



Organic carbon pools in Austrian permanent grassland soils

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Grasslands are known to store large amounts of carbon (C) and land use and farming management practices do have an impact on the quantity of soil organic carbon (SOC) as well as the biomass production. In the period from 1995 to 2010 the total area for agriculture and forest production in Austria declined and the most severe changes took place in grassland areas where more than 25% of the land used for extensive or intensive grass production was lost due to land use change, abandonment or sealing. In this study, we investigated the organic carbon (OC) stock at three different locations representative for Austrian mountainous grassland regions. At each location we compared the above- and belowground (down to 50 cm depth) C stocks at two adjacent but differently managed sites in order to see how management intensity affects the OC pools in permanent grassland soils. Mean OC stocks ranged from 8.2 to 15.7 kg per m² whereby approximately 95% was allocated belowground. In general, we found a significant positive correlation between the SOC content and biomass production at all three locations. Mean root biomass content ranged from 0.205 to 1.950 kg per m². 78.2 to 93.2% of root biomass was concentrated in the top 10 cm of the soil. Management had a significant influence on the SOC content as well as on above- and belowground biomass production.

We conclude that permanent grassland soils represent a large sink for OC. Root biomass and SOC content respond to management intensity.