

Controls on carbon cycling in Kruger

Lesego Khomo, Susan Trumbore, Kevin
Rogers and Oliver Chadwick

KNP

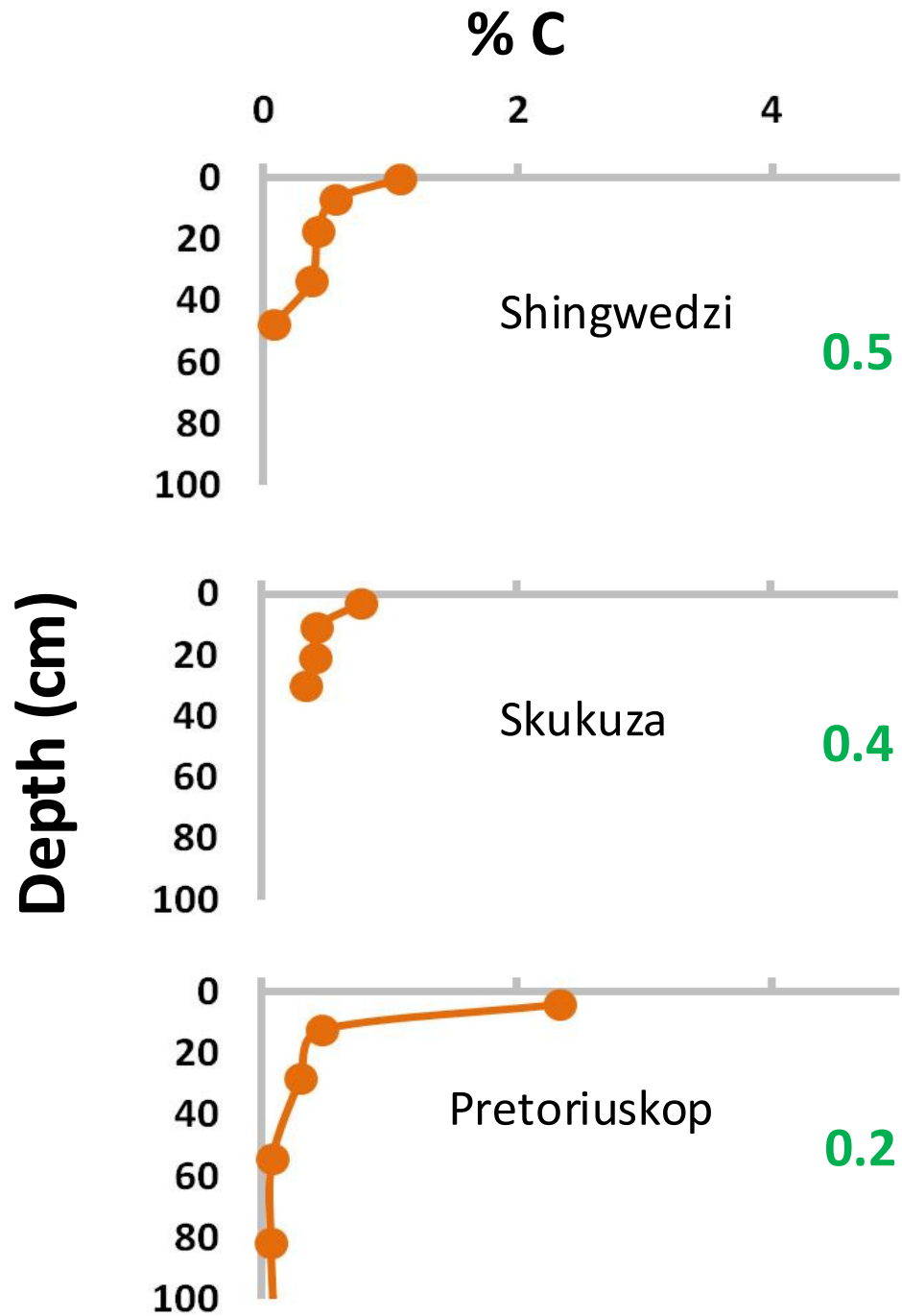
March 2009

The physical template

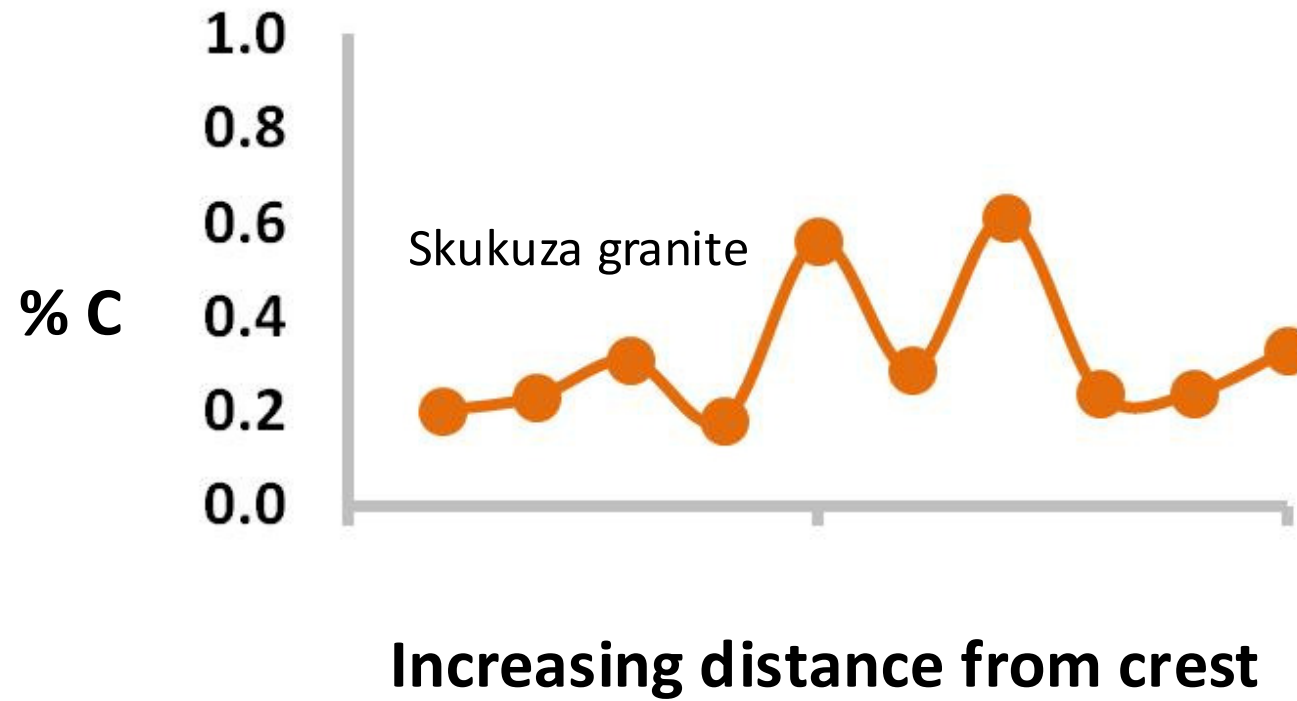


How does carbon vary across the template?

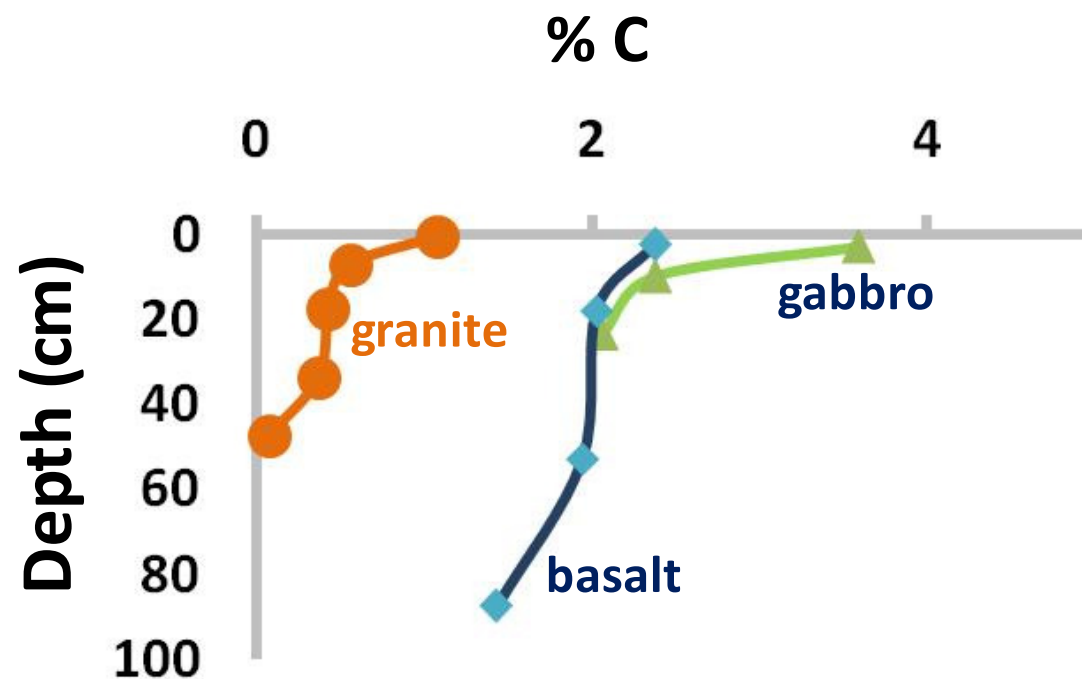
Across climate – granite crests



Across hillslopes



Across rock-type



In Shingwedzi

Why are there differences???

Inputs – Outputs

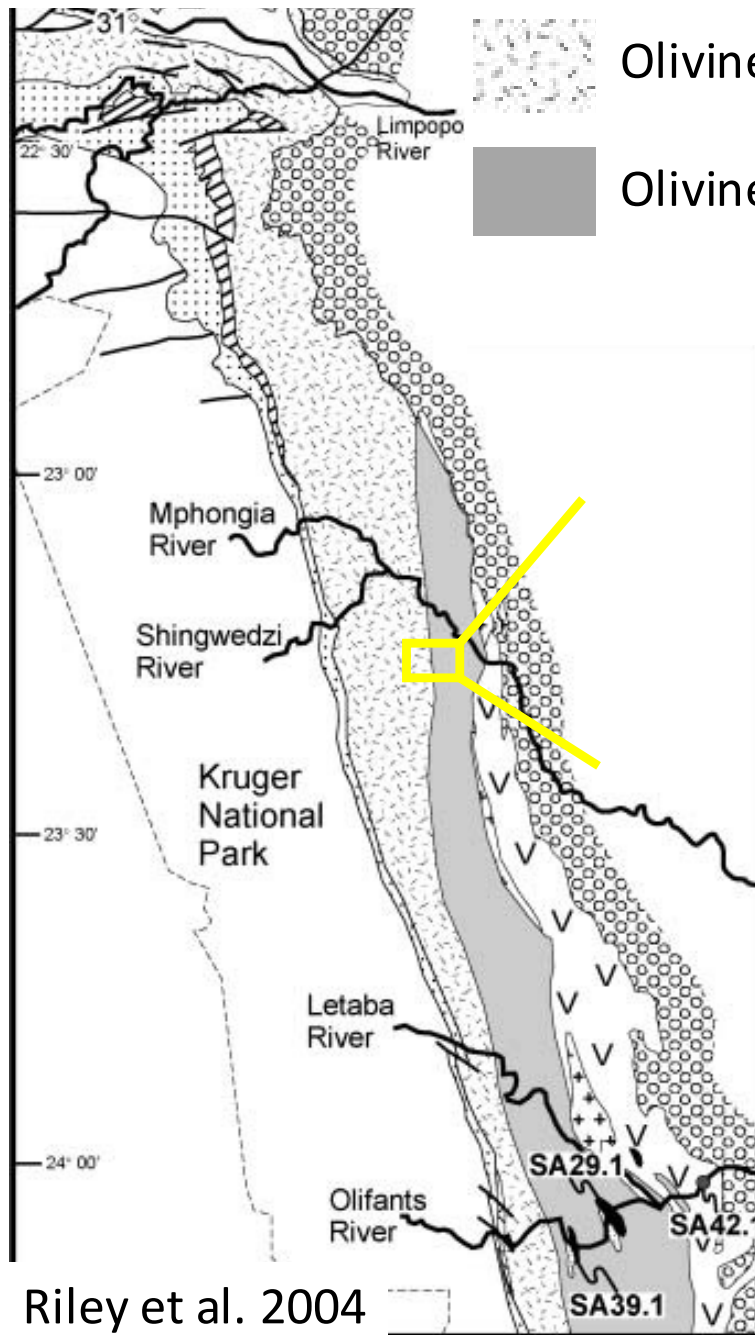


Red soil



Black soil

Study sites



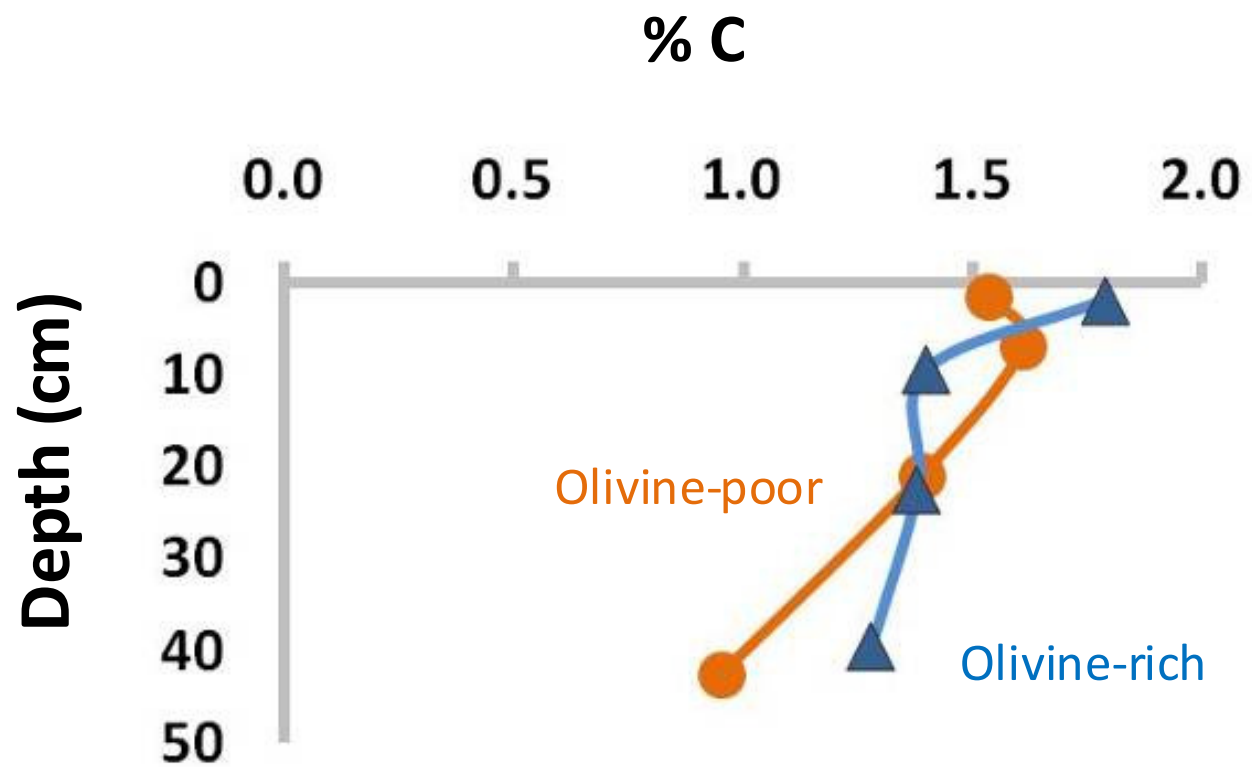
Olivine rich basalt

Olivine poor basalt

Olivine rich soil – black soil with lots of carbonate and smectite

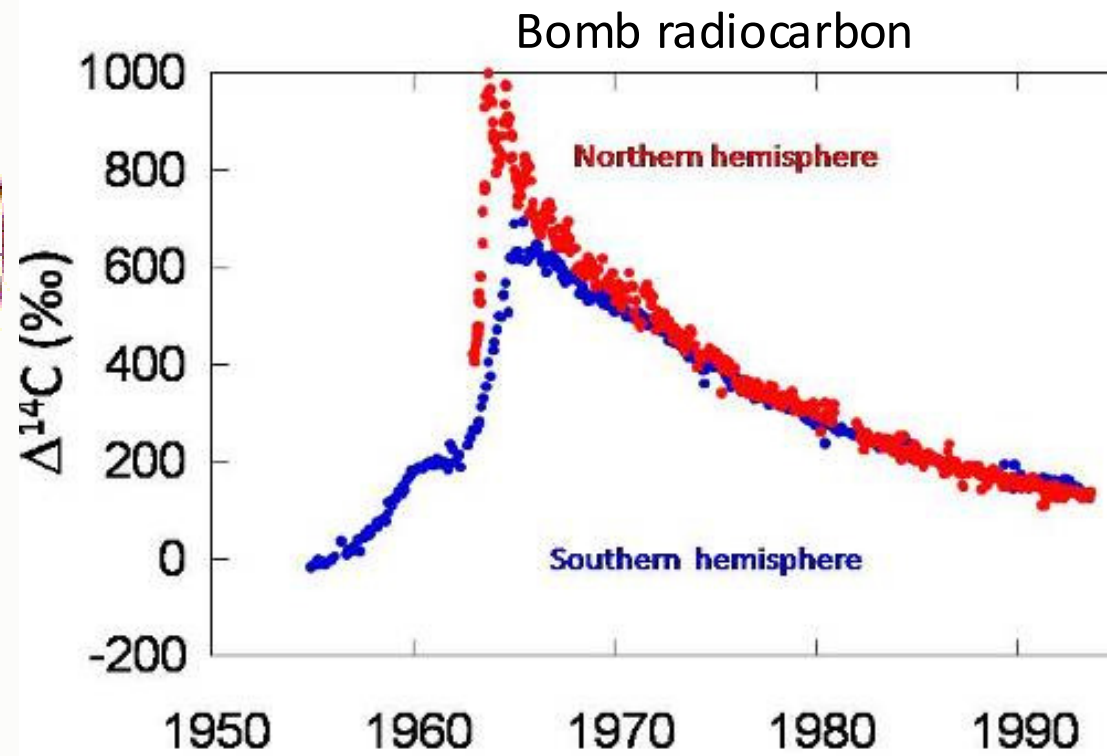
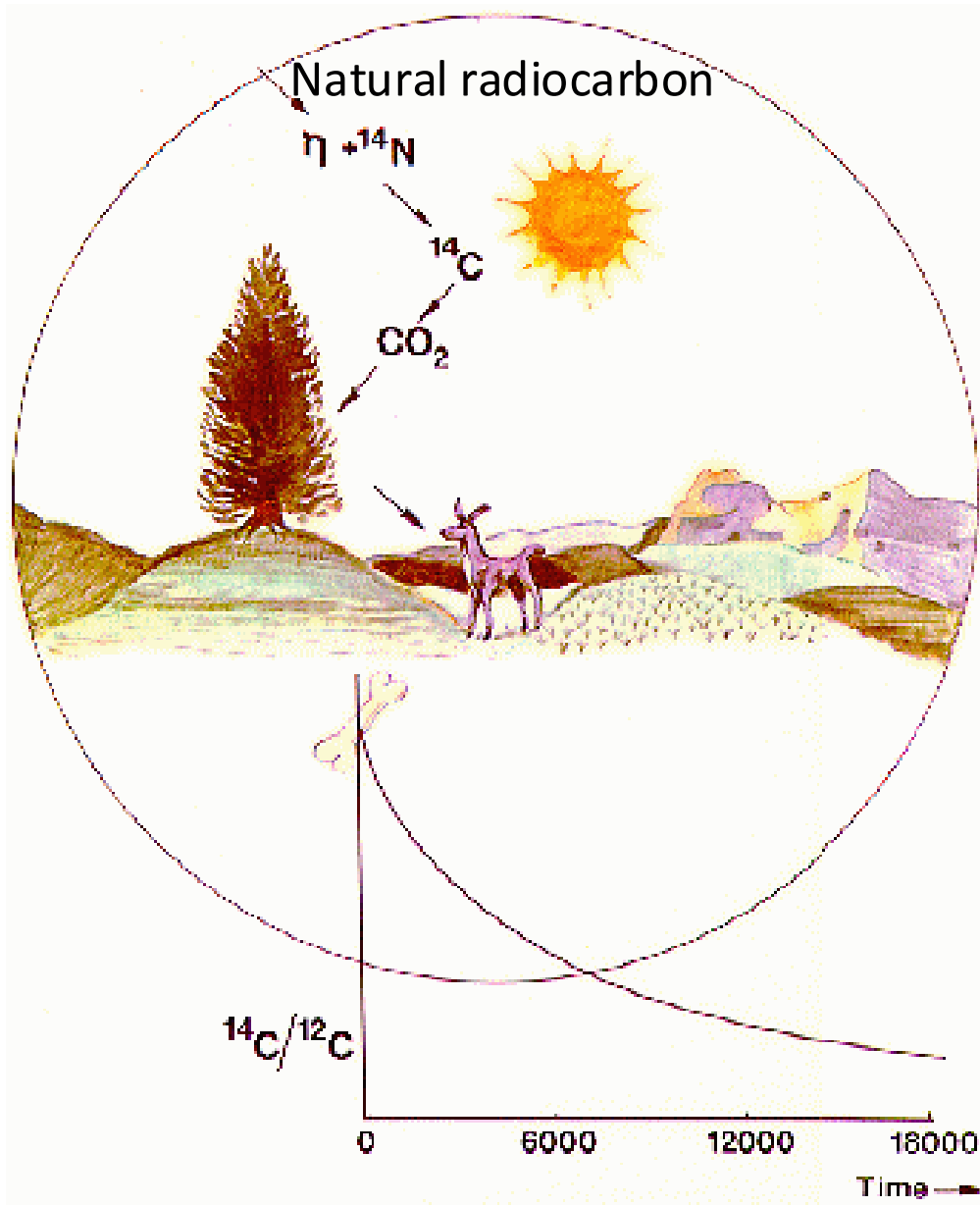
Olivine poor soil – kaolinitic red soil without carbonate

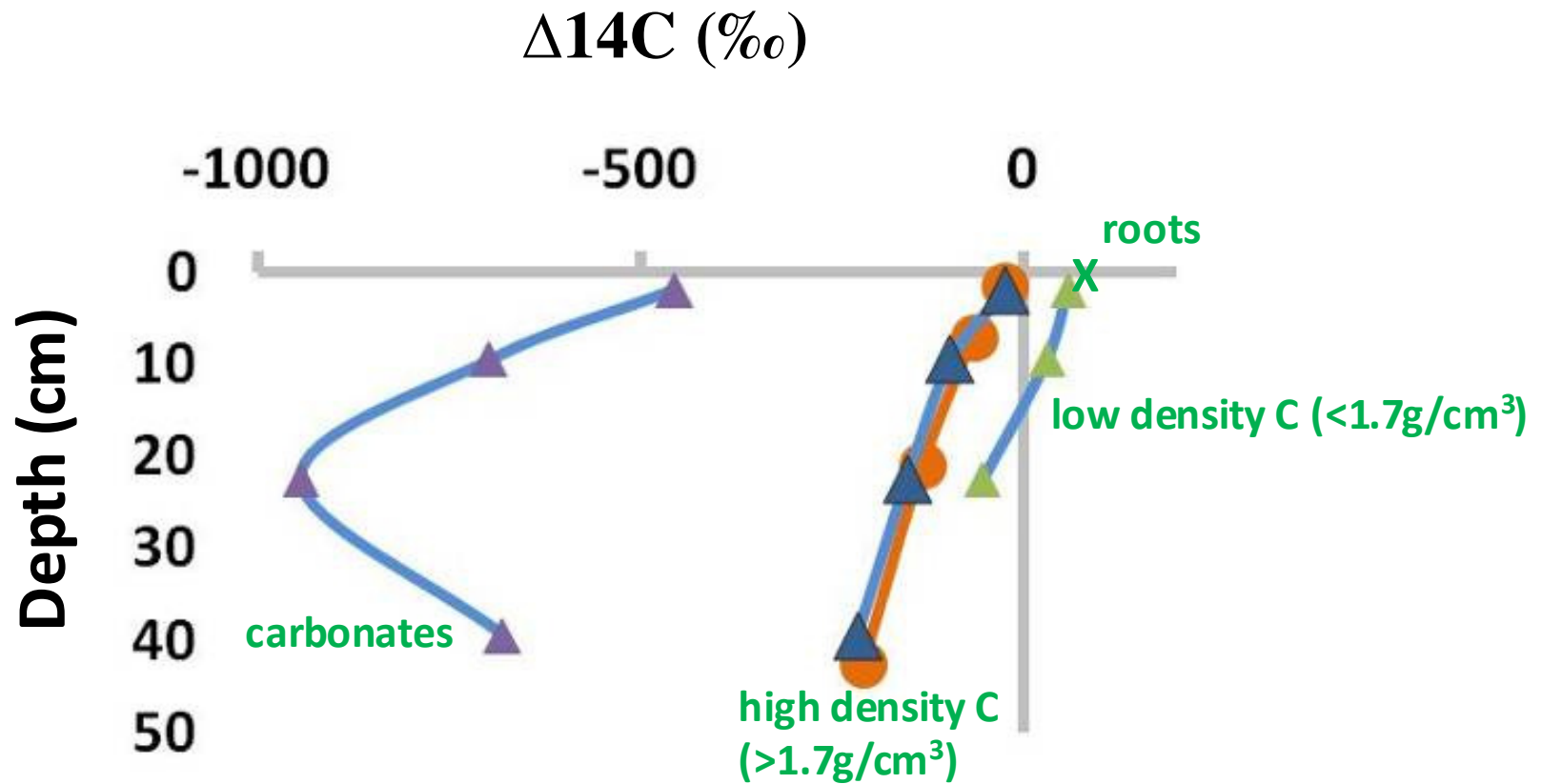
2.5 km



In Shingwedzi

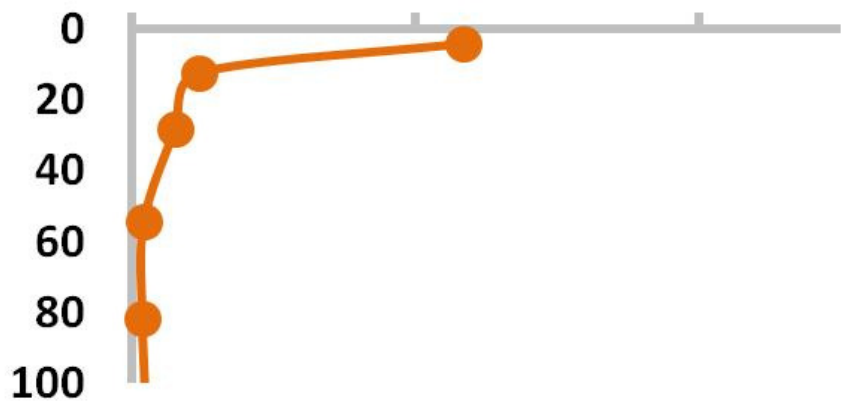
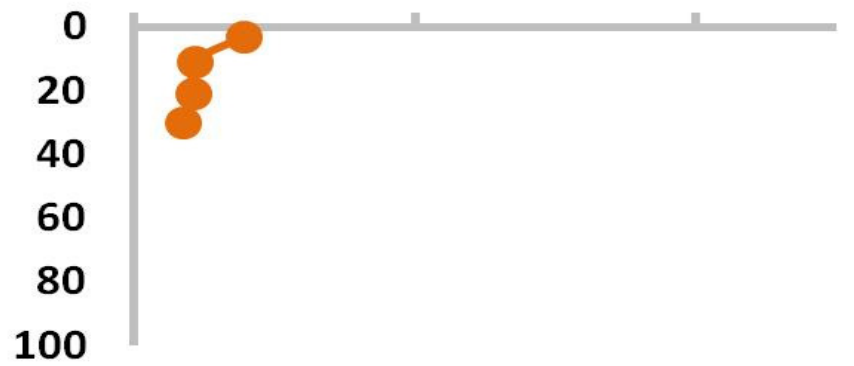
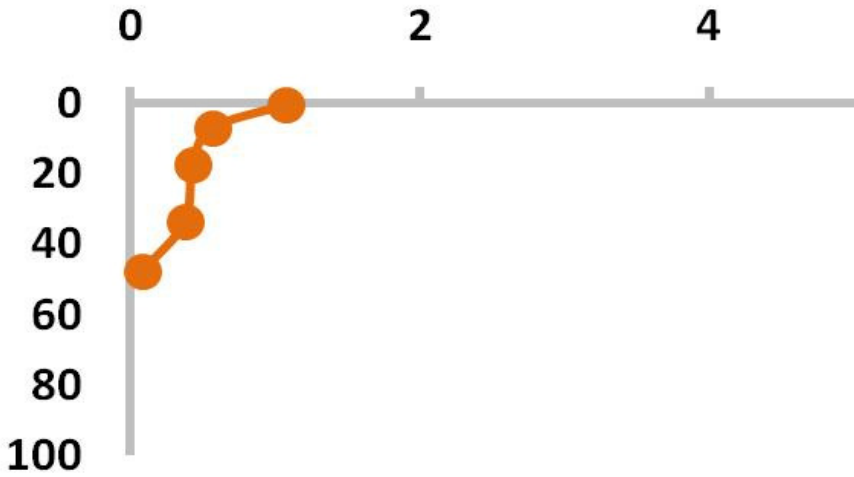
Radiocarbon



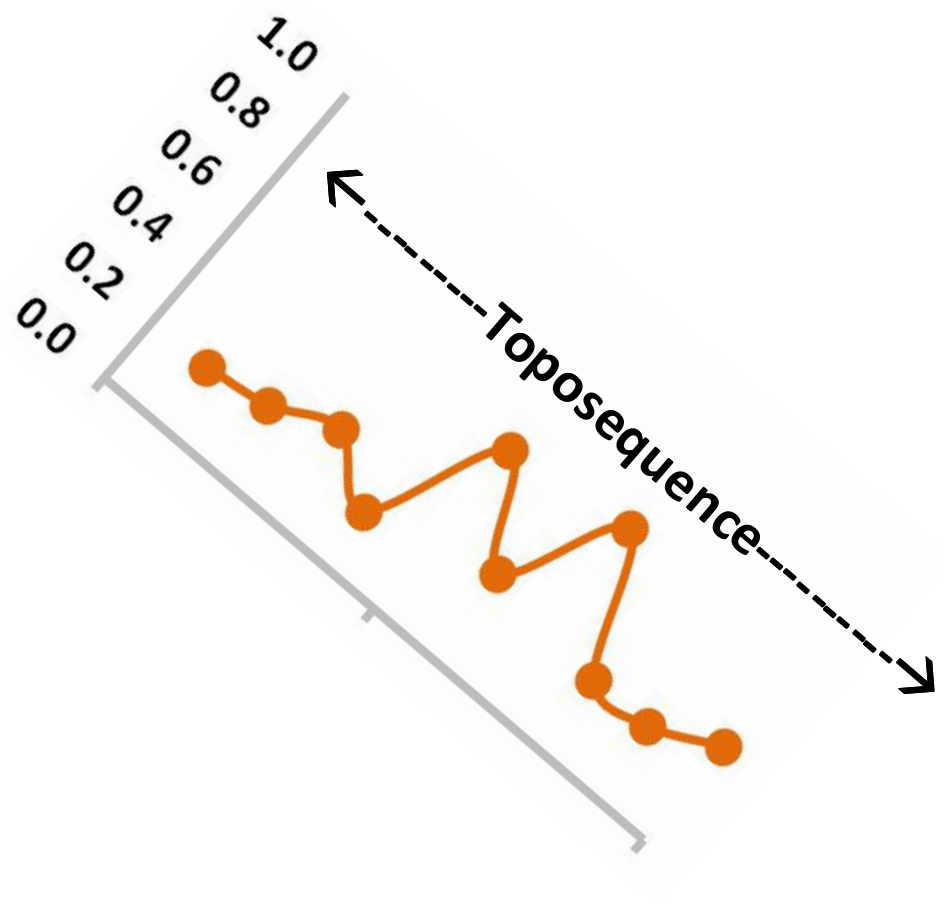
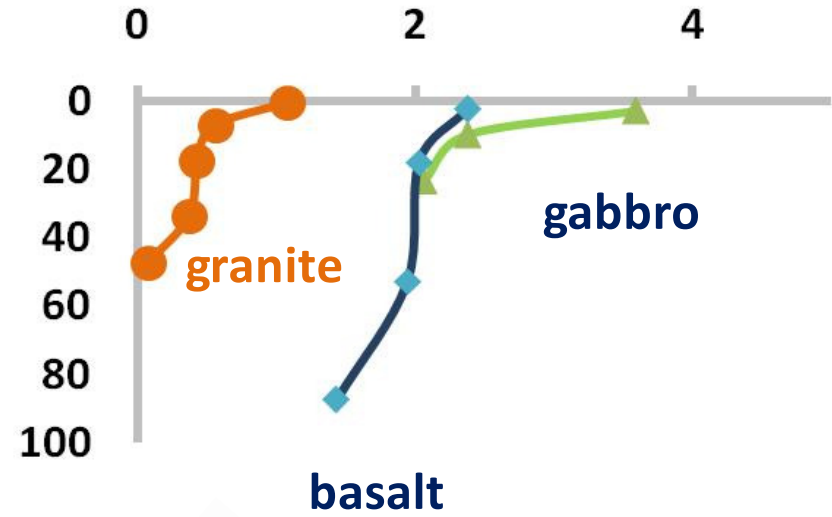


Not all carbon is the same

← Climosequence →



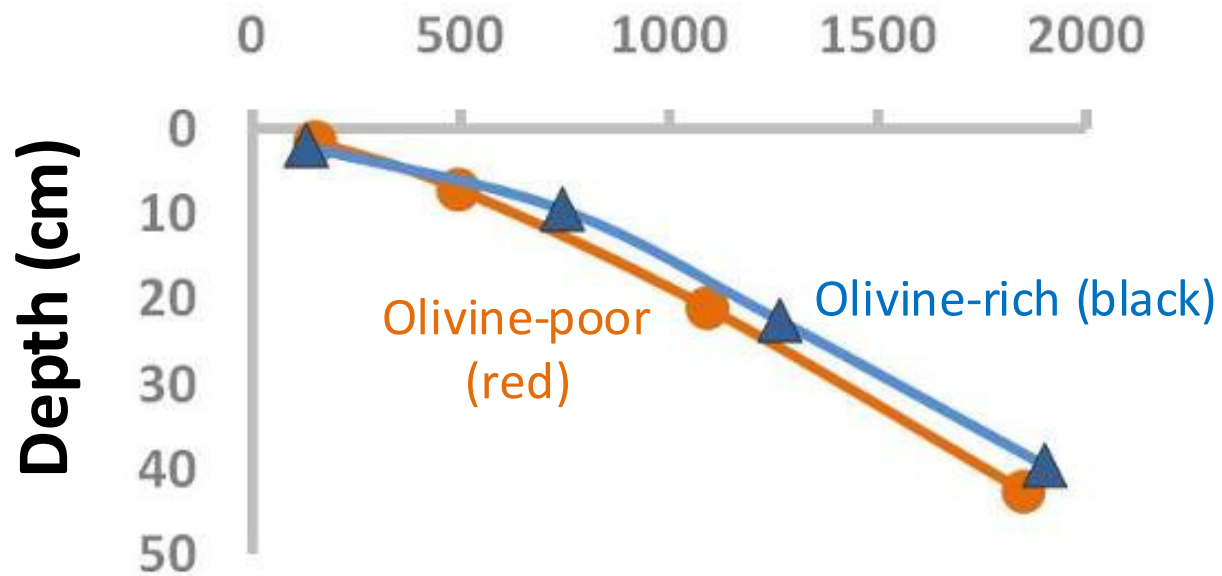
←-----Lithosequence-----→



Thanks

- **Max Planck Institute**
- **South African National Parks**
- **Andrew W. Mellon Foundation**

Radio-C age (yrs) of dense fractions

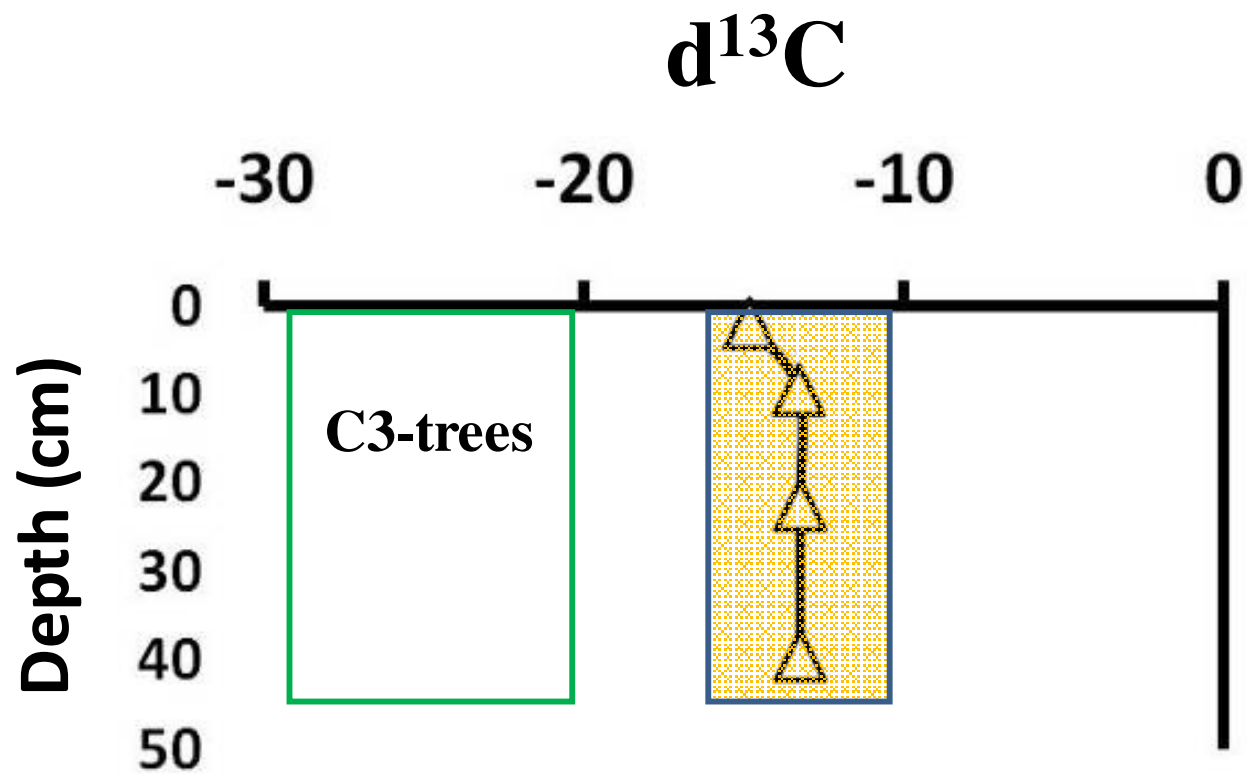


But why then are they so morphologically different?



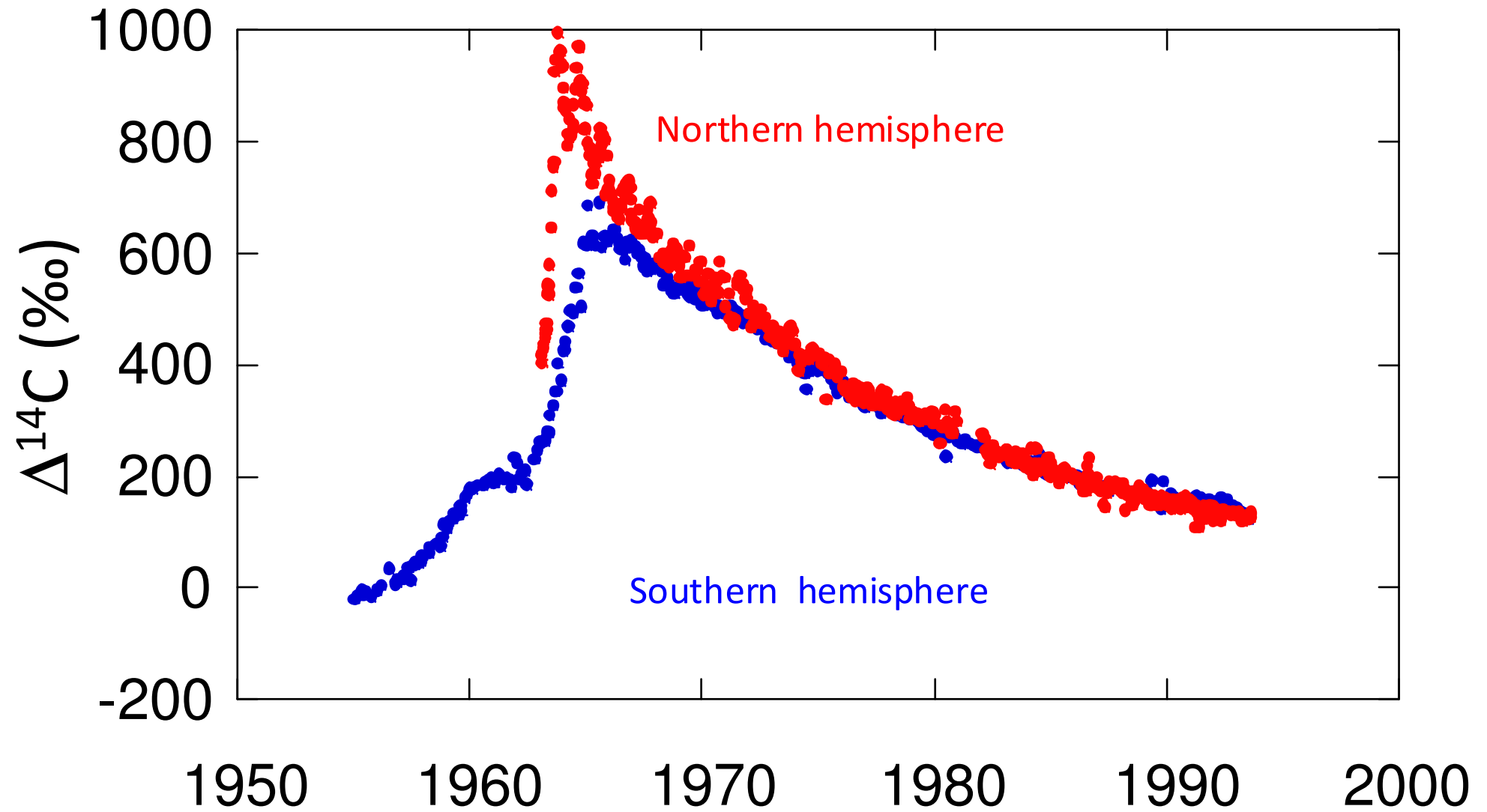
Venter, FJ

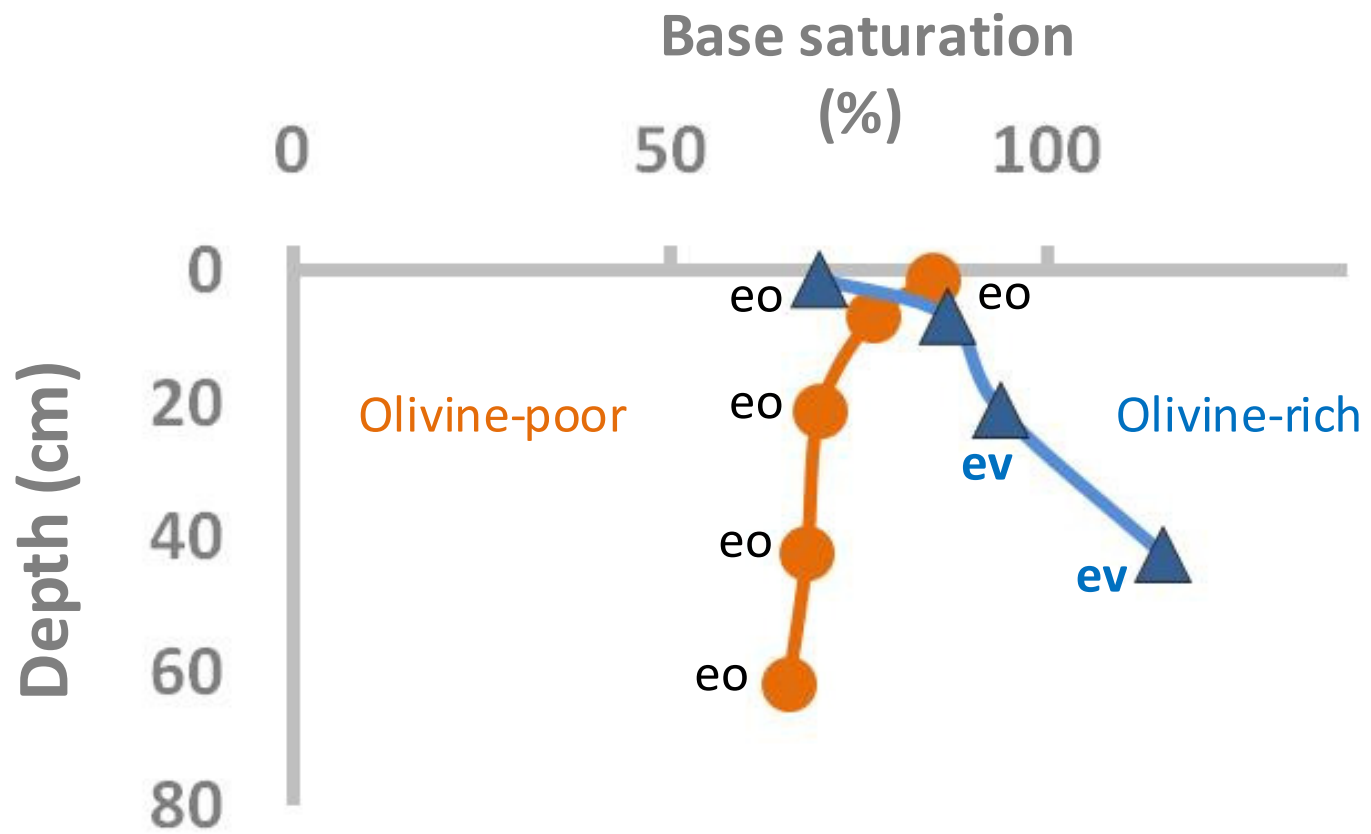




Light fraction and the roots where values are positive\
Meaning you have bomb carbon

(2) Recent carbon - where radioactive decay has not taken place





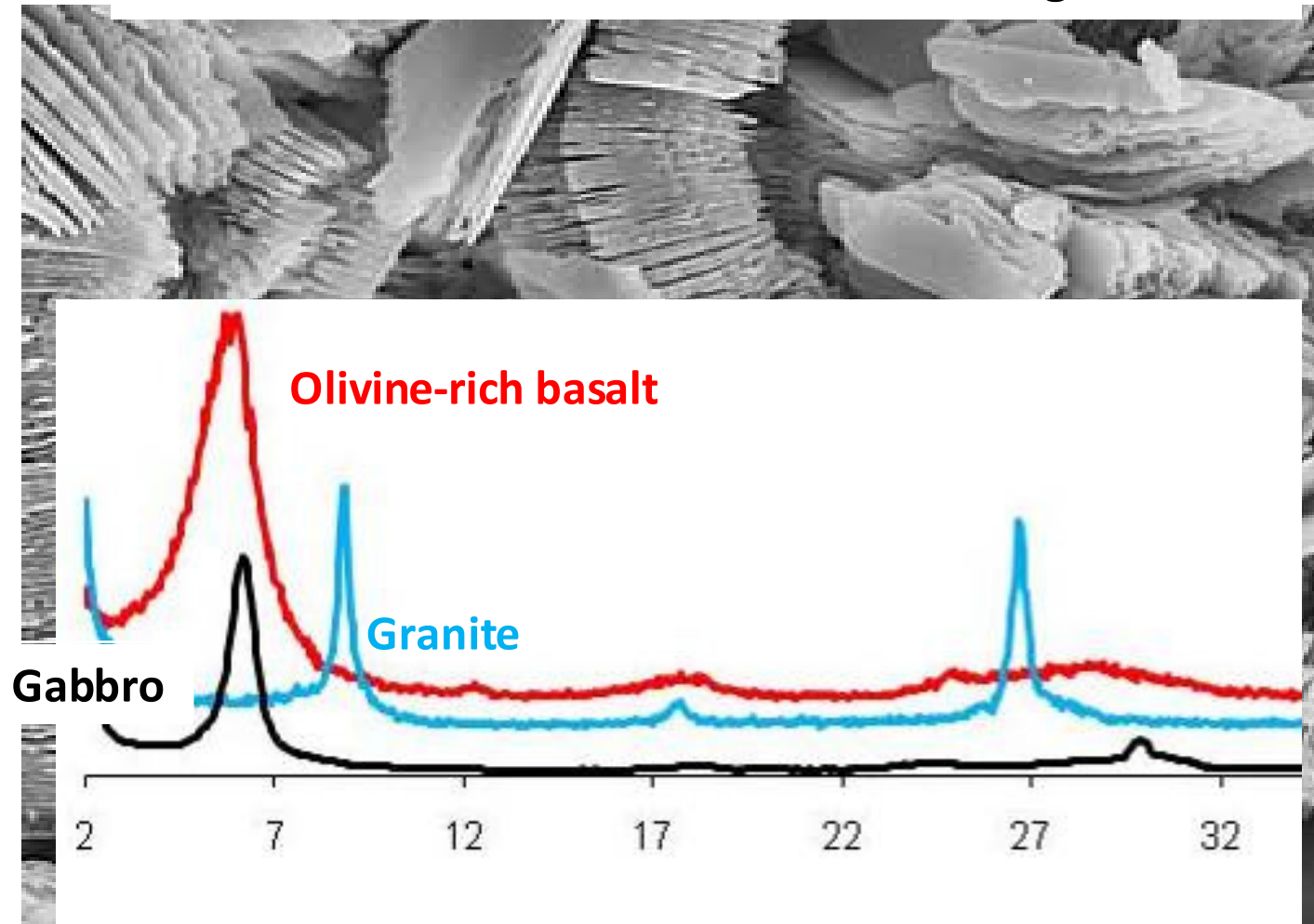
Age C_{litter} < Age C_{roots} < Age C_{minerals}

Years to decade
time scales

Centuries to millennia



Do different minerals retain C to differing extents?



Different clays under electron microscope