The Laboratory of Tree-Ring Research

presents a talk by

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Climate Response of Four Tree Species from the East-German Low Rainfall Area

Wednesday, October 1, 2014 - 12:00pm to 1:00pm

Room: Bannister 110

Climate response was investigated for four tree species in the East German low rainfall area in Thuringia where average annual precipitation falls below 600 mm. Black Pine (Pinus nigra) has large semi-natural stands on calcareous soils far north of its natural distribution, Common Ash (Fraxinus excelsior) reaches its physiological limit along calcareous slopes. European Beech (Fagus sylvatica) loses its competitive dominance and is gradually replaced by Pedunculate Oak (Quercus petraea) on warm and drier sites.All chronologies have been constructed with samples from several sites. Detrending was done by cubic smoothing splines to eliminate possible effects of management. In general all species responded strongly to precipitation: the whole growth period (March to July) gave the strongest correlations (r = 0.6 ... 0.7). Temperature was of minor influence (negatively correlated, r = -0.3, to June and previous September). Response to a combination of rainfall and temperature through PDSI as well as SPEI (with variable time lag) always lead to lower correlation coefficients.Although precipitation was the strongest factor, differences between species could be detected: Black Pine and Beech responded strongest to rainfall in July, Ash and Oak strongest to June rainfall. For Oak and Ash negative influence of temperature was narrowly peaked at June, while for Black Pine and Beech June and July contributed as well. The coefficients of response function showed a similar behaviour. For Ash the response coefficient to precipitation became higher when the trees were stressed by increasing drought along the slope. Oak and Beech had temporally rather constant correlations to rainfall (30y sliding window), while Ash showed a gradual decline in response coefficient (as a possible age effect?) and Black Pine indicated some (climatic?) transition from June to July precipitation as the most dominant factor.Our findings extend results of García-Suárez et al. (2009) from a higher rainfall area.

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