

## November 2023

#### Temperature

At the beginning of the month it seemed like we might be about to experience a (very) warm November. After all, it is an El Niño year and the warmest November we've recorded at UVic (since 2002) was in 2016, a *super* El Niño.

An El Niño typically brings warmer conditions and less moisture to the south coast of British Columbia. This is most pronounced in the winter. This happens because the average position of the jet stream moves south, and the southward flowing loop, a low pressure trough, tends to move to the west. The jet stream changes affect the north Pacific storm track. In the winter, when the north-south temperature contrast is strongest, low-pressure weather systems called midlatitude (extratropical) cyclones form, move, and grow along under the jet stream. In a normal (ENSO neutral) year the storms tend to move across the north Pacific and then turn in a northeast direction as they interact with North America. During La Niña this path is usually strengthened, with more storms bringing more moisture than usual. During an El Niño the storm track tends to cross the Pacific and move Figure 1: November 2023 at UVic, Month in a minute video.



Figure 2: Yo soy El Niño (1997-1998). *Chris Farley, Saturday Night Live.* 

toward the southeast (relative to our latitude). There are also fewer storms. This means we expect to see less moisture at those times.

An El Niño–La Niña forecast for the coming months is provided by the NOAA Climate Prediction Center:

The most recent IRI plume favours El Niño to continue through the Northern Hemisphere spring 2024 [Fig. 4, left]. Based on latest forecasts, there is a greater than 55% chance of at least a "strong" El Niño ( $\geq 1.5$  °C in Niño-3.4 for a seasonal average) persisting through January-March 2024. There is a 35% chance of this event becoming "historically strong" ( $\geq 2.0$  °C) for the November-January season. Stronger El Niño events increase the likelihood of El Niño-related climate anomalies, but do not necessarily equate to strong impacts (see CPC seasonal outlooks for probabilities of temperature and precipitation). In summary, El Niño is anticipated to continue through the Northern Hemisphere spring (with a 62% chance during April-June 2024; [Fig. 4, right]).



Figure 3: Jet stream, El Niño, and La Niña. *NOAA*.

All of this suggests that we should expect a milder than usual winter, with less rainfall.





Figure 5 shows the daily average temperature, and range for each day in November. The dashed lines give the long-term (21 years) averages, as well as the average extremes. The month started out anomalously warm. In the first week of November we recorded 18.1 °C on the  $4^{th}$  (at 11:37). This is a new high for November (since 2002). Figure 6 is a table of the days above 18 °Cin each month of the UVic observations. We expect temperatures this to be observed in October, with strong variability, and will see it return again in March or April.

The November 4 event was caused by a broad loop of the jet stream that had formed over the Pacific to the west, forming around a low (ac-

### Figure 4: ENSO predictions.

tually multiple lows). Between that and the high pressure to the south a steady flow of warm air from the south and west, and a broadly sunny day led to an anomalously warm day. It bears repeating that records we see today are really clues to the kind of weather we'll be seeing more of due to increasing climate change.

After the warm start (return to Fig. 5) daily temperatures returned to more expected ranges and continued to cool throughout the month. November and December are the months where we see the seasonal cooling trend reach its limit. We expect cold (and some warm) events throughout the next two months but they will be connected to weather passing along the storm track, or blocking high pressure systems lasting a few days to a week.



The monthly average for November, 2023 was 7.75 °C, ranking seventh since 2002. The warmest November in 2016, the super El Niño year, was 1.7 °C warmer. Figure 7 shows all of the observed Novembers in time order. Last year really stands out as unusually cold! It came at the peak of a protracted La Niña.

Figure 5: Daily average temperatures.

	Days above 18 °C																					
Y	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
J	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
м	0	0	2	3	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0
Α	3	4	10	10	4	1	1	3	1	0	2	0	3	3	12	0	4	1	4	9	0	3
м	10	14	18	20	15	16	11	15	6	3	7	12	22	24	21	12	26	20	14	14	7	26
J	27	27	29	27	27	19	19	28	18	22	16	26	28	29	25	24	22	27	24	24	23	24
J	22	31	31	30	31	30	29	28	30	30	29	31	30	29	30	31	31	31	29	31	29	31
Α	13	31	30	30	31	29	29	29	28	30	31	30	30	30	29	31	31	30	31	30	31	30
s	26	23	20	22	23	17	21	22	15	23	26	21	25	13	21	21	15	16	22	17	27	22
ο	2	4	7	0	4	2	0	1	1	0	5	1	6	5	0	3	1	0	5	0	15	4
Ν	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 6: Days above  $18 \,^{\circ}\text{C}$  at UVic.



Figure 7: Average November temperatures.

## Rain

November rain totalled 93 mm against a 20-year average of 114 mm ( $\pm$ 59 mm, rain is quite variable from year to year, Fig. 9). This continues the pattern of lower than usual rain in the region that has lasted more than a year. Interestingly, the number of days with recorded rain was greater than average (Fig. 9). The amounts measured each day of the month are shown in Fig. 10. Two thirds of the rain fell during five events that exceeded five millimetres per day. The remainder was observed in small amounts spread over 16 days. Five of those events resulted in a single tip of the rain gauge (0.25 mm).

As of December 6 (2023) the rain fed drinking water reservoir for the region is at 71% of the maximum level. This is considerably below the five-year average for this date (86%), but greater than the five-year low.







# Figure 9: Rain days anomaly.



Figure 10: November rain at UVic. Single tips of the rain gauge, 0.25 mm, are marked with arrows.