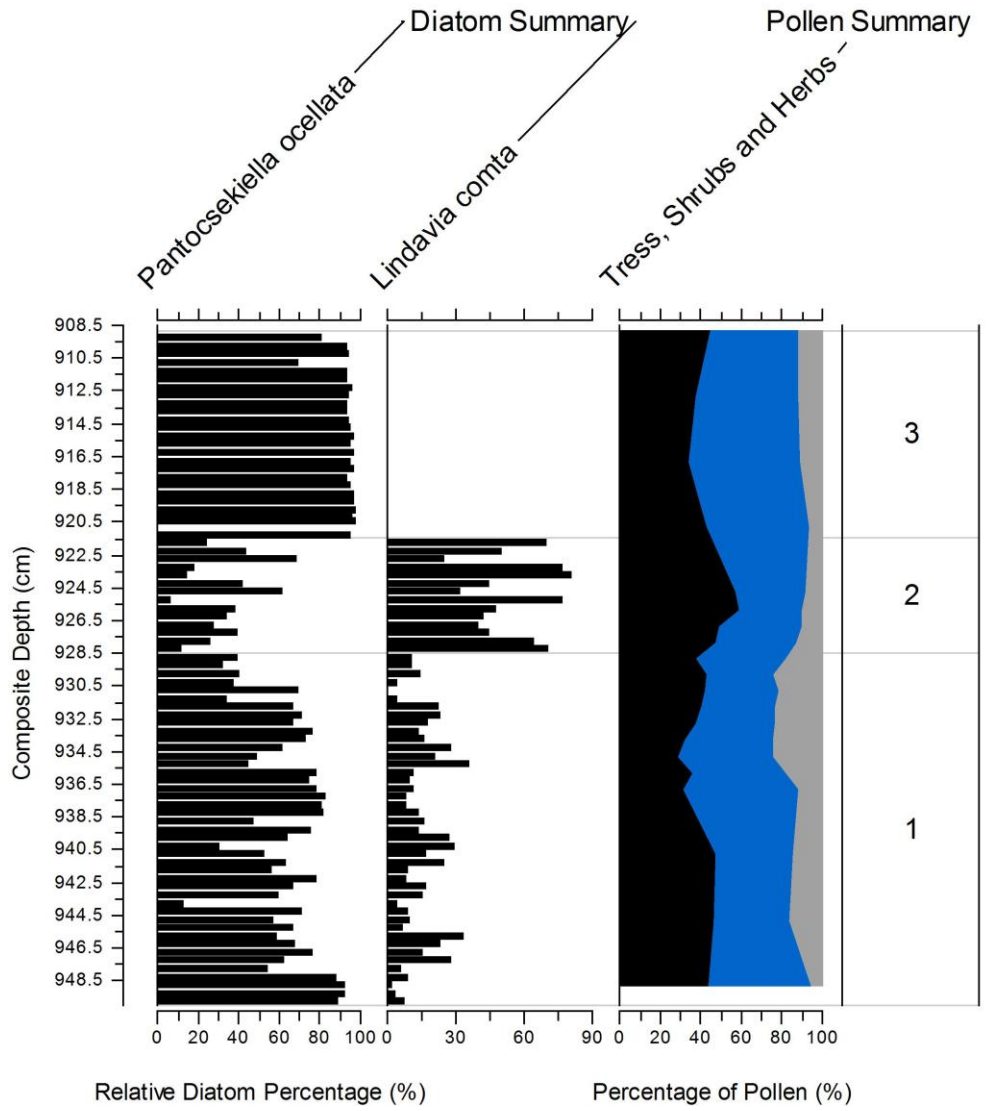
Results

Large abrupt shifts in diatom composition throughout the period from ~3000-2400 cal BP. Split into 3 diatom assemblage zones:

1 – Dominated by *P. ocellata.*
2 – Dominated by *L. comta.*
3 – Return to dominance of *P. ocellata.*

Changes are also documented in the proportions of pollen from arboreal, shrub and herbaceous sources. Herbaceous pollen declines as arboreal pollen increases during zone 2.

Chironomid inferred temperature changes of up to 2.5°C across the period, including two periods of low temperatures centred on 923 and 945 cm depth.



Summary diatom and pollen percentage data from Diss Mere (DISS16 core). Pollen data shown as proportion of total. Trees = black, Shrubs = blue, Herbs = grey.

Interpretation and Conclusions

Shifts in the Diatom Assemblage Zones are potentially linked to changes in water turbulence, water clarity and nutrient changes, allowing different species to thrive during different intervals.

- These shifts may be driven by several factors, including changes on the wider landscape, potentially increasing the impact of windiness on the lake or increasing erosion, and therefore bringing additional nutrients to the lake. Increased mixing of the lake may also change the proportion of nutrients being resuspended into the lake waters.

Additional evidence from micro-charcoal highlights a peak at ~2815 cal BP during a period of low arboreal pollen, which may be linked to human clearance of the landscape. This could be a trigger for some of the changes documented.

Variations in the chironomid inferred temperatures highlight instability in the climate at Diss Mere during this period.

The period around the 2.8 ka BP event in the high resolution Diss Mere record suggests there are a number of complexities around this event, with the interplay between linear and non-linear responses to climate change and human impacts on the landscape presenting a complex signal.

THE ROYAL SOCIETY

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