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THE GLACIERS ARE BECOMING GREENER
BIOALBEDO AS ACCELERATOR OF GLACIAL MELT

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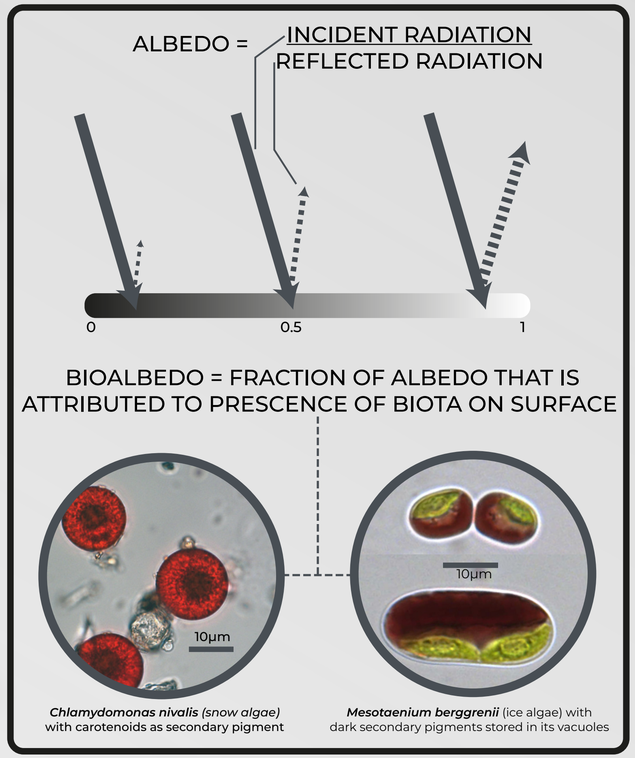
SUMMARY
Reflectivity (albedo) is a key factor that controls glacier mass balances. Supraglacial areas are inhabitated by microbial life that produces UV-protective dark pigments and hence lower the albedo substantially. Here, we quantify this biological darkening effect for the first time for an Alpine glacier.
This study is a sparkling science project, connecting school classes with scientific research at the university.

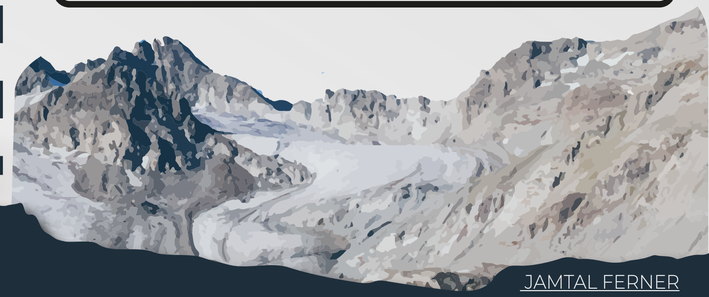
ECOLOGY OF GLACIER SURFACES
Supraglacial zones are dominated by viruses, bacteria, algae and some metazoans. Extreme conditions (e.g. low temperatures, high radiation, low nutrient and water availability) require physiological adaptations to persist in these environments.

BIOLOGICAL DARKENING
During summer the albedo of glaciers decreases because of the presence of inorganic and organic dark matter. For example, algae synthesize UV-absorbing pigments to prevent DNA damage and hence lower the albedo (bioalbedo).

METHODS
Albedo was measured before collecting snow / ice samples during two summer seasons. For monitoring, a timelapse camera was set up. Biological diversity, activity and abundance were correlated with albedo, meteorological and chemistry data.

KEY FINDINGS
Dark inorganic matter stimulates supraglacial melt and hence triggers a feed-back loop by providing water and nutrients for increased microbial growth and further biological darkening of the glacier.





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