Quantifying mass balance processes on the Southern Patagonia Icefield - DTU Orbit
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We present surface mass balance simulations of the Southern Patagonia Icefield (SPI) driven by downscaled reanalysis data. The simulations were evaluated and interpreted using geodetic mass balances, measured point balances and a complete velocity field of the icefield for spring 2004. The high measured accumulation of snow of up to 15.4 m w.e. yr\(^{-1}\) (meters water equivalent per year) as well as the high measured ablation of up to 11 m w.e. yr\(^{-1}\) is reproduced by the model. The overall modeled surface mass balance was positive and increasing during 1975-2011. Subtracting the surface mass balance from geodetic balances, calving fluxes were inferred. Mass losses of the SPI due to calving were strongly increasing from 1975-2000 to 2000-2011 and higher than losses due to surface melt. Calving fluxes were inferred for the individual glacier catchments and compared to fluxes estimated from velocity data. Measurements of ice thickness and flow velocities at the glaciers’ front and spatially distributed accumulation measurements can help to reduce the uncertainties of the different terms in the mass balance of the Southern Patagonia Icefield.