

# Climatology of surface and subsurface layer parameters on Piemonte (Italy) vineyards

Cassardo C.<sup>1\*</sup>, Andreoli V.<sup>1</sup>, Cavalletto S.<sup>2</sup>, Ferrarese S.<sup>1</sup>, and Spanna F.<sup>3</sup>

<sup>1</sup>Department of Physics and Natrisk Center, University of Torino "Alma Universitas Taurinorum", Torino, Italy, <sup>2</sup>Department of Agricultural, Forest and Food Sciences, University of Torino "Alma Universitas Taurinorum", Torino, Italy, and <sup>3</sup>Phytosanitary sector, Regione Piemonte, Torino, Italy

\*Corresponding Author: [claudio.cassardo@unito.it](mailto:claudio.cassardo@unito.it)

## ABSTRACT

The rationale of the project is to perform long term simulations using third generation land surface model UTOPIA (University of TORino model of land Process Interaction with Atmosphere) [1], in order to evaluate all components of hydrological and energy budget, as well as soil and canopy parameters, on a specific subset of land use, the vineyards. The reason is that vineyards have a specific importance in the economy of Italy, and in particular of some regions, like Piemonte [2]. A preliminary step of this work has been to compare the datasets resulted from the calculations made by the UTOPIA and some experimental datasets acquired within vineyards by our team in the past experiments [3]. The reason for such control is to ensure that UTOPIA outputs could be considered as sufficiently representative of the climatology of vineyards. Thus, three different Piedmontese vineyards (Fubine, Castiglione Falletto, Cocconato) were selected, each one characterized by same climatic but different microclimatic conditions, in which measurements of a wide number of variables were performed in the vegetative seasons 2008-2010 by us (experiment MASGRAPE) [4]. Subsequently, in this study, the results of additional simulations performed using the freely available global database GLDAS (Global Land Data Assimilation System) were compared with those of the simulations driven by observations, in order to check if the model was still able to reproduce the microclimatic characteristics of the vineyards.

This preliminary part of the study gave satisfactory results; thus, we could pass to the phase two of the project. In this phase, using GLDAS database, long term simulations will be carried out with the UTOPIA in order to have output data available on a period of climatic interest (30 years or more). This database could be used in order to perform climatic statistics and assess possible trends in some parameters, eventually to be correlated with grape production. In the talk, the preliminary aspects of this work will be illustrated.

**Keywords:** Piemonte; vineyards; energy and hydrological budget; microclimate; UTOPIA.

## References

1. C. Cassardo, 2015: *The University of Torino model of land Process Interaction with Atmosphere (UTOPIA) Version 2015*. Tech. Rep., CCCPR/SSRC-TR-2015-1, CCCPR/SSRC, Ewha Womans University, Seoul, Republic of Korea, 80 pp
2. S. Prino, F. Spanna, C. Cassardo, 2009: *Verification of the stomatal conductance of Nebbiolo grapevine*. Journal of Chongqing University (English Edition), No. 8(1), pp. 17~24.
3. C. Francone, C. Cassardo, F. Spanna, L. Alemanno, D. Bertoni, R. Richiardone and I. Vercellino (2010): *Preliminary Results on the Evaluation of Factors Influencing Evapotranspiration Processes in Vineyards*, Water, No. 2(4), pp. 916-937; doi:10.3390/w2040916
4. C. Cassardo, C. Francone, R. Richiardone, D. Bertoni, L. Alemanno, F. Spanna (2011) *Experimental and modeling analysis of micro-meteorological factors involved in the development of piedmontese vineyards*, Proceedings of "Incontri Fitoiatrici 2011", Cuneo, 4 Marzo 2011



Book of Abstracts

SISC ANNUAL CONFERENCE

**CLIMATE  
CHALLENGES  
AND SOLUTIONS  
UNDER THE  
2°C TARGET**

CAGLIARI / 19-20 OCTOBER 2016

Supported by



Università degli Studi di Sassari



Università di Cagliari

Sponsor



Advocacy



REGIONE AUTONOMA DE SARDIGNA  
REGIONE AUTONOMA DELLA SARDEGNA

# **BOOK OF ABSTRACTS**

## **SISC Annual Conference Climate challenges and solutions under the 2°C target**

Cagliari (Italy), October 19-20, 2016



# Table of contents

ABOUT CAGLIARI 2016 - CHALLENGES AND SOLUTIONS UNDER 2°C.....	VI
SCIENTIFIC COMMITTEE.....	VII
 CHALLENGES AND OPPORTUNITIES FOR MITIGATION AND ADAPTATION IN A POST-PARIS CONTEXT.....	1
 CONTRIBUTIONS BY NON-STATE ACTORS FOR MORE EFFECTIVE POLICIES AT SUB-NATIONAL LEVEL.....	9
 CLIMATE SMART SOLUTIONS FOR AGRICULTURE AND FORESTRY: A WAY TO COPE WITH CLIMATE CHANGE.....	18
 CLIMATE OF THE PAST, FROM ARCHIVES TO DATA INTERPRETATION.....	27
 FEASIBILITY AND IMPLICATIONS OF LOW-CARBON SCENARIOS.....	38
 IMPACTS AND MITIGATION STRATEGIES IN COASTAL AREAS.....	47
 INTEGRATED APPROACH FOR THE MANAGEMENT OF THE COASTAL AREAS IN A CLIMATE-CHANGING ENVIRONMENT.....	55
 NEW DATA ANALYSES AND DATA-DRIVEN MODELLING FOR CLIMATIC INVESTIGATIONS.....	63
 REGIONAL AND ENVIRONMENTAL IMPACTS IN A CHANGING CLIMATE I.....	75
 REGIONAL AND ENVIRONMENTAL IMPACTS IN A CHANGING CLIMATE II.....	83
 TRANSFORMING CONSUMPTION AND PRODUCTION PARADIGMS TO SUPPORT SUSTAINABLE SOCIETIES – SUSTAINABLE FUTURES IN PRACTICE.....	92
 POSTER SESSION.....	99
AUTHORS INDEX.....	185