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Aggregation and C dynamics along an elevation gradient in carbonate-containing grassland soils of the Alps

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C sequestration in mountainous grassland soils is regulated by physical, chemical and biological soil process. An improved knowledge of the relationship between these stabilization mechanisms is decisive to recommend the best management practices for climate change mitigation. In this regard, the identification of a successful indicator of soil structural improvement and C sequestration in mountainous grassland soils is necessary. Alpine and pre-alpine grassland soils in Bavaria represent a good example for mountainous grassland soils faced with climate change. We sampled grassland soils of the northern limestone alps in Bavaria along an elevation gradient from 550 to 1300 m above sea level. We analyzed C dynamics by a comparative analysis of the distribution of C according to aggregate size classes: large-macroaggregates (> 2000 μm), small-macroaggregates (250-2000 μm), microaggregates (63-250 μm), silt plus clay particles (<63 μm) and bulk soil. Our preliminary results showed higher C content and changed water-stable aggregate distribution in the high elevation sites compared to lower elevations. Magnesium carbonate seem to play an important role in stabilizing macroaggregates formed from fresh OM. In addition, the isolation of occluded microaggregates within macroaggregates will help us to improve our understanding on the effects of climate change on soil structure and on the sensitivity of different C stabilization mechanisms present in mountainous soils.