

Addendum - changes to the printed program guide.

Corrections

EE-2 Site-specific radial growth responses of *Pinus densata* to climatic change in southeastern Tibet Plateau (Rao-Qiong Yang, Pei-Li Fu, Ze-Xin Fan)

Presented by: Rao-Qiong Yang

Tree growth are various to climate. It is critical to investigate trees response to environment change. In this research, we contrast the growth variability and climate response variability in *Pinus densata* grew in different environment in southeastern Tibet Plateau. We collected more than 150 cores from 3 sites and analyzed their tree-ring width with climatological data. The result indicated that Growth response of *P. densata* to climatic changes were site-specific in southeastern Tibet Plateau. Growth of *P. densata* was limited by winter and spring moisture availability in Deqin but more sensitive to winter and spring temperature in Weixi and Shangri-la. The pines play an important role in carbon fixation and forest establishment in southwest China, this study will contribute to forest management.

Cancelations:

Formerly DC-23: Effect of Topography and Climate on the radial growth of Blue pine (*Pinus wallichiana*) in the Temperate Conifer Forests of South-West Bhuta (Sonam Wangchuk, Khwanchai Duangsathaporn, Patsi Prasomsin, Yenemurwon Omule, Karma Tenzin, and Dorji Dukpa)

Effect of topography and climate on radial growth of Blue pines (*Pinus wallichiana*) was investigated in temperate conifer forests at Chapcha, south-west of Bhutan, by assessing the radial growth patterns and examining the growth response to topographic and climatic factors using dendrochronological methods. The result revealed that radial growth patterns among trees did not show an orderly increase across altitudes both north and south aspect. Series intercorrelations is lower at higher altitudes than lower altitudes. Current annual increment among trees decreases with increase in altitude. Cumulative growth is higher in older trees a upper slopes. Mean sensitivity of trees exhibit intermediate sensitivity and decreases with increase in altitude : low to mid altitude except at high altitudes. Gleichläufigkeit sign test reveal high growth synchrony between two pairs of the closest chronologies.

In the topographic influence, radial growth has negative correlation with altitude. Other topographical variables did not show significant correlation with tree growth in N-aspect, while tree growth has negative correlation with aspect and slope, and positive correlation with LeAspect Index in S-aspect.

In the climatic influence, radial growth has stronger correlation with growing season rainfall and late winter MeanT in lower altitudes and higher altitudes respectively with distinct effect at S-aspect. Radial growth has no significant relationships with MinT, while radial growth show positive correlation with maxT at both aspects (February-August at N-aspect; August-December at S-aspect).

The knowledge gained from this research can provide useful information to adopt climate change mitigation measures.

Formerly DC-27: Growth-Climate Relationships of Teak (Tectona grandis L.f.) across Myanmar: the Potential for Reconstructing the Past Climate (Zaw Zaw , and Ze-Xin Fan)

Despite profound impacts of climate changes on the world's population, the information on the past regional climate change is particularly scarce for the nation of Myanmar. Tree-ring growth responses to climate change can provide much information to assess future forest productivity, vegetation dynamics and tree-species distributions. Teak, a commercial hardwood species, endemic to Myanmar, is one of the most successful tree species for tropical dendroclimatology. In this study, the research on tree-ring width of teak trees in the natural forest across Myanmar was conducted. The research aimed to provide crucial information on teak growth response to climate. The investigations were carried out in three different regions (Sagaing, Magway and Bago) of Myanmar which possess huge areas of natural teak bearing tropical forests which highly contribute to the country's economy. The growth rate of teak varies according to the site condition where it grows. In all study areas, tree-ring width is strongly correlated with precipitation and negatively correlated with temperature. The diameter growth dynamics of teak in Sagaing region is significantly slower than the trees from the other two sites. This study revealed that teak trees in Sagaing, Magway and Bago regions can be used as a high resolution proxy for reconstruction of the past regional climate in Myanmar.

Additions:

Poster Session I

WA-5p Dendrochronological and radiocarbon dating of medieval buildings in the mountain part of Ingushetia (Northern Caucasus, Russia) (Vladimir Matskovsky, Umalat Gadiev, Andrey Dolgikh, Ekaterina Dolgova)

Ten most prominent medieval buildings – Christian churches, crypts, temples, sanctuaries, battle towers, and living buildings – in mountain part of Ingushetia that contain wooden construction elements were selected to be dated using natural science methods – radiocarbon and dendrochronological dating. These kinds of analyses are performed for the first time in this region – previously all these buildings were only dated by historians, architects, and sometimes by archaeologists. We were not able to acquire dendrochronological dates due to the lack of long tree ring chronologies, but the obtained wiggle-matched radiocarbon dates will serve as new benchmarks for the chronology of architecture in the region. Also the developed floating tree ring chronologies will contribute to the improvement of dendrochronological network of the Northern Caucasus.

DE-19 Tree rings as records of changes in air quality and past impact of human activities on environmental conditions (Paolo Cherubini)

Presented by: Paolo Cherubini

Air pollution is one of the most important problems related to industrialisation and is of major concern to societies for its effects on the environment and on human health. In the past two decades, the attention of science and society has been particularly focused on the effects of particulate pollution. In rapidly industrialized regions of the world, particulate pollution is a serious environmental problem that is influencing air quality and human health, along a similar trajectory to that previously experienced by currently developed nations. Monitoring atmospheric pollution in industrial areas is essential to infer past levels of contamination and to evaluate the impact for environmental health and safety. However, the first stations measuring air pollutants were installed during the 1980s, and data currently available in most regions cover at best the past 30 years. We hypothesize that the chemical composition of tree-ring wood can be used for monitoring spatio-temporal variability of air pollutants and fine particles, to extend air quality data back in time. Tree rings can be used as indicators of the environmental (not only climatic) conditions in which trees have been growing, e.g., to

reconstruct the impact of air pollution, because their chemical and physical characteristics depend on the environmental conditions in which they grew. The concentration of chemical elements in tree rings has been studied using a combination of dendrochronological and chemical methods, i.e., dendrochemistry, for example, for tracing changes in nutrient availability in declining forests. However, uncertainty surrounds the use of dendrochemistry to monitor air pollution impacts and its temporal resolution scale. While some encouraging results have been reported in acidification studies, the actual suitability of dendrochemistry to provide unbiased evidence of the impacts of trace metal pollution has been questioned, although it seems that many of the problems can be overcome by appropriate investigation designs. Moreover, the effect of particulate pollution on plants is still largely unknown and in trees almost unexplored. We analysed tree rings formed in different years and close to different pollution sources, using standard dendrochronological methods, tree-ring stable isotopic (^{13}C , ^{18}O , ^{15}N) analyses, radiocarbon analyses (^{14}C), chemical analysis using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS), and computer-tomography imaging and chemical microanalysis at the synchrotron. We found changes in the chemical composition of tree-ring wood related to changes in air quality and air pollution episodes and trends. In this talk, I will give a short review of relevant dendrochemical studies, suggesting possible reasons why many have failed to provide annual-resolution information. I will use case studies close to an asbestos factory, a steel factory and Mount Etna, an active stratovolcano in Italy, to show that changes in the chemical composition of tree-ring wood, measured using high-resolution LA-ICP-MS, enable us to reconstruct past air pollution episodes and trends. Moreover, I will provide evidence that nanoparticles deposited on tree leaves are taken up through stomata and transported through the phloem into the xylem of trees.

IT-11 Myanmar Teak Tree ring oxygen isotope as a good proxy for Indian Summer Monsoon

Presented by: Nathsuda Pumijumnong

We present a first and unique proxy a 100-year oxygen isotope in Myanmar teak tree-ring cellulose. Six cores of teak from semi-dry areas in Myanmar were used to analyze oxygen isotope value in α -cellulose. The oxygen isotopic composition of teak tree-ring cellulose ranges from 21.56 ‰ to 29.47‰. The mean tree-ring value of $\delta^{18}\text{O}$ cellulose values and standard deviations were 24.94 ± 0.9 ‰. The $\delta^{18}\text{O}$ value was positively correlated with maxima temperature in the November (.284, $p < .05$) and December (.205, $p < .1$), positively correlated with mean temperature in the November (.251, $p < .1$) and December (.265, $p < .05$) and positively correlated with minima temperature in December (.249, $p < .1$) and negatively correlated with minima temperature in September (-.246, $p < .1$). The $\delta^{18}\text{O}$ value was negatively correlated with regional rainfall during May to October ($r = -.287$, $p < 0.5$) and Indian Summer Monsoon index (ISMI) June-July-August-September ($r = -.530$, $p < 0.5$), showing strongly coherent variations over large areas in Southeast Asia. We reconstructed ISM (June to September) rainfall, based on a linear regression model that explained 28.1% of the actual ISMI variance. Spatial correlation and spectral analyses revealed a strong impact of El Niño-Southern Oscillation (ENSO) on tree-ring $\delta^{18}\text{O}$.