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Effects of improved parametrization of ice contents through geophysical surveys on modelled future runoff at Murtèl-Corvatsch rockglacier catchment

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As glaciers are expected to continue to retreat during the 21st century due to projected atmospheric warming, an important source of water in high-alpine environments with a summer-dry climate regime will be diminishing, especially during the summer months. Therefore other sources of water, such as meltwater from permafrost, will become more important to the runoff. Here, we focus on the modelling of permafrost melt with regard to overall runoff from a small basin. We compute runoff during the 21st century using a glacio-hydrological model (GERM) applied to a periglacial catchment in Switzerland (Murtèl-Corvatsch). The model is able to compute conductive and latent heat exchange processes in the subsurface and thus provides runoff both from melting of ground ice as well as from other sources (rain, snow melt) at the catchment scale. The model is forced with climate scenarios until 2100. We show and discuss the differences in modelled runoff with respect to the parameterization of ground ice content which is either prescribed by a uniform value or by data from geophysical surveys. We find that the field data-based determination of ground ice content is important to achieve reasonable projections of permafrost runoff over the 21st century.