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Intercomparison of eddy-covariance daytime fluxes at three mountain sites / Ferraris, Stefano; Gisolo, Davide; Canone, Davide; Previati, Maurizio; Bechis, Stefano; Morra di Cella, Umberto; Cremonese, Edoardo; Galvagno, Marta. - STAMPA. - 21:(2019). ((Intervento presentato al convegno European Geoscience Union - EGU 2019 tenutosi a Vienna nel 2019.

Availability:

This version is available at: 11583/2793532 since: 2020-02-16T23:32:10Z

Publisher:

Geophysical Research Abstracts

Published

DOI:

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Intercomparison of eddy-covariance daytime fluxes at three mountain sites

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The Alps are very sensitive to climate and land cover changes. In the past years, a growing interest towards understanding the water and carbon exchanges in the mountains led to an increasing number of studies. However, the complexity of these environments determines many uncertainties from a methodological and ecological point of view.

Therefore, there is a need to compute and compare flux data collected at different, high-altitude and complex sites. Such studies will improve the knowledge about the impact of local morphology on measurements. In this study we compare different alpine sites regarding their momentum and scalar fluxes.

Three eddy covariance sites in the Aosta Valley (Italy) are considered. The first is located on a 33° slope in a small lateral valley having a South-East aspect at 1730 m a.s.l. The land cover is characterised by an abandoned pasture. The second site is on an almost flat area along a milder slope. The area has a South-East aspect and it is located at 2610 m a.s.l. and the land cover is a grassland. The third (namely the ICOS associated ecosystem site IT-Tor) is located on an almost flat (less than 5°) area. The site has a South aspect and its altitude is 2160 m a.s.l. The area is characterised by an unmanaged subalpine grassland.

Daytime measurements of sensible and latent heat and carbon dioxide fluxes collected at the three sites are compared during the growing season. Quality control procedure, energy balance closure, mean diurnal and cumulative fluxes are presented for each site. Potential reasons for differences among the investigated sites are discussed.