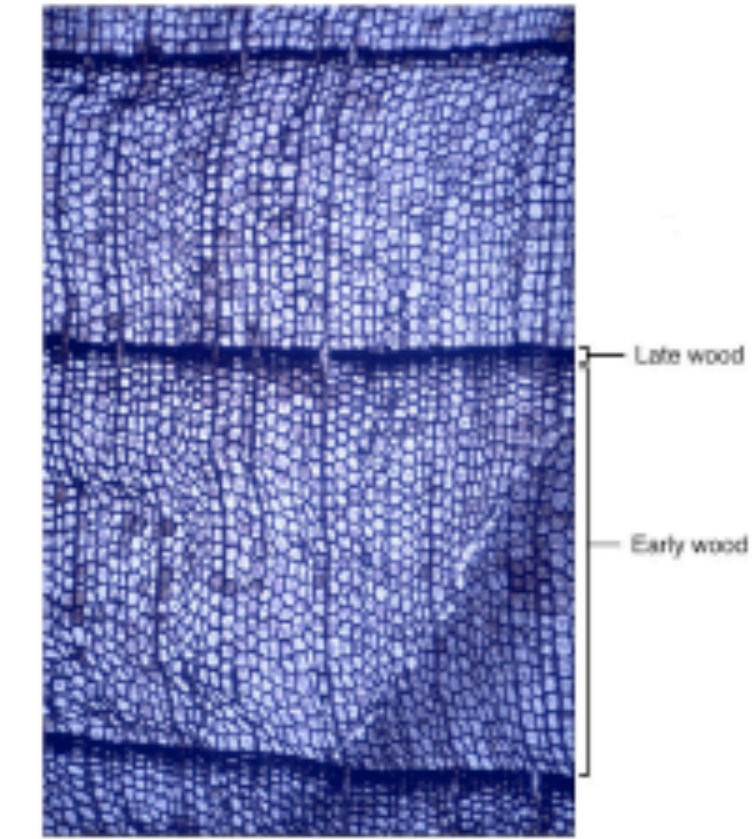


Plant Palaeoclimate Proxies

Physiognomic - Climatic signals encoded in plant architecture as a developmental and growth response to the environment, honed by selection to maximise functional efficiency. Examples - wood anatomy, leaf architecture and stomatal analysis.

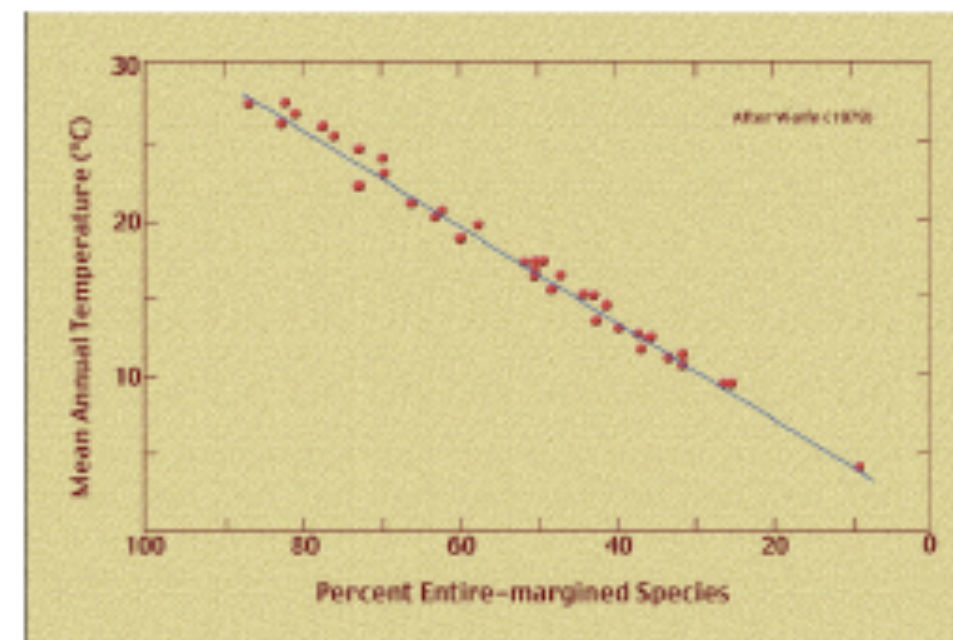
These techniques have the advantage of being useful over long timescales that encompass previous greenhouse climates, but are restricted to comparatively rare leaf and wood assemblages.



Wood records almost daily variations in growth conditions but is difficult to quantify unambiguously in terms of climate variables.

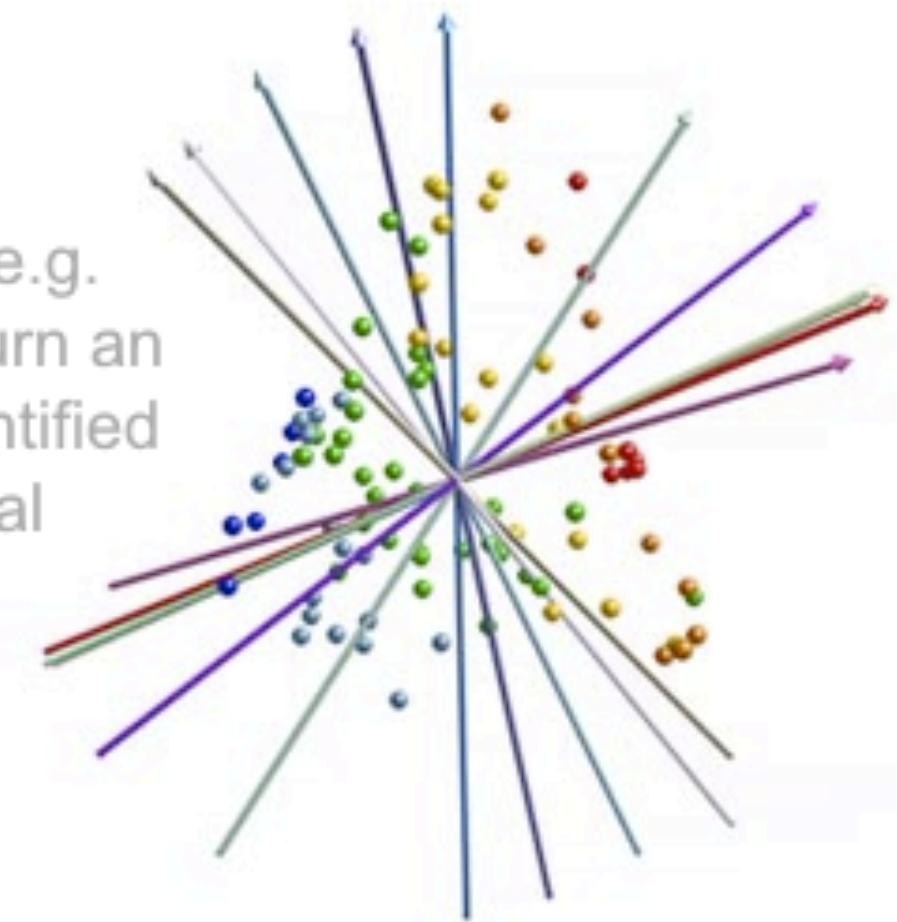


Stomatal analysis can yield estimates of ppCO_2 and, in ideal circumstances, estimates of elevation.



Univariate Techniques - Leaf Margin Analysis - return a single variable e.g. mean annual temperature.

Multivariate techniques (e.g. CLAMP) return an array of quantified environmental variables.





In desert regions where water is in short supply leaves are either small or have been dispensed with altogether in favour of photosynthetic stems. Additional adaptations include stem enlargement for water storage.

These adaptations are universal and are governed by the physics of evaporation. A small surface area to volume ratio is advantageous in limiting evaporation.

Because this represents a general “engineering solution” to the problem of water loss similar morphologies have evolved in similar environments independent of taxonomic affiliations.

