

Linking wood cell anatomy to climate

Research background

Tree rings have proved to be an invaluable source of environmental information. Clear evidences of relationships between tree growth and the environmental conditions have soon been identified and used by dendrochronologists to look into the past. All these information are stored into the characteristics of the rings, as the ring width, the density profile, the chemical composition of the wooden matrix or the anatomical characteristics of the cells.

However, depending on species and environmental settings, this ecological information can appear strongly expressed or diffusely masked by other concurring information. More detailed mechanistic understanding of the process of environmental registration in tree rings is thus required to fully exploit this information. Thanks to continuously improving measuring techniques there is an improved capacity in looking with increased resolution into the tree-rings, which might opens new frontiers in environmental research towards the possibility to distinguish between different seasonal signals. An unavoidable and fundamental step towards a mechanistic understanding of the registration process is however the ability to provide a detailed description and timing of ring formation. When during the season, under which environmental condition is what structure produced, are fundamental questions in order to link cause and effect.

Since 2007, our *Dendro Sciences Unit* at the WSL is running a project in Lötschental where intra-annual wood formation is monitored along an altitudinal gradient. It is known which cell has been build at which time and climatic data during timing of formation have been collected.

Aim

To relate tracheids anatomical characteristics to climate

Methods

- Measure tracheids anatomical characteristics
- Link anatomical characteristics of tracheids width climatic data
- Write a scientific report



Three photomicrographs of samples from a single larch tree growing at 1600 m asl on the north exposed slope of the Lötschental valley. These three samples were collected approximately 7 weeks apart and show the growth and cellular development throughout the growing season. At the end of May, newly formed xylem cells, the cambial zone (ca), and newly formed phloem cells are clearly visible. Towards the end of July, the radial-growth was nearly complete and the majority of the xylem cells lignified (red color). However, the lignification of latewood cells just started and does not show any evidence for cell wall thickening. By September 12, the 2007 ring on this tree is almost completely formed with the cell walls mostly, if not fully, thickened and lignified.

Referenten

[Patrick Fonti](http://www.wsl.ch/personal_homepages/fonti), WSL (www.wsl.ch/personal_homepages/fonti)
[David Frank](http://www.wsl.ch/personal_homepages/frank), WSL (www.wsl.ch/personal_homepages/frank)

Links and references

[Introduction to Dendrochronology](http://web.utk.edu/~grissino) (web.utk.edu/~grissino)
[Transect project in Lötschental](http://www.wsl.ch/forschung/forschungunits/dendro/Loetschental) (www.wsl.ch/forschung/forschungunits/dendro/Loetschental)
[WSL](http://www.wsl.ch), and [Dendro Science Unit](http://www.wsl.ch/forschung/forschungunits/dendro) (www.wsl.ch; www.wsl.ch/forschung/forschungunits/dendro)

Your profile

You have background in natural sciences and you are motivated in learning innovative tree-ring anatomical methods. You are willing to join the Dendro Sciences Unit at the WSL in Birmensdorf (Zurich).

Interested?

Send your request of interest per e-mail to patrick.fonti@wsl.ch. Please supply your request with some information about your person, your study background, address of the master referent at your university and the preferred period for the master.