

## Figure S1 – Snow crust

Field photos showing ice crust exposed during field work in the Aiguille du Midi SE face (replacing broken snow depth poles). Photos taken on 26<sup>th</sup> January 2022.



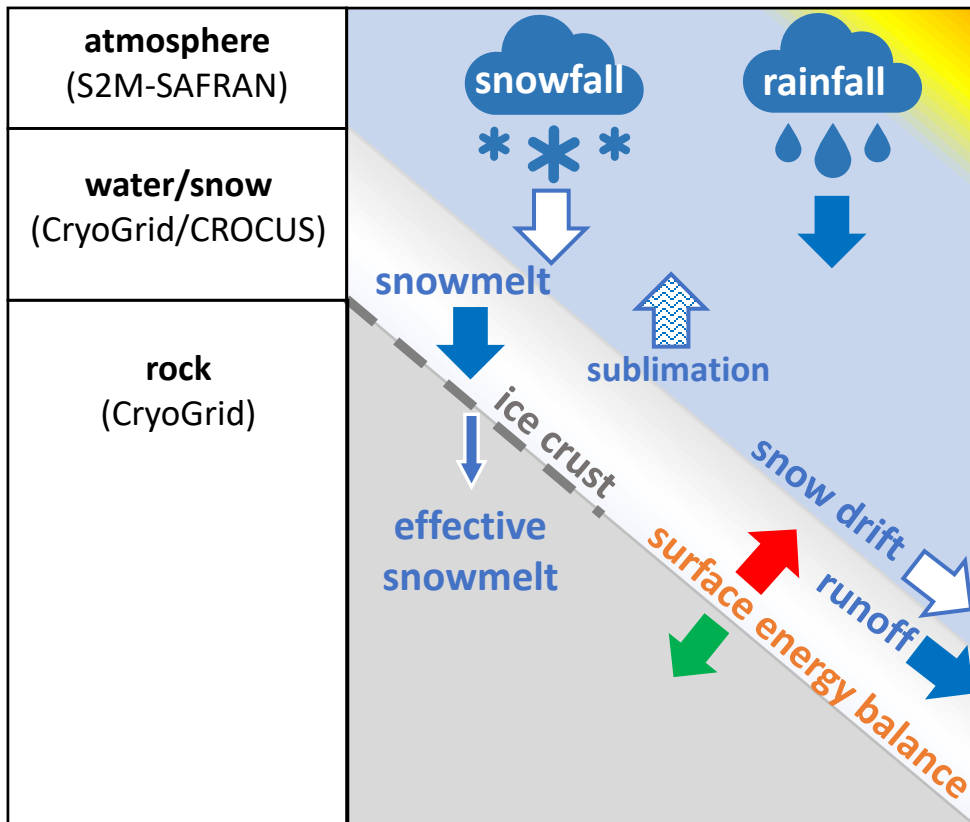
Ice crust at snowpack – rock interface

Exposed rock



**Figure S2 – Illustration of the model components**

The forcing data from the S2M-FAFRAN dataset include air T, wind speed, rainfall, snowfall, air pressure, short wavelength solar radiation, long wavelength radiation. Snowpack processes are simulated using the CryoGrid community model and the CROCUS scheme that is incorporated in it. Rock thermal regime is modelled with heat conduction by the CryoGrid ground component. The model calculates water mass balance (blue and white arrows) and surface (rock and snow) energy balance.



**Figure S3 – Comparison of S2M-SAFRAN dataset with field measurement.**

Comparison of S2M-SAFRAN dataset with field measurement from in-situ meteorological stations. A) Air temperature measurements from a Meteo France station in Aiguille du Midi (Poste 74056006) vs S2M-SAFRAN dataset. Air T measurements are from hourly data averaged over 3 hours. Dashed line is the 1:1 line and red line is a linear regression.

B) Precipitation measurements from a Meteo France station in in Chamonix (Poste 74056001) vs. S2M-SAFRAN dataset. There are no precipitation measurements available in Aiguille du midi. Precipitation measurements are summed over 3 days. Dashed line is a 1:4 ratio.

