

B1.13 Oral

Defining temperature and soil moisture thresholds for positive radial increment of cork oak (*Quercus suber* L.) in a mediterranean environment: An approach based on generalized semiparametric linear mixed models

Javier Vázquez-Piqué¹, Annie Deslauriers², Sergio Rossi²

¹University of Huelva, Huelva, Spain, ²University of Quebec in Chicoutimi, Chicoutimi, Quebec, Canada

The definition of threshold levels of limiting factors for assessing stem growth of forest species is of major importance for improving the knowledge about growth processes and to analyse the influence of a changing environment on the length of the vegetative period. In this work, we present a methodology to define temperature and soil moisture thresholds for radial increment of cork oak (*Quercus suber* L.). The dataset is based on continuous measurements by automatic dendrometers performed from 2004 to 2007 on 8 trees in two contrasting sites in Southern Spain. A mixed model considering the positive and negative daily values of radial increment as a binary variable and analysing the influence of the site, year, tree, soil moisture and temperature on the probability of radial expansion is applied. Trend in the probability of radial expansion during the year and in the bivariate soil moisture-temperature distribution are absorbed through low rank radial smoothers incorporated in the mixed model. Mean air temperature lower than 12–14°C and soil moisture lower than 5% of the field capacity are indicated as limiting the positive radial increment, while no significant effect is shown between sites, years and trees. Because of its flexible application, this mixed and bivariate approach can be suitably used to investigate the influence of the climatic factors on tree growth at very short time scale.