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What is the phase space of the last glacial inception?

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Would the ice and climate pattern of glacial inception changed much with small tweaks to the initial Eemian climate state? Given the very limited available geological constraints, what is the range of potential spatio-temporal patterns of ice sheet inception and associated climate? What positive and negative feedbacks between ice, atmospheric and ocean circulation, and vegetation dominate glacial inception?

As a step towards answering these questions, we examine the phase space of glacial inception in response to a subset of uncertainties in a coupled 3D model through an ensemble of simulations. The coupled model consists of the GSM (Glacial Systems Model) and LOVECLIM earth systems model of intermediate complexity. The former includes a 3D ice sheet model, asynchronously coupled glacio isostatic adjustment, surface drainage solver, and permafrost resolving bed thermal model. The latter includes an ocean GCM, atmospheric component, dynamic/thermodynamic seaice, and simplified dynamical vegetation.

Our phase space exploration probes uncertainties in: initial conditions, downscaling and upscaling, the radiative effect of clouds, snow and ice albedo, precipitation parameterization, and freshwater discharge. The probe
is constrained by model fit to present day climate and LGM climate.