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Does the vertical profile of ethane contain more insight into mixing layer height than carbon monoxide?

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To improve the interpretation of satellite data measurements near the surface, the DISCOVER-AQ project embarked on a four year campaign to produce an integrated dataset of airborne and surface based measurements at various locations in North America. One of the key metrics when pursuing the the goal of measuring the surface air quality from space is the mixing layer height. The measurement phase in 2014 included the novel 1-Hz Aerodyne Research, Inc. fast Ethane Spectrometer to distinguish the methane emissions from thermogenic (oil&gas) and biogenic sources in the Denver-Julesberg basin. A second potential use of ethane as a determinant of mixing layer height is revealed in the analysis of 213 vertical profiles collected at 7 points during 21 flights. The findings are evaluated relative to other in-situ metrics, such as carbon monoxide and remote sensing attributions of mixing layer height.