

Forecasting Severe Storms Seasonally

By William Marino

We are used to long range forecasts concerning temperature and precipitation trends. Using the Global Wind Oscillation (GWO), it may now be possible to make seasonal forecasts for severe storms. The basic idea is that when the GWO is in the positive phase the global wind tends to be dominated by westerly winds, which means more zonal flow and less blocking. On the other hand when the GWO is negative, the global wind is dominated by easterly wind flow. That sort of flow leads to more meridional flow and thus more blocking and enhanced storms with strong jet streaks. It is that later set up, the negative phase of the GWO would then favor severe storms. Since the GWO tends to be negative when there is a La Nina event going on in the tropical Pacific, and tends to be positive when an El Nino event is going on, during periods of time when there is a significant El Nino or La Nina, it would then be possible to forecast on a longer time scale, the relative frequency of severe storms over Southwest Lower Michigan.

Using our severe storm data back to 1999 and the GWO data provided by CPC I looked at the frequency of severe storms as a function of the GWO. As it turned out 61% of all of GRR's severe storms occurred when the GWO was in the negative phase. Of the events that occurred in the positive phase, about 50% of them were when the GWO was less than 1 STD, which means it was too weak to impact the global wind patterns. On the other hand 89% of the severe storm events that occurred when the GWO was negative occurred when the GWO was more than 1 STD negative. This means 65% of all of our severe storms events occurred when the GWO was more than 1 STD negative. This information suggests in years that one expects the GWO to be mostly positive, that is when there is an El Nino during the summer one would expect less severe storms, on the other hand if there is a La Nina event going on, this would suggest a more active severe weather season for Grand Rapids.