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# Are synoptic circulation types able to characterize the climate of an Alpine region?

Luca Panziera (1,2), Lavinia Laiti (2,3), Lorenzo Giovannini (2,3), Dino Zardi (2,3)

(1) MeteoSwiss, Locarno Monti, Switzerland, (2) Atmospheric Physics Group, Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy, (3) National Consortium of Universities for Atmospheric and Hydrospheric Physics (CINFAI), Rome, Italy

This study exploits a comprehensive data set of surface temperature, rainfall, solar radiation and wind measurements to investigate the relation between synoptic circulation types and the climate of Trentino, a mountainous region in the South-Eastern Alps.
Synoptic patterns are classified over different isobaric levels by means of an existing classification method according to their degree of zonality, meridionality and vorticity.
Distinct seasonal anomalies of mean daily temperature, total daily rainfall, daily solar irradiation and mean daily wind intensity are associated with most circulation types. Their magnitude varies not only among weather types, but also within the same type for different levels and seasons. Moreover, extreme meteorological events occur with preferential circulation types, since the frequency of occurrence of extremes for each synoptic pattern rarely coincides with the climatological value.
The ability of the classification method to resolve the variations of mean daily temperature, solar irradiation, total rainfall and mean wind intensity is also investigated. It is shown that the isobaric level considered by the classification scheme providing the highest predictive capability depends on the season and the atmospheric variable.
Finally, this study demonstrates that the mesoscale mechanisms resulting from the interaction of the large-scale flow with the local orography determine the character of the weather associated with each synoptic pattern, strongly influencing the climate of Trentino.