Summary and Conclusion

Unique terrain the eastern New York pays a pivotal role in the Capital District Region. Through compositing cases we could understand the typical synoptic scale setup common to these types of events to produce better forecasts.

The synoptic setup for warm cases of Mohawk-Hudson Convergence was a zonal jet at 300-hPa with weak cyclonic vorticity advection and weak cold air advection. Most importantly weak south or southwesterly winds can channel westerly down the Mohawk valley and southerly up the Hudson valley supplying rich and unstable air to the greater Capital District Region. The winds are also typically weak in Albany during the onset of these types of events.

The synoptic setup for cold cases of Mohawk-Hudson Convergence was a relatively stronger jet with trough over the East Coast with the jet maximum off the coast of southern Virginia. Strong cyclonic vorticity leads to a deepening of the low off the New England Coast increasing our surface pressure gradient. This leads to moderate northerly flow in the Hudson valley and northwesterly flow in the Mohawk valley. These events happen largely away from synoptic scale forcing. Cold events are also characterized by an interestingly moist boundary layer with dry air in the upper levels.

These types of events are hard to predict because of their seemingly innocuous conditions. But can quickly with slight assent from the river valleys cause upward vertical motion lead to thunderstorms and quick bursts of precipitation.