Finnish
Dendrochronology
Some views
Finnish dendrochronology:

– Does it exist?
SHORT INTRODUCTION TO FINNISH DENDRO

- Finnish Forest Research Institute or METLA was established in 1917.
- Finnish dendrochronology was born the same year.
- Erkki Laitakari published in 1920 the first Finnish dendrochronological article
- Dendrochronology, however, in the common international concept of today, is relatively young in Finland. It started in the beginning of the 1990s.

- Earlier tree-ring research in Finland had very practical purposes: it was helping forestry to estimate forest growth.

- There were some exceptions like Mikola, Siren and Hustich in the 1940s and 1950s.
Something about Finnish dendrochronology of today
Mauri Timonen, Finnish Forest Research Institute, Finland: Climate from the 7520-year unbroken Scots pine tree-ring chronology for Finnish Lapland

See in detail: http://7thicd.ibcas.ac.cn/
Old tree remnants, megafossils, may preserve undecayed for thousands of years in ice-cold and muddy lakes.
Lake Luolajärvi is one source of subfossil wood. Many of the living pines on the hillside are more than 450 years old.
Gassy shores are good indicators in locating subfossil logs from lakes.
Underwater subfossil "forest"
This pine megafossil was extracted from deep mud. It lived over 5000 years ago.
• Scots pine spread to Finnish Lapland 9000 - 8000 years ago.

• Summer climate during the Atlantic period (7000 - 4500 BP) was 2-4 degrees warmer than today.

• Large pines grew beyond the present pine timberline in those times.

• The oldest megafossil found so far is 7638 years old.
Two ways of locating sub-aqua pine megafossils
A French-made winch, Tirfor T560, is strong enough to drag most logs from mud. It weighs 13 kg and uses a steel wire (7 kg).
Sampling examples from a 2700 years old megafossil.
Sampled megafossils, age over 4000 years.
A set of cross sections ready to be prepared and measured
Metla (Finnish Forest Research Institute) uses a modified Eklund-based tree-ring measurement system.
DATA, RESULTS and CONCLUSIONS
The Finnish supralong 7639-year pine chronology
The supralong pine chronology is built from 1087 samples, scattered on the both sides of the present pine.
Pine timberline was at its highest during the Atlantic period.
Some statistics describing the Finnish 7639-year supralong timberline pine chronology.
A subdata from Lake Kompsiojärvi. Similar data available from over 70 sites (lakes).
Another example, a subdata from Riekkovaara.
Tree-ring width variation of Scots pine in the supralong pine chronology
THE SUPRALONG CHRONOLOGY Conclusions:

1. Good for dating
2. Limited for dendroclimatic analysis, because:
   • Data scattered and heterogenous
   • Not enough well replicated
3. Additional material needed
The problematic gap around 350-150 BC
The critical part of the Finnish pine chronology.
The graph shows how nicely Fil6201 and Kom6724 finally closed the gap around 350-150 BC. Note the correlation instability.

Cofecha segment correlations:
Each segments 20 years, opening to the right as shown by the horizontal lines. Segment overlap 10 yrs.

Fil6201: -511 ... -230
Kom6724: -378 ... -180
Overlap 199 years  r=0.66
Range -511 ... -180
WHAT ARE WE GOING TO DO NEXT?
We have to:

- improve our tree-ring data
- monitor climate and tree-growth on annual basis
- focus on more detailed studies with our data
- increase our international cooperation
Pleasant work: we need to continue our mud baths.
Reference:

EURACLIMATES

Acronym for

“EURAsian wide CLImate change Monitoring and Analysis based on Tree-ring and EcoSystem modelling.”
WHY EURACLIMATES?

- Better understanding of climate behaviour in Finland presupposes wider-scale macroclimate information.
- Need for information integration in climate change research.
- Connected to Metla’s cooperation with Russian forest research.

METHOD

- Multidisciplinary approach.
- Utilizes the Eurasian wide network of conifer tree-ring chronologies for resolving local historical and present-day climates in Eurasia (combined dendrochronological and GIS approach)
- Changes in one local ecosystem as an indicator for the causes of future climate changes in another ecosystem ("predictions")
Climate Change in Finland

CC approaches in Metla:

NATIONAL
1. Studies based on local proxies, instrumental climate data and macroclimate data
2. Studies based on carbon-based measurements and modelling
3. Studies based on the measurements of VMI (National Forest Inventory)

INTERNATIONAL
4. Studies based on regional and global scale proxies, instrumental climate data and macroclimate data

CC Research Program in Metla:
- Combination of all the four approaches
- International cooperation necessary
- Cooperation with Russian climate change research recommended (Metla’s agreements with VN Sukachev Institute of Forest and the Institute of Plant and Animal Ecology)
- Large database and network of Scots pine tree-ring chronologies available throughout Eurasia.
- Eurasian wide climate change research program SPINEACLIMA in preparation (Metla-Russia-US driven, 10-15 countries)
EURACLIMATES: General outlines for Eurasian wide climate change research, based on the networks of climatically sensitive conifer chronologies.

The approaches:

1. **SpineaClimates**: climate change research based on Scots pine (Pinus sylvestris) tree-ring chronologies
2. **TaigaClimates**: climate change research based on the all sensitive northern timberline conifer species
3. **EuraMountainClimates**: Eurasian mountain timberlines climate change research
4. **Boreal Zone Biome Climates**: Eurasian climate change research in the Boreal humid and semiarid zones.
5. **Other projects of the research program**
Welcome to the LUSTIA Website. Visit the Lustia Net Lab and learn what's up and hot in Finnish Tree-Ring Science. Click the links for further info.

Growth Trends Variation in Growth Climate Change

LUSTIA METLA
Metla's tree-ring research and laboratory development project (The Lustia Project)

FINTRILABS
A group of Finnish tree-ring labs focusing on building and analysing millennium-long chronologies

We analyse tree growth and contribute Tree-Ring Science by developing:
- Tree-ring data and metadata archiving
- Supra-long tree-ring chronologies
- Methods and applications

KINSYS Tree-Ring Research System

Our specialty: Underwater dendrochronology

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More to read here. Thank you!