

Separating Methane Emissions From Biogenic Sources and Natural Gas by Vertical Column Enhancements of Ammonia, Ethane, and Methane Along the Colorado Front Range

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Methane sources along the Colorado Front Range include biogenic sources from cattle feedlots and natural gas operations. Although numerous studies have measured methane emissions, there remains significant uncertainty regarding the relative contributions of these various methane emission sources. Here we present data from a March 2015 field campaign that deployed two Bruker EM27 Sun Fourier Transform Spectrometers (FTS) and the University of Colorado Solar Occultation Flux (CU-SOF) FTS in Eaton, Colorado; the former were used to measure enhancements in the methane vertical column densities (VCD), while the latter was used to measure ethane and ammonia VCDs. A third EM27 FTS was deployed to a background site in Westminster, Colorado which was far removed from cattle and petroleum operations. Northerly winds make possible the determination of methane VCD column enhancement from Westminster to Eaton. All instruments were compared during several background days at the National Center for Atmospheric Research in Boulder, Colorado. This presentation explores the potential of methane source attribution using ammonia as a tracer for feedlot emissions and ethane as a tracer for petroleum emissions.

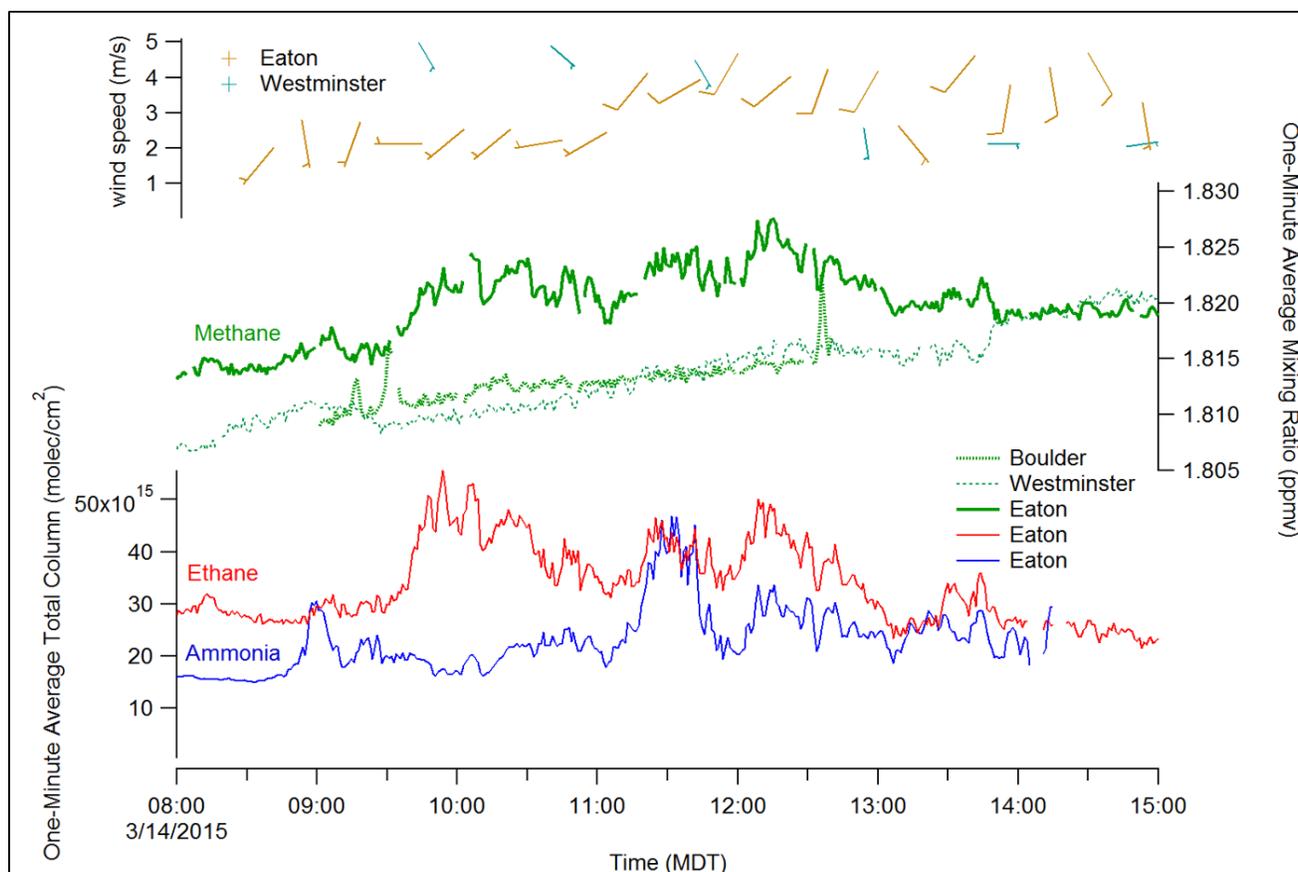


Figure 1. Time trace showing the correlation of methane, ethane, and ammonia VCD enhancements depending on wind direction on 14 March 2015.