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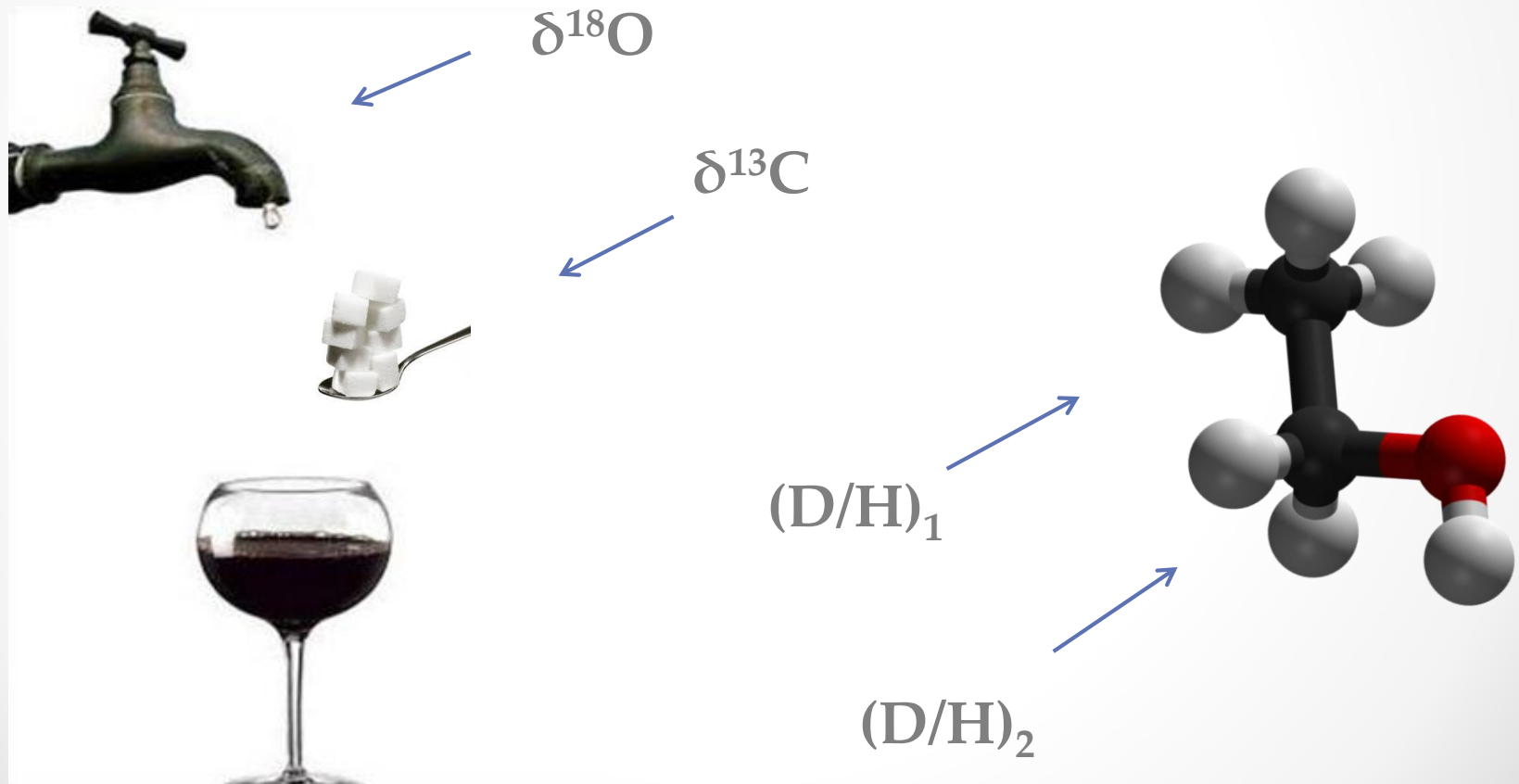
# Climatic and geographical dependence of H, C and O stable isotope ratios of Italian wine

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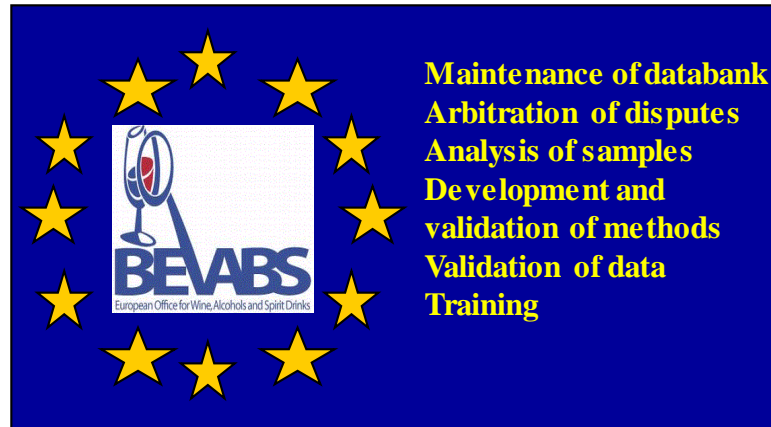


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# Stable isotope ratios of wine



# Wine Databank EC Reg. N° 555/2008



# Aim of the study

1. To evaluate relationships between wine  $(D/H)_1$ ,  $(D/H)_2$ ,  $\delta^{13}C$  and  $\delta^{18}O$  and climatic and geographic parameters of provenance areas.
2. To build a model able to explain relationships between wine isotope ratios and climatic and geographic parameters of provenance areas.

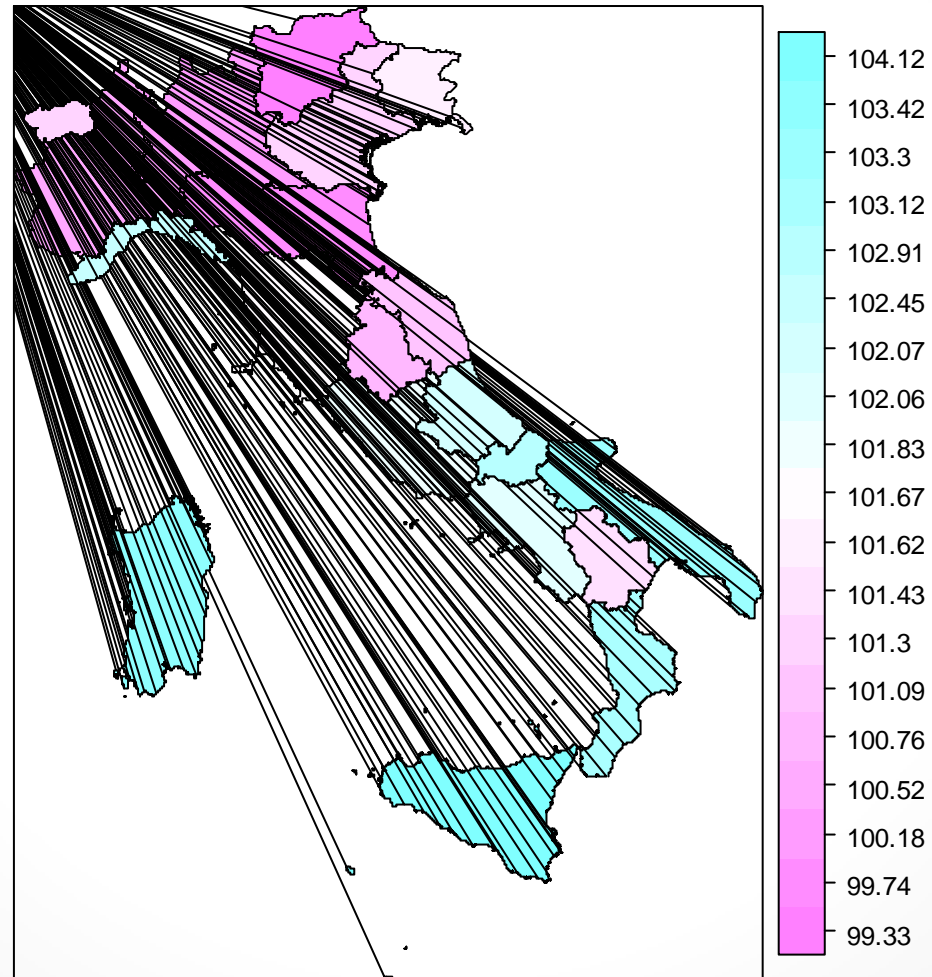
# Materials and methods

Variables	Data type	Resolution	Source
Date of harvest	static	day	Wine DB
Latitude	static	point	www.findlatitudeandlogitude.com
Longitude	static	point	www.findlatitudeandlogitude.com
Elevation	static	20m	Italian elevation model
Distance from the sea	static	250m	Derived from elevation map in GIS
Amount of precipitation [mm/day]	dynamic	25km	ECA&D, <a href="http://www.ecad.eu">http://www.ecad.eu</a>
Maximum daily temperature	dynamic	25km	ECA&D
Minimum daily temperature	dynamic	25km	ECA&D
Mean daily temperature	dynamic	25km	ECA&D
$\delta^{18}\text{O}$ of precipitation	static	37km	Bowen et al. (2005)
$\delta^2\text{H}$ of precipitation	static	37km	Bowen et al. (2005)

- Official samples from the Italian Wine Databank from 2000 to 2010 are considered.
- Explorative analyses and linear modelling

# Results

$(D/H)_1$

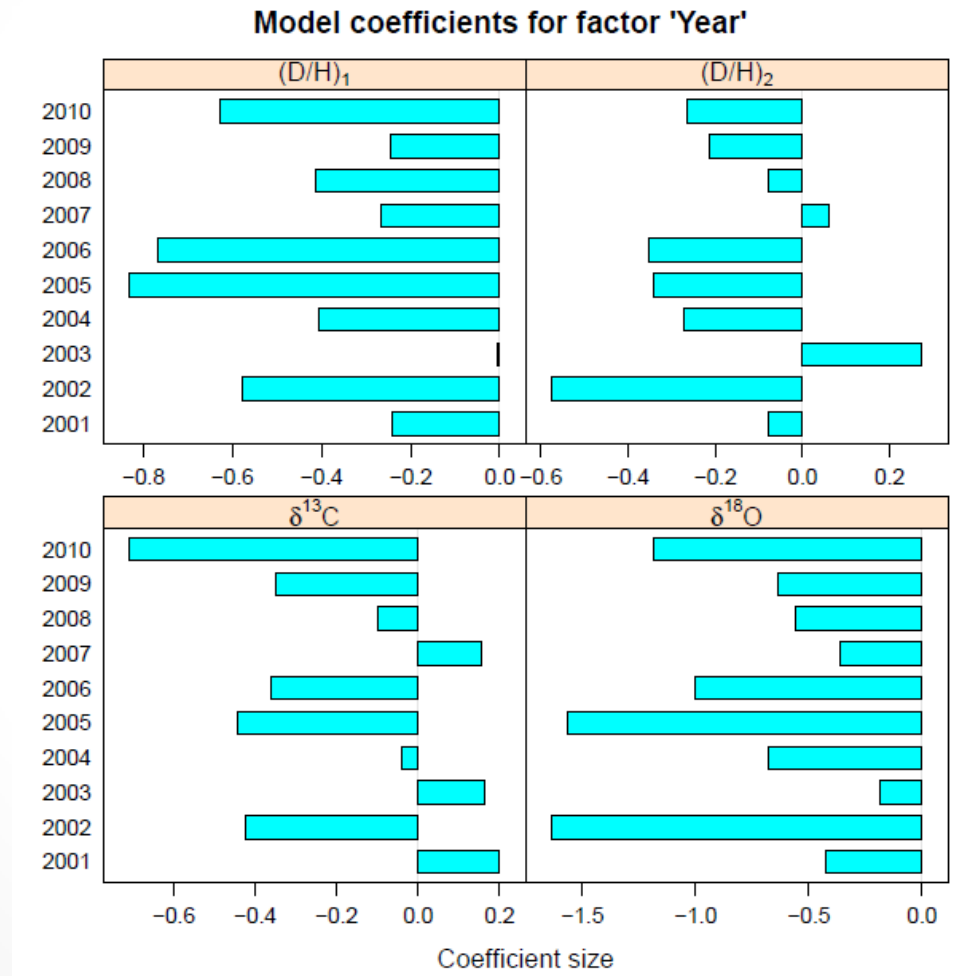






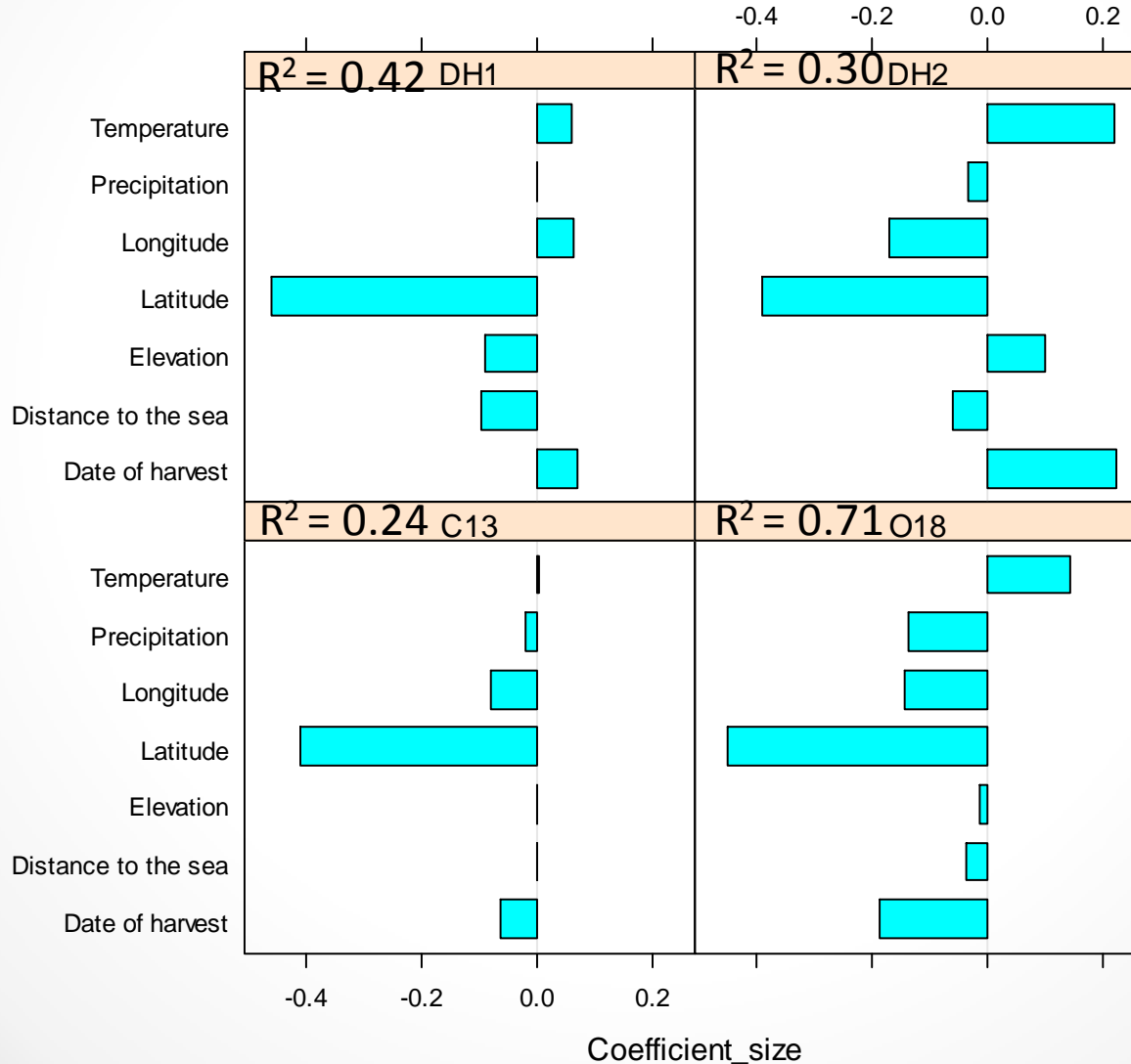


# Results: linear modelling



# Results: linear modelling

Regression coefficients for the selected variables



# Conclusions

1.  $\delta^{18}\text{O}$  and  $(\text{D}/\text{H})_1$  have the strongest relationship with climate and location.
2. The dominant variables are latitude,  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$  of MW and temperature.
3. Models may be used in wine authenticity assessments.



- F. Camin, N. Dordevic, R. Wehrens, M. Neteler, L. Delucchi, G. Postma, L. Buydens (2014) **Climatic and geographical dependence of the H, C and O stable isotope ratios of Italian wine**. *Analytica Chimica Acta* (accepted, in press).

# Acknowledgment

**Anti-Fraud Department of Italian Ministry of Agricultural, Food and Forestry Policy**, owner of the Italian wine databank

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