



Project acronym: EKIPACTIS

Project title: Environmental control of the Kinetics of Photosynthetic ACTivaTion In Subartic lichens

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Abisko Scientific Research Station (Sweden)

Lichens are important contributors to primary production in Arctic and sub-Arctic ecosystems, particularly where environmental harshness constricts the establishment of vascular plant communities. Being poikilohydric organisms, liquid or vapour water is the main factor controlling their metabolic activity and in particular photosynthesis. Thus, once water becomes available, the time-lags of metabolic activation are essential for the maintenance of a positive carbon balance and for the establishment of species-specific niche preferences. Since most predictions forecast a decrease of lichen diversity and cover in the Arctic, is of great importance to understand their responses to present and future conditions. In particular the effects of higher temperatures could stimulate respiration, impacting negatively impact on carbon balance. In the present study, taking advantage of the altitudinal gradient in the proposed study site (Abisko Research Station) that allows to explore a wide diversity of habitats, the kinetics of metabolic activation after rehydration with liquid or vapour water (estimated by chlorophyll fluorescence) will be followed in at least 10 of the most common species under three temperature regimes. The modelling of such responses will allow to scale up to more general patterns of response. This study is essential to conclude a much larger survey of metabolic activation in lichens by water, that has been developed in other extreme ecosystems such as lava fields, Mediterranean drylands, Antarctic islands and Alpine belts.