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High-resolution anelastic modeling of Alpine flows: a case study for a summer convection

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Contemporary numerical weather prediction (NWP) models are currently approaching 1km of horizontal resolution. This is promising for a better representation of local mountain effects, however, invokes a necessity of employing more sophisticated numerical techniques for reliable and robust modeling of the flows. When increasing the resolution, NWP models enter new convective regimes, which become explicitly represented on the numerical grid. Therefore, this is important to investigate the problems regarding coupling of model dynamics and physical parameterizations with orography and its influence on the model-represented convection. In the present study we show the results of modeling the Alpine convective flows using the anelastic nonhydrostatic model EULAG. It is considered as a prospective dynamical core of future NWP model. Different representation of boundary layer physics, i.e. boundary layer attenuation, Fickian diffusion and turbulent kinetic energy scheme are examined. The study is focused especially on exploring the influence of horizontal grid resolution on the simulated convective processes.