

Valery Melnikov

Estimation of the intensity of convection with weather radar

valery.melnikov@noaa.gov

Authors

Valery Melnikov, Oklahoma University,

Enhanced detectability of radar returns is demonstrated using clear air echoes observed with the S-band WSR-88D polarimetric radar. The enhancement of detectability is about 10 dB compared to the standard detectability level of the WSR-88Ds. Such detectability allows observations of convective air bubbles. The polarimetric capabilities are utilized for distinguishing echoes from the convective plumes and atmospheric biota.

Radar observations with the update time of 1 min in a selected area clearly show developing convection plumes. The intensity of convection is determined by observing the tops of convective plumes. The rate the plumes' heights increase with is an estimation of the updraft velocity inside the plumes. The measured minimal updraft velocities in convective bubbles are in an interval of 12-15 m s⁻¹. The second characterization of the convective intensity is the maximal height of the plumes' tops. The convective bubbles may reach heights of 5.5 km in Oklahoma. Applications of such radar observations in a pre-storm environment are discussed.