

the year, including winter, depending on PET. Detailed soil parameterisation was performed for each stand based on descriptions from deep soil pits dug in 2004. According to the observed soil properties and the fine root distribution, two layers were defined, including 75% of fine roots for the top soil layer and 25% for the deeper one. AWC and soil density were calculated for the two soil layers based on the properties of the corresponding pedological horizons. For each stand, daily relative extractable soil water (REW) was calculated from 1960 to 2007 as

$$REW = \frac{W_e}{AWC} \quad (2)$$

where W_e is daily extractable water. A soil water deficit is assumed to occur when REW drops below a critical threshold of 0.4 (REW_c), under which transpiration is gradually reduced due to stomatal closure (Granier et al., 1999).

The intensity of SWD (I_s), which accumulates the difference between REW and REW_c , was calculated monthly or annually:

$$I_s = \frac{\sum (0.4 * AWC - W_e)}{0.4 * AWC} \quad (3)$$

Statistics and dendroclimatic analyses

All statistical analyses were performed using a statistical software package (Statistica; Statsoft, Tulsa, OK, USA). The coefficient of variation (CV, ratio of standard deviation to mean) was calculated from 1960 to 2007 to compare the mean BAI of earlywood and latewood for oak and pine. Analysis of variance was conducted to determine whether "species" was a factor that significantly influenced the mean species BAI from 1960 to 2007. Comparisons between the stand or species mean BAI, MS or AC were checked with a t -test at the 95% confidence level. The homoscedasticity assumption and the comparison of the interannual variation amplitudes between the species BAI were checked by a Levene-test.

First, bootstrapped correlation coefficients were calculated between monthly climatic data (Tmax, Tmin and P) and the residual chronology of each stand (earlywood, latewood and total ring) with the software package DENDROCLIM2002 (Biondi & Waikul, 2004). This software calculates the statistical significance of the coefficients by calculating 95% quantile limits based on 1000 bootstrap re-samples of the data. Correlations were performed from August of the previous year (n-1) to August of the current year (n). Analyses were conducted for two periods: 1961 to 2007 (47 years) and the pointer years for each species (26 years for beech, 30 for oak and 25 for pine). For these two periods, the bootstrapped correlation coefficients were also calculated between SWD indices and the residual chronology of each stand. The SWD indices were I_s from June to October (n-1 and n) and annual SWD duration (n-1 and n).