SUPPLEMENTARY DATA
Wood, A., Vargas, S., Gambetta, G., Schober, D., Jeffers, E., & Coulson, T. (2024). Modelling the climate changing concentrations of key red wine frape quality molecules using a flexible modelling approach. *OENO One*, *58*(4).
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SUPPLEMENTARY DATA

Table S1. GPS Location for each of the vineyards used in the study.

Vineyard name	*Region*	*Latitude*	*Longitude*
El Boldo	Maule	-35.97224	-72.248466
Agua Santa	Libertador General Bernardo O'Higgins	-34.42692	-71.50539
RH	Maule	-35.472	-71.591167
Don Melchor	Región Metropolitana de Santiago	-33.607556	-70.604417
Lo Ovalle	Valparaíso	-33.266404	-71.389075
Ucuquer	Libertador General Bernardo O'Higgins	-34.036501	-71.658897
Chomedahue	Libertador General Bernardo O'Higgins	-34.659235	-71.350461
Rauco	Maule	-34.876104	-71.344644
Requinoa	Libertador General Bernardo O'Higgins	-34.331304	-70.793039
Santa Isabel	Región Metropolitana de Santiago	-33.660882	-70.542616
Lourdes	Maule	-35.444289	-71.805913
Mariposas	Maule	-35.535403	-71.452913
Quebrada de Agua	Maule	-35.512735	-71.459162
El Mariscal	Región Metropolitana de Santiago	-33.600979	-70.666869
El Triangulo	Región Metropolitana de Santiago	-33.371768	-71.302634
Yungay	Maule	-35.090554	-71.230752
Idahue	Libertador General Bernardo O'Higgins	-34.501245	-71.221709
Keule	Maule	-35.868566	-72.051819
La Protectora	Región Metropolitana de Santiago	-33.602894	-70.59467
Las Mercedes	Libertador General Bernardo O'Higgins	-34.793047	-71.691197
Las Pataguas	Libertador General Bernardo O'Higgins	-34.34308	-71.339631
Los Perales	Región Metropolitana de Santiago	-33.289834	-71.310799
Marchigue	Libertador General Bernardo O'Higgins	-34.411636	-71.610285
El Mirador	Maule	-35.19425	-71.19019
Palo Santo	Libertador General Bernardo O'Higgins	-34.420474	-71.59959
Pirque	Región Metropolitana de Santiago	-33.643245	-70.599737
Peumo	Libertador General Bernardo O'Higgins	-34.375542	-71.173559
La Puerta	Libertador General Bernardo O'Higgins	-34.610655	-71.404627
Quinta Maipo	Región Metropolitana de Santiago	-33.74886	-70.805433
El Recurso	Región Metropolitana de Santiago	-33.678778	-70.691111
Rucahue	Libertador General Bernardo O'Higgins	-34.409634	-71.066534
San Adolfo	Región Metropolitana de Santiago	-33.636718	-70.642031
San Ignacio	Maule	-35.072909	-71.260455
San Julian	Coquimbo	-30.667817	-71.350772
Tocornal	Región Metropolitana de Santiago	-33.604425	-70.597657

Table S2. Years tracked by the two datasets.

Chilean region	***Dataset 1 (Harvest Tracking)***	***Dataset 2 (Lab data for phenolics)***
Coquimbo	2018-21	2018-9
Libertador General Bernardo O'Higgins	2011,2015-21	2018-20
Maule	2011,2013-21	2018-20
Ñuble	-	2018-20
Región Metropolitana de Santiago	2011,2015-21	2018-20
Valparaíso	2011,2015-21	2018-20

Table S3. Baseline parameters used in each model.

Step in model	Parameters	# Possible links
1: Weekly cumulative soil moisture	Altitude, soil composition (clay, silt, cfvo, sand), weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light)	11
2: Sugar Concentration	Sugar last week, week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light)	10
3: Acidity (pH)	Acidity last week (pH), sugar concentration, week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light)	11
4: DO 520	pH, sugar concentration, clone, pruning style (driving system), week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light), quality of crop being produced, rootstock	15
5: DO 280	pH, sugar concentration, clone, pruning style (driving system), week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light), quality of crop being produced, rootstock	15
6: Anthocyanin concentration	DO520, DO280, pH, sugar concentration, clone, pruning style (driving system), week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light), quality of crop being produced, rootstock	17
7: Tannins concentration	DO520, DO280, pH, sugar concentration, clone, pruning style (driving system), week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light), quality of crop being produced, rootstock	17
8: Flavanols concentration	DO520, DO280, pH, sugar concentration, clone, pruning style (driving system), week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light), quality of crop being produced, rootstock	17
9. Phenols concentration	DO520, DO280, pH, sugar concentration, clone, pruning style (driving system), week number (log), weekly cumulative soil moisture, Altitude, weekly and monthly weather (mean temperature, cumulative precipitation, cumulative light), quality of crop being produced, rootstock	17

Formula S1.

```
FullGLM <- glm(
            formula = Output ~ Sugar +
            pH + WeeklyMeanTemp + MonthlyMeanTemp +
    WeeklyCumPrecip + MonthlyCumPrecip +
    WeeklyCumLight + MonthlyCumLight
            WeeklySoilMoisture + log(Week)+ Altitude + Clone + Quality +
    Rootstock+ DrivingSystem+ Age, family = gaussian(), data = data,
    na.action = "na.fail")
```

Formula S2.

```
dredge(FullParameterGLM,
subset = (LightRollSumWeekly|LightRollSumMonthly) &&
                (TempRollWeeklyMean|TempRollMonthlyMean) &&
(PrecipRollSumWeekly|PrecipRollSumMonthly))
```

Table S4. Models and their R^2 values.

Model	AIC-Selected model formula	R^2	Residual DF	Number of variables
1	SoilMoistureRollSumWeekly ~ cfvomean + claymean + Altitude + LightRollSumWeekly + PrecipRollSumMonthly + sandmean + siltmean + 1	0.86	33875	7
2	log(SugarConc) ~ Altitude + LastSugar + LightRollSumMonthly + log(Week) + 1 + PredictedSoilMoisture	0.90	26742	5
3	pH ~ LightRollSumMonthly + PrecipRollSumMonthly + 1 + Altitude + LastpH + log(Week) + PredictedSoilMoisture + SugarConc	0.81	26738	7
4	log(DO_520) ~ DrivingSystem + Altitude + LightRollSumWeekly + SelectionClonal_Massal + SoilMoistureRollSumWeekly + 1 + Age + pH + SugarConc	0.51	230	8
5	log(DO_280) ~ DrivingSystem + Altitude + log(Week) + pH + PrecipRollSumMonthly + Rootstock + 1 + SugarConc + TempRollMonthlyMean	0.46	237	8
6	`TotalAnthocyaninsByAdams_(mgL$^{-1}$)` ~ PrecipRollSumMonthly + 1 + QualityLevel + DO_280 + DO_520	0.77	247	4
7	`TotalTanninsByAdams(mgL$^{-1}$)` ~ DO_520 + Altitude + LightRollSumMonthly + PrecipRollSumMonthly + + Age + DO_280 + log(Week) + pH + SoilMoistureRollSumWeekly	0.79	247	9
8	`Flavonoles_totales_(mgL$^{-1}$)` ~ LightRollSumWeekly + pH + PrecipRollSumMonthly + 1 + Age + DO_280 + DO_520 + DrivingSystem + Altitude + SugarConc	0.72	242	9
9	`TotalPhenolsbyAdams(mgL$^{-1}$)` ~ QualityLevel + SoilMoistureRollSumWeekly + TempRollMonthlyMean + 1 + Age + DO_280 + DO_520 + pH	0.87	244	7

R^2 rounded to 2 decimal places.