Geophysical Research Abstracts
Vol. 20, EGU2018-13897, 2018
EGU General Assembly 2018

Climatology of phenological and other micrometeorological variables parameters in regional vineyard ecosystem in Piedmont (Italy)

Claudio Cassardo (1,2), Valentina Andreoli (1), Federico Spanna (3), Silvia Ferrarese (1), and Samuele Picco (1)

(1) Department of Physics and NatRisk Center, University of Torino "Alma Universitas Taurinorum", Torino, Italy, (2) Dept. of Climate & Energy Systems Eng., Ewha Womans University, Seoul, Korea, (3) Settore Fitosanitario, Regione Piemonte, Torino, Italy

Crop productivity is determined by several factors related to soil properties and fertility, management practives, meteorological conditions, and climate. The latter, in particular, becames a key factor that is deserving more and more attention since there is a need for a reliable assessment of the effects under a changing climate on yield and quality. However, in this respect, it is essential to primarily understand how and how much both climate and meteorology affect grape productivity and quality. In this context, crop models are emerging as essential tools for investigating the effects of climate change on crop development and growth via the integration of existing knowledge of crop physiology and phenology relating to changing environmental conditions.
For this reason, following the recent tendency of performing oenology and viticulture studies for developing tools able to help the managing of vineyards and improve the wine quality, the monitoring of physical and physiological processes related to environmental conditions that influence vine growth, yield and grape quality is associated with numerical and empirical models simulating physical, physiological, and phenological processes and diagnosing microscale plant responses to environment.
For this reason, our group has developed a crop model, named IVINE (Italian Vineyard Integrated Numerical model for Estimating physiological values), to simulate physiological and phenological vineyard conditions. The required boundary conditions, to be provided during the simulation, data are: temperature, relative humidity, solar global radiation, photosynthetically active radiation, soil temperature, soil water content, wind speed and direction, rainfall, and leaf wetness. Other data are required as input: vineyard and soil characteristics, geographic informations (latitude, longitude, slope, height), plant density, variety characteristics (clusters/plants, berries/cluster,..), and vineyard management (trimming, severity of trimming). The main model outputs are: the timing of the main phenological phases (dormancy break, budburst, flowering, fruit-set, veraison, harvest), the predawn leaf water potential, the leaf development, the yield, and the sugar concentration. To get information over a period of climatological relevance, the boundary conditions have been prepared for sixty years. Since input data required by models are not always simple to be retrieved, in this work we have used data coming by the worldwide-distributed database GLDAS (Global Land Data Assimilation System: https://hydro1.gesdisc.eosdis.nasa.gov/data/GLDAS/README_GLDAS2.pdf). The simulation has been carried out in Piemonte (north western Italy) wine region. The results reveal that the model seems able to evaluate the most characteristic variables related to the vine. A close look on the time trend during the 60-years period reveal significant trends for many variables.