Climate change-controlled dendroecological signal in *Pinus pinea* in Southern Spain

**1 Introduction**

Tree rings provide information about forest response to climate change. Shifts in the tree-ring sensitivity to climate and enhanced growth synchrony among stands indicate a reaction to common limiting factors acting at large scale. (Andreu et al., 2007; Di Filippo et al. 2010).

**2 Objectives**

Growth variability was studied over the dendrochronological time-span of *Pinus* populations from S Spain to detect any change in the sensitivity to climate and synchrony among stands.

**3 Materials**

**4 Methods**

- A common climatic signal for the Huelva chronologies was extracted with principal component analysis (PCA).
- The 1st component (PC1) was used for climate-growth correlations (Pearson r).
- The PCA, the PC1-climate correlations and the inter-annual tree-ring width variability (mean sensitivity) were computed for running windows (30 years).
- Running-interval (30 years) correlations were computed between PC1 and chronologies from La Mancha and Cazorla.

**5 Results**

Huelva PC1-climate correlations: *P. pinea* growth depends on water availability from previous winter and spring and is limited by high temperatures.

Running correlations between Huelva PC1 and *P. pinea* from La Mancha and *P. nigra* from Cazorla: correlations among populations increased.

Mean sensitivity of Huelva chronologies: *P. pinea* trees enhanced their sensitivity to climate.

**6 Concluding remarks**

The shifts in the climate-growth relationships and the increased sensitivity in Huelva suggest a common reaction to changing climate in the region. The enhanced growth synchrony among different populations in S Spain may indicate the action of large-scale environmental changes which induce more restricting conditions for growth.

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**References**

- Delmás M et al., 2013. Radial growth variations of black pine along an elevation gradient in the Cazorla Mountains (South of Spain) and their relevance for historical and environmental studies. European Journal of Forest Research 132(4)
- Di Filippo A et al., 2010. Climate change and oak growth decline: dendroecology and stand productivity of a Turkey oak (*Quercus cerris L.*) old stored coppice in Central Italy. Annals of Forest Science 67