



Ice flow and precipitation change over the Swiss Alps during the last glaciation, a modeling approach

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About 20,000 years before present at the end of the Würm glaciation, glaciers in Europe have reached their maximum extent and wide parts of the forelands were covered by ice. Our goal is to reconstruct the European alpine ice cap during the last glaciation using numerical simulations of the ice flow. To do that, we use the Parallel Ice Sheet Model (PISM) to simulate the ice flow. PISM is capable to simulate the time evolution of a large scale ice sheet for millenniums by accounting for the dynamics of ice, englacial temperature, bedrock temperature, lithosphere deformation and surface mass balance. The latter is computed using a positive degree day model that is forced by climate data. A classical approach consists of applying a constant temperature offset to present-day temperature data, while keeping constant today's precipitation patterns. However, geomorphological hints show that the prevailing precipitation regime during the last glaciation was dominated by a southerly atmospheric circulation pattern, in contrast to today's prevalent westerly airflow. Due to this fact we propose several empirical corrections to the present-day precipitation patterns and select those which yield the best match between modeled ice cap extents and geomorphologically-based margin reconstructions.