Future Winegrape Phenology in the Okanagan Valley

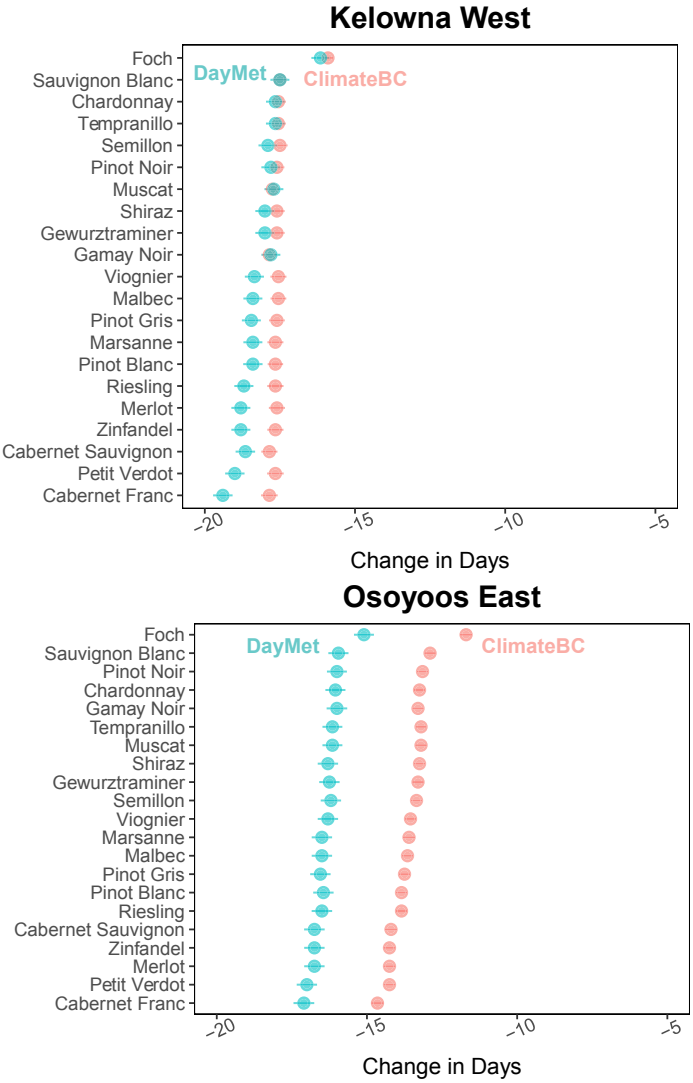
A series of factsheets on predicted phenology with continued warming across locations and varieties

Veraison

When 50% of the berries soften and change color (Eichorn-Lorenz stage 35).

Projections across the Okanagan Valley

Using a thermal sum (growing degree day) model of veraison (calculated using thermal sums from flowering to veraison), built from long-term data across the Okanagan Valley, we projected future veraison dates given continued warming across varieties.



Figures above: Projected shifts in veraison across three locations in the Okanagan Valley, using two different sources for projected climate (Climate BC and Daymet), show an average advance of 15.5 days, with larger shifts in the north (Kelowna advancing 18 days) compared to the middle and southern locations (Oliver and Osoyoos advancing 14-15 days on average). Varieties are ordered from the smallest to largest shift (averaged across climate sources). Compared to budbreak and flowering, shifts in veraison shifts across varieties were the most consistent across locations, with Foch showing consistently smaller shifts and Cabernet Franc showing consistently larger shifts across all three locations.

How we developed these projections

Using historical phenology data across 18 years (2001-2018), we built growing degree day models (GDD, base temperature of 10°C) that separated out variation due to vineyard, variety then used these models to project (forecast) future winegrape phenology.

For these phenological forecasts, we needed future daily climate data that was on a relatively fine spatial scale. Because future projections are themselves uncertain we used two methods:

1) **DayMet**: For this we used fine-scale long-term, continuous, gridded estimates of daily temperature data (provided here https://daymet.ornl.gov/). Projections for warming by mid-century (2031-2050) are roughly +2°C, thus we added +2°C to to daily climate data from 2001-2020 for our DayMet projections.

2) **ClimateBC**: Climate BC provides fine spatial scale future climate projects from global circulation models at the monthly scale (for more see: https://climatebc.ca/). We used DayMet daily data to downscale monthly mid-century projections.

In general these two methods agreed. They were especially similar for the middle and southern Okanagan, but diverged somewhat for Kelowna. This suggests projected warming for Kelowna--and thus shifts in phenology in the future--is more uncertain compared to other parts of the Okanagan winegrowing region.

Project Information

We analysed historical phenology data for vineyards spanning different companies and locations to compile historical trends and inform growers' decision making. Data for this project was generously donated by Arterra Wines Canada, Quails' Gate Winery and Sebastian Farms.

For further information please visit stateofwine.org

Acknowledgments

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