

TSPN Climate Action Panel – The Context

March 2019

Weather vs Climate

While it was a cold day in Toronto when the panel event was held and some of us may have wished for a bit of warming, Dan Weaver started with explaining the important difference between weather and climate. While weather refers to the short-term state of the atmosphere (what happens right now and in the next few days), climate refers to changes over decades, which are averages of the short-term information we obtain about the atmosphere.

Global vs Regional Warming

In climate science and policy, it is often talked about a single number, the global average surface temperature when summarizing the problem. To date, the global average surface temperature is approximately 1°C warmer than the pre-industrial average (1850-1900)¹. At a more regional scale, e.g. when only considering Canada, the extent of warming is much larger. Figure 1 shows the warming stripes, where each stripe represents an annual average for (a) global warming and (b) warming observed in Toronto, Canada.

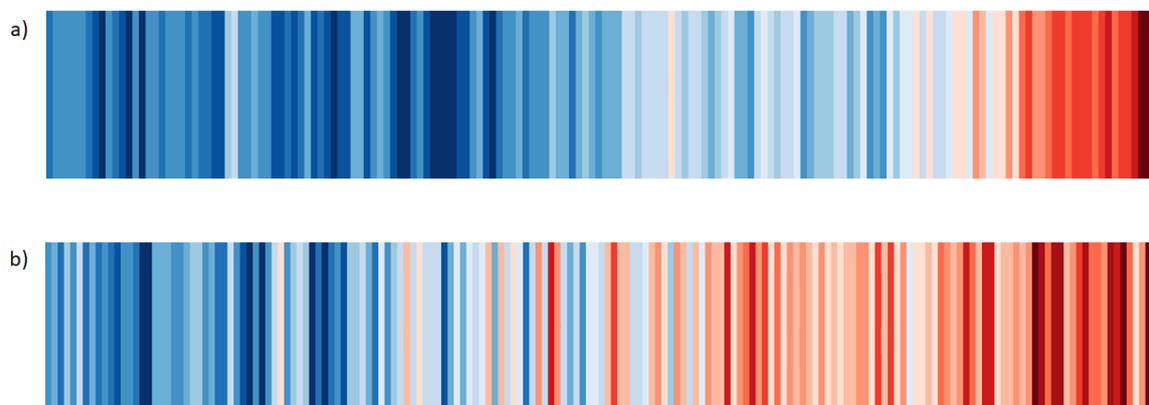


Figure 1 Warming stripes where each stripe represents an annual average for (a) global warming (1850-2017) and (b) Toronto, Canada (1841-2017). Source: <https://www.climate-lab-book.ac.uk/2018/warming-stripes/>

It is obvious that warming in Toronto is more rapid than the global average. And from research we know that the Arctic is warming and changing even faster than Toronto and the rest of the planet². Highlighting that regional changes in our environment – such as temperatures, frequency and severity of heat waves, and precipitation changes - can be much larger than the average global change. This is true for Canada.

¹ <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/>

² <https://changingclimate.ca/CCCR2019/chapter/executive-summary/>

Greenhouse Gases & Emission Targets

Human impact on our planet's climate cannot be completely avoided and GHGs emitted over the last century and which are in the atmosphere today will cause long-term changes to the climate system, e.g., sea level rise. The GHGs currently in the atmosphere are not enough to cause the 1.5°C of warming³, but with still increasing emissions we are currently on track to exceed the 1.5°C and most likely even 2°C global warming.

If we look at Canada's GHG emissions, it is clear that goals are not met – but there has been notable success in reducing emissions at the provincial level. Ontario, for example, ended its use of coal power and the vast majority of electricity is now generated from non-carbon sources. Despite success on energy overall, emissions due to the transportation and oil and gas sectors have been steadily rising across Canada. These areas will be key to future emission reductions.

Starting to reduce GHG emissions a decade or two ago, when first international agreements were signed, would have been better. But the sooner we act, the less risk and cost we will have. The future will be shaped significantly by our choices today, tomorrow, and each day after that. If we want to avoid these thresholds, rapid and substantial decreases in GHG emissions are needed in the next decade.

1.5°C warming versus 2°C warming

Change can be difficult and costly. However, inaction on climate is also costly and dangerous. Because this issue also revolves around the idea of managing risks and trade-offs, goals have also been expressed as a maximum amount of warming we think we can accept. This has typically been 2.0°C.

When the most recent emission reduction targets were set in 2015 at the UN Conference of the Parties (COP21) meeting in Paris, the IPCC was asked to produce a report examining the implications of limiting global warming to 1.5°C instead of the current goal of limiting warming to 2.0°C.

How much difference does half a degree of warming make for the planet we live in? The results offer a strong motivation for a 1.5°C target. Climate-related risks are much greater at 2.0°C than for 1.5°C. A few specific highlights if the warming is 2°C instead of 1.5°C include³:

- Extreme temperatures in many regions and changes to heavy precipitation are expected to be much larger
- Extreme hot days in mid-latitudes will be 4°C warmer, compared to 3°C if the 1.5°C target is met. And the number of hot days is projected to increase in most land regions, with highest increases in the tropics.
- Risks from droughts and precipitation deficits are projected to be higher. As a consequence of heavy precipitation, the fraction of the global land area affected by flood hazards is projected to be larger

³ <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/>

- By 2100, global mean sea level rise is projected to be around 0.1 meter lower with global warming of 1.5°C compared to 2°C. Small changes in sea level can cause large non-linear increases in damage and flooding.
- Species loss and extinction are projected to be higher. Of 105,000 species studied, 6% of insects, 8% of plants and 4% of vertebrates are projected to lose over half of their geographic range for global warming of 1.5°C, compared with 18% of insects, 16% of plants and 8% of vertebrates for global warming of 2°C. Impacts associated with other biodiversity-related risks such as forest fires and the spread of invasive species are lower at 1.5°C compared to 2°C of global warming.
- The probability of a sea ice-free Arctic Ocean during summer is substantially lower at global warming of 1.5°C when compared to 2°C.

Climate Attitudes in Canada

There is evidence that Canadians have become widely supportive of taking action on climate change and a poll commissioned in 2018 by Ecofiscal Commission on the views of Canadians on climate change and policy⁴ revealed that 74% of Canadians think action on climate change should be a public policy priority. However, issues such as health care, deficits, jobs, and cost of living are viewed as higher priorities. A shift of the economy towards clean energy is supported by 76% of Canadians, with result being notably consistent across age and province. However, most Canadians felt they did not understand the idea of a carbon price, a policy with widespread support from economists. Interestingly, the majority of people living in a province with a carbon price didn't know they were.

⁴ <https://ecofiscal.ca/reports/polling-results-perceptions-carbon-pricing-canada/>