# RESULTS

## MICROCLIMATIC CONDITIONS IN SCOTT BASE

The climate is Scott Base is governed by a marked **cyclical pattern** constant over the years (Fig. 1).

Cryptograms in Scott Base start receiving sunlight between the end of November and the beginning of December, when snow starts to melt (Fig. 1). Light is available until late February or early March in the following year (Fig. 1). During those three months, PAR follows a daily pattern in which at some points during the summer there is photosynthetic light available all the time throughout the day, but its intensity decreases around noon (Fig. 2). The amount of PAR received varied across samples, but in average all the samples received a mean radiation of ~200 μmol m-2 s-1, as seen in the data summarised in Table 1, with maximum values of around 1500 μmol m-2 s-1 (Table 1).

A screenshot of a graph

Description automatically generated

*Figure 1.*

A graph of a number and a line

Description automatically generated

*Figure 2*.

The average air temperature over the whole measuring period was -17.4 °C (Table 1) and values over 0 °C where only recorded in the summer months – defining as summer the period from the beginning of November until the end of February (Fig. 1). This generated a contrast of almost 11 degrees between the overall mean and the summer mean that was -6.73 °C in average across all years (Table 1). The minimum air temperature recorded was reached in August 2021, and was -53.4 °C, and the maximum, documented in December of 2022, 6.45 °C (Table 1). The minimum temperature during a summer season was – 28.9 °C and it was recorded in November 2022 (Table 2).

*Table 1.*



RH had an average value of 67.5% over the whole measuring period (Table 1), nearly identical to the 67.2% average over the summer months (Table 2). It did not show any seasonal variation (Figure 1).

All of these variables remained constant over time, and there was no clear increasing or decreasing trend over time in any of them (Figure 1, Table 2).

There were no anomalies in any of our variables recorded during the heatwave from the 15th to the 19th of March 2023 (Figure 1).



*Table 2.*

## CHARACTERIZATION OF AUSTROPLACA AND BRYUM ACTIVIVTY AND ACTIVATION PATTERNS

* 1. Active time

Both species showed **nearly identical annual activity cycles** highly coupled with available radiation, in which all the **activity was concentrated in the summer** months (Figure 1). The activity for both species is **continuous throughout the summer** except for occasional short inactivity events with an average length of 48 hours (Figure 3, see Appendix C). These were followed by uninterrupted dormancy until the following summer.

Both the lichen and the moss stayed inactive during the heatwave of March 2023 (Figure 1).

* + 1. Austroplaca Soropelta

*Austroplaca* was active 11.77% of the measuring period (Table 1). A total of 4991 hours of activity were irregularly distributed between the four measured summers, as seen in Table 2. There is a **decreasing trend** in the amount active time each summer with a steep decline from the summer 21-22 when there 1176 active hours to the summer 22-23 when there were only 483 (Table 2).

Every summer, *Austroplaca* had the less active time during the month of November, with 31, 24, 0 and 8 hours each respective year (Check Appendix B for monthly values). This is because activation did not occur until late in the month (Table 3, Appendix C). In 2019 *Austroplaca* activated on the 29th of November, in 2020 on the 30th of the same month, in 2021 on the 8th of December (meaning there was no active time during the month of November), and in 2023 again on the 29th of November.

Then activity increases dramatically during the months of December and January, December being the month with the most active hours every year (741, 715, 533, 301 active hours respectively).

Lastly, active time decreased in February with 240, 147, 125 and 0 hours each year. The decrease on the number of hours of activity over February through the years indicates that the lichen dries earlier in the month every year. Whereas in 2020 is dried the 18th of February, in 2021 it dried completely on the 13th and 14th. In 2022 it was on the 9th of February (Fig. 3), and in 2023 the 11th of January, so there was no activity in February.

Talk about drying- reactivation events.

* + 1. Bryum argenteum

*Bryum* was active 10.8% of the measured time (Table 1). The total 4583 hours, as with *Austroplaca*, were unevenly distributed over the summer showcasing a decreasing trend over time (Table 2). The decline was especially abrupt from summer 2021-2022 to summer 2022-2023 when the active hours reduced, in average, from 910 to 541, as shown in Table 2.

Every year, November was the month of the summer when Bryum was the less active. Two of the samples did not have any active time during this month any of the years, and Sample X2 only had 15 hours of activity in 2019 –it was active from the 24th to the 26th of November before drying until 2nd of December– and 21 in 2023 –activated the 30th of November. The dates of activation each year of the rest of samples are summarised in Table 3.

Bryum had the most active time during December and January. During the summers of 2019-2020 and 2021-2022 it had more active hours during the December whereas

In 2020-2021 and 2022-2023 it had more active hours during the month of January. This variation was constant across the three samples (check Appendix B).

Lastly, as in the lichen, active time decreased in February. Moreover, there was a dramatic change in the amount of active hours between the first two summers – with an average of and the

2.2 Yield

*Austroplaca*’s average yield when active was 0.25, which was lower than *Bryum*’s, that had an average of 0.35 as showed in the summarized data of Table 1.

Thallus Temperature

1. BEHAVIOUR UNDER SNOW