

# Overview

The discipline of dendrochronology is a set of techniques by which the annual growth layers of trees may be assigned to a definite calendar year. The history of changes in the tree's environment is reflected in various properties of the tree rings. These properties include ring width, cell size, wood density, trace element composition, radioactive and stable isotope ratios. External environmental variables affect the physiological processes that control tree growth. The annual radial growth increment produces a permanent record of these effects. Tree-ring series can be used to reconstruct past variations in precipitation, temperature, soil moisture, river flow, the frequency of extreme droughts, forest fires, major forest pest outbreaks, and several other variables. What can be reconstructed depends on those factors that limit tree growth. The reconstructions typically cover several centuries, but can occasionally extend to millennia. In this course, we will use instrumental and proxy records (tree-ring chronologies) to place the climatic conditions faced in the management of trees, water, livestock and the indigenous herbivores, and people and their needs into a proper perspective.

The four instructors for the course will each bring a special expertise to the subject matter. Additional perspective will be added by highly qualified guest lecturers. Students will have a responsibility to learn not only from the instructors, but from one another. It is our hope that the mixture of students from different disciplines will allow the refinement of the techniques and concepts we will present, and will promote the development of new or improved ways of answering the challenge of conservation and sustainable development of natural resources. To do this we have arranged to combine lectures and discussions with laboratory work and field visits.

## Tree Rings, Climate, and Natural Resources Summer School

June 29, 2008 to July 19, 2010

Course Held at Slovenian Forestry Institute



# Instructors



**Ramzi Touchan** is an Associate Research Professor in the Laboratory of Tree-Research and a Joint Associate Professor in the School of Natural Resources at the University of Arizona. His field of expertise is developing long tree-ring chronologies to reconstruct past climate in different parts of the world. Current research programs include establishing a multi-century network of climate records for the eastern Mediterranean and North Africa based on tree rings by extending and enhancing existing tree-ring datasets, and by developing new tree-ring chronologies geographically and temporally. This network is being used to study interannual to century scale climate fluctuations in the region and their links to large-scale patterns of climate variability.



**David M. Meko** is an Associate Research Professor in the Laboratory of Tree-ring Research and a Joint Associate Professor in the School of Natural Resources at the University of Arizona. He uses tree-ring data and instrumental data to study the natural variability of climatic and hydrologic systems on spatial scales from small watersheds to continents. He has developed extended records of stream flow for water resources agencies in the western United States. Current research topics include riparian dendrochronology, the improvement of quantitative methods for streamflow reconstruction, and estimation of the variability of the North American monsoon.



**Tom Levanic** is an assistant professor for dendrochronology and dendroecology at the University of Ljubljana and University of Primorska and senior associate at the Slovenian Forestry Institute. His field of expertise is development of long, multiproxy chronologies in Alpine region and Balkans, reconstruction of past climate and studies of tree decline due to different environmental stresses based. In these studies he combines tree-ring widths, stable isotopes, tree-ring densities and different environmental data. Current research includes studies of tree growth, tree physiology and cambium activity at the upper timberline as well as in the floodplain forests of Slovenia. Beside this he also develops long chronologies for pine species and studies their response to climate on the Balkan Peninsula.



**Jozica Gricar** is employed as a Research Associate at the Department of Yield and Silviculture at the Slovenian Forestry Institute. Her research interests are mainly focused on radial growth of trees, cambial activity, intra-annual dynamics of xylem and phloem formation of various tree species growing in natural or controlled environment. Her current research projects include studying the relationship between intra-annual tree growth and climate, and its application to the study of environmental change.

## Topics To Be Covered

1. **Dendrochronology:**  
History of Dendrochronology,  
Scientific Basis of Dendrochronology,  
Biological Basis of Dendrochronology.
2. **Chronology Development:**  
Sample Preparation, Cross-dating technique (Skeleton Plots), Ring-Width Measurement, Standardization, Assessing Chronology Quality
3. **Dendroclimatic Reconstructions:**  
Response Function Analysis  
Transfer Function Analysis
4. **Applications:**
  - a. Dendroarchaeology: Case Studies from North America
  - b. Dendrohydrology: Regional Precipitation and Palmer Drought Index Reconstructions for Eastern Mediterranean and North Africa; Sacramento River Reconstruction, return periods of low flows; Seasonal Precipitation from Latewood Tree-Ring Width; Large-Scale Drought Variations and Periodicity of Drought
  - c. Dendroecology: Fire history and climate patterns in Ponderosa pine and mixed-conifer forests of Southwest USA
  - d. Role of dendrochronology in natural resource management.

## Who Should Attend?

The course is structured for participants who have an interest in learning the applications of dendrochronology and have a preliminary background in statistic. **The language of the course is English.**

## Registration Fees

1,250 EURO include: course materials, transportation to the field.

## Accommodations

expenses per student		
rooms (for the time of a summer course)	double room	single room
	195 €	256 €
breakfast	4€ /day	
dinner	5€ / day	
tourist tax	1€/day	
<b>total for the period of summer course (20 days)</b>	<b>550 €</b>	<b>611 €</b>

Lunch: you can take lunch in restaurants nearby the Institute.  
Estimated cost of lunch is 10€

## Deadline

Registration deadline is April 30 2010.

## Contact Us

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