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Reconstructing spatially variable Equilibrium line altitude over the Alps and Pyrenees during the LGM

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Last glacial maximum (LGM) represents the last large ice age whose imprints we still observe in present-day topography and proxy data. The interconnected development of numerical models (climate, ocean, glacial, vegetation), continuous development of new methods and increase of available proxy data (pollen, SST) open opportunities for a combined understanding of the conditions during the last glacial, and improve knowledge of the interplay between the processes that lead to these conditions. The LGM temperature and precipitation patterns over central Europe are still an open debate. The position of the storm track, its potential southeast shift and seasonality changes, is still debated and is one of the key issues in understanding the precipitation patterns, zonal or meridional origin, over continental Europe. Whether the westerlies were bringing moisture to central Europe and feeding the Alpine ice sheet, or their shift south resulted in very dry continental conditions over Europe will impact the thickness of the ice sheet and the altitude and spatial variability of the equilibrium line altitude (E). Knowing which of the two climatic regimes was dominant is crucial for the further understanding of the evolution of the LGM landscape. Here we present the results of our reconstruction of the position of the equilibrium line altitude (E) over the Alps and the Pyrenees using the inverse method presented in Visnjevic et al 2018 and mapped ice extents during the LGM as data constraints. Series of experiments were performed exploring the parameter space of both inverse and forward model in order to investigate the sensitivity and influence of the physical and numerical parameters on the result of the inversion, helping us to shed light on the interplay within the system.