Estimation Of Greenhouse Gas Emissions From An Agricultural Farm Using The Nocturnal Boundary Layer Method. (A03-strachan135913-Oral)

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Abstract:

Our understanding of greenhouse gas (GHG) emissions at the farm scale (several km2), which can encompass animal and field contributions, is incomplete due to the difficulties associated with their integration over space and the challenge of collecting CH4, N2O and CO2 simultaneously. In this presentation, we will give an overview of a project which aims to directly address these problems. The stable nocturnal boundary layer (NBL) is used as an enclosure within which the exchange of all three GHG between the surface and the atmosphere is measured over time at the farm scale. Early results from a field campaign in July, 2002 will highlight the approach. A tethered blimp raised a tethered-sonde, a light-weight CO2/H2O analyzer and a gas collection system through the NBL repeatedly during several nights of measurement. Samples were later analyzed for N2O and CH4 by GC and TDL-TGA techniques. For capturing the spatial distribution of CO2, N2O and CH4 close to the surface, a golf cart was equipped with similar instrumentation plus a GPS and driven around the main 30-ha field. The development of the NBL and its turbulence was further investigated by performing frequent vertical profiles of wind speed, temperature and humidity and collecting wind velocities using a mini-SODAR system.

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