



## **Atmospheric circulation patterns and phenological anomalies of grapevine in Italy**

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Grapevine (*Vitis vinifera* L.) is a fundamental crop for Italian agriculture as testified by the first place of Italy in the world producers ranking. This justifies the importance of quantitative analyses referred to this crucial crop and aimed to quantify meteorological resources and limitations to development and production.

Phenological rhythms of grapevine are strongly affected by surface fields of air temperature which in their turn are affected by synoptic circulation. This evidence highlights the importance of an approach based on dynamic climatology in order to detect and explain phenological anomalies that can have relevant effects on quantity and quality of grapevine production.

In this context, this research is aimed to study the existing relation among the 850 hPa circulation patterns over the Euro-Mediterranean area from NOAA Ncep dataset and grapevine phenological fields for Italy over the period 2006-2013, highlighting the main phenological anomalies and analyzing synoptic determinants.

This work is based on phenological fields with a standard pixel of 2 km routinely produced from 2006 by the Iphen project (Italian Phenological network) on the base of phenological observations spatialized by means of a specific algorithm based on cumulated thermal resources expressed as Normal Heat Hours (NHH). Anomalies have been evaluated with reference to phenological normal fields defined for the Italian area on the base of phenological observations and Iphen model.

Results show that relevant phenological anomalies observed over the reference period are primarily associated with long lasting blocking systems driving cold air masses (Arctic or Polar-Continental) or hot ones (Sub-Tropical) towards the Italian area. Specific cases are presented for some years like 2007 and 2011.