

## Helicity and Shear

“Helicity 0-1000m”, “Helicity 0-3000m”, and “Shear 10-6000m” on weathernerds.org refer to helicity or shear computed in the specified layer above ground level (in meters). “Shear 200-850 mb” refers to the shear computed in the layer between the 200 and 850 mb pressure surfaces.

“Helicity Effective” and “Shear Effective” on weathernerds.org refer to helicity and shear computed using the “effective” layer as used by NOAA’s Storm Prediction Center (SPC) and defined in Thompson et al. 2004a and Thompson et al. 2004b. For effective shear, the shear is computed from the effective inflow base upwards to 50% of the equilibrium level of the most unstable parcel in the lowest 300 mb. The effective inflow base is defined as the first parcel (working upward from the surface) with  $CAPE > 100 \text{ Jkg}^{-1}$  and  $CIN > -250 \text{ Jkg}^{-1}$ . Effective helicity (effective storm-relative helicity) is computed in the effective layer which extends upward from the effective inflow base until parcels are defined by  $CAPE < 100 \text{ Jkg}^{-1}$  or  $CIN < -250 \text{ Jkg}^{-1}$ . A critical component of the effective storm-relative helicity formulation is the choice of storm motion. To remain consistent with the SPC methodology, storm motion on weathernerds.org follows the Bunkers et al. 2000 technique except that mean flow is defined in the effective layer rather than the mean flow in the lowest 6 km above ground.

### References:

Bunkers, M. J., B. A. Klimowski, J. W. Zeitler, R. L. Thompson, and M. L. Weisman, 2000: Predicting supercell motion using a new hodograph technique. *Wea. Forecasting*, 15, 61-79.

Thompson, R. L., C. M. Mead, and R. Edwards, 2004a: Effective bulk shear in supercell thunderstorm environments. Preprints, 22nd Conf. on Severe Local Storms, Hyannis, MA, Amer. Meteor. Soc.

Thompson, R. L., R. Edwards, and C. M. Mead, 2004b: An update to the Supercell Composite and Significant Tornado Parameters. Preprints, 22nd Conf. on Severe Local Storms, Hyannis, MA, Amer. Meteor. Soc.