

Figure 1: October Skies.

October 2023

Temperature

October 2023 seemed for a time poised to be warmer than previously observed Octobers at UVic (since 2002). Until the beginning of the third week of the month, temperatures seemed to be defying the seasonal trend for this time of year (Fig. 2). The daily average temperature was varying around 13 °C. A few warm days early in the month, with highs around 22 °C were very welcome.

In the last week of the month a large high pressure system developed in the Gulf of Alaska and slowly moved south along the coast. This set up a loop of the jet stream flowing around the high and looping back north and east over Vancouver Island. Inside that loop at the surface came an arctic air mass which brought cooler temperatures, limiting the daytime highs. The high pressure meanwhile contributed to clear skies and that meant we observed strong nocturnal cooling. Our first significant frosts of the year came during the morning of October 26. We did just reach freezing temperatures (-0.3 °C) on October 28.

Ultimately, October 2023 ranked as the sixth warmest since 2002 at UVic. This is not that surprising given the astonishing year we're seeing in global temperature. Figure 4 gives daily global average temperature anomalies (1991-2020 baseline). 2023 is defying the historical record. Regional variations remain important. A very warm year will see regions where the local pattern is contrary or at least reduced compared to the overall.



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Figure 3: Monthly average October temperatures.



Figure 4: Global temperature anomalies.

Halloween

I thought it might be fun to look at the likely temperatures for Halloween in the area around UVic and how like it is to rain. In the past twenty-two years, we've observed rain on twelve Halloweens. Based on this, there's a 55% chance of rain on Halloween day. On twentyone of those years we've see less than 6 mm of rain, a manageable amount, unless it all came while children were out trick or treating. The one outlier was really very wet, with 27 mm recorded. It seems the odds are in favour of a small amount of rain but there remains a small chance a lot will fall.



What is the temperature likely to be on Halloween? Figure 5 shows daily temperature ranges, the average is the line between the two colours in the chart on the left. The three histograms on the right reveal the relative frequencies that we observe for different temperature ranges (yes, only twenty-two values). The average of the all the daily averages is 8.6,°C but the temperatures we see most frequently are between 8 and 12 °C. I thought it was interesting that the histogram of minimums hints at a double peak, two different regimes for the daily low. The daily low most likely occurs early in the morning of the day, so this may not affect trick-or-treating. I think that we are likely seeing the difference between clear nights and cloudy nights. Clear nights will be colder, typically than a night with clouds due to the extra downward long-wave radiation from the clouds. They are cold, but are warmer than the upper atmosphere.

Figure 5: Halloween temperatures.

Rain

October is the usual beginning of the rainy season in the region. Heavier rains begin in this month, typically peak in November and continue through January. This is tied to a major change in the dominant weather pattern. In summer we see the storm track pass to the north of Vancouver Island and the dominant weather is high pressure with sinking dry air. In the fall the storm track moves south again, following the sun. We'll see storms, mid-latitude (extratropical) cyclones that move along the storm track from west to east and bring strong winds and rain. We also find atmospheric rivers of varying strength that can transport a lot of water from the southeast and dump it on the region. The seasonal rain pattern at UVic is shown in Figure ??. Total rain amount is heavily weighted to the October–January quarter year period.



Figure 6: Seasonal rain at UVic.

This October we observed 63 mm of rain, a bit less than the 20 year average (74 mm) (Figure 7). The rain fell on 17 days of the month, the average number of rainy days. Figure 8 shows the historical number of days with rain and 9 shows the daily rain amounts this month.

The CRD drinking-water reservoir chart (Figure 10 shows that storage is still at a five-year low. This reflects the linger dry pattern of the past year.



Figure 7: October rain.



Figure 8: Days with rain.



Figure 9: Daily rain amounts.



Figure 10: CRD reservoir levels.

Seasonal Forecasts

Environment and Climate Change Canada provides three month seasonal forecasts for temperature and precipitation at https://weather. gc.ca/saisons/prob_e.html, shown in Figs.11 and 12. Given the global situation, unprecedented high temperatures and a continuing El Niño, it's not too surprising that we should expect warmer than average temperatures through January. Remember, this doesn't mean it will be warm out in an absolute sense. It's still winter! The seasonal temperature forecast performs pretty well so this something we can probably count on.

The seasonal precipitation forecast is less successful (reliable). However, at present the forecast is for near-normal conditions. For us that'll mean a normally wet late fall and early winter.







