

Warmest September on Record?

Typically the warmest months in Thunder Bay are July, August and June in this order. This summer was warmer than usual because both July and August were warmer than normal. It is very likely that September will be the warmest on record and nudge out June to become the third warmest month in 2015. The first three weeks of September were been a continuation of August, i.e. summer weather, and about 4° C warmer than normal than seasonal.

For astronomers, the autumn season began on September 23 and indeed, the weather responded on queue with a cool and cloudy day. However, if one adds the forecast temperatures for the final days of the month, September comes in easily warmer than September 2009, the warmest on record. The coming weekend is likely to feature summer-like daytime temperatures about 8° C above normal. Of course, forecasts often do not become reality and a run of cooler-than-average temperatures later in September could relegate this month to second or third place.

Climatologists get excited about this news and also anyone with the habit of growing tomatoes. It was a slow and uncertain start to growing tomatoes and most agriculture this year. Having an extra month of summer (September will have less light but come in warmer than an average June) will be appreciated by most.

Heat records continue to accumulate at the global scale. Both July and August were the warmest on record, and the summer (winter in the southern hemisphere) was the easily the warmest ever recorded since instrument and there is rising certainty that 2015 will be the warmest in the global record. Part of this warmth at the global scale can be attributed to the super El Niño taking place in the Pacific Ocean. It is more difficult to attribute recent warm temperatures in our region to the process going on in the Pacific Ocean because the effects of El Niño usually are not apparent until December.

It is possible that the strength of this El Niño will override some of the usual timing. The calendar says fall, but summer is lingering on. Several forecasting agencies are predicting warmer than usual for October and the rest of the calendar year in a broadband that includes all of southern Canada. I suggest a warm bias that persists until near the spring of 2016. We will have winter, but the odds are it will be warmer and favour less snow – in part because winter rain is more likely.

Meteorological Versus Astronomical Autumn - Why the Difference?

The autumn season began on Wednesday, September 23. For the record, "meteorological autumn" began on September 1 and ends at midnight on November 30. Meteorological seasons are based on the annual temperature cycle; the astronomical seasons are based on the position of the Earth in relation to the Sun. People have used observable periodic natural phenomena to mark time for thousands of years. The orbit of the Earth around the sun forms the basis for the astronomical calendar, in which seasons are defined by two solstices and two equinoxes. The precise timing of solstices and equinoxes is determined based on the Earth's tilt and the Sun's alignment over the equator. The solstices mark the times when the sun's annual path is farthest, north or south, from the Earth's equator. The equinoxes mark the times when the sun passes directly above the equator. In the Northern Hemisphere, the summer solstice falls on or around June 21, the winter solstice on or around December 22, the vernal (spring) equinox on or around March 21, and the autumnal equinox on or around September 22. These seasons are the opposite but begin on the same dates in the Southern Hemisphere.

The Earth actually travels around the sun in 365.24 days, hence an extra day is needed every fourth year, creating what we know as Leap Year. Get ready for an extra day this coming February! This extra 1/4 day also influences the exact date of the solstices and equinoxes. In addition, the elliptical shape of the Earth's orbit around the Sun causes the lengths of the astronomical seasons to vary between 89 and 93 days. These variations in season length and season start/end would make it very difficult to compare climatological statistics for a particular season over time. Hence, meteorological seasons are confined to three calendar months.

Meteorologists and climatologists combine the calendar with the annual temperature cycle. Winter is the coldest time of the year and includes December, January, and February. Summer includes June, July, and August as the warmest time of the year. Meteorological spring includes March, April, and May; meteorological fall includes September, October, and November. These seasons were created for meteorological observing and forecasting purposes and make it easier to calculate seasonal statistics for use with agriculture, economics, and many other purposes. The length of the seasons is also more consistent for the meteorological seasons, ranging from 90 days for winter (plus 1 day this coming winter), to 92 days for spring and summer and 91 for autumn.

Sky News

Venus is spectacular in the eastern these days. It can be located using the figure courtesy of EarthSky Magazine below.



The full moon in a few days will be remarkable for a few reasons

- It is the closest Moon-Earth distance in 2015
- It is the Harvest Moon in the Northern Hemisphere, the full moon nearest the September equinox and

This "supermoon" evening will feature a total eclipse of the Moon that takes place on 27-28, 2015. The moon will reach its full phase on September 27, 2015 at 10:51 p.m. EDT.

Partial umbral eclipse begins: 9:07 p.m. EDT on September 27

Total eclipse begins: 10:11 p.m. EDT

Greatest eclipse: 10:47 p.m. EDT

Total eclipse ends: 11:23 p.m. EDT

Partial eclipse ends: 12:27 a.m. EDT on September 28

Source: <http://earthsky.org/tonight/most-super-supermoon-of-2015-on-september-28>

Origin of temperature scales

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Galileo Galilei invented a rudimentary water thermoscope in 1593, which for the first time allowed temperature variations to be measured. It was a container filled with bulbs of varying mass, each with a temperature marking, the buoyancy of water changes with temperature, some of the bulbs sink while others float, the lowest bulb indicated the temperature.

In 1612, the Italian inventor Santorio became the first inventor to put a numerical scale on his thermoscope. It was the first crude clinical thermometer and was designed to be placed in a patient's mouth for temperature taking.

Fahrenheit Scale

The first modern thermometer, the mercury thermometer with a standardized scale, was invented by Dutch inventor, Daniel Fahrenheit in 1714.

Temperature scales require points of reference.

In 1714 Daniel Fahrenheit built his scale on the work of Ole Rømer, whom he had met and discussed concepts of scales. With Rømer's scale, salt brine freezes at zero, water freezes and melts at 7.5 degrees, body temperature is 22.5, and water boils at 60 degrees. Fahrenheit multiplied each value by four in order to eliminate fractions. Hence, water freezes and melts at 32 degrees, body temperature is 90, and water boils at 240 degrees. Only 32° F (0° C) is accurate in a modern context

Fahrenheit chose the temperature of the body temperature of a healthy person (Fahrenheit's healthy person happened to be his wife) which he measured in the armpit at 96°. After Fahrenheit died, his successors used the boiling point of water to calibrate the thermometers. And they set it at 212° such that it retains the size of Fahrenheit's degree.

The zero point is determined by placing the thermometer in brine: he used a mixture of ice, water, and ammonium chloride, a salt, at a 1:1:1 ratio. This resulting temperature 0 °F (−17.78° C). The second point, at 32 degrees, was a mixture of ice and water at a 1:1 ratio. The third point, 96 degrees, was approximately the human body temperature, then called "blood-heat".

Scientists in the 1700s and 1800s researched what was the lowest temperature possible – see above. Lord Kelvin developed the idea of the coldest temperature theoretically possible, termed “absolute zero”. He presented the Kelvin Scale in 1848. The Kelvin scale uses the same units as the Celsius scale, but it starts at absolute zero, 0° K, the point or temperature at which atoms would stop moving. Absolute zero equals - 273° C (degrees Celsius).