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Agriculture and Climate Change- Adapting Crops to Increased Uncertainty (AGRI 2015)

Multi-scalar modelling of climate applied to european vineyard sites in the climate change context

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Abstract

Firstly this study illustrates regional climate projections for several European vineyards areas at mean- and long-term. Secondly, from a network of data loggers, a modeling approach at local scale is presented to reveal climate variability as an important component to reduce local uncertainties and its impacts on plant behaviour.³

First part of study concerns all of ADVICLIM vineyards sites. Downscaled Regional Euro-Cordex models are used to map average temperatures and growing degree days differences between 1970-2000, 2020-2050 and 2050-2070. Simulated data from two scenarios are used to show the potential impact of climate change on grapevine behavior at regional scale. Second part of study draws on data obtained from two sites : Saint-Emilion and Coteaux du Layon, France. Daily temperature data are used to quantify and model local climate variability in relation with local environmental features.^{1,2}

At regional scale, a large variability of climate appears inter- and intrasites. Projected directional climate change demonstrates significant warming and changes in rainfall patterns, however results reveal great uncertainties as a result of natural climate variability, climate models and socio-economic scenarios. Local scale study shows important variability of temperature and growing degree days over very short distances which is related to grapevine phenology and productivity.

Regional models are not accurate enough to take into account local climate variability. For this reason working with nested scales (local and regional) allow to better frame adaptations options to future climate change.

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Keywords: Climate change; Vine; modeling; nested scales

References

- ¹Parker, A.k., I.g. De Cortázar-Atauri, C. Van Leeuwen, et I. Chuine. 2011. « General Phenological Model to Characterise the Timing of Flowering and Veraison of *Vitis Vinifera* L. » *Australian Journal of Grape and Wine Research* 17 (2): 206-16. doi:10.1111/j.1755-0238.2011.00140.x.
- ²Quénol, Hervé. 2011. « Observation et modélisation spatiale du climat aux échelles fines dans un contexte de changement climatique ». Université Rennes 2. <http://tel.archives-ouvertes.fr/tel-00694300>.
- ³Van Leeuwen, C., V. Renouf, J. C. Payan, W. Trambouze, C. Garnier, C. Agut, I. Garcia-Cortazar, et al. 2008. « Heat requirements for grapevine varieties is essential information to adapt plant material in a changing climate ». 7th International Terroir Congress, Nyon, Switzerland. <http://ikee.lib.auth.gr/record/258020>.
1. Van der Geer J, Hanraads JAJ, Lupton RA. The art of writing a scientific article. *J Sci Commun* 2000;**163**:51-9.
2. Strunk Jr W, White EB. *The elements of style*. 3rd ed. New York: Macmillan; 1979.
3. Mettam GR, Adams LB. How to prepare an electronic version of your article. In: Jones BS, Smith RZ, editors. *Introduction to the electronic age*. New York: E-Publishing Inc; 1999. p. 281-304.