



Analysis of three severe droughts (1995-2006) and their effect on *Pinus sylvestris* transpiration and physiological response in a montane Mediterranean research catchment (Vallcebre, Spain).

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The increase of global average temperatures and change in rainfall regimes is expected to enhance the frequency and severity of droughts. These changes will probably be more significant in Mediterranean montane forests as are prone to suffer extremely dry periods. These montane areas in NE Spain are dominated by *Pinus sylvestris*, a tree species with a strict stomatal control of transpiration. We analysed the severe droughts occurred during the period 1995- 2006 at the montane Mediterranean research catchments of Vallcebre (Eastern-Pyrenees, Spain). Rainfall and temperature conditions of the studied period were firstly compared to long-term averages to detect climate anomalies. Secondly, drought occurrence, duration and intensity during the studied period were analysed at the daily scale using catchment rainfall, meteorological, soil water content and water table depths records. Finally, the analysis of the effect of soil water availability on measured *P.sylvestris* transpiration, during the vegetative period, was assessed. Three years (1998, 2000 and 2003) presented a total rainfall amount (vegetative period) 25% below the mean. For these years, soil water stress as an indicator of drought duration lasted for more than 100 days. Under these conditions, Scots pine transpiration was reduced to half the value measured during average years. Scots pine was found to be highly sensitive to soil drought, strongly regulating stomatal aperture in response to high evaporative demand during dry summers.