

ALPALGA: The search for mountain snow microalgae

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Sampling snow covered with "glacier blood." Credit: © Jean-Gabriel VALAY/JARDIN DU LAUTARET/UGA/CNRS

In glaciers, well above sea level, algae thrive. Normally invisible to the

naked eye, they are often spotted by hikers trekking through the mountains in late spring as strikingly colored stretches of snow, in shades of ochre, orange and red. Known as "glacier blood," this coloring is the result of the punctual multiplication (or bloom) of the microalgae that inhabit the snow.

But apart from this impressive phenomenon, the life and organization of mountain microalgae communities remains a secret. This still unknown ecosystem, now threatened by global warming, needs to be explored. The ALPALGA consortium aims to meet this challenge by organizing and pooling research efforts on snow microalgae, and it has already received support from the Agence nationale de la recherche and the Kilian Jornet Foundation.

In an initial study involving three consortium laboratories, researchers established the first map of snow microalgae distribution along elevation. In fact, as with vegetation, the different species of algae live at varying elevations on the mountains. The genus *Sanguina*, for example, which gives a characteristic red colour to the snow, has only been found at altitudes of 2000 meters and above. In contrast, the green microalgae *Symbiochloris* only live at altitudes below 1500 meters.

These results, obtained by collecting DNA from five Alpine sites, forms the foundation on which ALPALGA will build its work. The scientists will try to answer fundamental questions such as: what species of [microalgae](#) inhabit the [snow](#)? How can these organisms withstand such extreme temperature and sunlight conditions? Does [global warming](#) favor blooms? What effect do blooms have on snowmelt? The aim is to study the process of transformation of this ecosystem in order to promote and protect it.

The study is published in *Frontiers in Plant Science*.

More information: Adeline Stewart et al, Altitudinal Zonation of Green Algae Biodiversity in the French Alps, *Frontiers in Plant Science* (2021). [DOI: 10.3389/fpls.2021.679428](https://doi.org/10.3389/fpls.2021.679428)

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