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Dynamics of ecosystem services in *Pinus sylvestris* stands under different managements along ecological gradients

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Current forest policies emphasise the importance of managing forests to provide multiple goods and services. Timber and structural diversity, as a surrogate of biodiversity, are usually considered as two antagonistic ecosystem services (ES), largely influenced by silviculture. In addition, site ecological conditions have been demonstrated to be relevant in the provision of these ESs. In order to address the trade-offs between these two ESs over time, we have performed a retrospective study (back to the end of the 19th century) in the *Pinus sylvestris* forests of the Spanish Central System ranges, at a compartment level. Archival data were collected from Management Plans of forests with contrasted silvicultural systems (shelterwood system, irregular shelterwood system, selection system, salvage fellings) and located along ecological gradients (N-S, colder and wetter in the north; and W-E, wetter but more severe summer drought in the west). Timber production evolution was measured through stand volume, timber volume harvested and stand volume index. Structural diversity was examined using the Gini coefficient, the exponential of the Shannon entropy index, and the evenness index, all of them applied to diameter classes. Substantial increases in stand volume and timber harvested have been observed during the last century, particularly in areas located in the milder range of the gradient and under shelterwood system management. Structural diversity has maintained relatively stable, but slight decreases are shown in the last decades in those compartments with a higher interest in timber. Higher structural diversity indexes in the warmer end of the climatic gradient are due largely to the presence of other species with smaller size and reproductive strategies, mainly *Quercus pyrenaica*. Our results suggest that managements focused on timber provisioning have not jeopardised structural diversity levels, mainly in the extremes of the ecological gradient, but it is clear that management and ecological features interact to drive ESs provisioning.

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