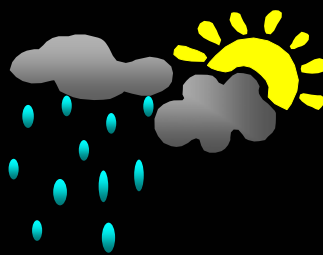


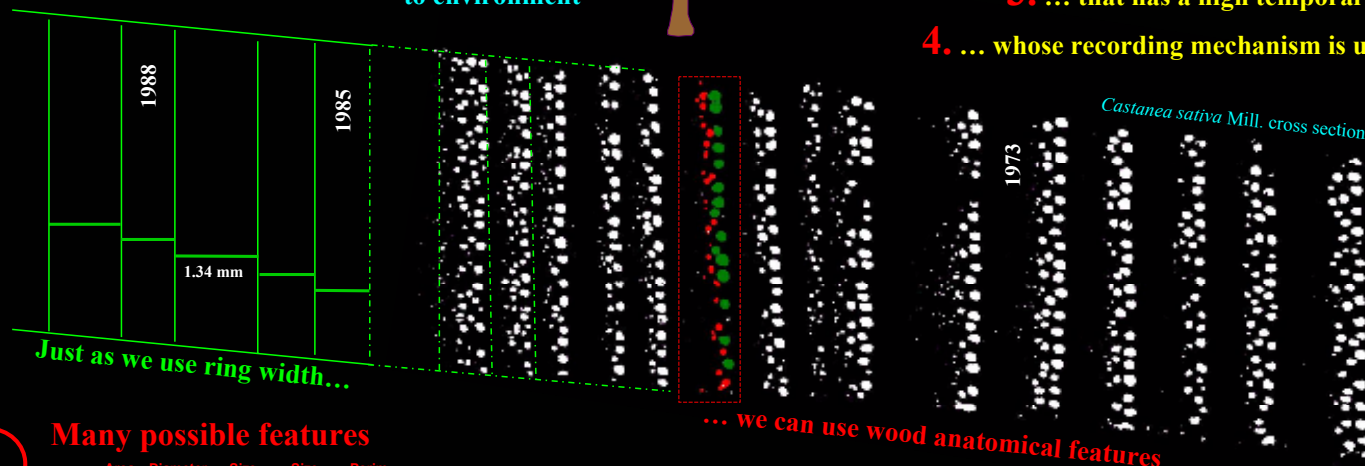
The study of **CHANGE** implies comparisons over time. Global change analysis requires knowledge of the past environmental scenario.

RING WIDTH is a reliable proxy of conditions that occur during the growing seasons and:

- has an annual resolution
- is easy-to-obtain and widely available
- is valid on a decennial to millennial scale



WOOD is the tree's response to environment



A **PROXY** is an indirect record of past environmental conditions based on biological or natural processes.

Intra-annual **WOOD ANATOMY** is even more informative than ring width.

HOWEVER, do we have the necessary prerequisites?

1. Do we have anatomical features?
2. ... which encode a signal different from ring width?
3. ... that has a high temporal resolution?
4. ... whose recording mechanism is understood?

1 Many possible features

Obj#	Area	Diameter	Size (length)	Size (width)	Perim. (ratio)
1	189	14.64	16.14	14.82	0.99
2	80	9.20	9.95	9.21	0.95
3	168	13.83	14.26	12.26	1.00
4	122	11.47	12.76	11.65	0.98
5	123	11.59	12.98	11.18	1.00
6	259	17.28	18.91	17.20	0.96
...
Tot	2078	177.61	194.36	169.32	13.73
Average	148.43	12.69	13.88	12.09	0.98

→ number, size, shape, ... of vessels

2 NEW and different signal

→ mean vessel area is unique

3 Higher temporal resolution

→ $r = -0.63$

4 Recording mechanism

→ regulated by hormones?

Outlook

- 1) As this example on *Castanea sativa* earlywood vessels has shown, wood anatomy might supply new proxies for the study of global change.
- 2) The identification and the understanding of the ecophysiological meaning of wood anatomical features constitutes a new tool for reconstructing the past (tree response) and modeling the future (tree adaptation).

For more details:

- Fonti P, García González I. 2004. Suitability of chestnut earlywood vessel chronologies for ecological studies. *New Phytologist* 163: 67-86.
- García González I, Fonti P (accepted). Selecting earlywood vessels to maximize their environmental signal. *Tree Physiology*.
- Fonti P, Solomonoff N, García González I. (in prep). Earlywood vessels of *Castanea sativa* record temperature prior to their enlargement.