

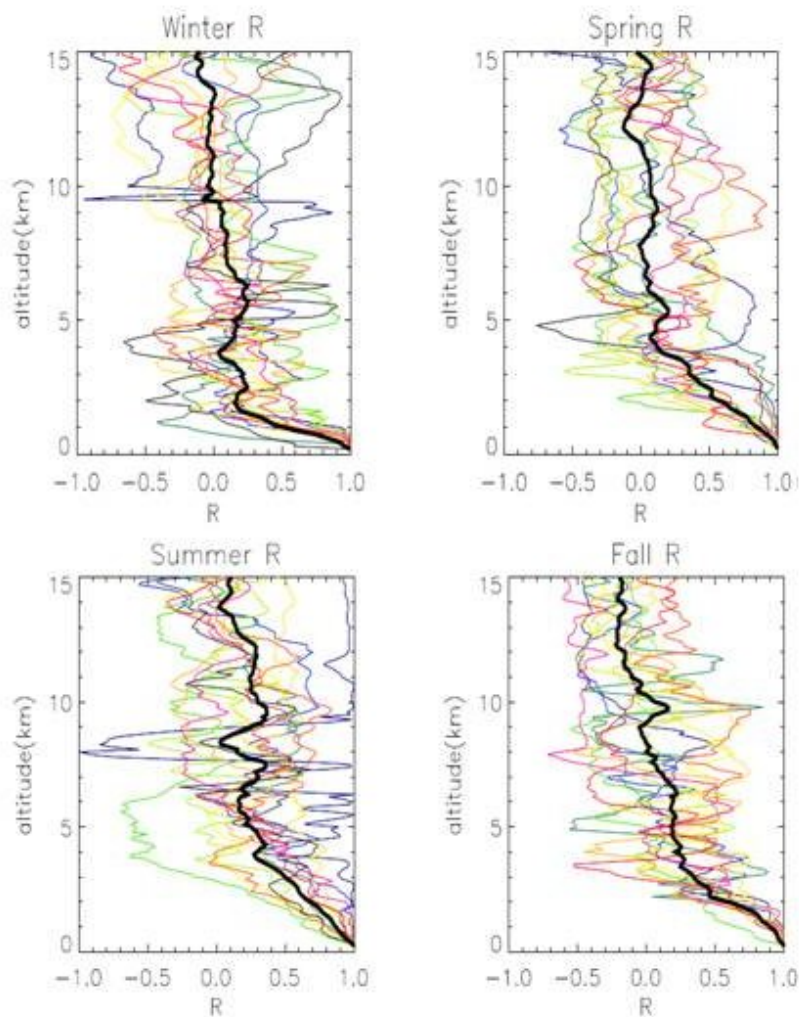
## Tropospheric Ozone Laminar Structures and Vertical Correlation Lengths

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Tropospheric ozone profiles often show laminar structures in both the PBL and the free troposphere. We study the quantitative definition and evolution of ozone laminar structures, correlations of surface ozone with ozone aloft, and continuous ozone observations, based on twelve-year Huntsville ozonesonde data and the Huntsville Ozone Differential Absorption Lidar (DIAL). We conclude: (1) Ozone values at altitudes higher than 1-2 km above the surface carry little physical information about contemporaneous surface ozone, (2) Free-tropospheric and nocturnal residual-layer ozone values do affect surface ozone through processes that are not well understood, but do involve evolving physical/chemical processes, and (3) Ozonesondes are good for observing snapshots of atmospheric processes resulting in laminar structure, while DIAL is good for observing the evolution of atmospheric processes involving laminar structures.



**Figure 1.** Seasonal correlation of surface ozone with ozone aloft. Color spaghetti plots are one-year seasonal correlation of surface ozone with ozone aloft based on 1999-2010 Huntsville ozonesonde data. The solid black line represents the 11-year mean profile.