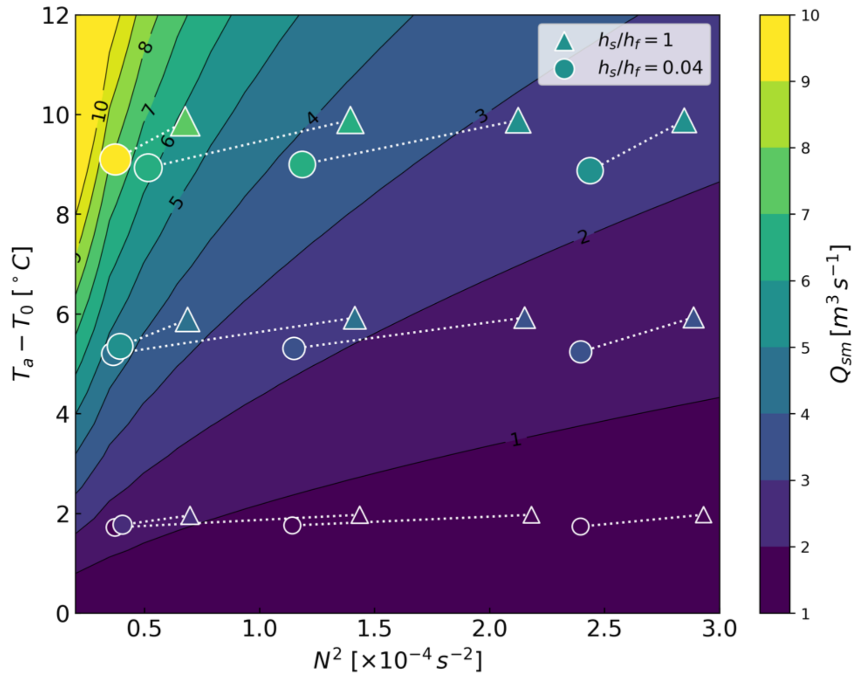


***Fig. R1***: *Dependence of submarine melt on fjord stratification and thermal forcing with a constant subglacial discharge of $Q_{sg}$ = 250 m$^3$s$^{-1}$. Cases with the same initial temperature (2℃, 6℃, or 10℃) and stratification ($1N_0^2, 2N_0^2, 3N_0^2, 4N_0^2$) are connected by blue dotted lines. The sizes of the markers represent the magnitude of $Q_{sm}$. The background contours correspond to the scaling of $Q_{sm}$ based on $(T_a - T_0)(N^2)^{-5/8}$ with linear coefficients calculated from the model output. The results of all markers are averaged over the last 14 days of simulations, corresponding to circulation regimes determined by the initial stratification ($1N_0^2$ & $2N_0^2$: Regime I, $3N_0^2$: Regime II, $4N_0^2$: Regime IV).*

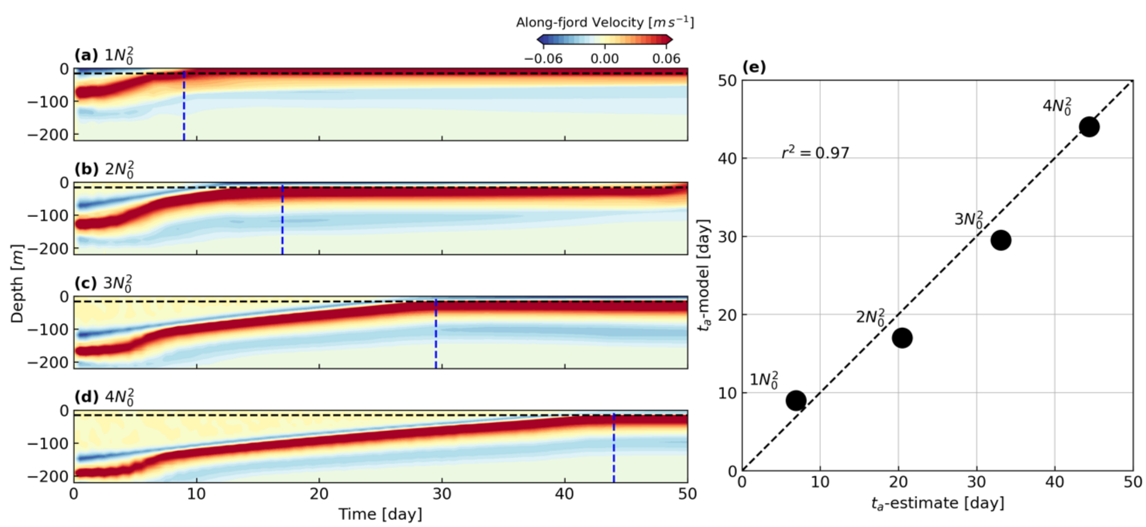


***Fig. R2***: *Ascending time scale ($t_a$) of the plume with increasing initial stratification. (a)-(d): Evolution of along-fjord velocity vertical structure near the glacier front. Horizontal dashed black lines show the maximum sill height ($h_s/h_f$=0.04), and vertical dashed blue lines indicate the time scale for the plume rising from its initial height to the level of the sill crest. (e) A comparison between the plume ascending time estimated from theory and from the model.*