



Dynamics of pedogenic carbonates and their relation to slope aspects in the Rumsey area (Alberta, Canada)

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The calcium carbonate content of a soil is crucial for the onset of further pedogenic processes such as brunification or lessivage. Because decalcification of a soil profile is strongly dependent on annual precipitation, the vertical distribution of calcium carbonate in a soil profile can provide information about the pedogenic development and the age of a soil. Since arid environments are often characterized by a tendency for ascending soil solutions and formation of pedogenic carbonates, chemical analysis of the calcium carbonate contents alone are not representative for the interpretation of soil age and genesis. In this study we aim to characterize soil development on a north-south running transect on a hill in the Rumsey Natural Area and compare our findings with numerical modeling of soil pH and calcium carbonate contents using the software SoilGen. The Rumsey Natural area was shaped by glacial processes during the last glaciation and is characterized by rolling hills covered with parkland vegetation. Soils were mapped and sampled along a north-south running transect for soil chemical and textural analyses. Further undisturbed samples were taken for the preparation of thin sections for soil micromorphological studies. On the basis of the soil chemical analysis, different initial conditions could be used for the soil modelling with the software SoilGen. Our soil mapping shows that soils along the transect differ between the forested northern slopes and the southern slopes covered with grassland. The findings suggest that at our study site slope aspect with solar radiation and evapotranspiration mainly cause the differences between the soils along the transect.