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## Long-term mass balance and firn modelling for Abramov glacier, Pamir Alay

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The application of a coupled energy balance-subsurface model allows studying the mass balance evolution of mountain glaciers and thereby assessing the role of subsurface processes in the accumulation area. Such model simulations are scarce for glaciers in High Mountain Asia where meteorological and glaciological calibration data are poorly available. Uncertainties in mass balance estimates are therefore high and questions regarding changes in accumulation and ablation regimes remain open.

Here, we run a distributed energy balance model coupled to a multi-layer snow model for Abramov glacier (Pamir Alay, 39.60°N 71.55° E) over the time period 1968 to present. A unique set of meteorological and glaciological data measured from 1968-99 is used to force and calibrate the coupled model. The modelling period is extended to present using gridded precipitation data and recent measurements from an automatic weather station installed in 2012. We use repeated firn profiles from the 1970s and 2018 to evaluate modelled evolution of snow and firn conditions.

Preliminary modelling results show that the mass balance of Abramov glacier has been predominantly negative since 1969. However, also periods with increasing mass balance trends have been found since then. For the period of historical measurements (1968-98), our results suggest an increase of net accumulation in the accumulation area. This result points towards a steepening of the mass balance gradient, which may cause increased dynamics.