

Terrain Influences on Bow Echoes in the Central Appalachians

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The evolution of bow echoes in the Blacksburg County Warning Area can be greatly influenced by the topography of the Appalachian Mountains. Previous research delineating crossing and non-crossing convective systems will be reviewed, with special attention paid to kinematic and thermodynamic similarities between events. Significant MUCAPE, relatively weak wind shear and time of day will be shown as the most important factors which maintain large scale Quasi-Linear Convective Systems, as they encounter the Appalachians. This presentation will examine some of these events over the past ten years to affect the region.

Future work seeks to evaluate the role of small scale orography along the Clinch River Valley with regards to bow echo enhancement or dissipation. A few cases showing possible terrain modification of the cold pool and rear to front flow will be detailed. The potential hydraulic jump with regard to the evolution of a larger scale squall line, downstream from a mountain ridge, will be discussed. Warning decisions may be improved as this future work identifies regions within the Appalachians where these processes are most likely to occur.