



Mid-term effect of silvicultural treatments on carbon cycling in a Mediterranean *Pinus halepensis* forest

Cristina Lull, Inmaculada Bautista, Luis Lado-Monserrat, and Antonio Lidón

Research Group in Forest Science and Technology (Re-ForeST), Departamento de Ingeniería Hidráulica y Medio Ambiente, Universitat Politècnica de València, Camí de Vera s/n, 46022 Valencia, Spain (ibautista@qim.upv.es)

Twelve years after a silvicultural treatment in a *Pinus halepensis* forest, seasonal variation of carbon pools were compared between three treatments: a control reference with no treatment (T0); a moderate thinning with 40% of mean basal area removed (T40); a total clearcut (T100). The silvicultural treatments were performed following a randomized block design. The three blocks selected, namely called Tuéjar izquierda (TI), Tuéjar derecha (TD) and Chelva (CH) are located in Valencia (East of Spain) and have the same canopy characteristics, but different soils. Soil environmental conditions in each plot were continuously recorded with a pluviometer and two soil moisture and temperature sensors installed at 5 and 10 cm depth connected to a data logger. During two years (2009 and 2010), superficial soil samples (0-15 cm) were collected thrice per year, in spring, summer and autumn. In each sample, water holding capacity, total organic carbon (TOC), soluble organic carbon (SOC), microbial biomass carbon (MBC) and soil respiration were determined. Our results showed that the textural composition (clay loam for TI and TD soils and sandy loam for CH soil), affected carbon pools. Total organic carbon differs significantly between blocks, and also between T40 and the other two treatments in Chelva.

Seasonal analysis of the data could not be performed because summer in the year 2009 was very dry compared with 2010. The SOC and MBC pools are related with TOC which explain 51% of the temporal and spatial variation of the SOC and 38% of the MBC. TOC also explain 75% of soil respiration variance. Despite the differences in soil properties between blocks, the silvicultural treatment affect significantly to the BMC pool and the basal respiration flux. Moreover, the most labile pool of soil organic carbon is affected by environmental variables such as soil temperature and for this reason changes seasonally.