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Davide Gisolo et al.

The carbon and water balances of high-elevation (>2500 m) Alpine grasslands still offer important open questions. Understanding whether those grasslands act as a net carbon either source or sink, and quantifying the evapotranspiration – also depending on the meteorological and soil conditions - is still a challenge. In this analysis, a focus on two years of measurements (dry year 2022 and closer to normal conditions 2023) collected at a high elevation grassland site (2600 m a.s.l.) is presented. The interannual variations of ecosystem respiration, gross primary production (GPP), net ecosystem exchange (NEE) and actual evapotranspiration (ET_a) give insights on how the ecosystem reacts to different atmospheric and soil conditions, including the Winter snowpack coverage extent, depth and duration. First results show that the greater duration and depth of 2023 Winter snowpack may influence the grassland behaviour, being characterised by a higher emission in early growing season just after the snowmelt. Hence, the grassland sink ability in 2023 (-1.5 gC m^{-2}) is strongly reduced, if compared to the 2022 one (-73.4 gC m^{-2}) even if the 2023 year was more wet if compared to very dry 2022. Limiting the analysis to the period January-October (end of the very late growing season), results indicate that the cumulative ecosystem respiration reaches 420.0 gC m^{-2} in 2023 whereas in 2022, the cumulative value is 345 gC m^{-2}. GPP cumulative values are instead -454 gC m^{-2} and -469.1 gC m^{-2} in 2022 and 2023, respectively.

Considering the most important part of the growing season (June-September), the cumulative ET_a does not show particular differences among the two years. In addition, the ET_a and NEE drivers can be analysed. Results indicate that the most significant drivers are net radiation, air temperature, wind speed, matric potential and ground heat flux for ET_a. Photosynthetic photon flux density, vapour pressure deficit, soil temperature and soil water content are the most important drivers for NEE.

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