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Citation


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Heat

Figure 1: Observed mean Growing Season Temperature (Oct–Apr) across all growing years from 1997–2017.

Figure 2: Observed change in mean Growing Season Temperature from 1997–2017 to 1961–1990.

Figure 3: Projected mean Growing Season Temperature from 2021 to 2100.

Figure 4: Projected Growing Season Temperature (October to April) for 20-year time periods from 2021 to 2100. Growing Season Temperature is expected to increase steadily into the future. Each grid cell is the mean of the 6 ensemble members.

Figure 5: Probability distribution of GST for 20-year time periods from 2001 to 2100. Variability can occur spatially within the region, across growing years, or between ensemble members. Grey shapes represent the probability distribution of GST for contrasting regions during 1997–2017. A shift to the right (left) indicates warmer (cooler) conditions.

Figure 6: Probability distribution of growing year maximum GDD for 20-year time periods from 2001 to 2100. Variability can occur spatially within the region, across years, or between ensemble members. Grey shapes represent the probability distribution of growing year maximum GDD for contrasting regions during 1997–2017. A shift to the right (left) indicates warmer (cooler) conditions.

Figure 7: Cumulative Growing Degree Days (GDD) across the growing year (July–June). Dashed lines show GDD values (1000, 1500, 2000, 2500) for some example phenological thresholds. Each growing year is represented by a coloured line. In future time periods, heat accumulates faster, thresholds are reached earlier and maximum GDD reached is higher.

Figure 8: Distribution of date when Growing Degree Days reaches threshold.
Figure 1: Observed mean Growing Season Rainfall (Oct–Apr) across all growing years from 1997–2017.

Figure 2: Change in Growing Season Rainfall (Oct–Apr) between the current (1997–2017) and historical (1961–1990) periods. Negative values indicate a trend towards drier conditions. Positive values indicate a trend towards wetter conditions.

Figure 3: Projected mean Growing Season Rainfall for 20-year time periods from 2021 to 2100. Each grid cell is the mean of the 6 ensemble members.

Figure 4: Projected Growing Season Rainfall (October to April) for 20-year time periods from 2021 to 2100. Each grid cell is the mean of the 6 ensemble members. Horizontal bars represent the mean Growing Season Rainfall value during 1997–2017 in selected regions across Australia. These provide a comparison between current conditions (1997–2017) and future conditions in the region and help identify future analogue regions. Coloured bars represent the projected mean global temperature increase into the future (following the RCP 8.5 scenario). These can be used to make decisions based on projected climate change rather than time.

Figure 5: As with Figure 4, but for Non-Growing Season Rainfall (October to April). Horizontal bars represent the mean Non-Growing Season Rainfall value during 1997–2017 in selected regions across Australia.

Figure 6: Violin plots of monthly rainfall (mm) for 20-year time periods from 2001 to 2100. Each violin represents monthly totals for each grid cell, for each of the 6 ensemble members. The violin shifts lower (higher) this indicates a change towards drier (wetter) conditions.

Figure 7: Seasonal rainfall (Winter, Spring, Summer, Autumn) (mm), presented as a probability distribution for each 20-year period. The shape of the curve is driven by the level of variability experienced within each 20-year period. Variability can occur spatially within the region, across years, or between ensemble members. Grey shapes represent the probability distribution of seasonal rainfall for contrasting regions during 1997–2017. Differences in the shape of curves between the current and future periods indicate a change in the typical conditions. A shift to the left (right) indicates an increase in drier (wetter) conditions.

Figure 8: Number of rainy days during harvest for each 20-year period. Harvest refers to the date when Growing Degree Days (GDD) reach example phenological thresholds (1000, 1500, 2000, 2500) which were chosen to reflect development time of different grape styles and varieties. Rainy days during harvest were defined as days with >10 mm of rain from 7 days before to 7 days after the date each GDD threshold was reached. Variability can occur spatially within the region, across years, or between ensemble members. A shift in the curve to the left (right) indicates fewer (more) rainy days during harvest. A missing time period indicates that the specific phenological threshold was not reached within the growing year (July–June).
Figure 1: Observed mean annual Aridity Index

![Figure 1: Observed mean annual Aridity Index](image)

Figure 2: Observed change in mean annual Aridity Index

![Figure 2: Observed change in mean annual Aridity Index](image)

Figure 3: Projected mean annual Aridity Index

![Figure 3: Projected mean annual Aridity Index](image)

Figure 4: Projected Aridity Index

![Figure 4: Projected Aridity Index](image)

Figure 5: Projected monthly Aridity Index

![Figure 5: Projected monthly Aridity Index](image)

Figure 6: Distribution of seasonal Aridity Index

![Figure 6: Distribution of seasonal Aridity Index](image)

Figure 7: Distribution of mean Aridity Index from July until harvest

![Figure 7: Distribution of mean Aridity Index from July until harvest](image)
Australia’s Wine Future — A Climate Atlas

TASMANIA NORTH WEST COAST
Extremes — Hot

Figure 1: Observed mean Excess Heat Factor (EHF) during heatwaves (as per Nairn and Fawcett (2013)), across all growing years from 1997–2017. EHF is an index that characterises heatwaves; high values indicate more intense heatwaves. The mean EHF is the mean value from all heatwaves that occurred from 1997–2017.

Figure 2: Observed change in mean Excess Heat Factor between the current (1997–2017) and historical (1961–1990) periods. Positive (negative) values indicate a trend towards more (less) intense heatwaves.

Figure 3: Projected mean Excess Heat Factor for 20-year time periods from 2021 to 2100. Each grid cell is the mean of the 6 ensemble members. Increasing (decreasing) values indicate a trend towards more (less) intense heatwaves.

Figure 4: Projected mean number of extreme heat days per growing year for 20-year time periods from 2001 to 2100. Colours indicate the level of variability experienced within each 20-year period. Variability can occur spatially within the region, across years, or between ensemble members. A shift to the right (left) indicates higher (lower) temperature heatwaves.

Figure 5: Projected number of days with severe risk to humans working outside between 1°C to 4°C. Values are averaged across all grid cells and the 6 ensemble members. Colours indicate the level of variability experienced within each 20-year period. Variability can occur spatially within the region, across years, or between ensemble members. A shift to the right (left) indicates higher (lower) temperature heatwaves.

Figure 6: Violins plots of high temperatures (°C) per growing year for 20-year time periods from 2001 to 2100. Colours indicate the level of variability experienced within each 20-year period. Variability can occur spatially within the region, across years, or between ensemble members. A shift to the right (left) indicates higher (lower) temperature heatwaves.

Figure 7: Probability distributions of daily maximum temperature and minimum overnight temperatures during heatwaves. Values are averaged across all grid cells and the 6 ensemble members. A shift to the right (left) indicates higher (lower) temperature heatwaves.
Figure 1: Observed mean number of days at risk of frost during the growing season (October to April) over the period 1997–2017. Days at risk of frost are those with a daily minimum temperature $< -2^\circ C$. High (low) values indicate high (low) frost risk.

Figure 2: Observed change in mean number of days at risk of frost during the growing season (October to April) between the current (1997–2017) and historical (1861–1990) periods. Days at risk of frost are days with a minimum temperature $< -2^\circ C$. High (low) values indicate increased (decreased) frost risk.

Figure 3: Projected mean number of days at risk of frost during the growing season (October to April) for 20-year time periods from 2021 to 2100. Each grid cell is the mean of the 6 ensemble members. Increasing (decreasing) values indicate a trend towards higher (lower) frost risk.

Figure 4: Violin plots of daily minimum temperature ($^\circ C$) for each month for 20-year periods from 2001 to 2100. Each violin represents daily data for each grid cell, for each of the 6 ensemble members, and for each growing year within that period. The tops of the violins represent the daily minimum temperatures for every January day in the period 2001–2020, for each grid cell in the region, for each of the 6 ensemble members. The current period (2001–2020) has been shadowed underneath future time periods to highlight any differences expected into the future. Dots represent the means for each violin. If the violin shifts lower (higher) this indicates a change towards colder (warmer) conditions.

Figure 5: Monthly average cumulative frost days for 20-year periods from 2001 to 2100. Values are a summary across all grid cells, for all years with each 20-year period, for each of the 6 ensemble members. This reflects how frost risk varies across the year within each 20-year period. The current period (2001–2020) has been shadowed underneath future time periods to highlight any differences expected into the future.

Figure 6: Timeseries of accumulated frost intensity, which is the cumulative total of temperatures less than $-2^\circ C$ over a growing season. This index characterizes exposure to cold conditions. High values indicate cold winters/springs. Points are for each grid cell, averaged across the 6 ensemble members.

Figure 7: Time-series of the number of days per growing year when temperature falls below selected thresholds ($-2^\circ C$, $-0^\circ C$, $2^\circ C$). Areas indicate the number of days temperatures fall below each threshold per growing year. Values are averaged across all grid cells and the 6 ensemble members. Fewer instances reflect a warming climate.