



INFORMATION TRANSFER TO THE VITICULTURAL SECTOR

Information transfer to the viticultural sector

2016



COORDINATOR

Hervé Quénol

AUTHORS

Julie Caudel¹

Chris Foss²

¹ Société ECOCLIMASOL, Immeuble MIBI, 672 Rue du Mas de Verchant CS 37777 - 34 967 Montpellier Cedex 02 - France

² Plumpton College, Ditchling Road, Nr Lewes, East Sussex - United Kingdom

Introduction

ADVICLIM project has a main objective to make the transfer between the "research and development" towards the applications (shift from "laboratory" to the application) that will allow to change the behaviour of wine professionals and policies. For this purpose, the ClimaVista® Wine web platform, developed by ECOCLIMASOL, has been adapted to respond to the needs of the ADVICLIM Project teams and stakeholders through the VIDAC platform (VID Data Archive Center and Visualization). The VIDAC platform aims at providing to the project researchers and stakeholders a large set of project data (meteorological stations, satellite data, model outputs, carbon footprint results, etc...). These data are helpful for research as well as for responding to the needs of the actors (viticultural sector, public organizations, political ...) in order to easily release information to the viticultural sector and raise their awareness of climate change (Figure 1).

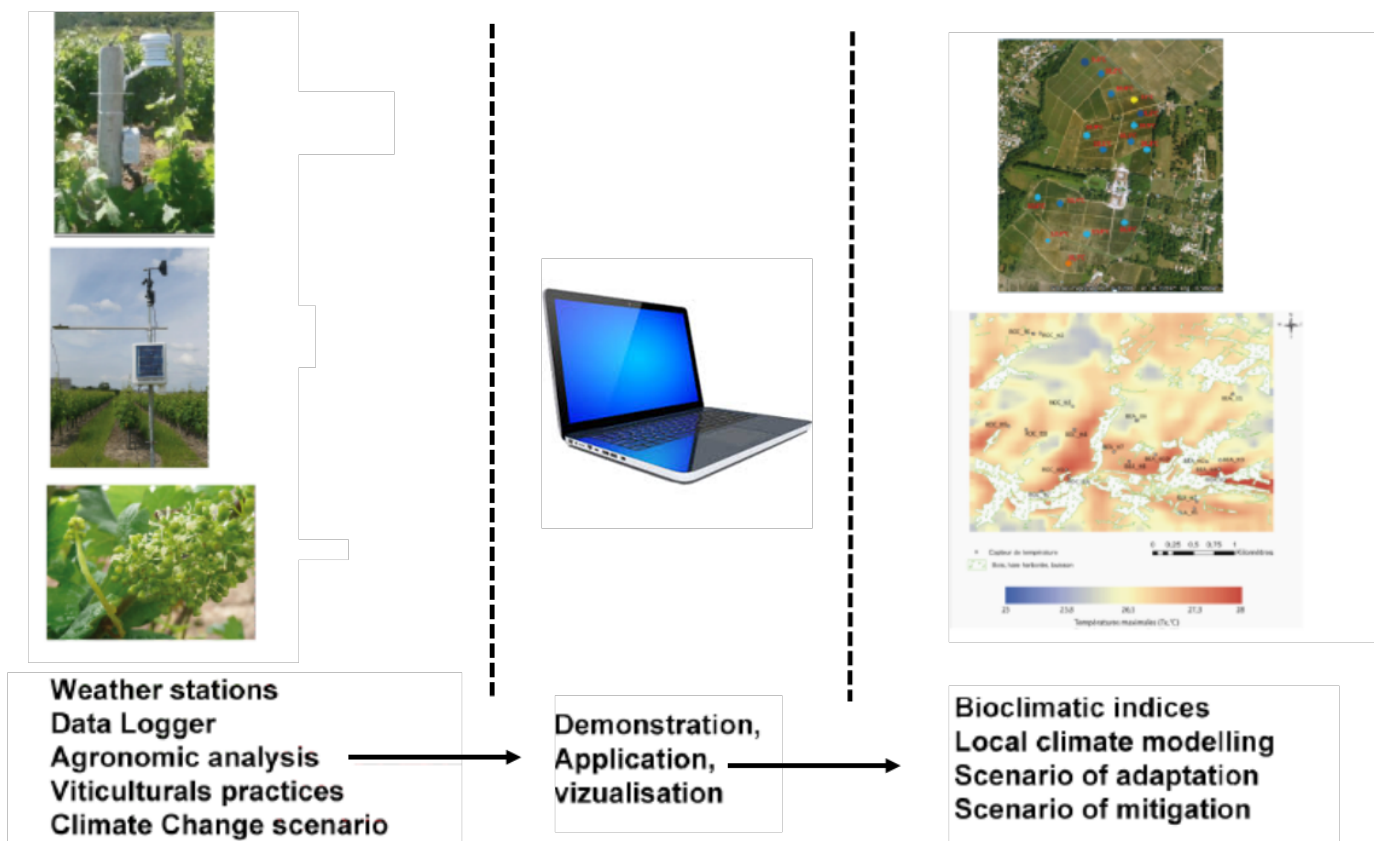


Figure 1: Agro-climatic data acquisition and visualization, and visualization of modeling results into the VIDAC platform to wine and political organizations.



Data Archive Center and Data Visualization Platform

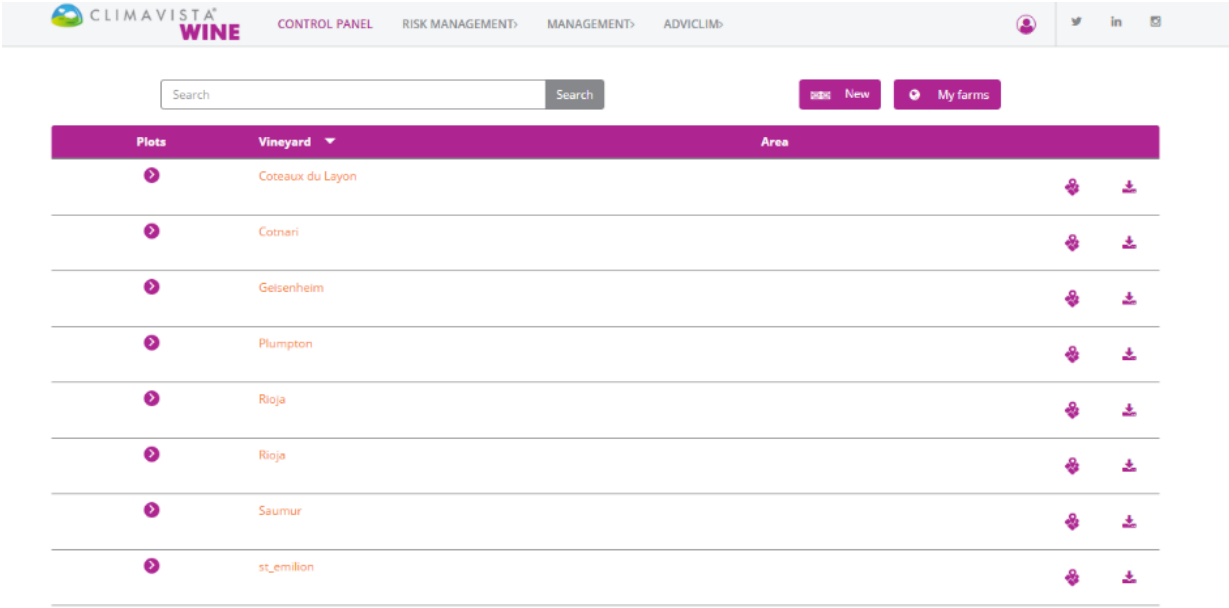
The VIDAC platform as a data archive center and data visualization platform:

- Provides the georeferencing of the experimental plot of the different pilots sites of the project.
- Archives the temperature data of the ADVICLIM sensor networks and provides an interface to visualize and download these data.
- Provides a visualization of climate data modelling in the ADVICLIM framework (spatialized temperatures, bioclimatic indices, etc).

These different points are described in sections 1.1, 1.2 and 1.3. In addition, some extra ClimaVista® Wine services also available for the ADVICLIM partners and stakeholders are presented in section 1.4.

1.1 Georeferencing of the experimental vineyards of the ADVICLIM project

The experimental plots of the different ADVICLIM pilot sites (Plumpton, Geisenheim, Cotnari, La Rioja, Saint-Emilion, Coteaux-du-Layon and Saumur) have been geolocalized in the VIDAC platform. This information is viewable in the tab “Control Panel” (Figure 2). When the user clicks on a particular pilot site, he access to a map of the geolocalized plots and a table listing the plots and their surfaces. The georeferencing for the pilot sites of Coteaux-du-Layon and Plumpton are shown in Figures 3 and 4 respectively. The user has always the possibility to edit (via the button ) or to cancel (via the button ) a plot. Figures 5 and 6 illustrate how to make the georeferencing of a vineyard and its plots in the platform.



The screenshot shows the 'CONTROL PANEL' tab of the ADVICLIM platform. At the top, there is a navigation bar with the CLIMAVISTA WINE logo and tabs for CONTROL PANEL, RISK MANAGEMENT, MANAGEMENT, and ADVICLIM. Below the navigation bar, there is a search bar and buttons for 'New' and 'My farms'. The main content is a table with three columns: Plots, Vineyard, and Area. The table lists eight pilot sites: Coteaux du Layon, Cotnari, Geisenheim, Plumpton, Rioja, Rioja, Saumur, and st_emilion. Each row has a 'Plots' column with a right arrow icon, a 'Vineyard' column with the site name, and an 'Area' column with a leaf icon and a download icon.

























Plots	Vineyard	Area
	Coteaux du Layon	 
	Cotnari	 
	Geisenheim	 
	Plumpton	 
	Rioja	 
	Rioja	 
	Saumur	 
	st_emilion	 

Figure 2: Control Panel of the platform with the whole geolocalized pilot sites.

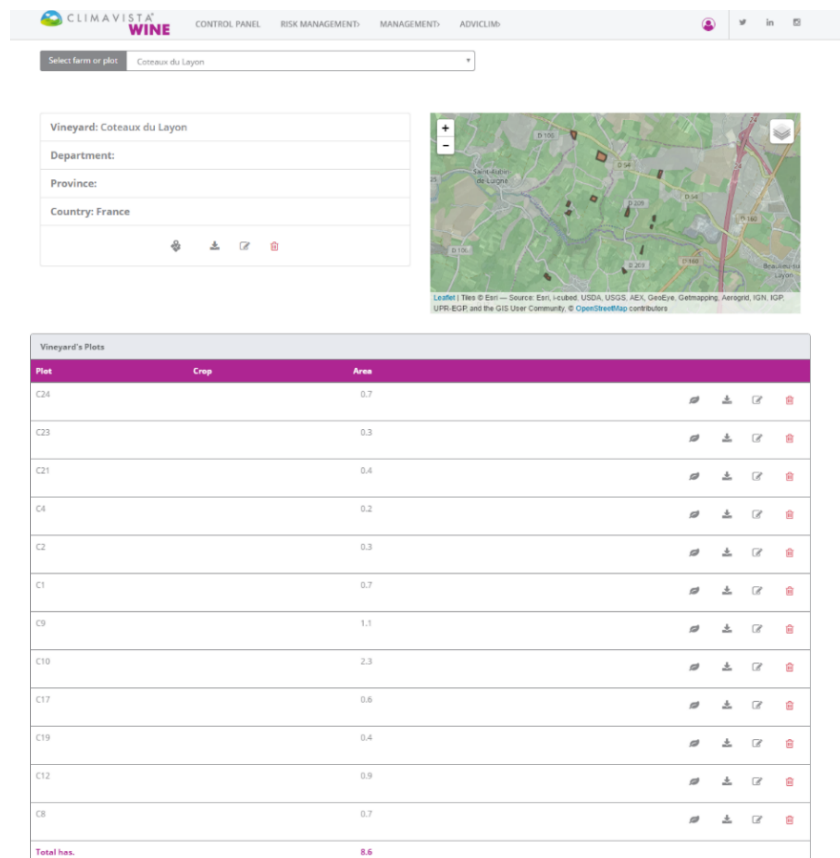


Figure 3: Geolocalized experimental plots of the Coteaux-du-Layon pilot site.

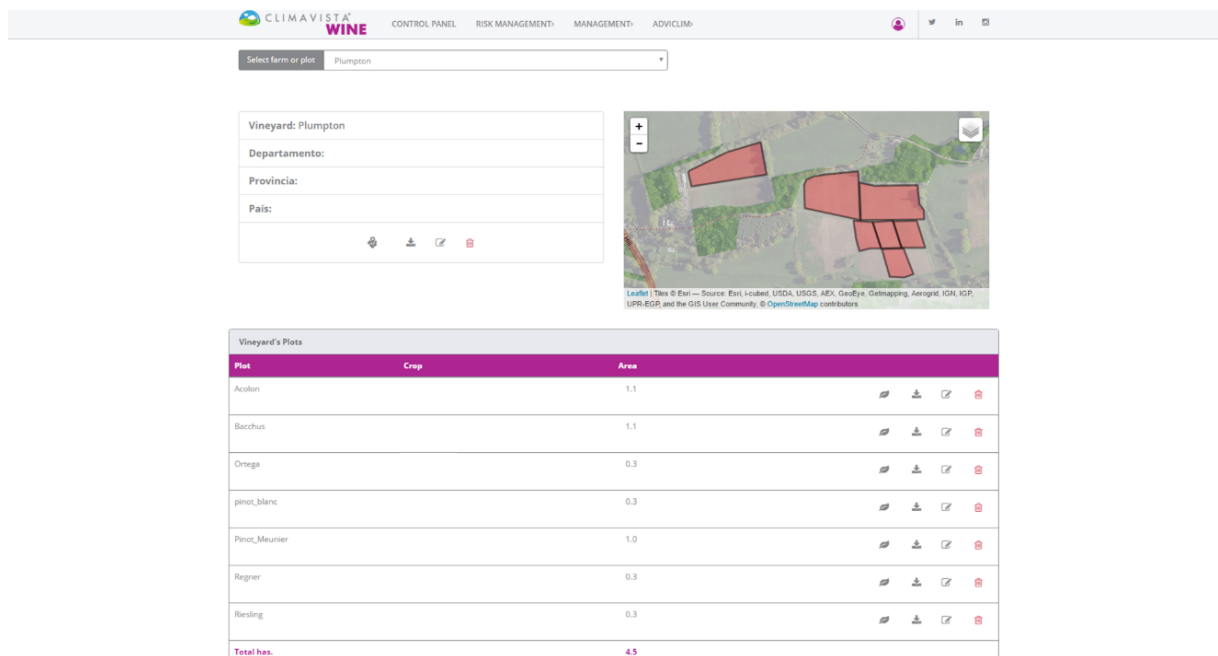


Figure 4: Geolocalized experimental plots of the Plumpton pilot site.

CLIMAVISTA[®] WINE

CONTROL PANEL RISK MANAGEMENT MANAGEMENT ADVICLIM

1 INFORMATION **2** GEOREFERENCING

NEW

Vineyard

Plot

Crop

Variety

Date of the last harvest

JANUARY 2017

Do	Lu	Ma	Mi	Ju	Vi	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Next Cancel

Figure 5: First step: Inform the name of the vineyard, the name of the plot, the variety and the date of the last harvest.

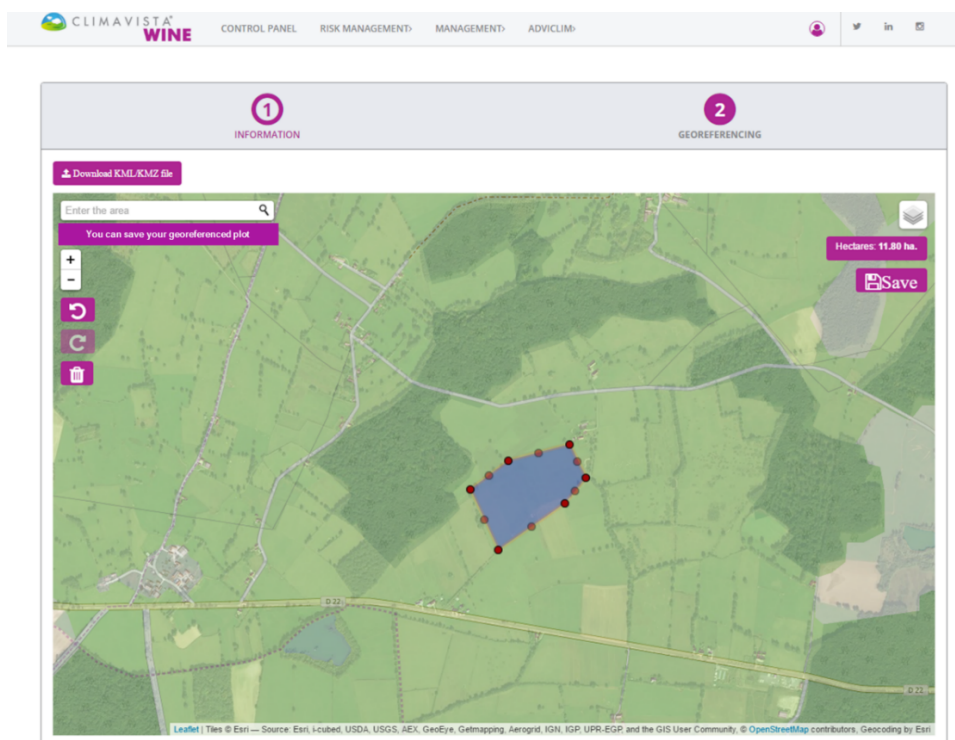


Figure 6: Second step: Download the kml or kmz file of your plot or make manually the georeferencing on the map and save it.

1.2 Visualization and download of temperature data (sensors) and others data from public weather stations

In the tab “Climate”, the user can visualize the map of the nearby weather stations by clicking on “Nearby stations”. Among these nearby stations, there are both the sensors from the ADVICLIM networks and the public weather stations monitored by ECOCLIMASOL. The example for the Coteaux-du-Layon pilot site is presented in Figure 7.

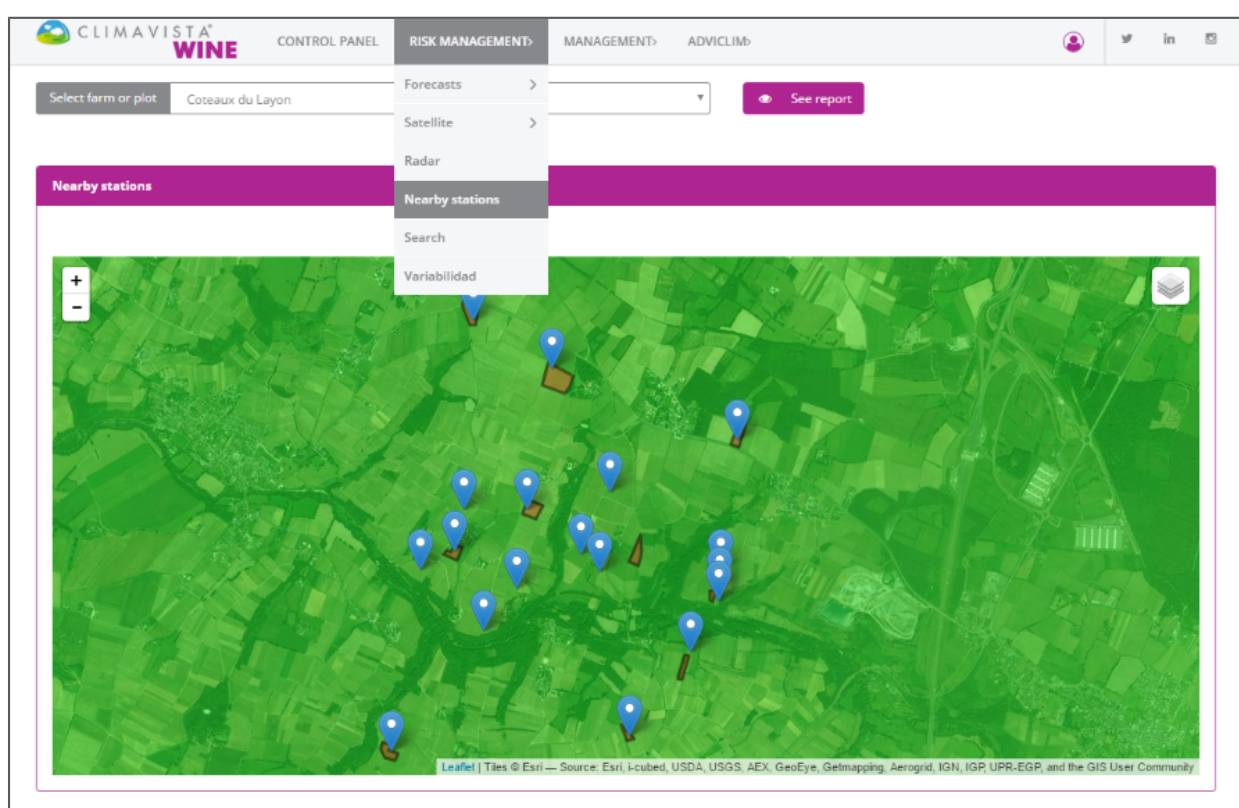


Figure 7: ADVICLIM temperature sensors and public weather stations monitored by ECOCLIMASOL at Coteaux-du-Layon

On the nearby stations map, the user can know the name of the sensor/public weather station and the last date at which data have been registered by positioning the mouse on the sensor, as it is shown in Figure 8 in the case of the Coteaux-du-Layon .

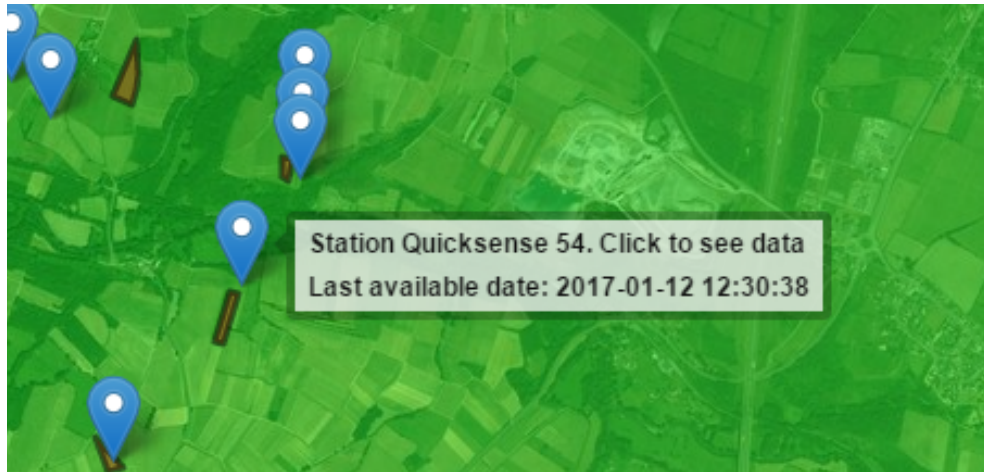


Figure 8: Information that appears when positioning the mouse on a sensor

When clicking on a blue bubble, the user access to the graphical visualization of the data registered by the given sensor (or public weather station).

The French pilot sites of ADVICLIM are connected to the Orbiwise system (and ECOCLIMASOL gets back these data into the VIDAC platform through the Orbiwise server at the hourly time step). However, the Plumpton, Cotnari, La Rioja and Geisenheim pilot sites are not connected with the Orbiwise system and the corresponding data are collected manually and downloaded to the VIDAC platform every 3 months.

Data are shown for the last days (first graph in the Figure 9) and for the last months (second graph in Figure 9) at the time step of their recording (every ten minutes for the temperature sensors of ADVICLIM project). The user has also the possibility to select a particular range of dates by using the calendar in the right side of the page (Figure xxx). The data downloading in a CSV format is completed by clicking on the button

“Export CSV” (Figure 10). An automatic control of the missing and abnormal data is in progress and will soon be available on the platform.

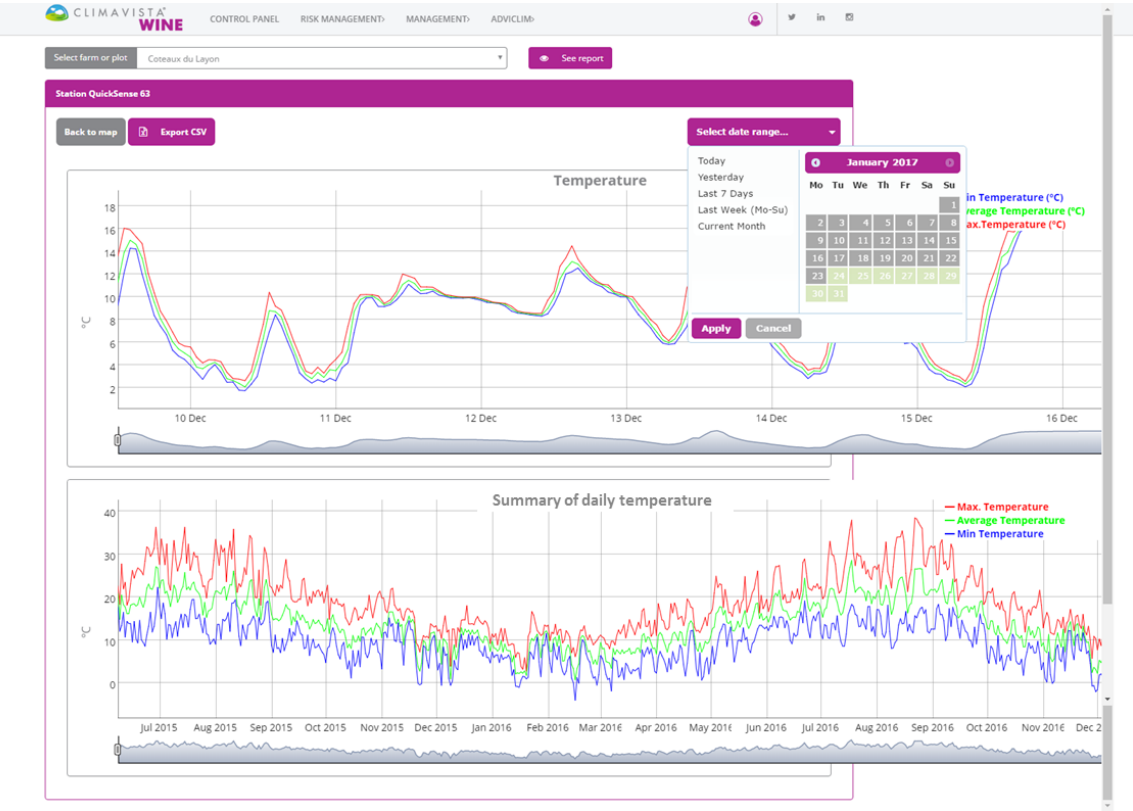


Figure 9: Visualization of the daily temperature for the sensor QuickSense 63 at Coteaux-du-Layon.

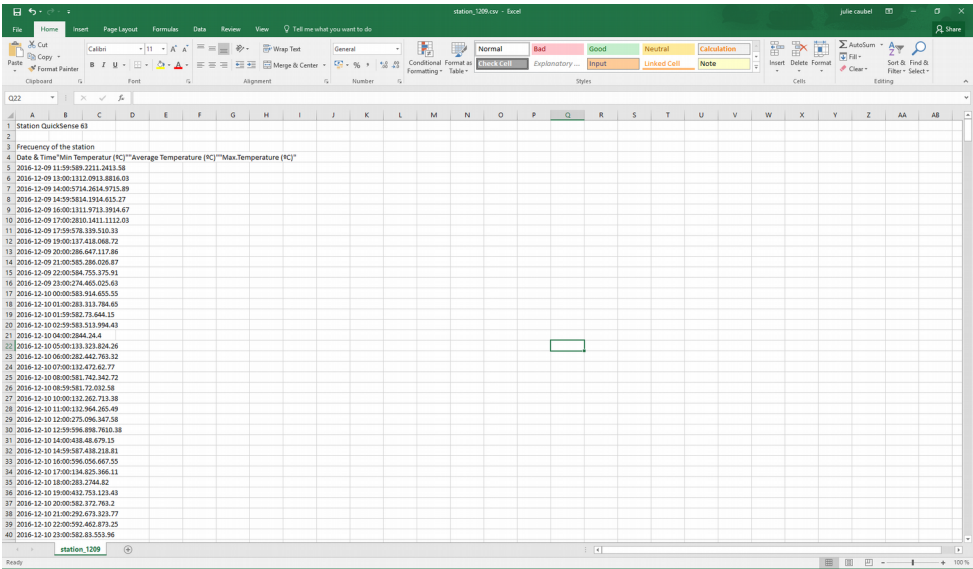


Figure 10: Example of a downloaded file of temperature data

1.3 Link with climate data modeling

1.3.1. Bioclimatic indices

In the tab “Management”, VIDAC provides temporal charts of bioclimatic indices relevant to characterize growth and development conditions for grapevine for a given year. Among these bioclimatic indices, the cumulated degree. days (also called Winkler index) is computed during the phenological grapevine period (from April to October in the North hemisphere) and enables to evaluate if the grapevine heat requirements are fulfilled (Figure 11 for a temperature sensor of Cotnari in Rumania). Another bioclimatic index provided by the platform is the Huglin index, an heliothermal index computed during the growing season of grapevine and displaying a good relation to the potential of sugar content of the grape.

These bioclimatic indices can be computed from the temperature sensor data (or public station data), but also from temperatures at the regional scale (data from satellite). Moreover, the VIDAC platform enables to compare the current year with past years (median and extreme values of the past years).

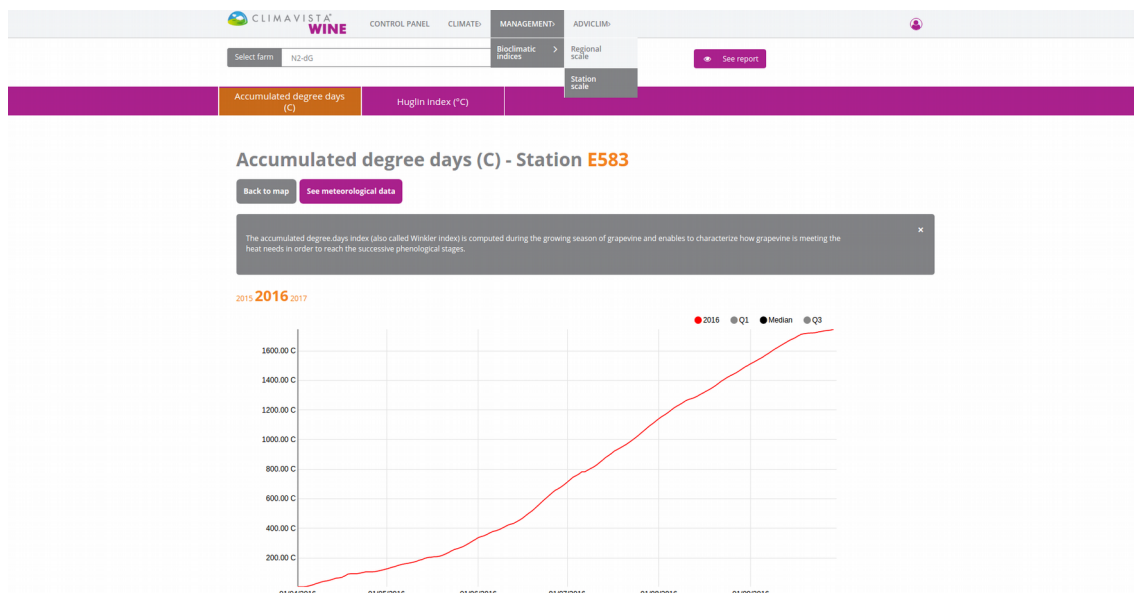


Figure 11: Temporal chart of the cumulated degree.days for a Cotnari sensor in 2016.

1.3.1. Maps of spatialized temperatures and bioclimatic indices

An automatic process providing maps of spatialized temperatures and bioclimatic indices was implemented on the platform. The model of spatialization uses temperature sensor and topographical (from a Digital Elevation Model) data, and was developed by TerraClima©. The service is now operational in the tab “Management” for the sites of Saint-Emilion, Coteaux-du-Layon and Saumur. It will very soon be available in others Adviclim sites. It currently provides:

- maps of minimal temperatures, helpful to localise frost zones;
- maps of maximal temperatures, helpful to localise heat stress zones;
- maps of growing degree.days and Huglin index that can help to spatially organize the harvest (heterogeneity in maturity).

This service will be progressively improved with additional maps and other ways to visualize the information (integration over a period or on time) thanks to the comments of Adviclim partners, especially wine growers .

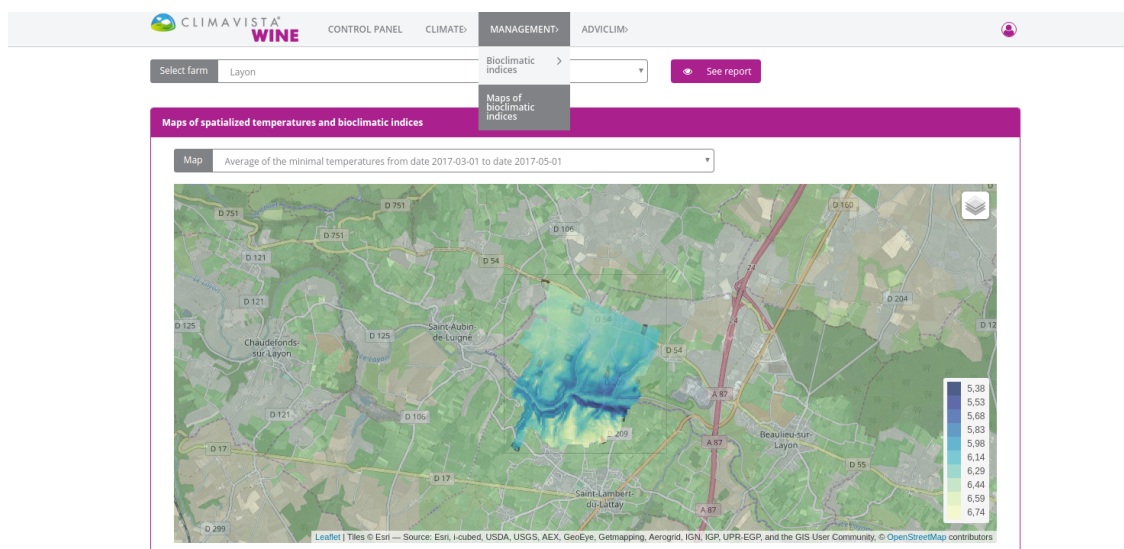


Figure 12: Spatial map of the average of the daily minimal temperatures from 01/04/2017 to 01/05/2017 at Coteaux-du-Layon.

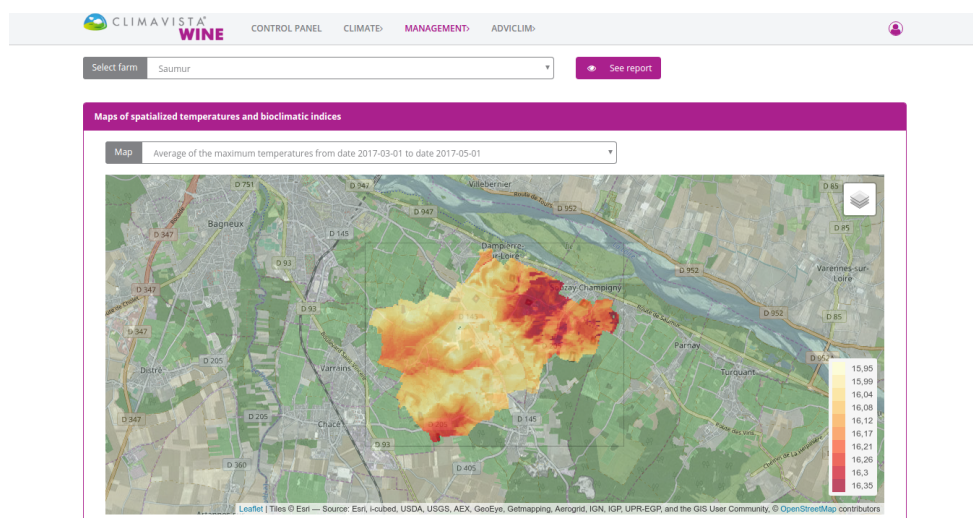


Figure 13: Spatial map of the average of the daily maximal temperatures from 01/04/2017 to 01/05/2017 at Saumur.

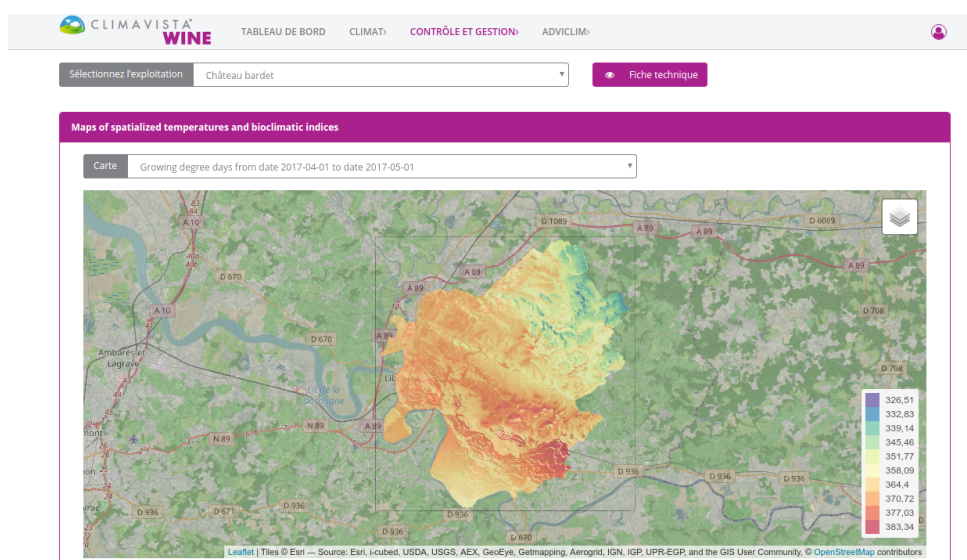


Figure 14: Spatial map of the cumulated degree.days from 01/04/2017 to 01/05/2017 at Saint-Emilion.

1.4 Other services providing by ClimaVista Wine

ClimaVista® Wine is a web platform providing agroclimatic services to help wine growers and winemaking cooperative to manage their vineyards. In addition to the services presented in 1.1 and 1.2 sections, it also provides to its users (and therefore to the ADVICLIM partners and stakeholders) the services described below.

- *The visualization and download of estimated precipitations from satellite (tab “ Climate”):* the user can visualize and download estimated precipitations from satellite (Global Precipitation Measurement from NASA) in real time (Figure 16 and 15).

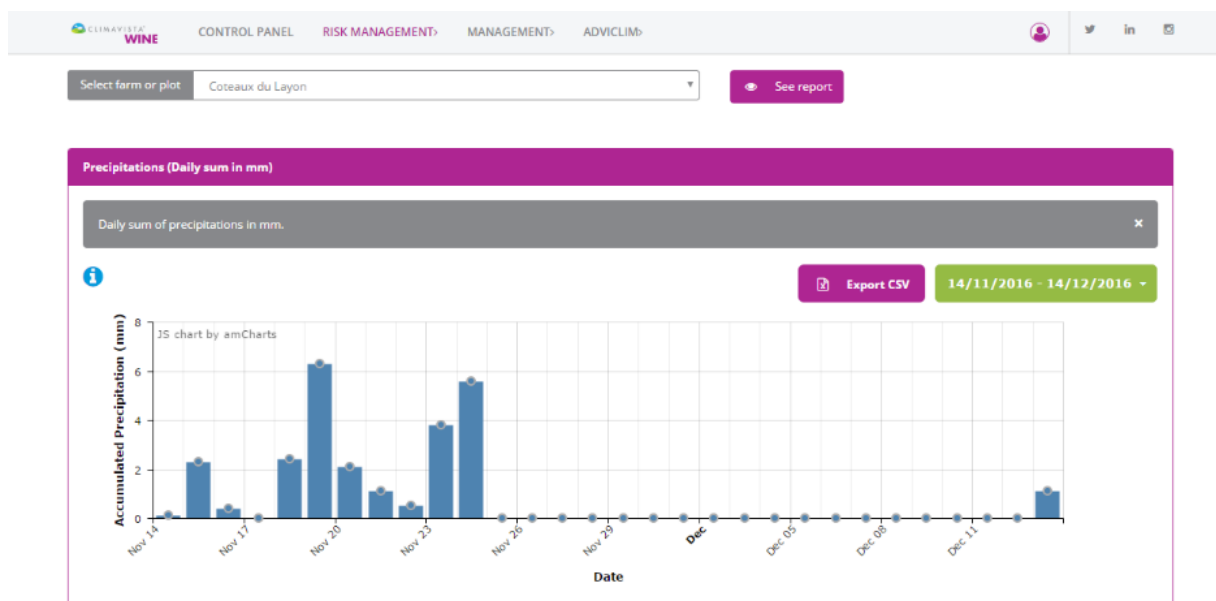


Figure 15: Visualization and downloading of estimated precipitations from (Global Precipitation Measurement from NASA) in the Coteaux-du-Layon zone.

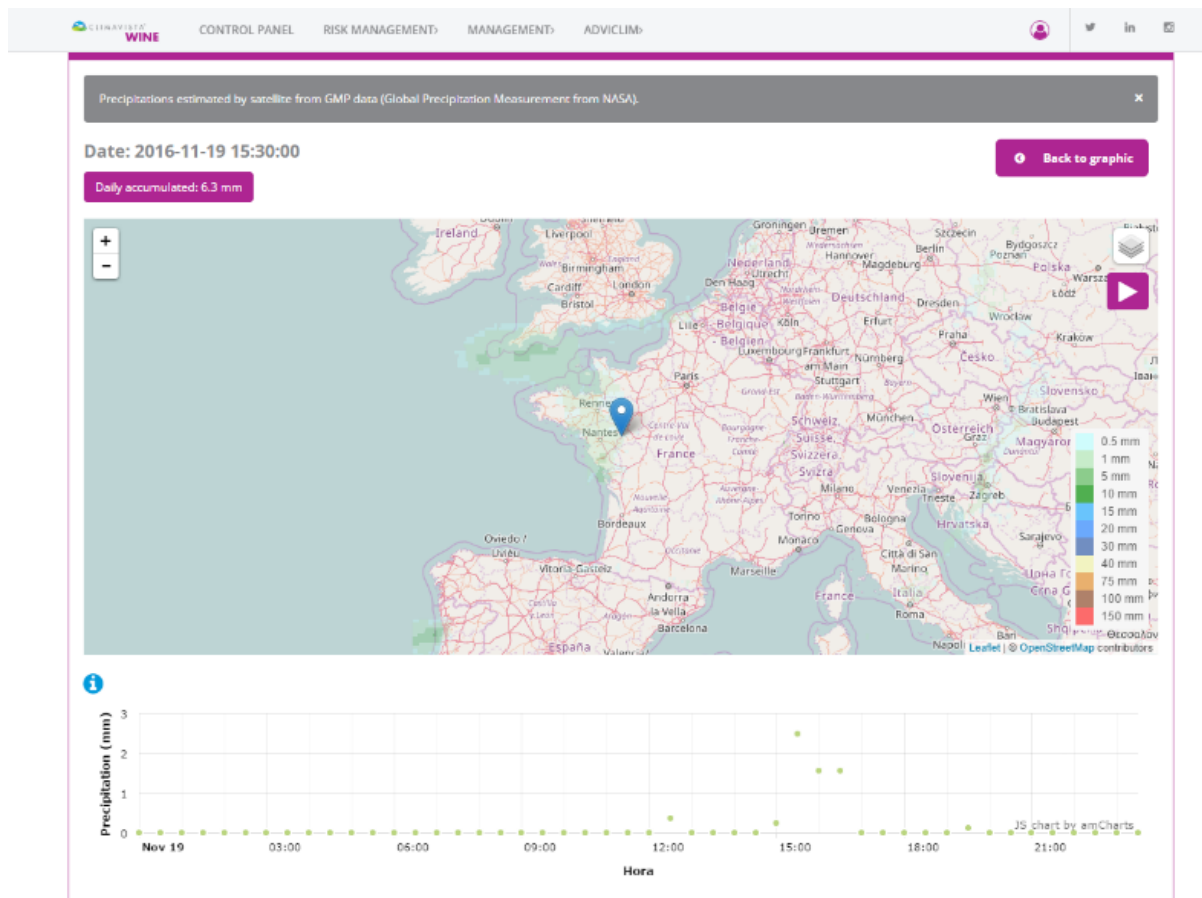


Figure 16: Spatial visualization of estimated precipitations from (Global Precipitation Measurement from NASA) and hourly details for one particular day.

- The visualization of short-term forecasted weather data (tab “Climate”) from the Global forecast system (GFS) for the seven coming days (Figure 17)

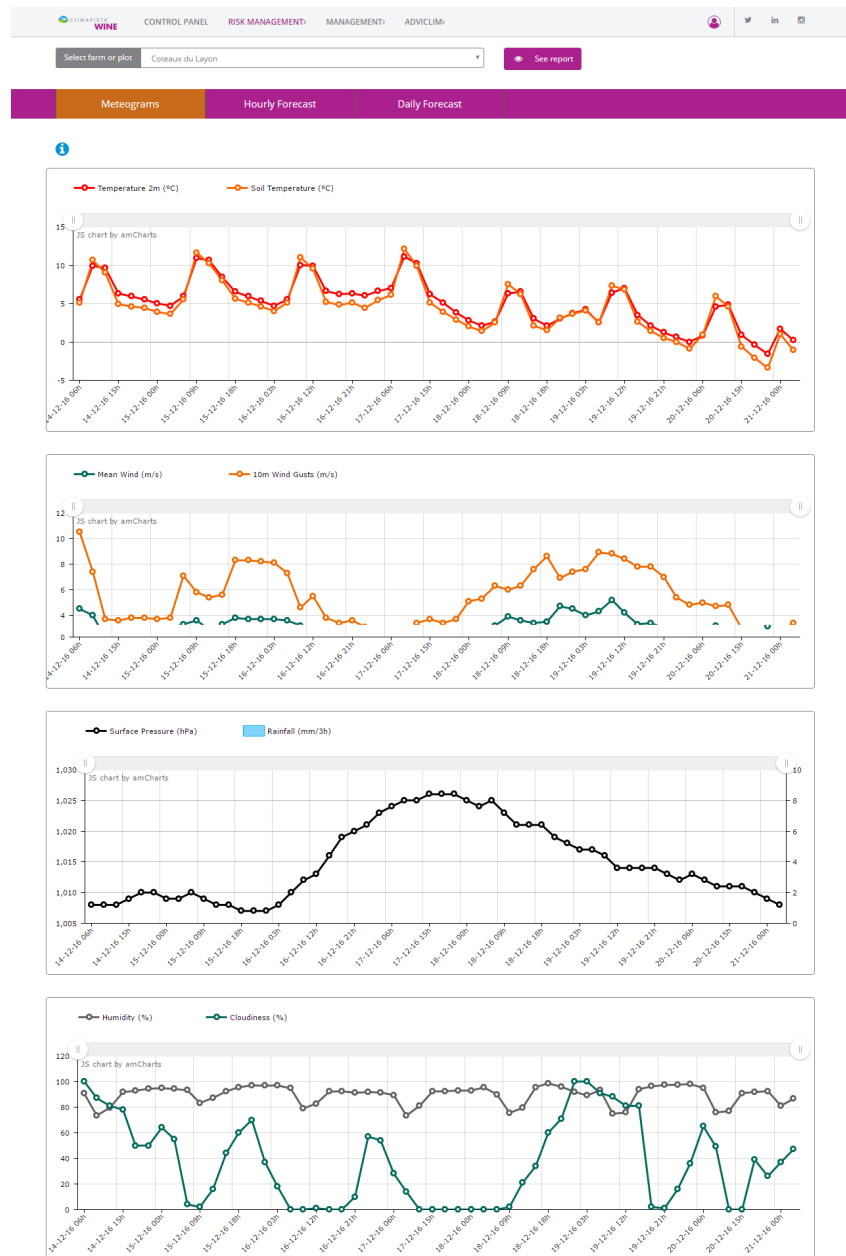


Figure 17: Visualization of short-term forecasts (GFS data)

- The visualization of topographical data (tab “Management”): ClimaVista® Wine provides maps (Figure 18) of height (in meters), slope (in %) and slope orientation from a Digital Elevation Model (DEM) for a plot and its surroundings in order to identify potential zones with risk of cold air accumulation.

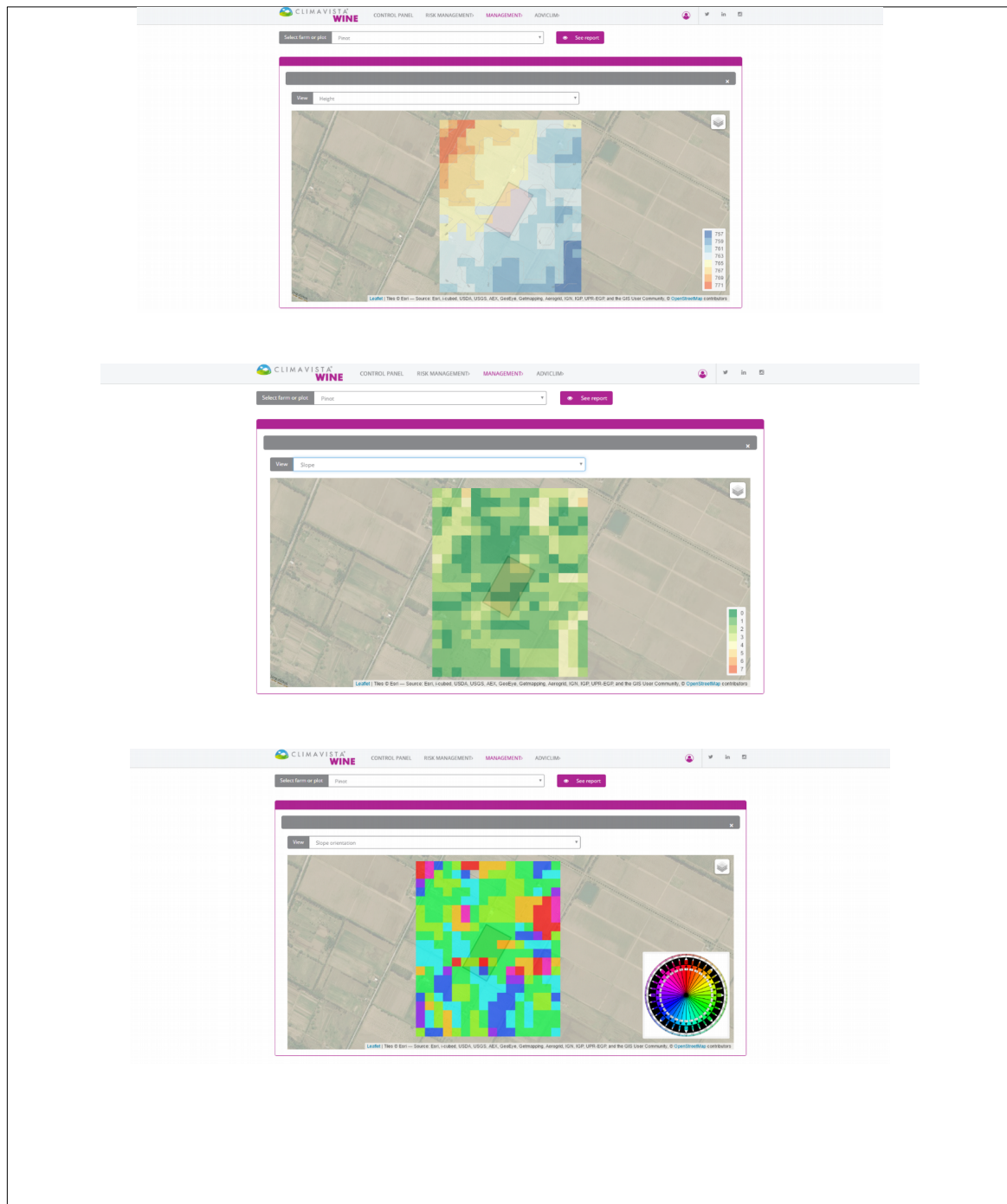


Figure 18: Height (in meters), slope (in %) and slope orientation of a plot and its surroundings.

Specific section on project website for information transfer

The VIDAC platform offers a tab named “ADVICLIM” with the forms to gather all the vineyard information required for the SEVE model, which aims at simulating the impact of environmental conditions and constraints on grapevine behaviour and viticultural activities (action B1), and for the Bilan Carbone model (action B2).

They are of three types: “**Inventory**”, “**Practices**”, and “**Monitoring**”, as it is shown in Figure 19.



Figure 19: Tree view of the different forms to fulfill.

In “Inventory”, the whole tools (for e.g. thermic heater weeder), inputs (for e.g. insecticide), and equipment (for e.g. trellising system) of a vineyard are listed in the forms “Tools” (Figure 20), “Inputs” (Figure 21) and “Equipment” (Figure 22) respectively. Moreover, the form “Components” (Figure 23) enables to describe the components which make up certain equipment (for e.g. an irrigation system with hydraulic valve).

Specific interventions (for e.g. fungicide treatment) at the scale of a plot being part of the vineyard are described in the Practices form (Figure 24). These interventions request the use of the inputs, tools and equipment listed in Inventory.

Finally, any observations (phenological observations, pest and diseases observations), measurements (crop vegetation, yield) or analysis (soil analysis, berry analysis) at the scale of a geographical point into the plot

are described in the Monitoring form. The Monitoring form in the case of crop vegetation measurement is shown in Figure 25.

These forms have to be fulfilled jointly by the wine growers and the partners responsible of the ADVICLIM pilot sites. Some information are obligatory (in red) to fulfill by the wine growers (helped by the partners) as they are the minimal required information to compute the Bilan Carbone model. Each form which were fulfilled and saved is viewable and editable in a panel control as it is shown in Figure 26 in the case of a Saint-Emilion vineyard.

Adviclim partners have now started to fulfill the forms and the collected information will soon be transferred to partners in charge of the Bilan Carbone and SEVE models, in order they provide the first results concerning GHG emissions and grapevine behaviour in the different pilot sites.

The screenshot shows a web form titled 'CLIMAVISTA WINE' with a navigation bar containing 'CONTROL PANEL', 'RISK MANAGEMENT', 'MANAGEMENT', and 'ADVICLIM'. The 'ADVICLIM' tab is active. The form is for 'Select farm or plot' and is currently set to 'Plumignon'. A 'See report' button is visible. The form fields are as follows:

- Tool name:** Text input field with a red border and a close button (X).
- Pilot site:** Dropdown menu with a red border and a close button (X).
- Tool category:** Dropdown menu with a red border and a close button (X).
- Tool type:** Dropdown menu with a red border and a close button (X).
- Brand:** Text input field with a red border and a close button (X).
- Tool cost (euros):** Text input field.
- Tool lifetime:** Text input field.
- Tool lifetime unit:** Radio buttons for 'Hours', 'Days', and 'Years'.
- Tool weight:** Text input field.
- Tool weight unit:** Radio buttons for 'g' and 'kg'.
- Model:** Text input field.
- Only for animal traction tools:** Section header.
- Description of the tool:** Text input field.
- Only for sprayers and atomizers:** Section header.
- Average mixture volume (L/ha):** Text input field.
- Volume of tank bottom (L):** Text input field.
- Internal cleaning?:** Radio buttons for 'Y' (selected) and 'N'.
- Water volume (internal)(L):** Text input field.
- Water volume (external)(L):** Text input field.
- Only for motorized tools:** Section header.
- Tool power (kW):** Text input field.
- Source of information:** Dropdown menu.
- Save & list:** Button at the bottom right.

Figure 20: Form relative to the Inventory of Tools at the level of the vineyard.

CLIMAVISTA[®] WINE CONTROL PANEL RISK MANAGEMENT MANAGEMENT ADVICLIM

Select farm or plot Plumpton See report

Commercial name ✖

Pilot site -- Select -- ✖

Input category Fungicide ✓

Only for Fungicide

Fungicide product -- Select --

Type of fungicide ☐ Contact ☐ Systemic

Brand ✖

Biocontrol input? ☒ Y ☐ N

Volume of purchased container (L)

Source of information -- Select --

Save & list

Figure 21: Form relative to the Inventory of Inputs at the level of the vineyard

CLIMAVISTA[®] WINE CONTROL PANEL RISK MANAGEMENT MANAGEMENT ADVICLIM

Select farm or plot Plumpton See report

Equipment name ✖

Pilot site -- Select -- ✖

Equipment category -- Select -- ✖

Equipment type -- Select -- ✖

Brand ✖

Equipment without components (all excepted trellising, irrigation or antifrost with water spray equipments)

Equipment lifetime Equipment lifetime unit ☐ Hours ☐ Days ☐ Years

Equipment weight Equipment weight unit ☐ g ☐ kg

Equipment cost (euros)

Equipment with components (trellising, irrigation or antifrost with water spray equipments)

Component description (to repeat for every component making up the equipment)

Only irrigation or antifrost with water spray equipments

Water origin for irrigation ☐ Water from the system ☐ Surface water ☐ Underground water

Filtration? ☐ Y ☐ N

Fertilizer injector? ☐ Y ☐ N

Metering pump? ☐ Y ☐ N

Thermal pump? ☐ Y ☐ N

Equipment power (kW)

Irrigated surface (ha)

Flow (L/h)

Only phytosanitary effluent equipment

Degradation Product -- Select --

Degradation type -- Select --

Capacity volume of phytosanitary effluent degradation (m³/year)

Cost of material for phytosanitary effluent degradation (euros)

Source of information -- Select --

Save & list

Figure 22: Form relative to the Inventory of Equipment at the level of the vineyard.

The screenshot shows the 'CLIMAVISTA WINE' interface with a top navigation bar containing 'CONTROL PANEL', 'RISK MANAGEMENT', 'MANAGEMENT', and 'ADVCLIM'. The main form is titled 'Select farm or plot' with a dropdown menu set to 'Plumpton' and a 'See report' button. The form fields include: 'Component name' (text input), 'Related equipment name' (dropdown), 'Component type' (dropdown), 'Brand' (text input), 'Number of components units' (text input), 'Main material making up the components' (dropdown), 'Component lifetime' (text input), 'Component lifetime unit' (radio buttons for Hours, Days, Years), 'Component weight' (text input), 'Component weight unit' (radio buttons for g, kg), 'Component cost (euros)' (text input), and 'Source of information' (dropdown). A 'Save & list' button is at the bottom right.

Figure 23: Form relative to the Inventory of Components (making up certain equipment) at the level of the vineyard.

The screenshot shows the 'CLIMAVISTA WINE' interface with the same top navigation bar. The main form is titled 'Select farm or plot' with a dropdown menu set to 'Plumpton' and a 'See report' button. The form fields include: 'Pilot site' (dropdown), 'Plot' (dropdown), 'Type of intervention - Possibility to fill 2 interventions performed the same day with the same tool(s) and/or input(s)' (dropdown), 'Tool(s) used for the intervention(s) - Possibility to fill 3 names of tool defined in Tool inventory' (dropdown), 'Input(s) used for the intervention(s) - Possibility to fill 3 names of input defined in input inventory - Only for non mechanical interventions' (dropdown), 'Date of action' (calendar picker showing 25-01-2017), 'Duration (hours)' (text input), 'Number of workers' (text input), 'Number of seasonal workers' (text input), and 'Plot surface treated (ha)' (text input). A 'Save & list' button is at the bottom right.

Figure 24: Form relative to the Practices at the level of the plot.


CLIMAVISTA WINE CONTROL PANEL RISK MANAGEMENT MANAGEMENT ADVCLIM

Select farm or plot: Plumpton [See report](#)

Pilot site: -- Select --

Plot: -- Select --

Point



Observation type: Crop

Only for Crop

Stem height (m)

Canopy height (m)

Leaf area index (m2 leaves/m2 soil)

Plant cover of the external plant

Observation date

23-01-2017

ENERG 2017

De Lu Ma Mi Ju Vi Sa

1 2 3 4 5 6 7

8 9 10 11 12 13 14

15 16 17 18 19 20 21

22 23 24 25 26 27 28

29 30 31

Source of information: -- Select --

Save & list

Figure 25: Form relative to the Monitoring at the level of a point into the plot.

CLIMAVISTA WINE CONTROL PANEL RISK MANAGEMENT MANAGEMENT ADVCLIM

Select farm or plot: SaintEmillion [See report](#)

Search [Now](#)

Tool name	Tool category	Tool type	Pilot site	Updated		
LAP-tracteur inter-rang Case Q	Motorized pulling tool	Inter-row tractor	Château Lapelletrie	13-Ene	✎	✖
LAP-tracteur inter-rang Case	Motorized pulling tool	Inter-row tractor	Château Lapelletrie	13-Ene	✎	✖
LAP-Tenaile	Tools	Link pliers	Château Lapelletrie	13-Ene	✎	✖
LAP-sécteur F	Tools	Electric pruner	Château Lapelletrie	13-Ene	✎	✖
LAP-sécteur électrique L	Tools	Electric pruner	Château Lapelletrie	13-Ene	✎	✖
LAP-Rotavator	Towed tool	Rotary harrow	Château Lapelletrie	13-Ene	✎	✖
LAP-rogneuse	Towed tool	Trimmer	Château Lapelletrie	13-Ene	✎	✖
LAP-pulvé	Towed tool	Pneumatic sprayer	Château Lapelletrie	13-Ene	✎	✖
LAP-herse	Towed tool	Rotary harrow	Château Lapelletrie	13-Ene	✎	✖
LAP-Gyrobroyeur	Towed tool	Intervine blade mower	Château Lapelletrie	13-Ene	✎	✖
LAP-Griffe	Towed tool	Subsoiler	Château Lapelletrie	13-Ene	✎	✖
LAP-Epampreuse	Towed tool	Mechanical trunk cleaner	Château Lapelletrie	13-Ene	✎	✖
LAP-Effeuilleuse	Towed tool	Roller and cutter bar leaf remover	Château Lapelletrie	13-Ene	✎	✖
LAP-disques	Towed tool	Intervine disc tool	Château Lapelletrie	13-Ene	✎	✖
LAP-Debroussailluse	Tools	Brush cutter	Château Lapelletrie	13-Ene	✎	✖
LAP-Cuve d'eau	Tools	Water tank	Château Lapelletrie	13-Ene	✎	✖
LAP-Brouette	Tools	Wheelbarrow	Château Lapelletrie	13-Ene	✎	✖
LAP-épinettes	Tools	Harvest scissors	Château Lapelletrie	13-Ene	✎	✖

Figure 26: Panel control summarizing the fulfilled forms of Inventory of Tools.

Next steps

One of the major developments now under way is:

- To improve the service which provides maps of spatialized temperatures or bioclimatic indices in the platform, especially thanks to the comments of wine growers.
- To transfer the information collected by the form in order to simulate grapevine behaviour and GHG emissions for each pilot site. Then, we will have to think about the way to visualize of these results on the platform, as well as results in the context of climate change.