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Topsoil SOC stocks in Pyrenean snowbeds

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Snowbed ecosystems in temperate mountains are threatened by surrounding chionophilous grasslands, triggered by the longer growing season and higher temperatures induced by climate change. Such vegetation shift would imply future changes in edaphic biogeochemical processes that could modify CO_2 emissions. To assess the role of snowbeds in terms of carbon storage, we sampled three soil profiles along the snowmelt gradient under different vegetation types (grassland and snowbed) and species (the dwarf shrub *Salix herbacea* and the dominant grass at plot level) in three non-calcareous Pyrenean localities. We measured soil organic carbon (SOC), pH, bulk density and texture. The soils studied were characterized by low pH and high total soil organic carbon (TOC), which is more abundant at early snowmelting profiles and at the topsoil. Soils on shales had the highest TOC mean values and the lowest variability (10.7%±0.11 at the topsoil), although no significant differences were observed between plots under different vegetation types. SOC stock was between 18-46 $MgC{\cdot}ha^{-1}$ at the first 5 cm of early snowmelting topsoil with *Salix herbacea*, whereas at the late snowmelting topsoil with grasses it was between 17-37 $MgC{\cdot}ha^{-1}$. Our results show that TOC is mainly explained by the situation along the snowmelt gradient, soil depth, and parent material, and suggest that changes in snow cover duration will translate into higher TOC accumulation in current snowbed patches.