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## Summary of the available published data on root biomass and root carbon in Swiss grasslands

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In the current Swiss National Inventory Report (NIR) estimates for root biomass in Swiss grasslands are based on a study from two temperate grassland sites in the Swiss Central Plateau (Ammann et al. 2009). This number is used for all grasslands although it is known that not only soil carbon stocks but also root densities may scale with elevation. To infer more appropriate numbers for root biomass in grasslands two recent studies were included in this revised estimate.

In the NIR soil carbon is grouped into three elevation classes, < 600 m; 600-1200 m; > 1200 m asl. Root data were grouped accordingly. The new data comprise the previous data from Ammann et al. (2009) for the first class, data published in Leifeld et al. (2009) for the second and third class, and data in Budge et al. (2011) for the third and thus highest elevation class.

All measurements are based on 6-10 replicates per site and cores of 7-8 cm diameter were used to measure root biomass. After separation by hand and thorough washing root C content was measured by elemental analysis at Agroscope Reckenholz-Tänikon Research Station in Zurich.

Roots in Ammann et al. (2009) were measured in the upper 100 cm of soil whereas in the subsequent studies sampling depth was 30 cm only. Therefore all data now refer to 0-30 cm soil depth. Data in Ammann et al. (2009) show that roots in 40-100 cm only contribute by 0.8-2.6 % to the total root biomass and are therefore negligible.

The table summarizes root carbon for the three elevation classes. Details including root dry matter contents are provided in 'root carbon grassland CH.xls and in the cited papers.

	root carbon, t ha <sup>-1</sup> 0-30 cm	1 standard deviation
< 600 m asl	1.82	0.32
600-1200 m asl	2.04	0.12
> 1200 m asl	5.70	4.42

### References

Budge, K., Leifeld, J., Hiltbrunner, E., Fuhrer, J., 2011. Alpine grassland soils contain large proportion of labile carbon but indicate long turnover times. *Biogeosciences* 8: 1911-1923.

Ammann, A., Spirig, C., Leifeld, J., Neftel, A., 2009. Assessment of the nitrogen and carbon budget of two managed temperate grassland fields. *Agriculture, Ecosystems and Environment* 133: 150-162.

Leifeld, J., Zimmermann, M., Fuhrer, J., Conen, F., 2009. Storage and turnover of carbon in grassland soils along an elevation gradient in the Swiss Alps. *Global Change Biology* 15: 668-679.