



Slope deposits of different genesis and ages in the Colorado Front Range (Rocky Mts.) and their significance for chemical weathering fluxes within the critical zone (CZ)

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The Colorado Front Range is divided in five altitudinal belts reaching from the alpine tundra (> 3.450 m a.s.l.) down to the plains (> 1.710 m a.s.l.). Our investigations are dealing with different kinds of slope deposits, their genesis and age. The critical zone is the heterogeneous carapace of soil and weathered rock, and the ecosystems they support. Understanding the evolution of the critical zone, and its sensitivity to perturbations, requires an understanding of its architecture and the processes that produce this architecture. The Boulder Creek Critical Zone Observatory (BC CZO) is designed to understand how weathering (both physical and chemical) and transport processes control the structure of the critical zone, and to explore the impact of critical zone structure on hydrological, geochemical and biological functions of the landscape. Slope deposits are crucial elements of the critical zone. The 1.160 km² Boulder Creek watershed in Colorado's Front Range encompasses strong contrasts in erosional regimes, and therefore contains critical zone architectures that range from dominantly bare rock to deeply weathered profiles. Through the late Cenozoic, a slowly eroding rocky upland comprising Precambrian crystalline rocks has been etched in its headwaters by glaciers, and bitten into by headward migrating stream knickzones. This has produced a landscape in which the critical zone is captured in three states. Each of these is represented in a focus subcatchment in the BcCZO where the critical zone will be characterized in detail. The slope deposits show characteristic variations within the subcatchments. Fundamental characteristics of the critical zone, together control the passage of water, the chemical processes operating, the material strength, and the function of subsurface ecosystems. Slope deposits of different genesis and ages play a decisive role.