

B1: Optimization of water management for vineyard

In order to manage the available water resources, it is intended to help wine growers to optimize their irrigation using the correct dose at the optimum moment taking into account local conditions. With the purpose to do it, based on soil knowledge, climate monitoring and direct measures in plants, throughout the 2017 campaign, irrigation recommendations have been issued according to the variety and location of the vineyard.

In 2017, a total of 11 weather stations were installed throughout the Priorat region. In order to have climatic data available throughout the region, climatic stations were positioned in areas of the region not yet covered by public access stations (Image 1).

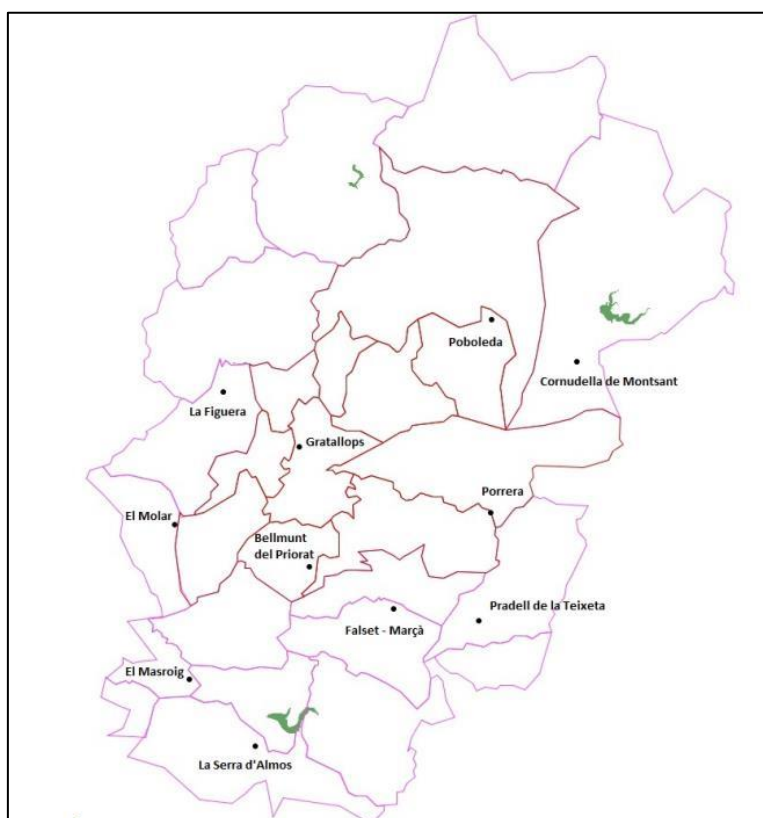


Image 1: Location map of installed weather stations

Estaciones meteorológicas instaladas					
Nombre de la estación	D.O.	Localidad	Altitud	Latitud	Longitud
Celler de l'Era	D.O. Montsant	Cornudella del Montsant	470	41°14'0,56"N	0°53'59,64"E
Lluís Perpiña	D.O. Montsant	García	131,2	41°6'41,01"N	0°42'44,34"E
Celler Cedo Anguera	D.O. Montsant	La Serra d'Almos	227,1	41°5'13,69"N	0°44'44,94"E
Celler Clos Mesorah	D.O. Montsant	Marçà	340	41°8'22,20"N	0°48'43,72"E
Juan Viejobueno	D.O. Montsant	La Figuera	515,4	41°13'08,09"N	0°42'31,10"E
Celler Sant Rafel	D.O. Montsant	Pradell de la Teixeta	352,4	41°08'8,71"N	0°51'15,84"E
Celler Grifoll	D.O. Montsant/DOQ Priorat	El Molar	248	41°10'80,60"N	0°42'11,58"E
Celler Mas d'en Gil	D.O.Q. Priorat	Bellmunt del Priorat	304,8	41°9'15,97"N	0°46'12,92"E
Celler Ferrer Bobet	D.O.Q. Priorat	Porrera	492	41°10'35,55"N	0°51'33,20"E
Celler Mas Doix	D.O.Q. Priorat	Poboleda	466,72	41°14'54,77"N	0°51'26,17"E
Celler Clos Figueras	D.O.Q. Priorat	Gratallops	227,3	41°11'57,25"N	0°45'49,13"E

Table 1: location data of installed weather stations



Image 2: Weather stations

The data collected by the weather stations installed can be consulted through a web platform where wine growers and wineries can consult the meteorological parameters compiled by the meteorological stations closest to their vineyards. This tool allows to visualize in graphs and to download in Excel format updated data of any of the weather stations installed.

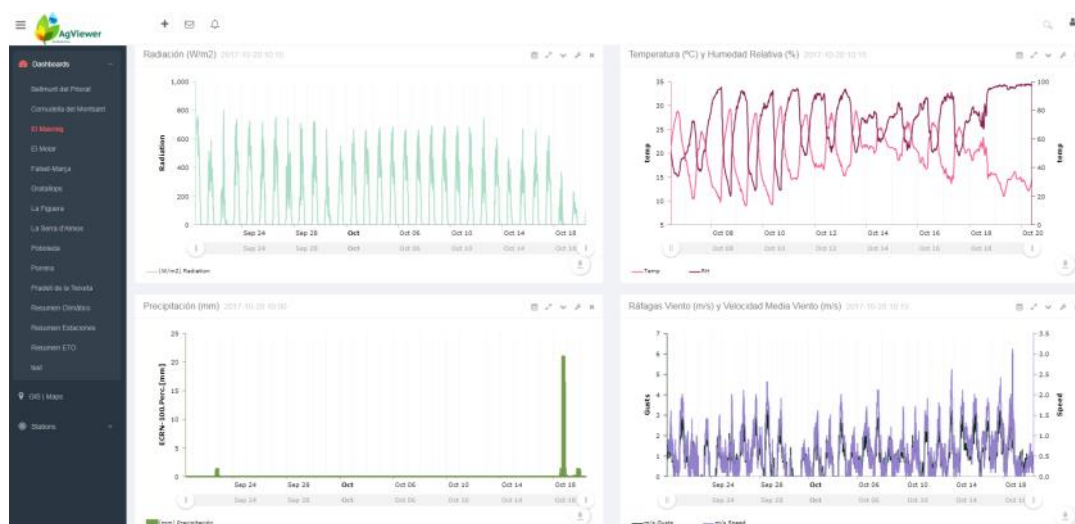


Image 3: Platform to view and download weather data

This implies a qualitative improvement in the availability of meteorological data in the region. The network of weather stations together with the web platform allows you to obtain up-to-date and accurate weather data regardless of your location within the Priorat region. The usefulness of the collected meteorological data is being valued in a very positive way by the participants of the project in these first months of use of the platform.

Taking into account the meteorological stations installed by VITEC and the public access stations of the region, 14 climatic zones have been differentiated (Image 4). The climatic data of each zone are registered by at least one weather station of the region (Table 2).

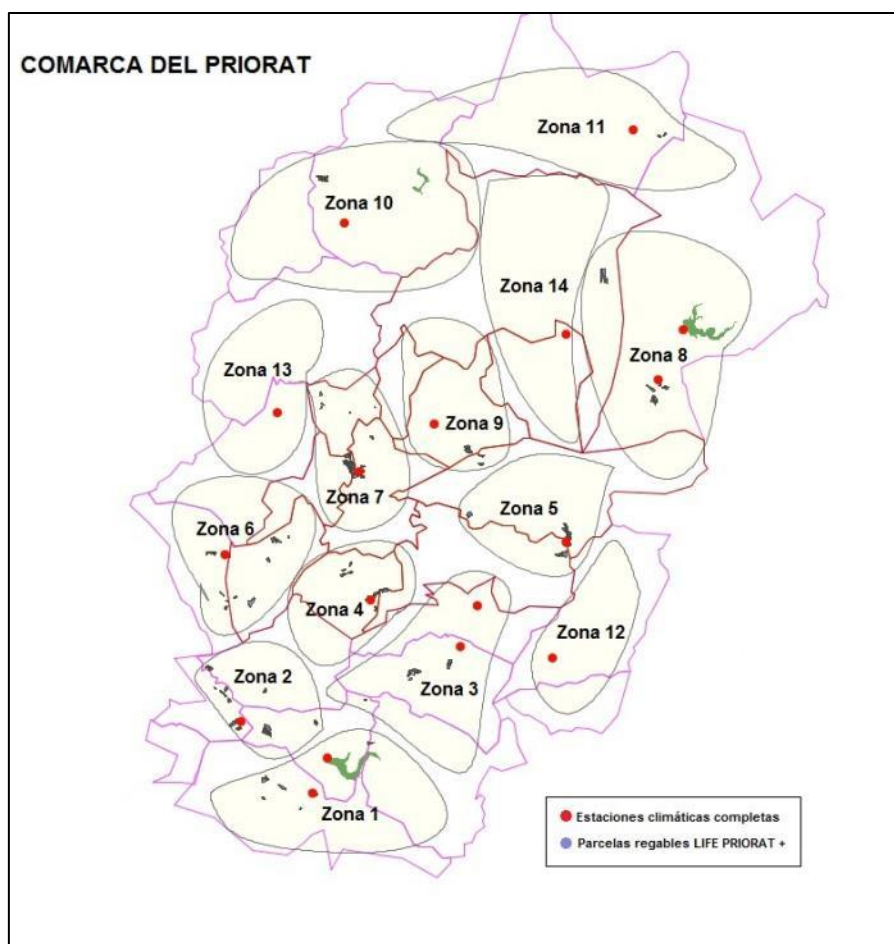


Image 4: Climatic zones established in the Priorat region

Climatic zones	Data collection station
<u>Zona 1</u>	Serra d'Almos (*) y Panta el Guiamets
<u>Zona 2</u>	Masroig (*)
<u>Zona 3</u>	Falset-Marça (*) y Falset
<u>Zona 4</u>	Bellmunt del Priorat (*)
<u>Zona 5</u>	Porrera (*)
<u>Zona 6</u>	El Molar (*)
<u>Zona 7</u>	Gratallops (*)
<u>Zona 8</u>	Cornudella de Montsant (*) y Panta de Siurana
<u>Zona 9</u>	Torroja del Priorat
<u>Zona 10</u>	Margalef
<u>Zona 11</u>	Ulldemolins
<u>Zona 12</u>	Pradell de la Teixeta (*)
<u>Zona 13</u>	La Figuera (*)
<u>Zona 14</u>	Poboleda (*)

* Weather stations installed by VITEC
D.O. Montsant
D.O.Q. Priorat

Table 2: Weather data collection station for each climate zone

During the first months of 2017, the project participants provided VITEC with information and characteristics of land plots with irrigation capacity. Information was obtained from vineyards with irrigation capacity in 11 of the 14 differentiated climatic zones.

Based on this information, VITEC technicians selected representative vineyards in each area to monitor water stress. Vineyards of different varieties were selected and monitored separately due to the different behaviour between varieties in situations of water stress. Vine varieties, white and red, representative of vine cultivation in the Priorat region were chosen. In the 2017 campaign, water stress was monitored in 9 climatic zones.

Water stress monitoring zones			
Irrigated zones	Monitored vine varieties	Winery/vine grower LIFE with irrigated vineyard in this zone	D.O. vineyard location
Zone 1 (Serra d'Almos, Darmos, el Guimets sureste y Capçanes suroeste)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon, Ull de Llebre	Celler Cedó Anguera	D.O. Montsant
		Celler Capçanes	D.O. Montsant
Zone 2 (El Masroig, El Guimets Suroeste, García)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon, Ull de Llebre, Merlot, Garnaxa Blanca, Macabeo	Celler el Masroig	D.O. Montsant
		Celler Capçanes	D.O. Montsant
		Lluís Perpiña	D.O. Montsant
		Celler la Placeta	D.O. Montsant
		Ricard Giné Benet	D.O. Montsant
		Celler Clos Mesorah	D.O. Montsant
Zone 3 (Falset Sur, Marça)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon, Macabeo	Celler la Placeta	D.O. Montsant
		Cooperativa Falset-Marça	D.O. Montsant
		Viticultors Mas d'en Gil	D.O.Q. Priorat
Zone 4 (Bellmunt del Priorat)	Carinyena, Garnaxa Negra, Cabernet Sauvignon, Merlot, Garnaxa Blanca	JR Sedó Cabre	D.O.Q. Priorat
Zone 5 (Falset norte, Porrera)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon	Celler Ferrer Bobet	D.O.Q. Priorat
		Celler Marco Abella	D.O.Q. Priorat
Zone 6 (El Molar, La Figuera Sur)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon, Garnaxa Blanca	Celler Pol Grifoll Declara	D.O. Montsant i D.O.Q. Priorat
		Celler Cal Grau	D.O.Q. Priorat
Zone 7 (Gratallops, El Lloar)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon	Celler Clos Figueras	D.O.Q. Priorat
		Vinícola del Priorat	D.O.Q. Priorat
		Celler Cesca Vicent	D.O.Q. Priorat
Zone 8 (Cornudella de Montsant, La Morera de	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon, Merlot	Celler de l'Era	D.O. Montsant
Zone 9 (Torroja del Priorat, Porrera Norte)	Carinyena, Garnaxa Negra, Syrah, Cabernet Sauvignon	Celler Joan Atmeller	D.O.Q. Priorat
		Celler Epicure Wines	D.O.Q. Priorat
Zone 10 (Margalef)	Monitoring not done in 2017	Celler Ronadelles	D.O. Montsant
Zone 11 (Ulldemollins)	Monitoring not done in 2017	Celler Serra Major	D.O. Montsant

Table 3: Water stress control zones

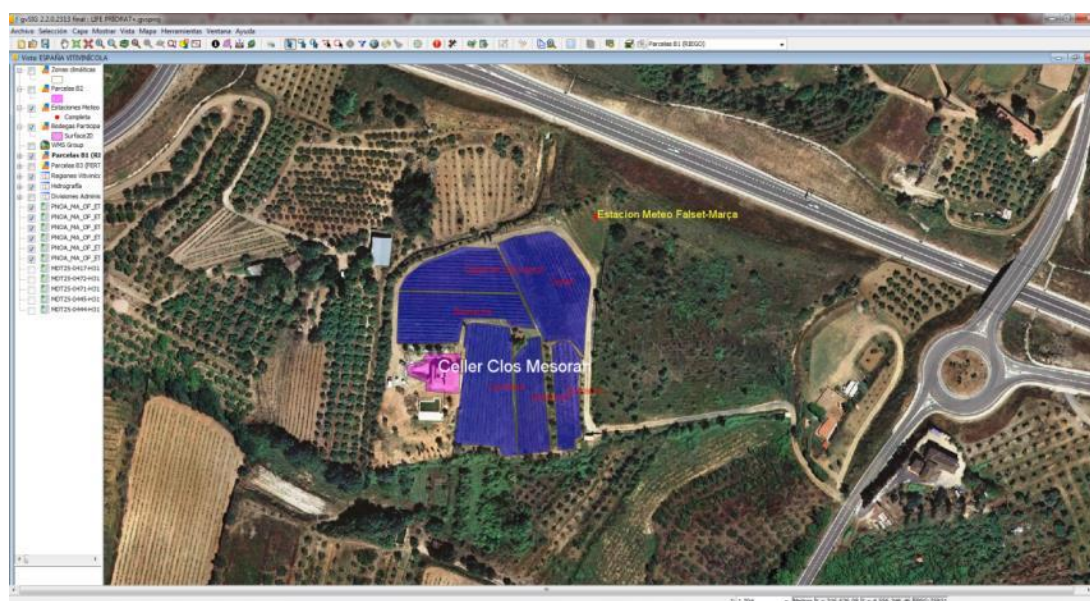


Image 5: Monitoring of water stress in vineyards of the Clos Mesorah winery in GIS software

As seen in image 5, all the monitored irrigated vineyards have been incorporated into a GIS (Geographical Information System) in order to visualize and at the same time to organize all the data of the B1 action. In addition, in this way, the data can be crossed with the data obtained in other technical actions of the project.

The monitoring of water stress in 2017 was carried out from the last week of July to the first week of September in a total of 54 plots. For this, measurements of the leaf water potential at noon were made using a Scholander pressure chamber.



Image 6: VITEC technician measuring water stress

Taking into account the climatic data collected by the weather stations of each zone and the water stress measurements made in the field during the campaign, the VITEC technicians prepared and sent 3 technical reports to the project participants detailing the situation of water stress for each vine variety in each climate zone and giving irrigation recommendations in those cases where it was considered necessary.

In order to assess the influence of irrigation on the quality of wine, in 14 of the 54 controlled plots, maturation was monitored from grape samples and later, with the grapes produced, a total of 38 microvinifications of 50 liters in the VITEC experimental winery.