

Jet Streak summer variability over the Mediterranean Sea and its relationship with air temperature anomaly.

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Jet streaks are defined as localised wind speed maxima along the jet stream. They are a common feature of the extratropical flow regimes in atmosphere, particularly at the level of the tropopause. Since the beginning of the atmospheric science jet stream and jet streaks have assumed a prominent role in synoptic meteorology, largely in recognition of their association with cyclogenesis and severe weather. Furthermore they were regarded as upper level precursors to these atmospheric phenomena. Many investigations of jet streaks typically have focused on the transverse vertical circulations associated with their morphology and occurrence. We propose a study of the jet streak morphology, occurrence and position over the Euro – Atlantic area and its relation with the cool and warm horizontal air advections in the Central – Western Mediterranean basin.

In this region, the jet stream has two main branches: the Scandinavian and the Mediterranean, which, in summer, are at a meridional minimum distance. Using a Principal Component Analysis of the zonal wind component at 300hPa derived from the NCEP-NCAR reanalysis, we study typical pattern morphology associated with cool and warm 850hPa air temperature advections. We find that, when these two jets are almost aligned, there is a streak of the Mediterranean jet over the Alps and, to the south of them, an anticyclonic vorticity aloft, which forces a strong subsidence and an adiabatic warming of the troposphere over the Mediterranean. This configuration is also a characteristic of anomalously warm spells over the basin. While, when the Mediterranean jet resides further south and along the Northern rim of Africa, its meridional distance from the Scandinavian branch is relatively large, the vorticity over the Mediterranean is cyclonic and this region is relatively cool. The position and persistence of these jet streak configurations have been analysed in order to provide a circulation type classification at continental scale which could be applied as a practical tool for forecasting surface temperature anomaly from monthly to seasonal timescales.