(54-180321-A) **Successes and Challenges of Spectroscopic Based Techniques in Enteric Methane Measurements**

W. Gichuhi[1] and L. Gamage[2]

[1]Department of Chemistry, Tennessee Tech University, Cookeville, TN 38505; 931-372-3499, E-mail: wgichuhi@tntech.edu
[2]School of Environmental Studies, Tennessee Technological University, Cookeville, TN 38505

Whereas livestock methane (CH_4) emissions are not the dominant overall source for the observed sharp rises in global CH_4 levels, the occurrence of significant uncertainities in the magnitude of the existing livestock CH_4 emission inventories calls for more experimental measurements of enteric CH_4. One major challenge associated with accurate experimental measurements of CH_4 production from livestock is the fact that the grazing animals are a representation of mobile emission sources with activity-related emission patterns. In this presentation, we assess the application of spectroscopic-based techniques in measuring enteric methane. The efficacy of a portable wavelength-scanned CRDS (Picarro G2401) in estimating CH_4 production from ruminants in a feedlot, based on the measured CH_4:carbon dioxide (CO_2) ratio from exhaled breath and the amount of CO_2 produced per Heat Producing Unit (HPU) is examined and compared with other spectroscopic techniques that are based on natural grazing conditions such as the open-path laser technique. Our measurements shows daily linear regression fits of the CH_4 to CO_2 concentration that have high correlation (R^2=0.91), allowing for direct estimation of enteric CH_4 emission factors

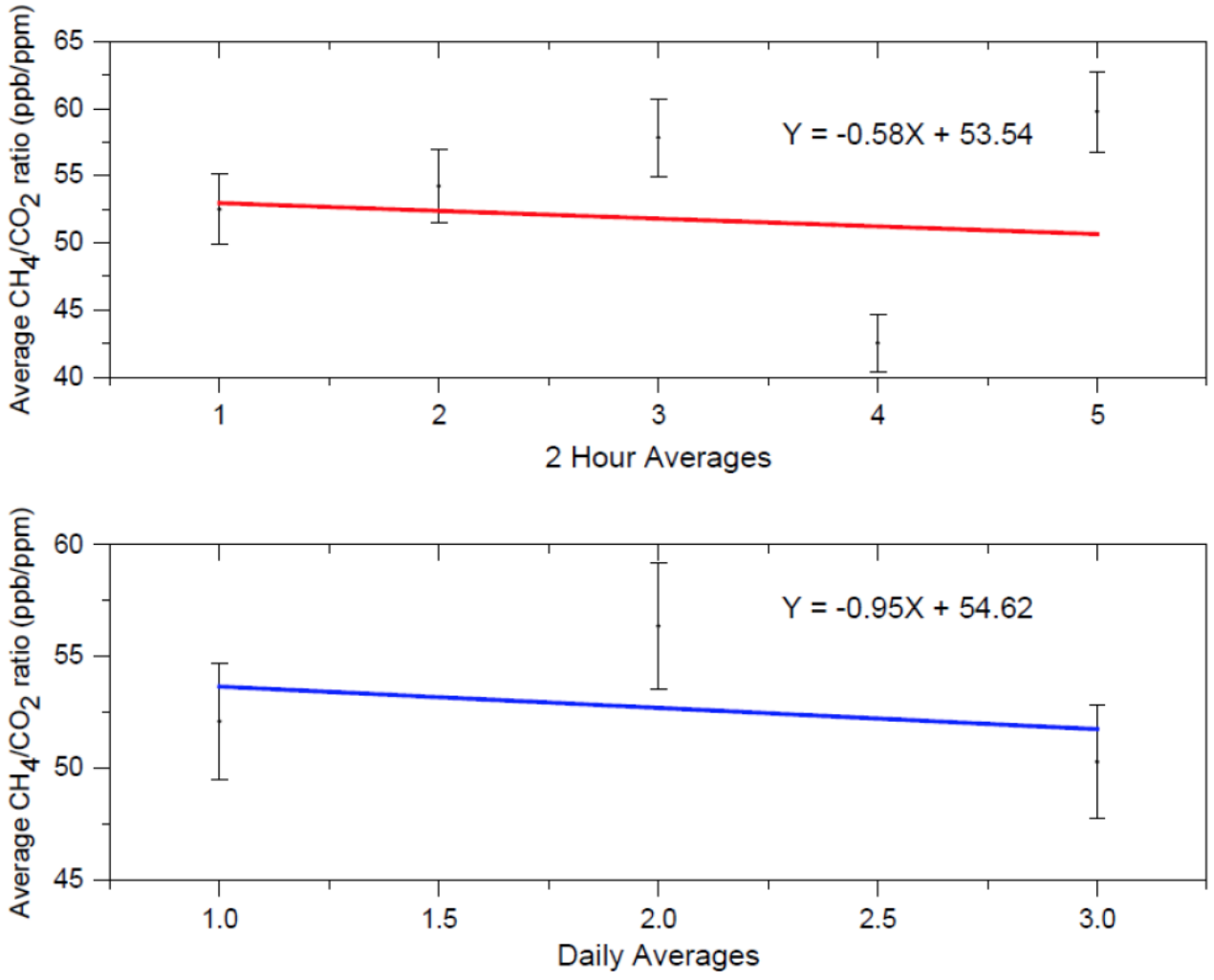

Figure 1. Daily and hourly averages of the linear regression ratios of CH_4:CO_2 (ppb/ppm).