SUPPLEMENTARY DATA
Hamon, B., Thibault, J., Tissot, C., Parker, A., & Quénol, H. (2024). Identification of Best Viticultural Areas by Spatial Optimisation: Application in New Zealand South Island in the Context of Climate Change. *OENO One*, *58*(3).
https://doi.org/10.20870/oeno-one.2024.58.3.8031

Supplementary data

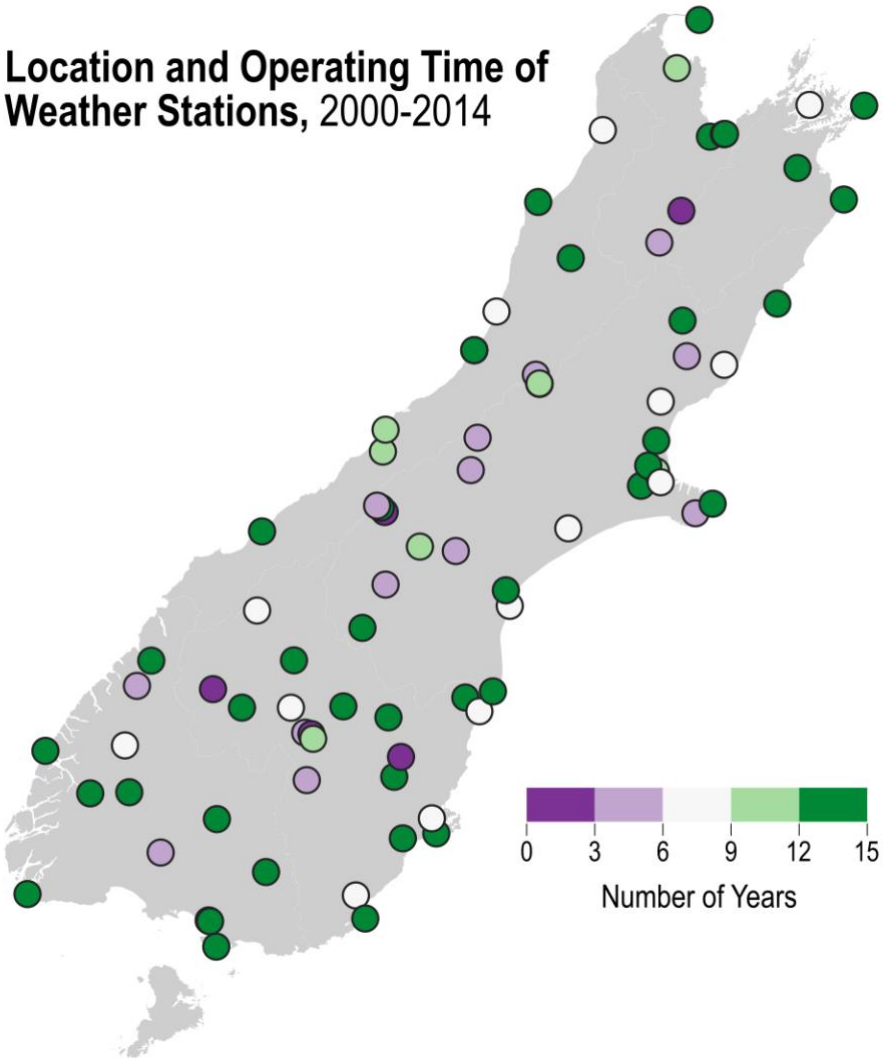


FIGURE 1. Weather Stations Network. Points represent the location of weather stations (n=82) used and the colour represents the number of years recorded over the 2000-2014 period. Five stations had an operating time between 0 and 3 years, 9 stations between 3 and 6 years, 15 stations between 6 and 9 years, 8 stations between 9 and 12 years, and 45 stations higher than 12 years.

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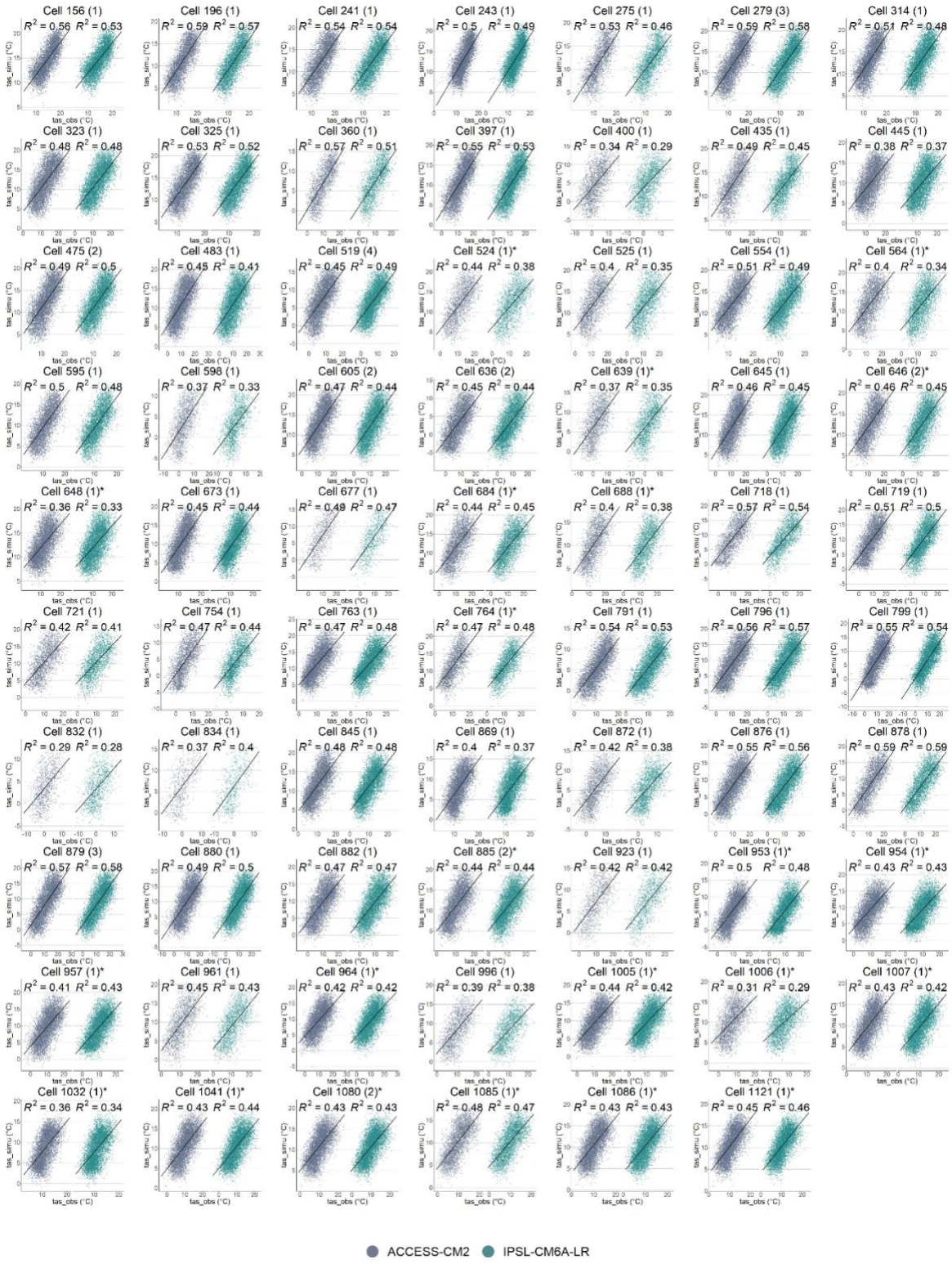


FIGURE 2. Comparison between simulated (ACCESS-CM2 and IPSL-CM6A-LR) and observed daily mean temperatures (weather stations) for each cell. Each plot represents the comparison for one cell. Numbers in brackets correspond to the number of weather stations used for the comparison and * indicates significant a difference (*p-value* < 0.05) between ACCESS-CM2 and IPSL-CM6A-LR for the given cell.

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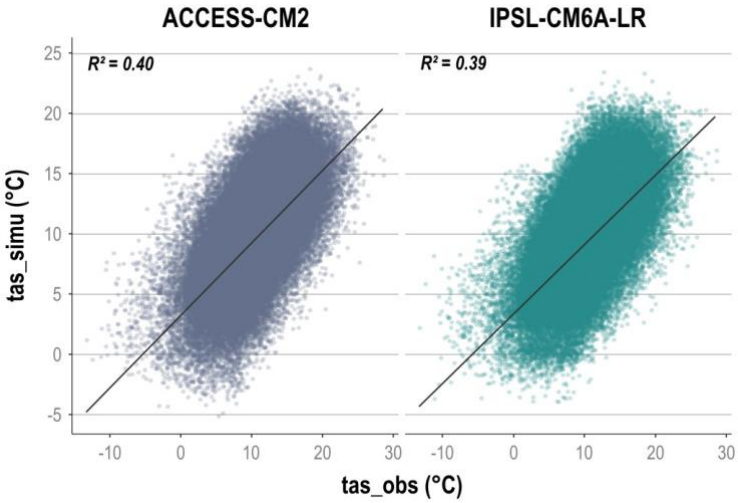


FIGURE 3. Comparison between simulated (ACCESS-CM2 and IPSL-CM6A-LR) and observed daily mean temperatures (weather stations) for the aggregation of GDDP data cells observing a significant difference between the two climate models (n = 22).

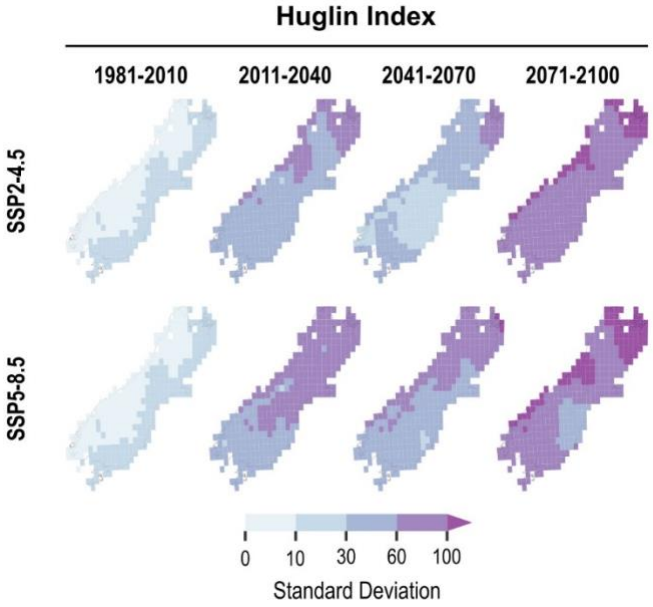


FIGURE 4. Huglin Index uncertainties expressed as the inter-model standard deviation for the baseline (1981-2010), in the near-term (2011-2040), mid-term (2041-2070) and long-term (2071-2100) with SSP2-4.5 and SSP5-8.5.

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TABLE 5. Average veraison and ripeness (time to 190g/l sugar) date anomalies compared to the baseline (1981-2010), in the near-term (2011-2040), mid-term (2041-2070) and long-term (2071-2100) for Sauvignon blanc in the Marlborough region. Results correspond to the inter-model means and the standard deviation is given in brackets.

			Near term (2011-2040)	Mid-term (2041-2070)	Long term (2071-2100)
Veraison (GFV)	**Pinot Noir**	SSP2-4.5	-8 (2.02)	-18 (3.59)	-25 (4.79)
		SSP5-8.5	-8 (1.50)	-23 (4.30)	-37 (6.72)
	Sauvignon blanc	SSP2-4.5	-8 (2.03)	-18 (3.48)	-25 (4.75)
		SSP5-8.5	-8 (1.51)	-23 (4.29)	-37 (6.68)
Ripeness (GSR)	**Pinot Noir**	SSP2-4.5	-7 (1.67)	-16 (2.17)	-23 (1.72)
		SSP5-8.5	-6 (1.39)	-21 (1.70)	-36 (1.52)
	Sauvignon blanc	SSP2-4.5	-7 (1.94)	-15 (2.70)	-22 (2.22)
		SSP5-8.5	-5 (1.25)	-22 (2.22)	-34 (1.71)

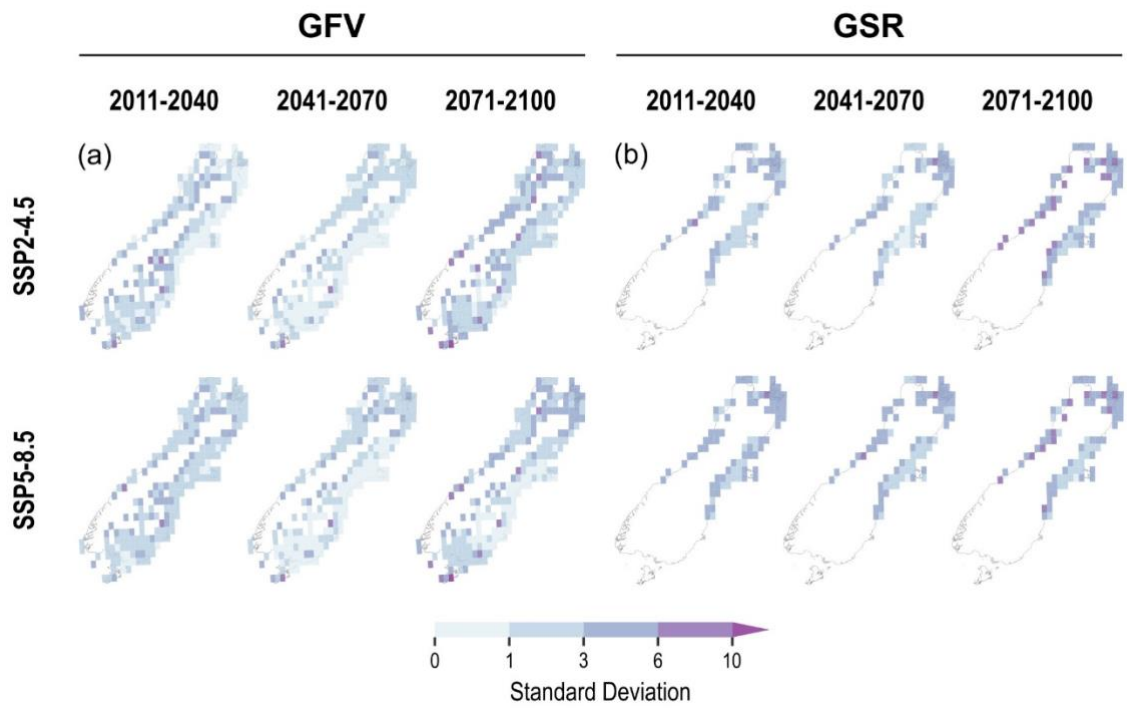


FIGURE 6. Veraison (a) and ripeness (b - time to 190g/l sugar) date anomaly uncertainties expressed in days as the inter-model standard deviation in the near-term (2011-2040), mid-term (2041-2070) and long-term (2071-2100) for Sauvignon blanc with SSP2-4.5 and SSP5-8.5. Only cells having reached at least once veraison or ripeness over the baseline are mapped.

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TABLE 7. Average time between veraison and ripeness (time to 190g/l sugar) for the baseline (1981-2010), in the near-term (2011-2040), mid-term (2041-2070) and long-term (2071-2100). Results correspond to the inter-model means, the standard deviation is given in brackets and * indicates a significant (*p-value* < 0.05 with t.test) difference with the baseline.

		Baseline (2011-2040)	Near term (2011-2040)	Mid-term (2041-2070)	Long term (2071-2100)
Pinot Noir	SSP2-4.5	31 (5.5)	31 (4.96)	32* (4.51)	33* (4.39)
	SSP5-8.5	31 (5.5)	32* (4.19)	31 (5.60)	30 (6.14)
Sauvignon blanc	SSP2-4.5	25 (5.64)	25 (5.52)	27* (4.56)	28* (4.64)
	SSP5-8.5	25 (5.64)	26 (4.63)	25 (6.00)	25 (7.38)

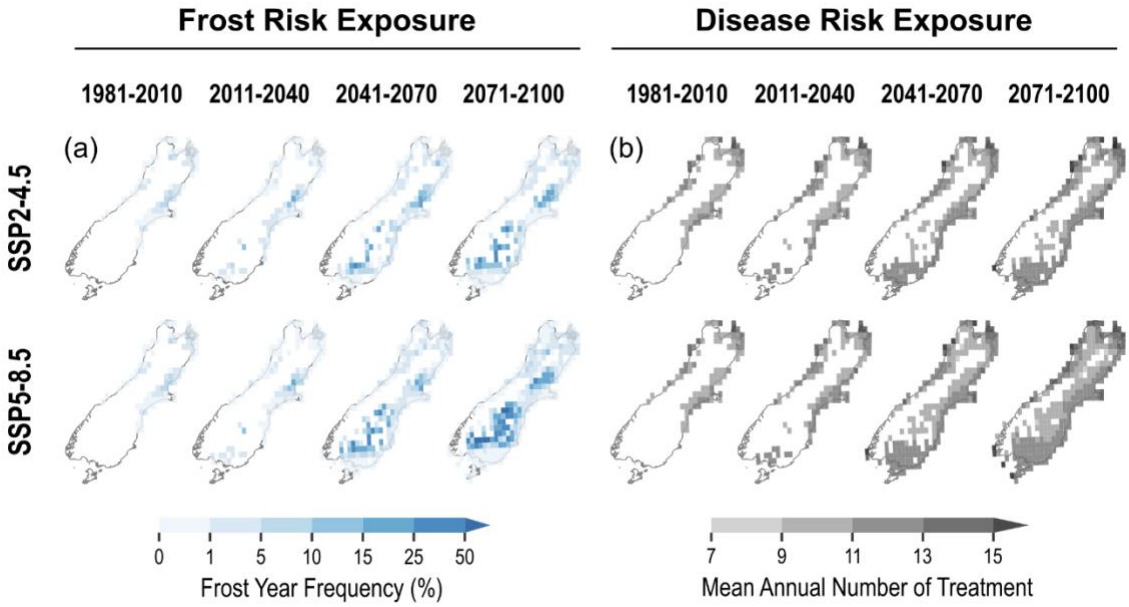


FIGURE 8. Projected frost risk (a – frequency of years with at least one frost event) and disease risk (b – mean number of pathogen treatments per year) exposure for the baseline (1981-2010) in the near term (2011-2040), mid-term (2041-2070) and long term (2071-2100) with SSP2-4.5 and SSP5-8.5 for Pinot noir. Results correspond to the inter-model means.

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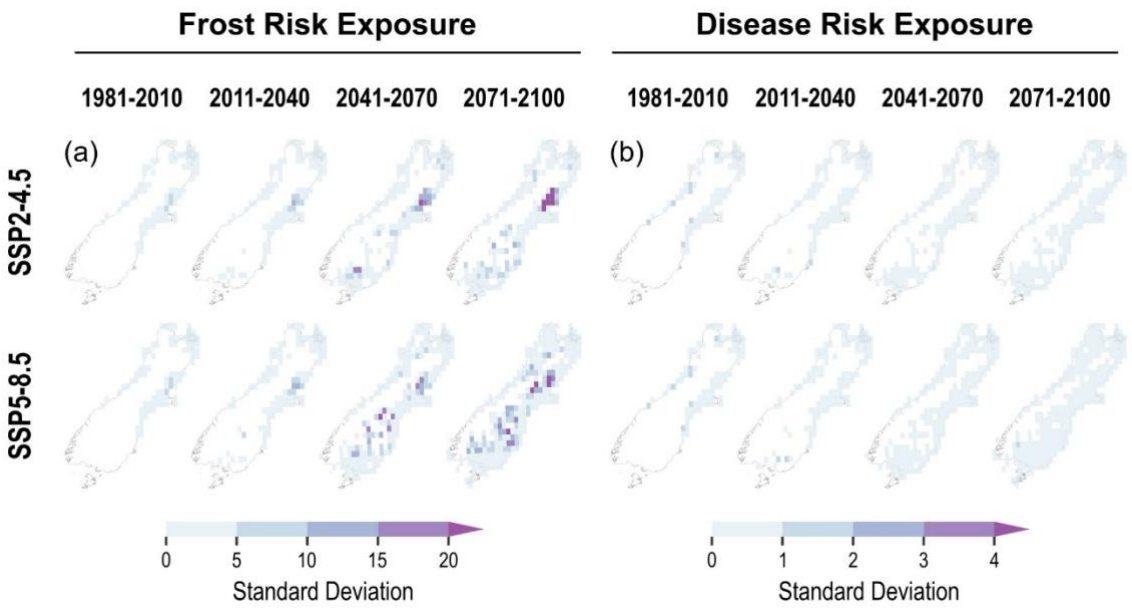


FIGURE 9. Frost risk (a – frequency of years with at least one frost event) and disease risk (b – mean number of pathogen treatments per year) exposure uncertainties expressed as the inter-model standard deviation for the baseline (1981-2010), in the near-term (2011-2040), mid-term (2041-2070) and long-term (2071-2100) for Sauvignon blanc with SSP2-4.5 and SSP5-8.5.

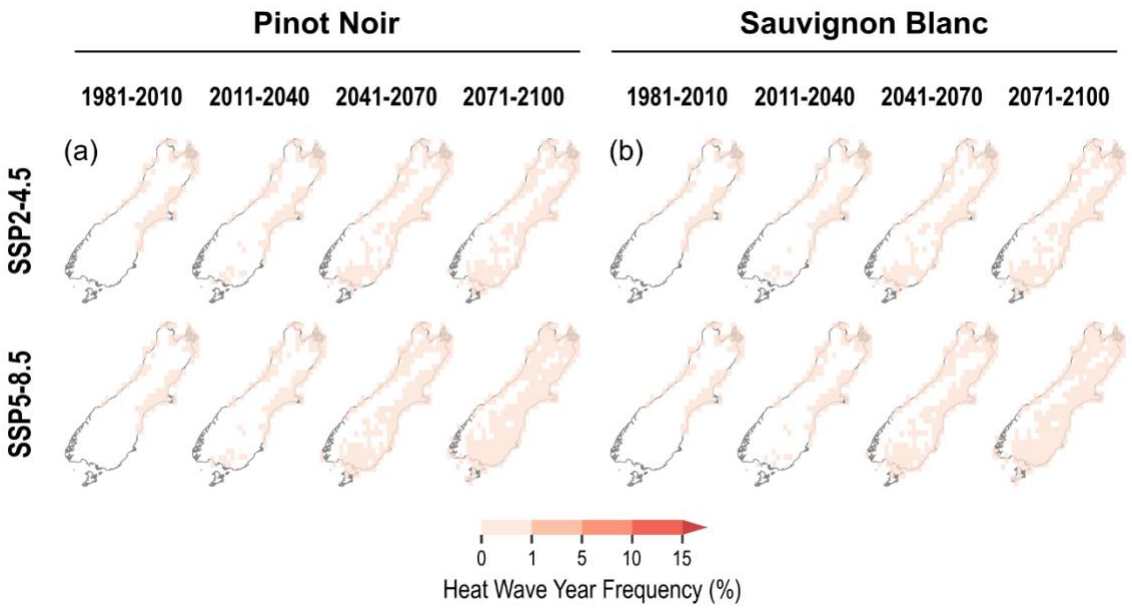


FIGURE 10. Projected heat risk exposure for the baseline (1981-2010), in the near-term (2011-2040), mid-term (2041-2070) and long-term (2071-2100) for Pinot noir (a) and Sauvignon blanc (b). Results correspond to the inter-model means.

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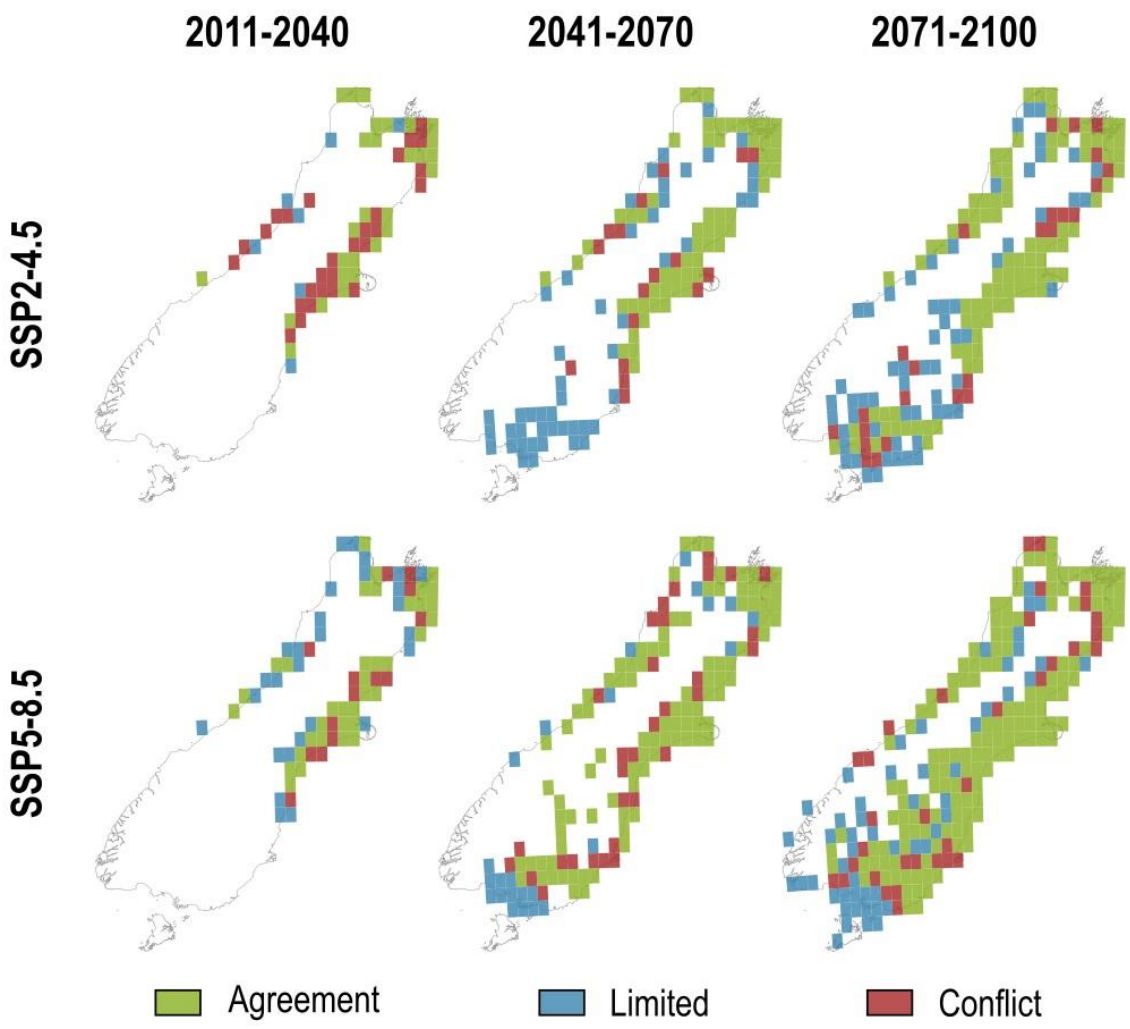


FIGURE 11. Best solution comparison between MOA outputs with ACCESS-CM2 and IPSL-CM6A-LR climate models. Agreement: cells were identified as the best solutions with the same grape variety with both models. Limited: cells were identified as the best solutions with one model but not with the other. Conflict: cells were identified as the best solutions with both models but not with the same grape variety.