Is Vermont getting warmer?   Alan K Betts, July 15, 2010

Vermont is getting warmer in winter twice as fast as in summer.

As the global climate warms, Vermont is also getting warmer. If we look at the temperature records for the past fifty years, we see Vermont is getting warmer in all seasons – especially in winter.

Figure 1 shows the mean Vermont summer temperatures (at top in red) and winter temperatures (below in blue). They are an average of four Vermont climate stations from 1960 to 2008. Trend lines have been fitted as dashed lines. The trend in winter is more than twice as large as in summer.

Summer trend is 0.4 ◦F (0.23◦C) per decade
Winter trend is 0.9 ◦F (0.5 ◦C) per decade

So if fifty years, mean winter temperatures in Vermont have risen 4.5 ◦F (2.5 ◦C); while in summer mean temperatures have risen less, about 2 ◦F (1.1 ◦C). This is just the mean trend: there is an uncertainty in the trends of about 30%, because of the large variability from year to year. Note also that the variability from year to year in winter is also more than twice as large as in summer.

Figure 1. Summer and winter temperature trends in Vermont since 1960.

Figure 2 shows the monthly trends from 1960 to 2008, where January is 1 and December is 12. The Fahrenheit scale is on the right and Centigrade on left. The mean annual trend is the dashed line at 0.5 ◦F per decade (with the uncertainty range dotted above and below)

We see the larger trends in winter (months 12, 1 and 2) than in summer (months 6, 7 and 8); as well as larger error bars in winter (a measure of uncertainty). The smallest trends are in May and October: perhaps because the growing season is getting longer, so that there is more evaporation and cloud in these months than in earlier decades. (Both evaporation and cloud cool the surface.)

Figure 2. Monthly temperature trends and the annual mean.

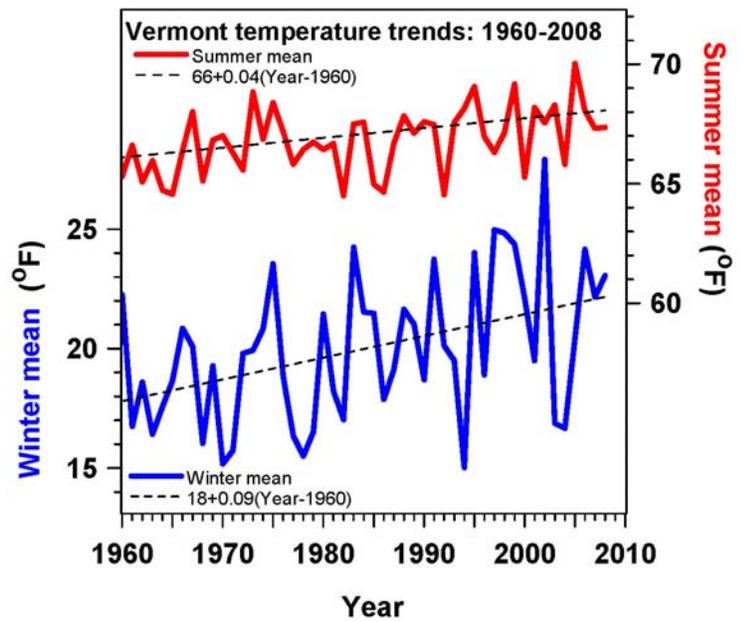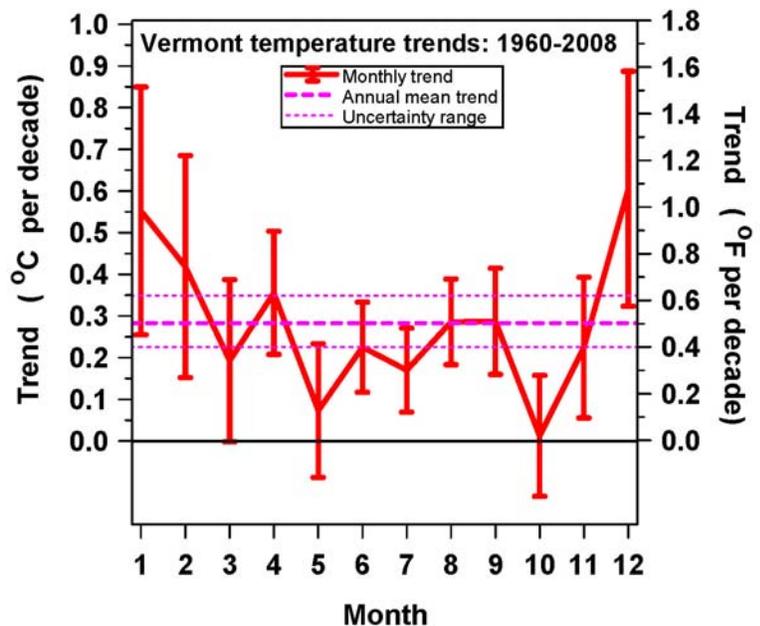Looking ahead, these trends are likely to continue for the next few decades and accelerate - unless we reduce the burning of fossil fuels.