SUPPLEMENTARY DATA

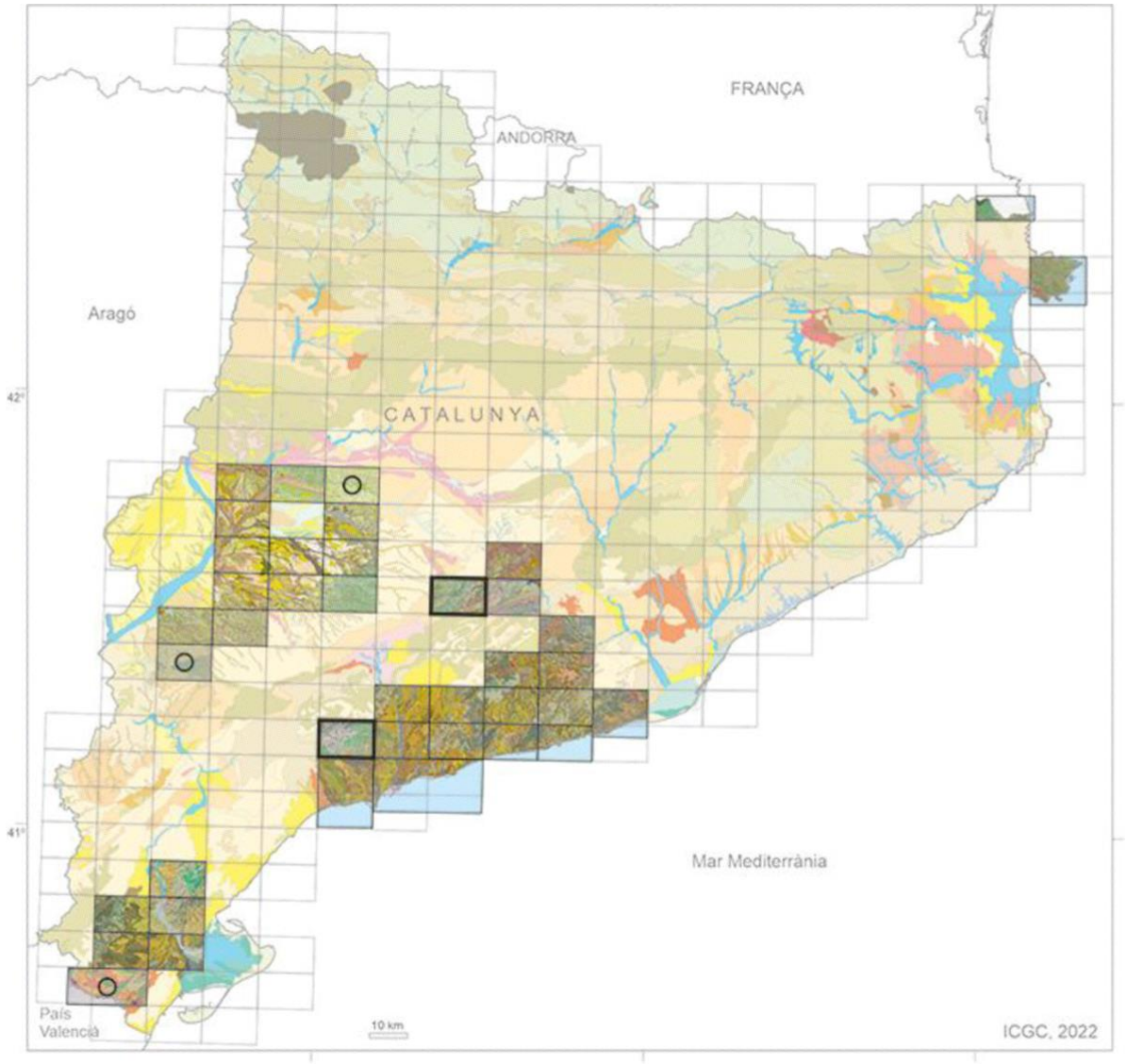


Figure S1. Deployment of the Soil Map of Catalonia (MSC25). The soil map is a pedological content that spans the entire area of Catalonia, divided into 304 sheets defined as the formal basis 1:25,000. Published sheets are represented in deep colours. Source: ICGC (Institut Cartogràfic i Geològic de Catalunya).

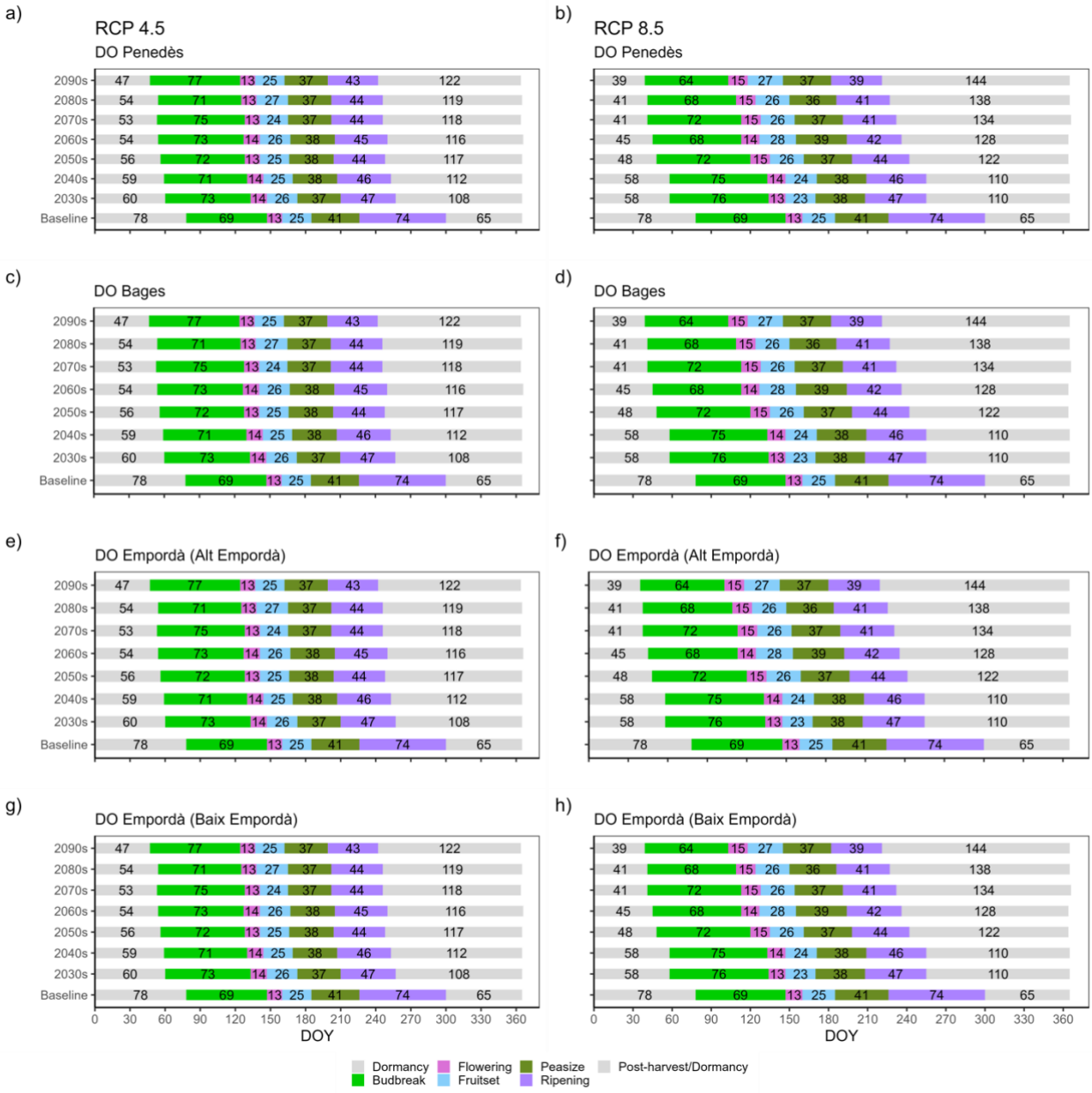


Figure S2. Time-sequence representation of grapevine phenological phases from the day of the year (DOY) 1 (January 1st) to 365 (December 31st) under RCP 4.5 (plots to the right) and RCP 8.5 (plots to the left) climate change scenarios in DO Penedès: (a) and (b), Bages: (c) and (d) and Alt Empordà: (e), (f), (g) and (h). Numbers represent the duration in days of each phase. All data are averaged through the corresponding term: Baseline Period (1972–2005), 2030s (2030–2039), 2040s (2040–2049), 2050s (2050–2059), 2060s (2060–2069), 2070s (2070–2079), 2080s (2080–2089), 2090s (2090–2099).

Funes Mesa, I., Sánchez-Costa, E., Aranda, X., Altava-Ortiz, V., Barrera-Escoda, A., Prohom, M. ., … de Herralde, F. . (2024). Modelling future climate change impacts on grapevine water requirements and growing cycle in three wine PDOs of NE Spain. *OENO One*, *58*(4).
https://doi.org/10.20870/oeno-one.2024.58.4.7789

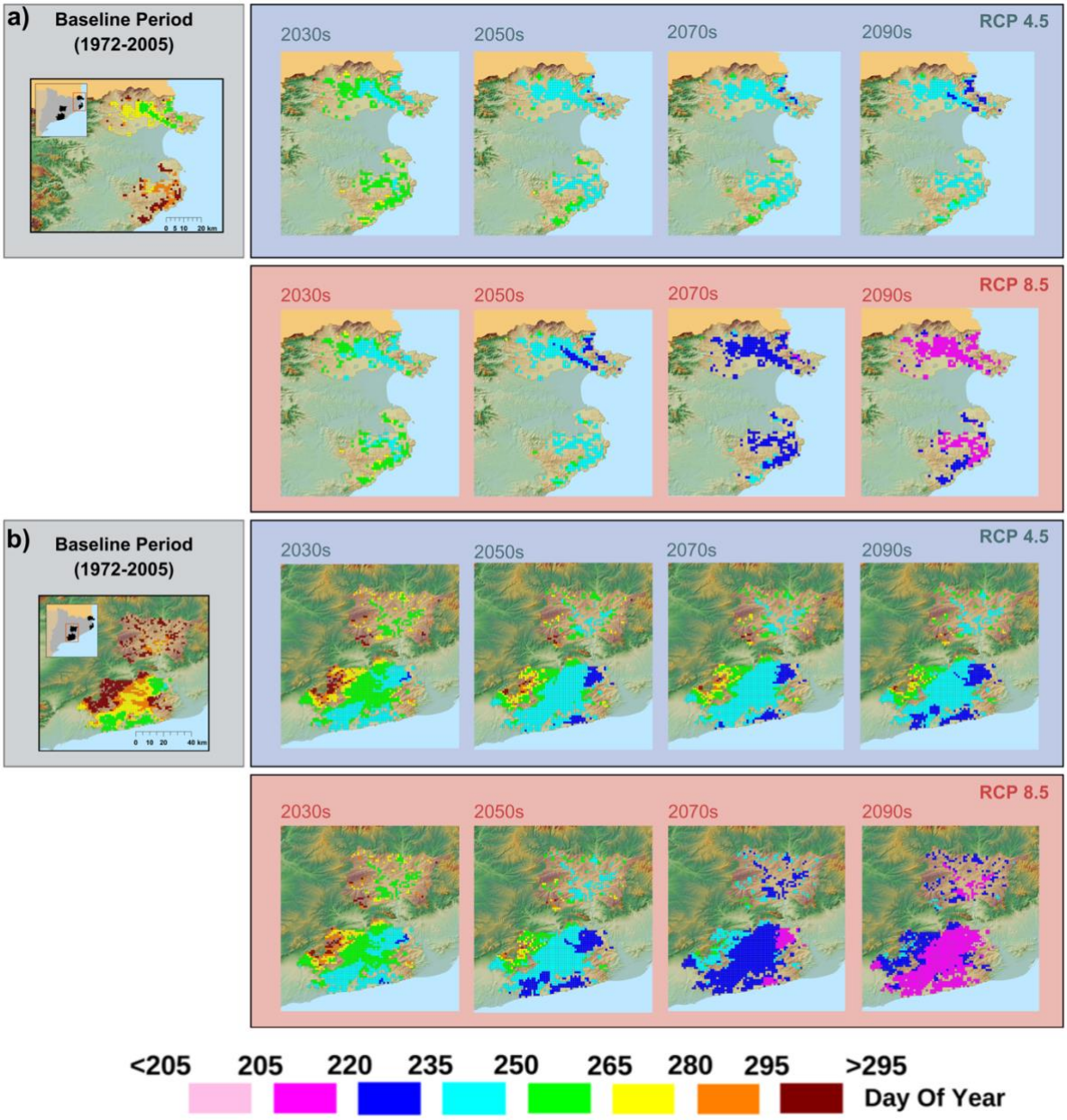


Figure S3. Timeline of mean grapevine harvest date (Day Of Year, DOY) for the Baseline period (1971–2005) and projected over four future decades along the 21st century under two climate change scenarios (RCP 4.5 and RCP 8.5) for the vineyard area of: a) PDO Empordà and b) PDO Pla de Bages and PDO Penedès, at 1 km resolution.

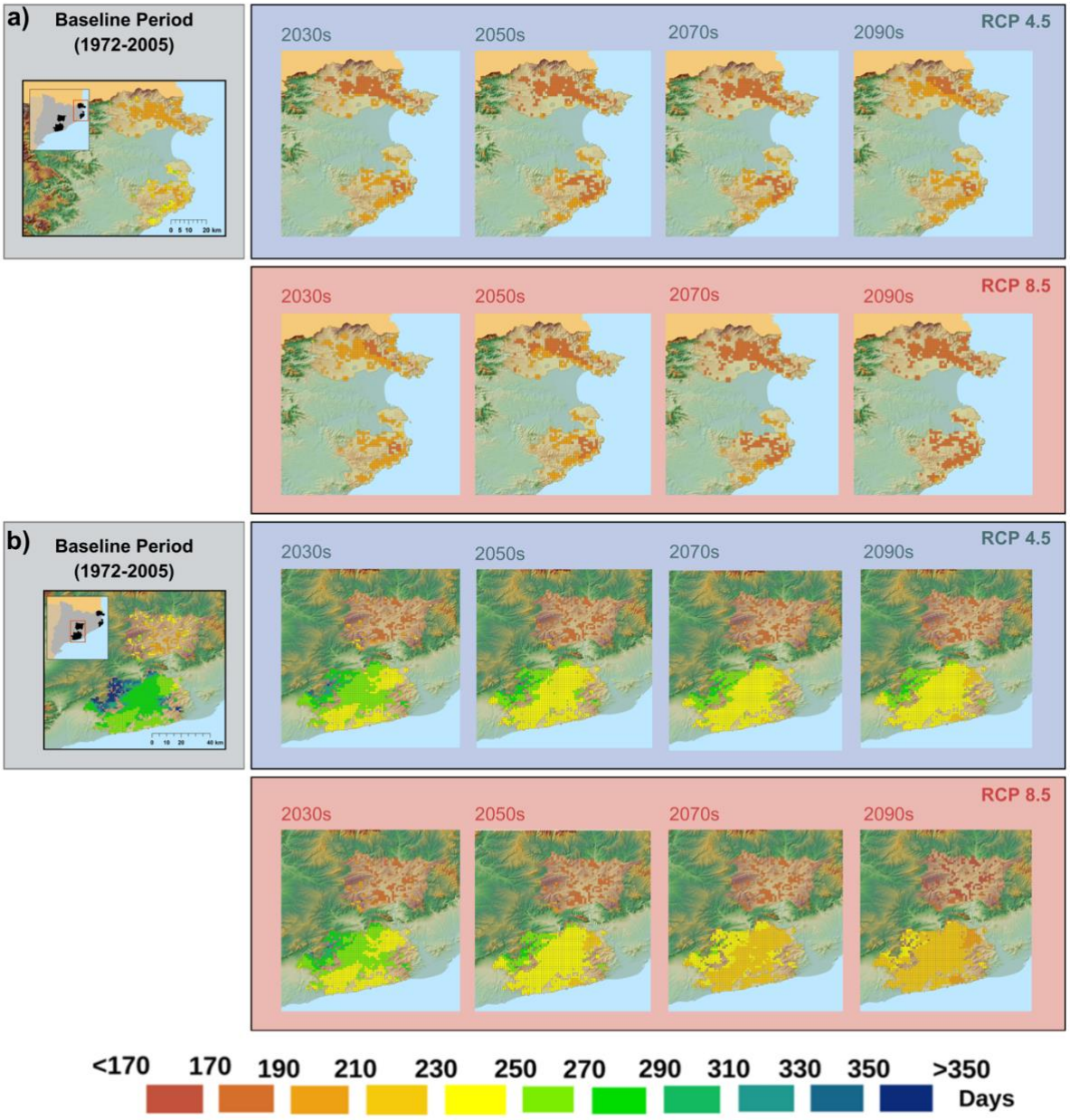


Figure S4. Timeline of mean grapevine length of 'Budburst to Harvest' period (days) for the Baseline period (1971–2005) and projected over four future decades along the 21st century under two climate change scenarios (RCP 4.5 and RCP 8.5) for the vineyard area of: a) PDO Empordà and b) PDO Pla de Bages and PDO Penedès, at 1 km resolution.

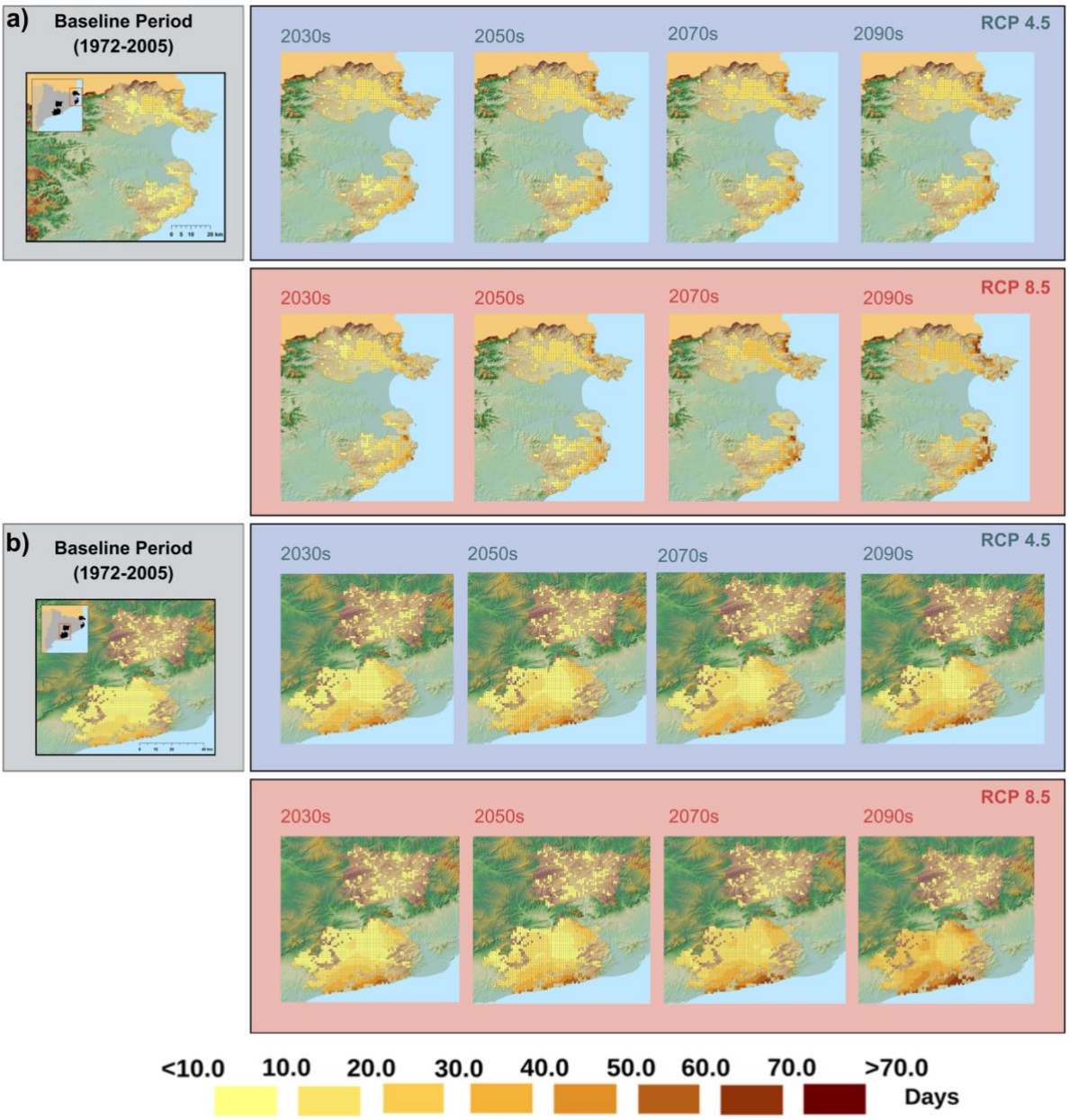


Figure S5. Timeline of mean number of tropical nights during grapevine ripening (days) for the Baseline period (1971–2005) and projected over four future decades along the 21st century under two climate change scenarios (RCP 4.5 and RCP 8.5) for the vineyard area of: a) PDO Empordà and b) PDO Pla de Bages and PDO Penedès, at 1 km resolution.

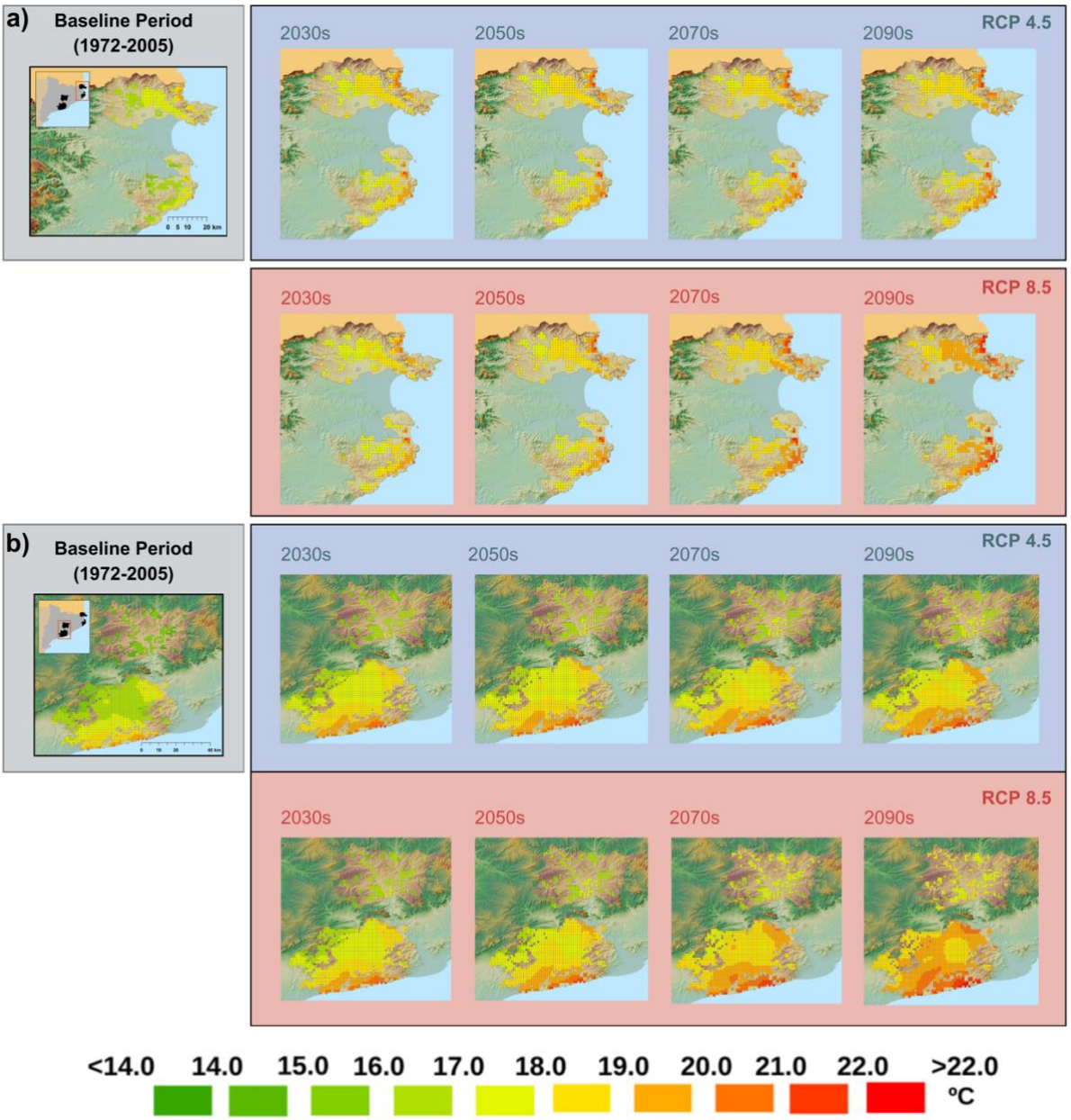


Figure S6. Timeline of mean daily minimum temperature during ripening (ºC) for the Baseline period (1971–2005) and projected over four future decades along the 21st century under two climate change scenarios (RCP 4.5 and RCP 8.5) for the vineyard area of: a) PDO Empordà and b) PDO Pla de Bages and PDO Penedès, at 1 km resolution.

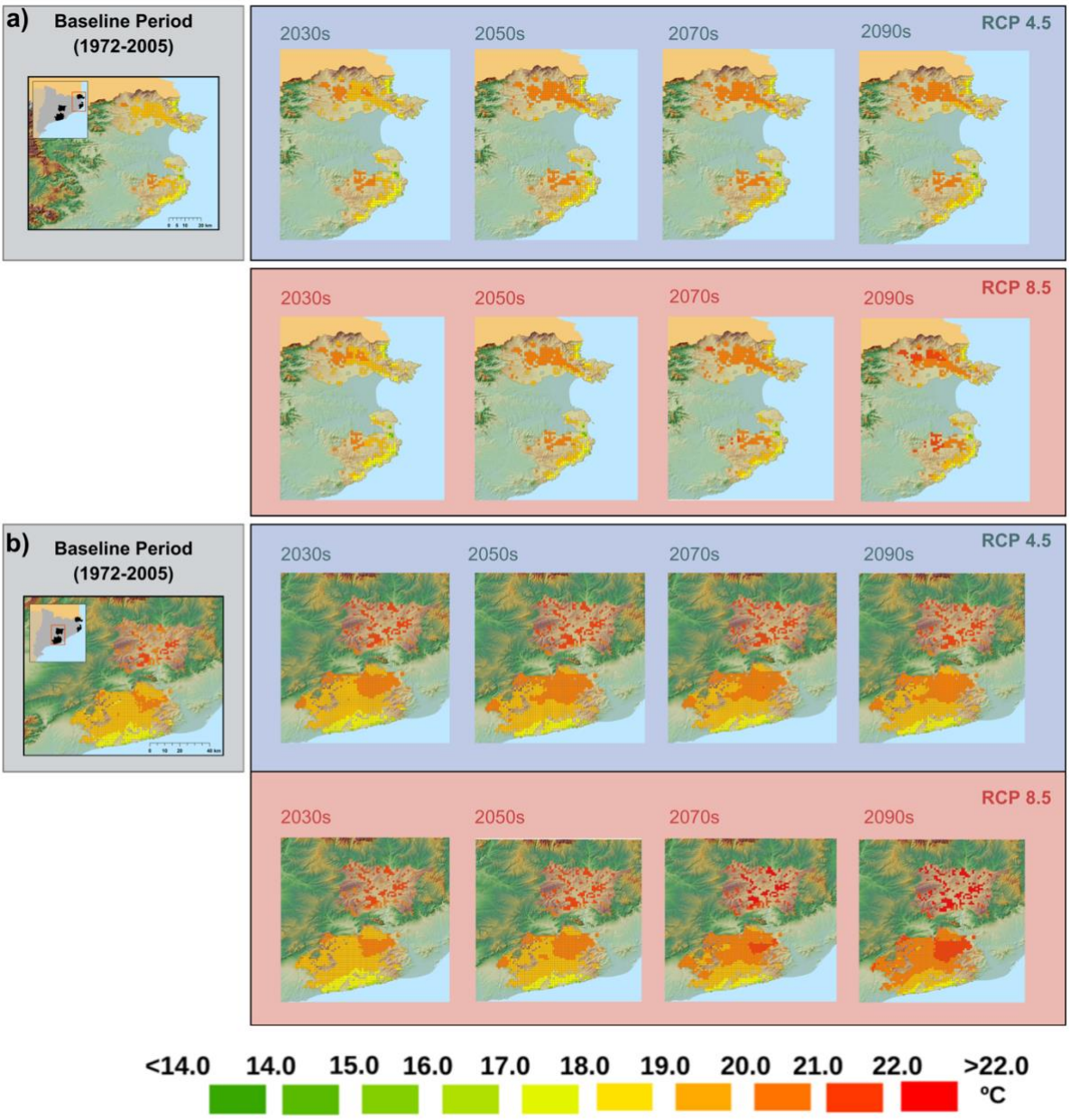


Figure S7. Timeline of mean thermal amplitude during ripening (ºC) for the Baseline period (1971–2005) and projected over four future decades along the 21st century under two climate change scenarios (RCP 4.5 and RCP 8.5) for the vineyard area of: a) PDO Empordà and b) PDO Pla de Bages and PDO Penedès, at 1 km resolution.

SUPPLEMENTARY DATA
Funes Mesa, I., Sánchez-Costa, E., Aranda, X., Altava-Ortiz, V., Barrera-Escoda, A., Prohom, M. ., … de Herralde, F. . (2024). Modelling future climate change impacts on grapevine water requirements and growing cycle in three wine PDOs of NE Spain. *OENO One*, *58*(4).
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Table S1. Averaged values of grapevine annual net hydric needs (mm · year $^{-1}$) for the baseline period (1972–2005) and differences from the baseline period of projections (Δ mm · year $^{-1}$) of two climate change scenarios (RCP) for future decades of the 21st Century in Alt Empordà (AE), Baix Empordà (BE) and Pla de Bages (PB), considering 60, 80 and 100 mm of TAW. The standard deviation (± SD) of each baseline period and changes in SD in future periods are shown in brackets.

PDO	CC Scenario	TAW (mm)	Baseline (1972–2005)	Future projections						
				2030s	2040s	2050s	2060s	2070s	2080s	2090s
				Δ mm · year $^{-1}$						
AE	RCP 4.5	60	34.6 (± 6.7)	+27.1 (± 1.5)	+20.8 (± 0.4)	+26.8 (± 1.2)	+34.8 (± 2.2)	+35.7 (± 2.0)	+54.1 (± 2.1)	+27.4 (± 3.0)
		80	25.3 (± 6.7)	+25.5 (± 1.1)	+19.6 (± 0.0)	+24.9 (± 0.9)	+32.3 (± 2.0)	+34.9 (± 1.8)	+51.5 (± 2.1)	+25.1 (± 2.6)
		100	17.5 (± 6.7)	+22.8 (± 0.5)	+18.1 (± 0.4)	+22.1 (± 0.6)	+28.6 (± 1.6)	+32.8 (± 1.5)	+47.6 (± 1.7)	+22.1 (± 1.7)
	RCP 8.5	60	34.6 (± 6.7)	+27.3 (± 3.3)	+31.0 (± 1.7)	+42.5 (± 4.2)	+46.2 (± 2.0)	+92.4 (± 4.6)	+82.4 (± 6.0)	+99.4 (± 6.3)
		80	25.3 (± 6.7)	+24.3 (± 3.0)	+28.7 (± 1.4)	+40.4 (± 3.9)	+43.6 (± 2.0)	+89.7 (± 4.6)	+79.7 (± 6.1)	+95.7 (± 6.4)
		100	17.5 (± 6.7)	+21 (± 2.3)	+25.8 (± 0.7)	+37 (± 3.4)	+39.6 (± 1.6)	+85.5 (± 4.6)	+75.6 (± 6.1)	+91.5 (± 6.4)
BE	RCP 4.5	60	39.3 (± 6.7)	+21.9 (± 4.8)	+20.4 (± 5.8)	+23 (± 5.6)	+43.3 (± 9.8)	+29.1 (± 5.8)	+39.8 (± 9.1)	+32.8 (± 7.2)
		80	30 (± 6.7)	+20.4 (± 4.2)	+18.5 (± 4.7)	+21.3 (± 5.1)	+40.4 (± 9.3)	+27.9 (± 5.0)	+37.8 (± 8.1)	+30.1 (± 6.5)
		100	22.1 (± 6.7)	+17.7 (± 3.4)	+16 (± 3.2)	+19 (± 4.0)	+36.6 (± 8.6)	+25.9 (± 3.9)	+35.2 (± 7.0)	+27.1 (± 5.6)
	RCP 8.5	60	39.3 (± 6.7)	+20.5 (± 5.9)	+21.2 (± 6.3)	+29.2 (± 6.0)	+41.6 (± 10.3)	+73.7 (± 12.5)	+85.7 (± 12.5)	+91.7 (± 16.5)
		80	30 (± 6.7)	+17.7 (± 5.2)	+19.7 (± 5.2)	+26.9 (± 5.1)	+38.1 (± 9.5)	+70.8 (± 12.3)	+82.8 (± 12.5)	+89.2 (± 16.3)
		100	22.1 (± 6.7)	+14.5 (± 4.1)	+18.1 (± 4.2)	+23.5 (± 3.9)	+34.4 (± 8.1)	+66.7 (± 11.9)	+78.9 (± 12.3)	+84.9 (± 15.9)
PB	RCP 4.5	60	52.2 (± 7.2)	+37.3 (± 3.8)	+31.8 (± 3.5)	+1.6 (± 5.9)	+16.8 (± 1.7)	+42.5 (± 6.3)	+40.4 (± 3.4)	+35.7 (± 2.6)
		80	42.2 (± 7.2)	+35.4 (± 3.7)	+30.1 (± 3.3)	+39.7 (± 5.7)	+15.8 (± 1.7)	+40.9 (± 6.1)	+38.3 (± 3.2)	+33.2 (± 1.9)
		100	32.7 (± 7.2)	+32.9 (± 3.8)	+28.3 (± 3.0)	+37.4 (± 5.2)	+14.4 (± 1.6)	+39.1 (± 5.7)	+35.6 (± 3.0)	+33.1 (± 2.2)
	RCP 8.5	60	52.2 (± 7.2)	+60.6 (± 1.3)	+41.8 (± 4.1)	+41.7 (± 6.1)	+57.3 (± 5.4)	+83.2 (± 3.2)	+96.8 (± 4.4)	+90.3 (± 5.3)
		80	42.2 (± 7.2)	+59.1 (± 1.5)	+39.8 (± 4.0)	+40.0 (± 6.0)	+54.8 (± 5.1)	+81.0 (± 3.2)	+94.6 (± 4.4)	+87.3 (± 5.3)
		100	32.7 (± 7.2)	+57.3 (± 1.6)	+37.5 (± 3.8)	+38.4 (± 5.6)	+52.4 (± 4.6)	+78.4 (± 3.2)	+91.9 (± 4.4)	+84.0 (± 5.0)