

# **Is there a climatic evidence for the drop of the olive-tree training in the southern Po Plane ?**

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The principal aim of this work concerns the reconstruction of winter minimum temperature mean and extreme values, in order to study the influence of the climate variability on the drop of the olive-tree training in the northern hill-side, south of the Po Plane (Emilia-Romagna, Italy), during the Late Maunder Minimum. A statistical downscaling technique, based on the Canonical Correlation Analysis, has been applied, adopting the winter mean sea level pressure and geopotential height at 500 hPa as potential predictors (WDCA Paleo data). Predictands are the mean and the tenth percentile of the daily minimum temperature, the number of frost days, observed from 1958 to 2000 in 37 stations, uniformly distributed over Emilia-Romagna. The model set-up was performed, through a cross-validation analysis, in order to maximize the skill for the period 1961-1990. The Pearson's Correlation coefficient, Bias and RMSE, used as skill scores of the model, showed that mean sea level pressure has been the best predictor. The results reveal for the period 1671-1700 the Southern Po Plane was characterised by strong negative anomalies respect to the present climate (1961-1990). In particular, for the most cold years the spatial average of winter mean temperature values reached  $-2.5\text{ }^{\circ}\text{C}$  and the number of frost days increased up to 65 days. Moreover, the statistical model has been able to reproduce the positive and the strong negative anomalies, respectively for the years 1708 and 1709, as reported by chronicles of that time. The recurrence of cold winters irreversibly damaged trees located in the central and west side of the Southern Po Plane, so forcing the drop of the olive-tree training.