Table S1. Coefficients of determination (R^2) and their significance (p-value) found between simplified canopy water stress index (siCWSI) from different canopy zones and grapevine physiology observed on 15 September 2017. G_s: stomatal conductance (mmol H_2O m^{-2} s^{-1}); F_s: steady-state fluorescence; CWZ: canopy zone-weighting method. Linear models were used in general, otherwise specified with acronyms: Exponential (Ep), Logarithm (Lg), Power (Pr) and second-degree Polynomial (Pl). Significance levels were represented as * for p-value < 0.05, ** for p-value < 0.01, *** for p-value < 0.001; ns. is for not significant. The bold fonts for the strongest relationship give the flight time and all flights combined.

Image retrieval	Flight Time	Physiological parameters	Sunlit	Nadir	Shaded	Sunlit+nadir	Sunlit+ shaded	Nadir+ shaded	Average canopy	CWZ
siCWSI	Midmorning	G_s	0.05	0.14(Pl)*	0.10 (Pl)*	0.13(Pl)*	0.10*	0.15 *	**0.30 (Pl)***	0.13***
		F_s	0.65(Ep)**	0.43(Ep)**	0.81(Pl)***	0.74(Ep)**	0.81(Pr)***	0.60(Ep)	0.73(Ep)**	**0.82 (Pr)*****
	Midday	G_s	0.42**	0.14(Pl)*	0.34(Pl)**	0.45(Pl)*	0.32(Pr)*	0.32(Pr)*	0.50**	**0.61(Ep)****
		F_s	0.67(Pl)**	0.78(Pl)**	0.58(Pl)**	0.80(Pl)**	0.76(Pl)**	0.62(Pl)**	0.64(Pl)**	**0.83 (Pl)*****
	Afternoon	G_s	0.01(Pr)*	0.43(Ep)**	0.47(Pl)**	0.20(Pl)*	0.24*	0.58(Ep)**	0.36*	**0.60 (Ep)****
		F_s	0.15(Pl)*	**0.52(Pl)****	0.35(Pl)**	0.38**	0.03	0.10 (Pl)	0.10*	0.30(Pl)*
	All	G_s	0.42(PI)**	0.46(Ep)**	0.47(Ep)**	0.58**	0.52**	0.61(Ep)**	0.63(PI)**	**0.71****
		F_s	0.55(PI)**	0.56(PI)**	0.55(PI)**	0.66(PI)**	0.65(PI)**	0.50(PI)**	0.58(PI)**	**0.73(Pl)****

Table S2. Coefficients of determination (R^2) and their significance (p-value) found hyperspectral image retrievals from different canopy zones and grapevine physiology observed on 01 August 2018. G_s: stomatal conductance (mmol H_2O m^{-2} s^{-1}); F_s: steady-state fluorescence; CWZ: canopy zone-weighting method. Linear models were used in general, otherwise specified with acronyms: Exponential (Ep), Logarithm (Lg), Power (Pr) and second-degree Polynomial (Pl). Significance levels were represented as * for p-value < 0.05, ** for p-value < 0.01, *** for p-value < 0.001; not significant if not specified. The bold fonts for the strongest relationship give the flight time and all flights combined.

Image retrieval	Flight Time	Physiological parameters	Sunlit	Nadir	Shaded	Sunlit+ nadir	Sunlit+ shaded	Nadir+ shaded	Average canopy	CWZ
PRI	Midmorning	G_s	0.30*	0.30(Pl)*	0.1*	0.3*	0.1*	0.20*	0.17 (Pl)*	**0.35****
		F_s	**0.88(Pl)*****	0.26*	0.10(Pl)*	0.58(Pl)**	0.32*	0.11*	0.27(Pl)*	0.60(Pl)**
	Midday	G_s	**0.48****	0.36**	0.22*	0.44**	0.33(Pl)**	0.28(Pl)*	0.35*	0.4*
		F_s	**0.78*****	0.48**	0.21(Pr)*	0.73(Pl)**	0.43(Pr)*	0.36(Pl	0.52(Pl)**	0.68(Pl)**
	Midafternoon	G_s	0.54(Pl)**	**0.75****	0.46(Pl)*	0.67(Pl)**	0.55**	0.68(Pl)**	0.65**	0.65**
		F_s	0.52**	0.58**	0.35*	**0.59(Pl)****	0.43(Pl)***	0.44(Pl)**	0.50(Pl)**	0.55(Pl)**
	Afternoon	G_s	0.92(Pl)***	0.93(Pl)***	0.85(Pl)**	0.94(Pl)***	0.94(Pl)***	0.94(Pl)***	0.96(Pl)***	**0.98(Pl)*****
		F_s	0.71**	0.72(Pl)**	0.60**	**0.75(Pl)****	0.66(Pl)**	0.63*	0.66**	0.71**
	All	G_s	0.58**	0.40(Lg)*	0.23*	0.53**	0.47**	0.33(Lg)*	0.64**	**0.70***
		F_s	0.68(Pl)**	0.48(Ep)*	0.27(Ep)*	0.62(Ep)**	0.55(Ep)**	0.40(Ep)*	0.54(Ep)**	**0.76(Pl)*****
RE	Midmorning	G_s	**0.29***	0.21*	0.10*	0.25(Pl)*	0.10(Pl)*	0.10(Pl)	0.15*	0.20(Pl)*
		F_s	0.29*	**0.32**	0.10*	0.31*	0.12*	0.17*	0.20(Pl)*	0.22*
	Midday	G_s	**0.28(Pl)***	0.13*	0.18*	0.23*	0.23(Pl)*	0.20(Pl)*	0.24*	0.25*
		F_s	**0.28***	0.15(Pl)*	0.16*	0.28*	0.23*	0.19*	0.25*	0.27(Pl)*
	Midafternoon	G_s	0.26(Pl)*	0.27(Pl)*	0.28*	**0.31***	0.29*	0.27*	0.22*	0.29*
		F_s	0.1*	**0.12***	0.10(Pl)*	0.11*	0.1*	0.1*	0.1*	0.1*
	Afternoon	G_s	**0.15***	0.1*	0.10(Pl)*	0.10*	0.10*	0.10*	0.10	0.10*
		F_s	0.13(Pl)*	0.18(Ep)*	0.11	0.14*	0.11	0.14(Pl)*	0.13(Pl)*	0.13(Pl)*
	All	G_s	**0.35(Lg)****	0.30(Lg)*	0.12*	0.34(Lg)**	0.24*	0.19*	0.27*	0.31*
		F_s	0.23*	0.13*	0.10	0.20*	0.10	0.1	0.11*	**0.3****
SR	Midmorning	G_s	0.20*	0.32(Pl)*	0.28*	0.30*	0.28(Pl)*	0.22*	0.25**	**0.31(Pl)****
		F_s	0.28*	**0.34(Pl)****	0.2*	0.33(Pl)*	0.16*	0.14*	0.12(Ep)*	0.20*

	Midday	G_s	0.29(Pl)**	0.30*	0.29(Pl)**	0.22*	0.24(Pl)*	**0.33**	0.21(Pl)*	0.32*
		F_s	0.26(Pl)**	0.27(Ep)*	0.31(Pl)*	0.26*	0.26(Pl)*	0.28(Ep)*	0.31(Pl)*	**0.34 (Pl)**
	Midafternoon	G_s	**0.19***	0.10	0.10	0.14*	0.15(Pl)*	0.12*	0.15*	0.15*
		F_s	**0.15(Pl)***	0.11*	0.01(Pl)	0.10(Pl)*	0.03(Pl)	0.10	0.10	0.10
	Afternoon	G_s	0.15*	0.27**	0.23(Pl)*	0.28 (Pl) *	0.21(Pl)*	0.28(Pl)*	0.27(Pl)*	**0.30(Pl)***
		F_s	0.22*	0.24*	0.25*	0.23*	0.24*	0.26*	0.25*	**0.27 (Pl)**
	All	G_s	0.30(Lg)**	0.23*	0.29*	**0.31(Pl)****	0.2*	0.15*	0.2*	0.23*
		F_s	0.24*	0.15*	0.04(Ep)	0.24	0.13(Pl)*	0.08	0.16*	**0.30***
	Midmorning	G_s	0.1	0.1	0.1	0.10(Pl)	0.1	0.13*	0.13*	**0.15(Pl)***
		F_s	0.28(Ep)*	**0.37(Pr)****	0.35(Ep)*	0.35*	0.35(Pr)*	0.29(Pr)*	0.36(Pr)*	0.30(Pr)*
	Midday	G_s	0.04	0.18*	0.29(Ep)*	0.22(Pr)*	0.33(Pr)*	0.32*	**0.34(Pr)****	0.33(Pr)
		F_s	0.01	0.26(Ep)*	0.25(Pl)*	0.22(Pr)*	0.31(Pr)**	0.31(Pl)*	0.32(Ep)**	0.40(Ep)**
NDVI	Midafternoon	G_s	0.01	0.21*	0.25 (Pl)	0.29	**0.34 (Pr)**	0.24(Pl)*	0.24*	0.25(Lg)*
		F_s	0.01	0.04	**0.12***	0.03	0.06	0.1	0.1	0.04
	Afternoon	G_s	0.1	0.22(Pl)*	0.25*	0.28**	0.29**	0.23(Pl)*	0.26(Pl)**	**0.30(Pl)****
		F_s	0.01	0.04	0.12*	0.03	0.10(Pl)	0.10(Pl)	**0.12***	0..04
	All	G_s	0.23*	0.3**	0.10*	**0.32****	0.2*	0.2*	0.21*	0.24*
		F_s	0.20(Pl)*	0.22(Pl)*	0.01	0.23*	0.1	0.1	0.13(Pl)*	**0.24****
	Midmorning	G_s	0.20(Ep)*	0.04	0.26*	0.02(Ep)	0.14*	0.27*	0.1	**0.28****
		F_s	0.01	0.1	0.25(Pl)*	0.01	**0.27 (Ep)**	0.25*	0.26*	0.13*
	Midday	G_s	0.16*	0.02	0.11(Pl)*	0.04	**0.15 (Pr)**	0.04(Ep)	0.01(Pr)	0.08(Pr)
		F_s	0.17	0.10(Pl)	0.26(Pl)*	0.01	**0.31***	0.1*	0.13*	0.2*
	Midafternoon	G_s	0.03	0.1	0.16(Pl)*	0.1	0.08 (Ep)	0.04	0.03 (Pr)	**0.28**
WI		F_s	0.10(Pr)*	0.03	0.35**	0.01	**0.34(Pl)**	0.22*	0.21*	0.28*
	Afternoon	G_s	0.10(Pr)*	**0.25(Pl)**	0.23(Pl)*	0.01(Ep)	0.21(Pl)	0.19(Pl)	0.17(Pl)	0.10(Pr)
		F_s	0.1	0.12(Pl)*	0.10	0.10	0.10	0.10	0.10	0.10
	All	G_s	0.1	0.03	0.1	0.04	0.10	0.1	0.1	**0.12**
		F_s	0.03	0.02	0.20(Ep)*	0.01	**0.22(Pr)***	0.20(Pr)*	0.20(Ep)*	0.1
	Midmorning	G_s	0.38**	0.36(Pl)*	0.40(Pl)*	0.41(Pl)**	0.43(Ep)**	0.40(Pl)*	0.41(Pl)**	**0.45(Pl)****
		F_s	**0.95(Pl)*****	0.53**	0.82(Pl)***	0.85(Pl)***	0.88(Pl)***	0.74**	0.84(Pl)***	0.91(Pl)***
	Midday	G_s	0.38**	0.32*	0.50**	0.40**	**0.58(Pl)****	0.46(Pl)**	0.48**	0.48**
		F_s	0.52(Pl)**	0.39(Pl)*	0.34**	0.44**	0.44**	0.37(Pl)**	0.41**	**0.57****
SIF	Midafternoon	G_s	0.22*	0.39**	0.34*	0.11(Pl)*	0.22(Pl)*	**0.40(Pl)****	0.27(Pl)**	0.22
		F_s	0.54*	0.52*	0.52*	0.55(Pl)*	0.53(Pl)*	0.52(Pl)*	0.54*	**0.68(Pl)***
	Afternoon	G_s	0.59**	0.51*	0.56(Pl)**	0.58(Pl)**	**0.60(Pl)****	0.53**	0.58(Pl)***	0.59**
		F_s	0.54(Pl)**	0.52(Pl)**	0.52**	0.56(Pl)**	0.54(Pl)**	0.52**	0.54(Pl)**	**0.71(Pl)****
	All	G_s	0.54**	0.40*	0.41*	0.53**	0.56**	0.42(Pl)*	0.52(Pl)**	**0.69(Pl)****
		F_s	0.86***	0.58**	0.54(Ep)**	0.78(Pl)**	0.77**	0.57(Ep)**	0.71(Pl)**	**0.89(Pl)*****

siCWSI	Midmorning	G_s	0.88***	0.60(Ep)**	0.82(Pl)***	0.90***	0.95***	0.90(Pl)***	0.96***	**0.98(Pl)*** **
		F_s	0.71(Pl)**	0.24*	0.60*	0.56(Pl)**	**0.80(Pl)** **	0.56*	0.71**	0.73
	Midday	G_s	0.51(Pr)**	0.70**	0.74**	0.74**	**0.89(Pl)*** **	0.75**	0.81(Pl)**	0.87(Pl)***
		F_s	0.34(Ep)*	0.63**	0.63**	0.67(Pl)**	0.69(Pl)**	0.67**	0.63**	**0.72(Pl)** **
	Midafternoon	G_s	0.81**	**0.96(Pl)*** **	0.75**	0.87(Pl)**	0.85**	0.87(Pl)***	0.91(Pl)***	0.91(Pl)***
		F_s	0.88***	**0.96(Pl)*** **	0.72(Pl)**	0.87***	0.92***	0.87***	0.94***	0.95(Pl)***
	Afternoon	G_s	0.25*	0.26*	0.23*	0.41(Pl)**	0.40(Pl)**	0.41(Pl)**	0.3*	**0.47(Pl)** **
		F_s	0.53(Ep)**	0.48(Pr)*	0.39(Pl)*	0.66**	**0.88(Pl)***	0.56(Pl)**	0.72(Pl)**	0.82***
	All	G_s	0.49(Ep)**	0.51(Pl)**	0.54(Pl)*	0.61(Pl)**	0.69**	0.66(Pl)**	0.73**	**0.75** **
		F_s	0.44(Pr)**	0.48**	0.72(Pl)**	0.58(Pl)**	0.62**	0.57*	0.66**	**0.74(Pr)** **

Table S3. Coefficients of determination (R^2) and their significance (p-value) found simplified canopy water stress index (siCWSI) from different canopy zones and grapevine physiology observed on 19 September 2018. G_s: stomatal conductance (mmol H_2O m^{-2} s^{-1}); F_s: steady-state fluorescence; CWZ: canopy zone-weighting method. Linear models were used in general, otherwise specified with acronyms: Exponential (Ep), Logarithm (Lg), Power (Pr) and second-degree Polynomial (Pl). Significance levels were represented as * for p-value < 0.05, ** for p-value < 0.01, *** for p-value < 0.001; ns. is for not significant. The bold fonts for the strongest relationship give the flight time and all flights combined.

Image retrieval	Flight Time	Physiological parameters	Sunlit	Nadir	Shaded	Sunlit+ nadir	Sunlit+ shaded	Nadir+ Shaded	Average canopy	CWZ
siCWSI	Morning	G_s	0.60***	0.48(Pl)**	0.60(Pl)**	0.60**	0.60(Pl)**	0.59(Pl)**	0.68**	**0.70(Pl)****
		F_s	0.39*	0.43**	0.49(Ep)**	0.49(Pl)**	0.49(Ep)**	**0.59(Pl)****	0.55**	0.56(Ep)**
	Midday	G_s	0.51(Ep)**	0.37(Pl)*	0.25*	0.58(Ep)	0.48(Pl)**	**0.59(Ep)****	0.50(Pl)**	0.50(Pl)**
		F_s	0.69(Pl)**	0.46(Pr)**	0.40(Ep)**	**0.73*****	0.67(Pl)**	0.50(Pl)**	0.69(Pl)	0.70**
	All	G_s	0.46**	0.46**	0.43(Pl)**	0.52**	0.53(Pl)**	0.51**	0.57(Pl)**	**0.60****
		F_s	0.50**	0.40**	0.53**	0.60**	0.64(Pl)**	0.59**	0.68(Pl)**	**0.71(Pl)****