Measurements of stand and tree characteristics

The stand dominant height, overstory basal area and understory proportion were obtained from forest inventories performed during winter in 1994-1995 (Le Dantec et al., 2000). The leaf area index (LAI) was estimated at each stand with a canopy analyser (LAI-2000, LI-COR Inc., Nebraska, USA). From 1994 to 2000, 40 to 150 measurements, according to stand area, were performed distributed along transects below the canopy on sunny days 2 h after sunrise or before sunset. Linearly interpolated values of incident light on three zenith angles were used (from 0° to 43°, Dufrêne & Bréda, 1995). For pine, measurements were divided by 0.57 to compute hemisurface leaf area (Stenberg et al., 1994). The mean of the maximal LAI measurements performed from 1994 to 2000 was chosen as the stand LAI parameter. AWC was calculated from soil samples collected every 2 ha in 1995 by the ONF. For each soil sample, all soil horizon depths and textures were determined. The field capacity and wilting point were calculated for each horizon according to the function of Saxon *et al.* (1986). AWC was the sum of the horizon differences between the field capacity and wilting point (Le Maire, 2005). Soil types (IUSS Working Group, 2007) and the C/N ratio were determined from soil pits dug in January and February 2004. Organic C and N were determined in the upper organo-mineral layer by oxidation, as soils are acids (pH ranging between 4 and 5) according to the normalised method (NF ISO 14235).

With respect to tree characteristics, the circumference at breast height (C_{130}) was measured in the 15 sampled trees per stand from the core sampling in April 2008. The mean age was measured from 5 to 15 trees per stand by ring counting to the pith in the sampled cores. The mean age of the trees in B9, O3, O4 and O19 was estimated from a previous study conducted in 1995 (Barbaroux, 2002), and that of B4 and B12 was estimated from a study from 2008 (E. Silva, pers. com.).

Tree-ring data and pointer years

Tree rings were measured microscopically in the sampled cores for earlywood, latewood and total ring width to the nearest 0.01 mm from 1960 to 2007 using a digitising tablet connected to a micro-computer and the tree-ring program SAISIE (Becker, unpublished). As beech is a diffuse porous species, only the total ring widths were measured for this species. After cross-dating, 45 individual ring series for oak (15 trees in 3 stands), 45 for beech and 41 for pine were used. Thinning information was available for each stand from 1970 to 2007 (ONF). Some thinnings impacted the stand tree-ring series and led to stand pointer years, especially for beech. Thus, the pointer years were identified for each species to limit the number of non-climatic pointer years. They were calculated separately for each ring component, i.e., earlywood, latewood and total ring. Relative growth variation (*RGV*) was calculated for each *n* year in each individual ring series as follows: