ATS/CIRA Colloquium

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Visiting ATS from NCAR

Distance Velocity Azimuth Display (DVAD) – New Interpretation and Analysis of Doppler Velocity

Hosted by Wayne Schubert

Friday, October 3, 2014

ATS room 101; Discussion will begin at 11:15am
Refreshments will be served at 10:45am in the weather lab

The concept and mathematic framework of the Distance Velocity Azimuth Display (DVAD) methodology is presented. DVAD uses rV_d (Doppler velocity scaled by the distance from the radar to a gate, r) as the basis to display, interpret and extract information from single Doppler radar observations. Both linear and non-linear wind fields can be represented by the same Cartesian polynomial with different orders. DVAD is mathematically concise and superior to the Velocity Azimuth Display (VAD) in interpreting and deducing flow characteristics.

The rV_d pattern of a two-dimensional linear wind field is exclusively in the form of a bivariate quadratic equation representing conic sections (e.g., ellipse, parabola, and hyperbola) centered at the radar depending only on divergence and deformation. The presence of a constant background flow translates the conic sections to a different origin away from the radar. It is possible to graphically estimate the characteristics of a linear wind field from the conical sections without performing a VAD analysis. DVAD analysis can deduce quantitative flow characteristics by a least-squares fitting and/or a derivative method, and is a natural way to account for non-linearity. rV_d behaves similar to a type of velocity potential in fluid mechanics where the gradient of rV_d is a proxy of the true wind vector and is used to estimate the general flow pattern in the vicinity of the radar.

Link to colloquium videos and announcement page: http://www.atmos.colostate.edu/dept/colloquia.php