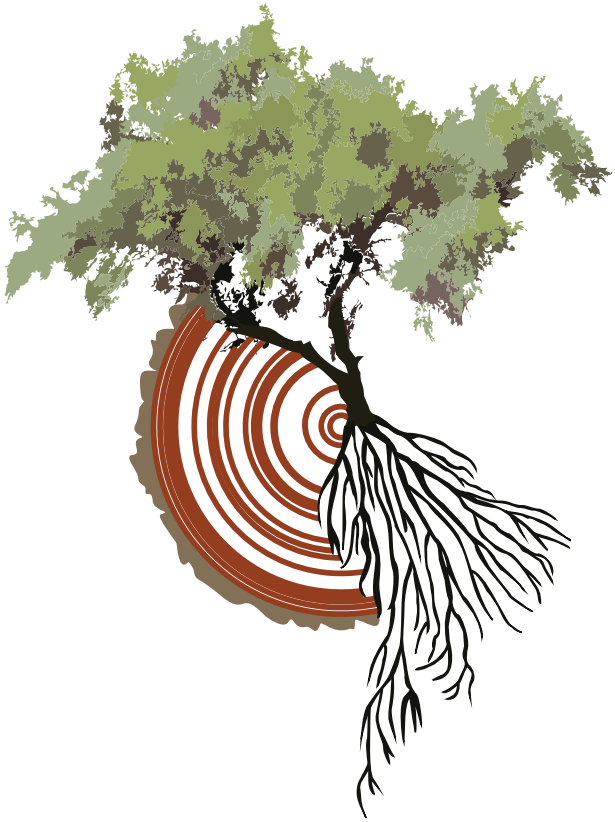
AMERIDENDRO 2016

Third American Dendrochronology Conference

Monday March 28 - Friday April 1, 2016, Mendoza, Argentina



Organizing institutions

IANIGLA
CONICET
U.N.CUYO
GOBIERNO DE MENDOZA

Tree-Ring Society

Sponsors

CONICET

FUNDACIÓN WILLIAMS

INSTRUMENTS REGENT
Image Analysis for Plant Science

Haglöf SWEDEN

FUNDACIÓN Villavicencio

IUFRO

iawa

Ministerio de Agroindustria
Presidencia de la Nación

MENDOZA ARGENTINA

(milder) zones may acclimate to a further increase of drought, while the southern populations could further approach, or exceed, an ecological limit, which may threat their sustainability

The temperature signal of Blue Light Intensity (BI) tree-ring data sets from trees growing under distinct environmental conditions

OELKERS, R.C.[1,4]; D'ARRIGO, R.[1]; ANDREU-HAYLES, L.[1]; WILES, G.[2]; WILSON. R.[3]; DAVI, N.K.[1,4]; BUCKLEY, B.[1]; ANCHUKAITIS, K.[5]

1. Tree-Ring Laboratory, Lamont-Doherty Earth Observatory, Palisades, NY, USA; 2. The College of Wooster, Wooster, Ohio, USA; 3. School of Geography and Geosciences, University of St Andrews, St Andrews ,UK; 4. William Paterson University, New Jersey, USA; 5. University of Arizona, Tucson, AZ, USA

roelkers91@gmail.com

Symposium 3. Applications of Blue Intensity in Dendrochronology - Room Magna: 31/03-11:30

Latewood density has proven to be an essential parameter in assessing the inter-annual variability of tree rings. In addition to the traditional proxy of ring-width, maximum latewood density (MXD) is commonly found to record a strong climate signal for summer temperatures in the Northern Hemisphere. In particular, MXD data is valuable for reconstructing past temperatures when the temperature/ring-width relationship is weak or unstable. However, measuring MXD is both expensive and time-consuming. Through the development of Image Analysis programs such as Coorecorder, a new proxy, Blue Light Intensity (BI); has emerged as a potentially similar proxy to latewood density measurements. Here, we compare BI tree-ring chronologies, some preliminary, generated from different species in very distinct environments: the boreal forest of Alaska, the high/low altitude forests of Mongolia, the temperate forests of NY, and the tropical forests of Vietnam. For each BI chronology, the Mean Correlation and Expressed Population Signal (EPS) were analyzed, and spectral analysis using the Multi-taper Method (MTM) was performed. In Alaska, BI from a white spruce site was found comparable in quality to previously measured MXD in recording a strong temperature signal. In agreement with pre-existing ring-width data, preliminary BI results from Siberian pine and Larch sites in Mongolia provide substantial evidence of rapidly increasing temperatures over Central Asia, with BI improving the climate signal recorded previously in ring-width and MXD data. This is particularly important for model development in regions such as Mongolia where few instrumental meteorological records exist. Preliminary work on *Fokienia* samples from Vietnam, show that BI can improve the moisture signal in the tropics, which has not been found previously for MXD. This study illustrates the considerable potential of BI as a new tree-ring climate proxy in many different environments.

The *Araucaria* dendrochronological network: growth patterns and climatic signals of paraná-pine on the Southern Brazilian plateau

OLIVEIRA, J.M.[1]; BOTOSSO, P.C.[2]; GALVÃO, F.[3]; ESEMANN-QUADROS, K.[4,5]; OLMEDO, G.M.[1]; ALBIERO JR, A.[3,6]; ADENESKI FILHO, E.[3,5]; OLIVEIRA, J.R.[5]

1. Universidade do Vale do Rio dos Sinos, São Leopoldo/RS, Brazil; 2. Empresa Brasileira de Pesquisa Agropecuária, Colombo/PR, Brazil; 3. Universidade Federal do Paraná, Curitiba/PR, Brazil; 4. Universidade da Região de Joinville, Joinville/SC, Brazil; 5. Fundação Universidade Regional de Blumenau, Blumenau/SC, Brazil; 6. Escola Superior de Agricultura Luiz de Queiroz, Piracicaba/SP, Brazil

julianooliveira@unisinos.br

Symposium 1. Dendrochronology in the Tropics of America - Room Magna: 29/03-12:00

Araucaria angustifolia (Bertol.) O. Kuntze is a long-lived Araucariaceae, widespread and dominant in mixed-forests and grasslands on SE South America highlands. The Araucaria Dendrochronological Network is a collaborative project aiming to develop large-scale dendroclimatic researches in this region, by integrating previous and novel chronologies of this conifer and associated angiosperms. Here, we present a first assessment of long-term growth patterns and climatic signals in paraná-pine across the range of mixed-forests and grasslands on Southern Brazilian plateau (SBP). Crossdated ring-width series of 165 trees, composing 11 chronologies in four SBP regions were analyzed. The chronologies represent contrasting ecological conditions, especially different geology and geomorphology among regions, soil and vegetation types within regions. We considered two datasets: 1) including all chronologies but a more recent period (1951-2010); and 2) considering a longer extent (1851-2010 period) but fewer spatial replicates (seven chronologies from three regions). For each dataset, raw series per tree were detrended by cubic smoothed spline functions 50% cut-off; 24 or 64yr segments; filtered by autoregressive modeling and combined on biweighted mean site chronologies. We applied Principal Component Analyses (PCA) on Correlation matrices between chronologies, followed by randomization tests, to explore growth patterns across the SBP. To evaluated dendroclimatic signals, significant eigenvectors were compared, through linear modeling, with annual series of monthly total precipitation and mean temperature (CRU TS3.23 estimates for the study region). The analyses showed no significant eigenvector in dataset-1 ($P > 0.1$), but a stable 1st eigenvector in dataset-2 ($P = 0.09$). In general, this eigenvector (25% of total variation) represented a convergent growth pattern across sites, explained by climate ($R^2 = 0.32$; $N = 109$; $P = 0.001$). We conclude *A. angustifolia* presents a large spatio-temporal growth pattern in SBP, caused by autumn temperature controlling the growing-season extent and by soil water conditions on spring. The existence of dendroclimatic signals and century long chronologies provide a unique opportunity to infer past climatic conditions on SE South America highlands.

Teleconnections in spruce growth patterns across the North Atlantic boreal region

OLS, C.[1]; HOFGAARD, A.[2]; BERGERON, Y.[1]; DROBYSHEV, I.[1,3]

1. Forest Research Institute, University of Québec in Abitibi-Témiscamingue, Rouyn-Noranda, Canada; 2. Norwegian Institute for