

## Forecasting the surface maximum Temperature (T) with 850-mb T

A near-record maximum temperature was recorded on Monday, October-19-15. The max reached 21° C between 3 and 4 p.m. The record for this date was 22.2° C, set in 1971.

A very dry atmosphere was in place with dew point at 2° C

Our discussion of the dry adiabat, DALR: 10°C/km works on the way up but also works coming down. For example, if we knew the 850-mb temperature on Monday (which was approximately + 7° C) and “brought” this down to the Thunder Airport, about 1300 metres it would predict a max T of  $7+13 = 20$ .

### METHOD

The procedure can be done on a tephigram (see Appendix J on page A22). This is often called a Skew-T or a simple calculation – see example. From the morning sounding, note the 850-mb temperature. Take a parcel of air at 850 mb using the 850-mb temperature and bring it dry adiabatically to the surface. The temperature of this parcel after it is brought to the surface will estimate the high temperature for the day in sunny conditions. The method works best in locations near sea level, in the warm season, on barotropic days, with flat topography, on moderate windy cloud-free days. If any of these conditions are not met then adjust or discard the temperature prediction.

### LIMITATIONS

1. Method does not work on cloudy days or days with afternoon precipitation
2. Temperature will tend to be higher/lower than calculated on days when the wind is light/strong. This is because the surface wind affects the depth of mixing.
3. Method assumes air is mixed only between the surface and 850 mb. If the air mixes to a height significantly above or below 850 mb the technique will not work accurately.
4. Method only works in a barotropic atmosphere. Frontal systems mean different airmasses and complicated advection will contaminate this technique.
5. Method does not work as well in regions with complex topography like coastal areas, mountainous areas, and areas near large lakes.

## Forecasting the surface minimum T with the Dewpoint

As mentioned above, the warm afternoon T on Monday, October-19-15 had dry air and a low dewpoint. In the conditions that made the max T prediction and option (sunny, barotropic, light winds) the afternoon dewpoint can be used to predict the following overnight min T. The dewpoint T suggests a min T of 0 to 4° C and it was 1° C around sunrise on Tuesday, October-20-15.