Litter layer influence on the thermal regime of a sandy soil under a pine forest in Mediterranean Portugal

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Abstract

Removal of the litter layer to reduce fire hazard may be required on portuguese pine forests. Such practice may influence the thermal regime of the soil, hence affecting soil biological activity, litter decomposition and nutrient dynamics. Temperature profiles of a sandy soil (Haplic Podzol) under a pine forest were measured at several depths down to 16 cm, with and without litter layer. Daily courses of soil temperature were analysed using Fourier series, on days defined according to soil water content. Daily periodic variations of soil temperature were generally well described by the two first Fourier harmonics. The litter layer acted as a thermal insulator, reducing soil temperature gradients and amplitudes and increasing damping depth, particularly at low soil water contents, and provided conditions for increased soil biological activity in winter.

Keywords: Litter layer; pine forest; soil temperature; Fourier series; damping depth