Supplementary Table S1. Monthly climatic data in 2015, 2016 and 2017 vintages in 'Estación de Viticultura y Enología de Galicia' (EVEGA) grape vineyard germplasm bank.

Month	T Max (°C)			T Mn (°C)			T Min (°C)				Rainfall (mm)		
	2015	2016	2017	2015	2016	2017	2015	2016	2017		2015	2016	2017
Jan	13.0	14.1	12.6	5.5	8.9	4.5	0.8	4.9	0.0		94.6	297.4	73.4
Feb	13.8	14.5	16.8	6.6	8.4	9.4	1.3	3.9	4.2		50.8	204.4	213.1
Mar	20.5	17.9	19.6	10.5	9.4	11.3	2.6	3.1	5.3		5.6	130.4	79.7
Apr	23.8	19.6	27.1	14.1	11.6	14.3	6.4	5.3	4.1		74.6	155.0	15.4
May	26.8	23.4	27.2	16.9	15.3	17.9	8.1	8.7	10.3		56.6	134.6	140.0
Jun	32.6	29.1	30.1	21.0	19.5	21.0	11.3	11.2	13.3		9.8	31.8	22.2
Jul	33.5	35.0	32.6	22.9	22.8	22.0	13.8	12.6	13.0		1.4	4.0	6.4
Aug	31.1	35.5	33.9	21.2	22.2	21.7	12.8	11.7	12.2		10.2	4.4	41.2
Sep	28.1	30.5	28.0	17.4	18.9	17.3	9.2	10.3	9.2		78.6	52.6	3.4
Oct	22.3	24.5	28.6	14.3	14.7	15.1	8.7	8.4	6.4		136.6	52.8	22.4
Nov	18.3	15.7	17.5	11.3	8.8	7.5	6.7	4.3	1.6		45.8	100.2	78.8
Dec	16.1	14.0	12.7	9.4	6.5	6.2	4.8	2.5	2.1		94.6	44.2	173.0
Mean	**23.3**	**22.8**	**23.9**	**14.3**	**13.9**	**14.0**	**7.2**	**7.2**	**6.8**	**Total**	**659.2**	**1211.8**	**869.0**

Supplementary Table S2. Major volatile compounds in free and bound form.

Compound	Family	AG	AA	BA	BM	BL	DB	FP	GF	GO	IT
F	**Acids**		Hexanoic acid		3-hydroxy-dodecanoic acid	Hexanoic acid	Nonanoic acid		Hexanoic acid		Octanoic Acid
F	**Alcohols**					2-ethyl-1-hexanol,					
F	**C6**	2-Hexenal, (*E*)-	Hexanal	2-Hexenal, (*E*)-		1-Hexanol	Hexanal	1-Hexanol		2-Hexenal, (*E*)-	
F	**Aldehydes**	Epidolichodial	Benzaldehyde	Epidolichodial		3,4-dimethyl-3-cyclohexen-1-carboxaldehyde	2,5-dimethyl-benzaldehyde,	Benzaldehyde	2,2-dimethyl-hexanal	2,5-dimethyl-benzaldehyde	Epidolichodial
F	**Esters**	Butanoic acid, 2-ethylhexyl ester	Pentanoic acid, pentyl ester	12,15-Octadecadiynoic acid, methyl ester	Methyl formate	Pentanoic acid, 2,2,4-trimethyl-3-carboxyisopropyl, isobutyl ester	2-Hydroxyhexadecyl butanoate		Methyl formate		9-Tetradecen-1-ol, acetate, (*E*)-
F	**Phenols**	Phenol, 2,4-bis(1,1-dimethylethyl)-		4,6-di-tert-Butyl-m-cresol	Phenol, 2,4-bis(1,1-dimethylethyl)-	Estragole	4,6-di-tert-Butyl-m-cresol			Phenol, 4,4'-butylidenebis[2-(1,1-dimethylethyl)-5-methyl-	4,6-di-tert-Butyl-m-cresol
F	**Ketones**					Methyl Isobutyl Ketone					
F	**PAHs**	Hemimellitene		Mesitylene	Hemimellitene	Mesitylene			Hemimellitene		
F	**Lactones**	dihydro-4,4,5,5-tetramethyl-	Furaneol	dihydro-4,4,5,5-tetramethyl-2(3H)-furanone,		Furaneol		hexahydro-3-methylene-2(3H)-	dihydro-4,4,5,5-tetramethyl-2(3H)-furanone,		hexahydro-3-methylene-2(3H)-

		2(3H)-furanone						benzofuranone			benzofuranone
F	**Norisoprenoids**	β damascenone		δ-Damascone				β damascenone			
F	**Sesquiterpenes**	trans-Z-β-Bisabolene epoxide		γ-Elemene	trans-Z-β-Bisabolene epoxide		Juniperol	trans-Z-β-Bisabolene epoxide	Cedrene	4αH-Eudesmane	1.(Z)-α-Farnesene
F	**Terpenes**	cis-Geraniol	Linalyl anthranilate	*o*-Cymene	trans-Geranylacetone	Linalol	α-Terpineol	Linalyl anthranilate	Eucalyptol	cis-Geraniol	Linalol
F	**Thiols**				2-methyl-2-undecanethiol,		3-(methylthio)-nonanal,	2-methyl-2-undecanethiol,	3-(methylthio)-nonanal,		
Compound	**Family**	**AG**	**AA**	**BA**	**BM**	**BL**	**DB**	**FP**	**GF**	**GO**	**IT**
A.P.	**Acids**				Nonanoic acid				Octanoic Acid	Nonanoic acid	
A.P.	**Alcohols**	Benzyl Alcohol	1-Octanol		Benzyl Alcohol		Phenylethyl Alcohol		Benzyl Alcohol		
A.P.	**C6**					1-Hexanol					
A.P.	**Aldehydes**	2-Octenal, (*E*)-	Octanal	Benzaldehyde		3,7-dimethyl-6-Nonenal	Octanal	Decanal	Benzaldehyde		Decanal
A.P.	**Esters**	Nonanoic acid, methyl ester		Salicylic acid, methyl ester	Nonanoic acid, methyl ester		Benzoic acid, 2-hydroxy-, methyl ester		Nonanoic acid, methyl ester	Nonanoic acid, ethyl ester	Salicylic acid, methyl ester
A.P.	**Phenols**	Phenol, 2,4-bis (1,1-dimethylethyl)-	Phenol, 2-methoxy-4-propyl-	Phenol, 2,4-bis (1,1-dimethylethyl)-	Phenol, 2-methoxy-4-propyl-	Phenol, 2,4-bis(1,1-dimethylethyl)-			Phenol, 2-methoxy-4-propyl-	Phenol, 2,4-bis (1,1-dimethylethyl)-	Phenol, 2-methoxy-4-propyl-
A.P.	**Ketones**	Benzophenone	Methyl Isobutyl	Benzophenone	Methyl Isobutyl	Benzophenone	Methyl Isobutyl Ketone				Benzophenone

				Ketone			Ketone				
A.P.	**PAHs**	psi. -Cumene	Hemimellitene	Mesitylene		Hemimellitene		psi. -Cumene		Hemimellitene	
A.P.	**Lactones**	tetrahydro-6-nonyl-2H-pyran-2-one,									
A.P.	**Norisoprenoids**	Dihydro-*β*-ionol						Megastigma-3,7(E),9-triene		Ionone	Dihydro-*β*-ionol
A.P.	**Sesquiterpenes**	Patchoulane		Caryophyllene oxide	Patchoulane	trans-Z-*β*-Bisabolene epoxide	Longipinene epoxide	trans-Z-*β*-Bisabolene epoxide		Patchoulane	
A.P.	**Terpenes**	Dihydrocitronellol	Tetrahydrolinalool	Dihydrocitronellol	cis-Geraniol		Linalol			Carvacrol	Linalol
A.P.	**Thiols**	2-methyl-2-undecanethiol		2-methyl-2-undecanethiol		2-ethyl 1-hexanethiol		2-methyl-2-undecanethiol,			
Compound	**Family**	**JA**	**LA**	**MBM**	**PA**	**PI**	**PF**	**RA**	**SI**	**TO**	**TR**
F	**Acids**	3-hydroxy-dodecanoic acid	Hexanoic acid	Acetic acid	Nonanoic acid		Hexanoic acid		Nonanoic acid		3-hydroxy-dodecanoic acid
F	**Alcohols**	1-Hexanol, 2-ethyl-									
F	**C6**	2-Hexenal, (*E*)-		1-Hexanol	2-Hexenal, (*E*)-	1-Hexanol		2-Hexenal, (*E*)-		1-Hexanol	2-Hexenal, (*E*)-
F	**Aldehydes**	Epidolichodial	2,5-dimethyl-benzaldehyde,		Benzaldehyde		2,5-dimethyl-benzaldehyde,		Benzaldehyde		
F	**Esters**	9-Octadecenoic acid (*Z*)-, phenylmethyl ester	9-Tetradecen-1-ol, acetate, (*E*)-	Methyl formate	Tetradecanoic acid, ethyl ester	6,9,12-Octadecatrienoic acid, phenylmethyl ester, (*Z*,*Z*,*Z*)-		Methyl formate	Pentanoic acid, 2,2,4-trimethyl-3-carboxyisopropyl, isobutyl ester	Hexanoic acid, ethyl ester	13,16-Octadecadiynoic acid, methyl ester

F	**Phenols**	4,6-di-tert-Butyl-m-cresol	Estragole	4,6-di-tert-Butyl-m-cresol	Estragole	4,6-di-tert-Butyl-m-cresol	Phenol, 3,5-bis (1,1-dimethylethyl)-	Estragole	Phenol, 4,4'-butylidenebis [2-(1,1-dimethylethyl)-5-methyl-		Estragole
F	**Ketones**	Methyl Isobutyl Ketone									
F	**PAHs**	Hemimellitene					Mesitylene	Hemimellitene	psi. -Cumene	Hemimellitene	
F	**Lactones**	dihydro-4,4,5,5-tetramethyl-2(3H)-furanone	2-(1-hydroxy-1-methyl-2-oxopropyl)-2,5-dimethyl-3(2H)-furanon	Furaneol		dihydro-4,4,5,5-tetramethyl-2(3H)-furanone			Furaneol	dihydro-4,4,5,5-tetramethyl-2(3H)-furanone	Furaneol
F	**Norisoprenoids**		β damascenone			β damascenone					
F	**Sesquiterpenes**					Farnesan			α-Bisabolol	4αH-Eudesmane	Caryophyllene oxide
F	**Terpenes**	Borneol	cis-Geraniol	Linalol	Linalol	*m*-Cymene	β-Cyclocitral	β-Cyclocitral	cis-Geraniol	β-Terpinyl acetate	Cis-2,6-Dimethyl-2,6-octadiene
F	**Thiols**	2-methyl-2-undecanethiol				2-methyl-2-undecanethiol	3-(methylthio)-nonanal,	2-methyl-2-undecanethiol	2-ethyl-1-hexanethiol	2-methyl-2-undecanethiol	
Compound	**Family**	**JA**	**LA**	**MBM**	**PA**	**PI**	**PF**	**RA**	**SI**	**TO**	**TR**
A.P.	**Acids**	Nonanoic acid		3-methyl-decanoic acid			Nonanoic acid			3-methyl-decanoic acid	Nonanoic acid
A.P.	**Alcohols**	Phenylethyl Alcohol	Benzyl Alcohol	Phenylethyl Alcohol		Benzyl Alcohol		Phenylethyl Alcohol	Benzyl Alcohol		
A.P.	**C6**	1-Hexanol									
A.P.	**Aldehydes**	Benzaldehyde	Decanal			Benzaldehyde		Octanal	Benzaldehyde		Decanal

A.P.	**Esters**	Nonanoic acid, methyl ester	Salicylic acid, methyl ester	Nonanoic acid, methyl ester		Salicylic acid, methyl ester						Octanoic acid, methyl ester	Salicylic acid, methyl ester
A.P.	**Phenols**	Phenol, 2,4-bis(1,1-dimethylethyl)-			Phenol, 2-methoxy-4-propyl-	Phenol, 2,4-bis(1,1-dimethylethyl)-							
A.P.	**Ketones**	Methyl Isobutyl Ketone			Benzophenone				Methyl Isobutyl Ketone	Benzophenone		Acetophenone	Benzophenone
A.P.	**PAHs**	Hemimellitene	Mesitylene		Hemimellitene		psi-Cumene	Hemimellitene	psi-Cumene		Hemimellitene		
A.P.	**Lactones**	*δ* Dodecalactone											
A.P.	**Norisoprenoids**				*β*-Damascenone		Dihydro-*β*-ionol	*β*-Damascenone	Dihydro-*β*-ionol				
A.P.	**Sesquiterpenes**	Patchoulane		trans-*Z*-*β*-Bisabolene epoxide		Longipinene epoxide	(*E*,*E*)-Farnesol	Caryophyllene oxide				Longiborneol	trans-*Z*-*β*-Bisabolene epoxide
A.P.	**Terpenes**	Thymol	Dihydrocitronellol	cis-Geraniol	Linalol	Dihydrocitronellol		Thymol	Dihydrocitronellol		AR 1		Dihydrocitronellol
A.P.	**Thiols**	2-methyl-2-undecanethiol	4-(phenylthio)-3,7-dimethylocta-2,6-dien-1-ol	2-methyl-2-undecanethiol									

F: free volatile; A.P.: aromatic precursors; PAH's: polycyclic aromatic hydrocarbons. See Table 1 for varieties abbreviations.