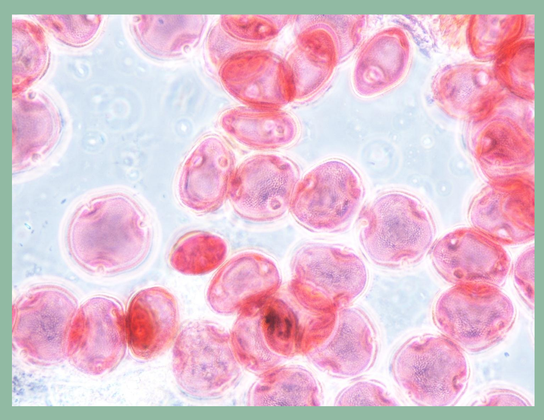
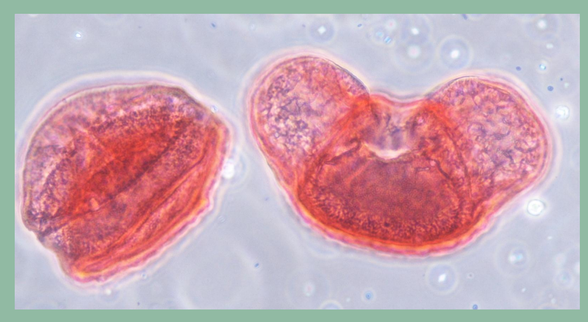
Palaeoecological Proxies

Pollen

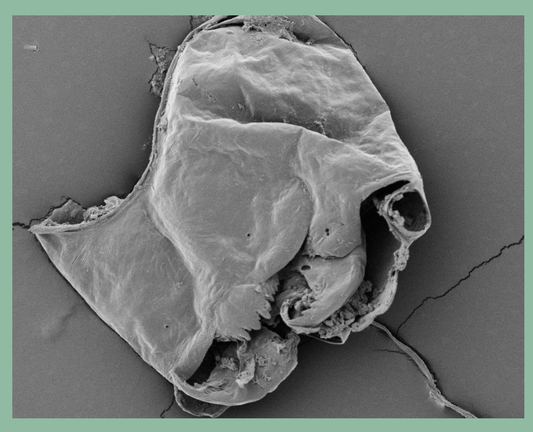
Pollen is produced by flowering plants, shrubs and trees and can be used to assess how vegetation has changed in the past. Human activities that impact upon vegetation, such as agriculture and deforestation can be seen in the pollen record. Pollen is extracted from sediment cores and counted. The pollen grains from each species are unique in appearance which allows palaeoecologists to assess how the surrounding vegetation and thus land use has changed over time.

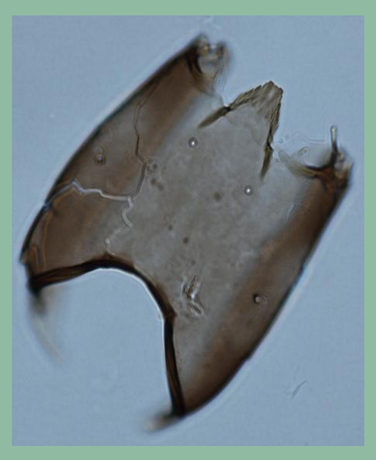




Chironomids

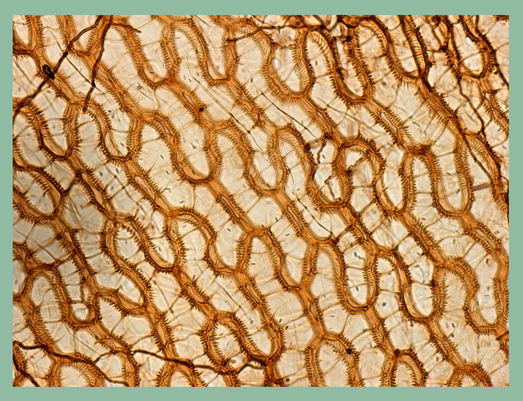
Chironomids are the preserved remains of non-biting midges found mainly in lake sediments. They are extracted from sediment cores , then individually picked out and identified in the lab. The changes in species abundances over time can allow us to determine how lake temperature has changed thus providing valuable information to assist in the reconstruction of past climate.





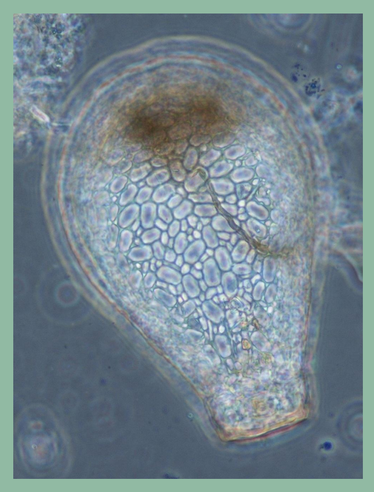
Plant Macrofossils

Plant macrofossils are preserved plant remains found within sediments. The most commonly studies plants are bog mosses. By looking at how the species in the plant community change over time past climate can be reconstructed as different plants have varying environmental preferences. Plant macrofossil records can be even more useful when used in combination with other proxies like pollen or testate amoebae.



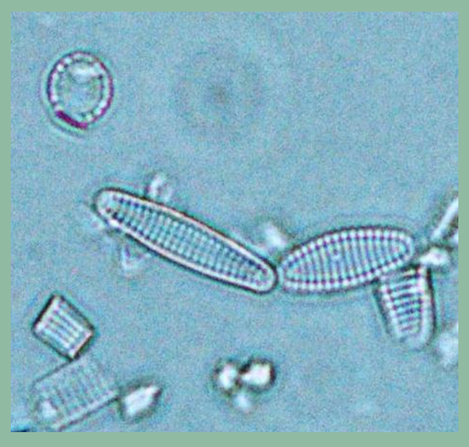
Testate Amoebae

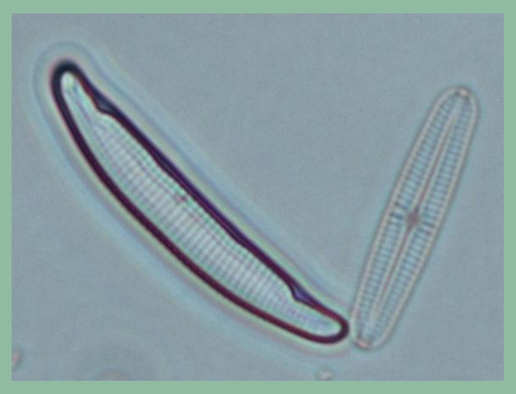
Testate amoebae are found living in peat bogs, soil and other freshwater environments. In the sediment record they can tell us about the level of the water table in the past as they are sensitive to the hydrological changes in the sediment. Knowing how the depth of the water table in a peat bog has changed can tell us about past climate.



Diatoms

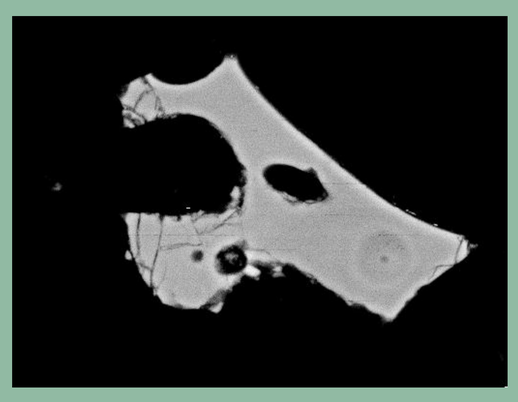
Diatoms are microscopic algae that live in freshwater and marine ecosystems. The shell-like ‘frustules’ of each species are unique, allowing palaeoecologists to determine which species were present in the past and how their abundance changes over time. By analysing these diatoms’ frustules found in lake sediment cores, changes in the lake over time can be identified, for example changes in water level, nutrient influx and the acidity (pH) of the lake.





Tephrochronology

Tephra shards (volcanic ash) are produced by erupting volcanoes and can be carried thousands of miles by the wind before being deposited in surface sediment. The unique geochemical composition of each volcanic eruption acts as a ‘fingerprint’ which allows the tephra shards to be linked to specific eruptions.



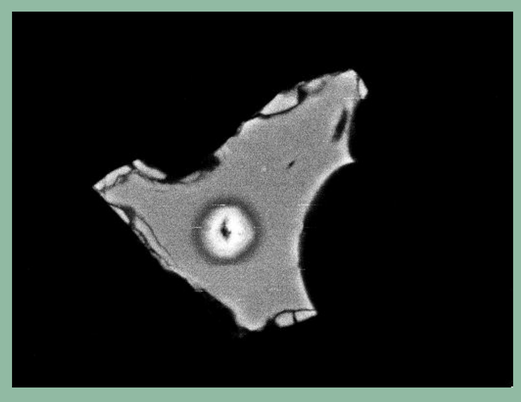


Image Credits: Pollen: H Essex, Chironomids: T. Bishop, Macrofossils: D. Mauquoy (left), T. Roland (right), Testate Amoebae: G. Mallon, Diatoms: T. Fonville, Tephra: G. Mallon

http://www.southampton.ac.uk/geography/research/groups/palaeoenvironmental_lab.page