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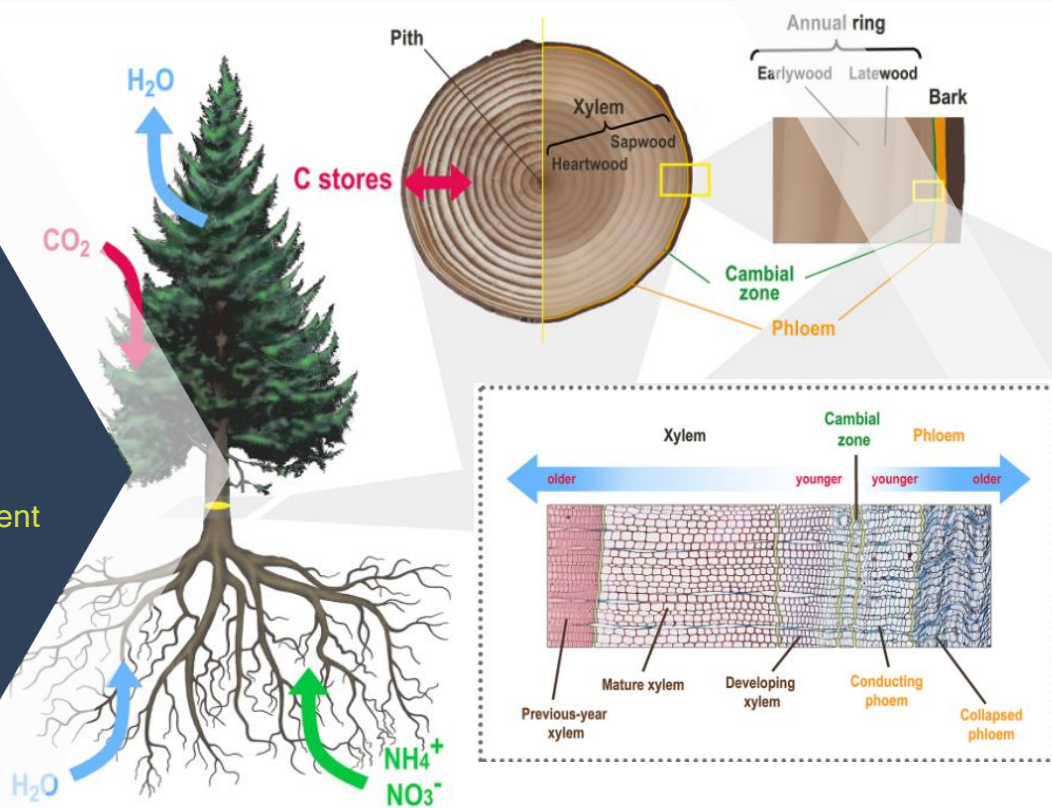
Moderator : Anne-Sophie Sergent
(INTA Bariloche, Argentina)

AUGUST 27 | 15H

CET/Paris time
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LIA FORESTIA
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2021

#4



ECOPHYSIOLOGY OF TREE RING FORMATION: CONCEPTS, METHODS AND APPLICATIONS

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dynamics of xylem formation by the cambium, as well as the environmental conditions that influence it.

In most parts of the world, cambium activity follows a seasonal cycle. At the beginning of the growing season, when temperature rises, the cambium resumes its activity.

During the growing season, the new xylem cells produced by the cambium undergo profound transformations, passing through successive stages of differentiation, which will enable them to fulfil their future functions in trees. Finally, at the end of the growing season, when climatic conditions deteriorate, the activity of the cambium stops, followed rapidly by the cessation of all differentiation processes.

In this presentation, after reviewing the biological basis of wood formation and describing the methods to monitor it, we investigate and model the relationships between cambium phenology, tree-ring formation dynamics, tracheid differentiation kinetics and climatic factors. The results are used to describe the coordination between stem growth in size and biomass, as well as the relationships between the source (the canopy) and the main sink (the cambium) of carbon in trees.

Finally, three promising avenues of research will be presented, exploring the relationships between: (1) intra-annual dynamics of woody biomass production and gross primary productivity; (2) intra-annual dynamics of xylem water conduction and stem sap flow and stand evapotranspiration; and (3) kinetics of tracheid differentiation and the generation of isotopic signals in the tree-ring archive.

In the context of accelerating global change, it is crucial to study what governs tree-ring formation and wood production, in order to better assess how ongoing changes in environmental factors affect trees, biogeochemical cycles, human societies and, ultimately, the climate itself.

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