extractable soil water, promote earlywood formation during spring. Pine growth was also affected by maximal temperatures in June (as in Rigling et al., 2002), July and August and positively correlated with abundant precipitation in June and August. Therefore, pine was the only species sensitive to the climate of August. The observed pine growth response to I_s in August and September also highlighted the key role of the soil water status at the end of the growing season. This could be explained by the longer growing season of pine in Fontainebleau (until September) compared to beech and oak over a mean climatic year (Michelot et al., in prep.) Warm and dry climatic conditions over June to August could lead to quick stomatal closure in Scots pine, and thus, photosynthesis is reduced during the early stage of drought (Cochard, 1992, Zweifel et al., 2009). The use of SWD indices, rather than precipitation to predict the interannual growth variations of pine greatly improve model quality. These indices include the accumulated SWD during the growing season and thus the water constraints of the previous months, contrary to monthly precipitation. A major effect of summer SWD on Scots pine ring formation has been observed in other European sites (reviewed in Lebourgeois et al., 2010): in Mediterranean forests (e.g. Andreu et al., 2007) and Alpine valleys in Switzerland and Austria (e.g. Bigler et al., 2006, Weber et al., 2007).

In the context of climatic changes, droughts will be more intensive and frequent, and maximal temperatures will increase in central and Southern Europe, particularly in winter (IPCC 2007). The high sensitivity of *F. sylvatica* to maximum temperatures and the precipitation of the current growing season could make this species highly vulnerable to future drought events (as suggested by the results of Gessler et al., 2007b). Oak growth was strongly dependant on the carbon reserve storage. In the case of summer droughts, reserve depletion due to soil water deficits could lead to long-term consequences for oak growth. Additionally, Bréda *et al.* (2006) have shown the impact of drought in 2003 via the amount of carbohydrate reserves on the crown vitality of oak during the following year. *P. sylvestris* could be the species that is less vulnerable to expected climate changes among the investigated species because its growth could be stimulated by warm winters. However, recent studies have shown that its great sensitivity to maximum summer temperatures and summer SWD, as we found, could have an opposite effect. This lead to decrease in pine growth and survival in central and southern Europe (Reich & Oleksyn, 2008) and probable decrease of its future distribution area, as predicted by Cheaib *et al.* (in prep.) in the west of France.

Differing responses between earlywood and latewood growth

For oak, interannual earlywood growth variations were buffered compared to latewood growth. The mean sensitivity and the number of pointer years were therefore extremely low for the earlywood chronologies. During a mean climatic year, earlywood develops over April to mid-May (Bréda & Granier, 1996, Gricar, 2010, Michelot et al., in prep.) before leaf maturity occurs. Carbohydrate reserves are used as the main substrate for earlywood formation, as shown by the severe