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17 October 2023

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Alpine ecosystems are vulnerable to climate and land use changes. Measurement sites at different altitude and aspect can provide precious information on them. Also, vadose rootzone plays a major role in partitioning fluxes. In this work field data of soil water content, matric potential and soil temperature in some mountain grassland sites are compared with simulations results of the CLM model (The Community Land Model, NCAR, US). These are key state variables regulating the physical processes that determine the flows of two main greenhouse gases, water vapour and carbon dioxide, to the atmosphere in the presence of vegetation.

Some transients show significant differences between data and CLM simulation results and further analyses are performed using the HYDRUS model from the US Salinity Laboratory, in order to better explore the soil, grass, and atmosphere roles in the dynamics of those state variables. Some insight is finally provided about the effects on water vapour and carbon dioxide fluxes.