

Quantifying Atmospheric Nitrogen and Methane Emissions from Agricultural Activities



Providing information on best practices to address emissions from agriculture

New atmospheric studies from a mobile laboratory: Short-term, intensive field measurements at source locations in Colorado are providing keys on inventory values of agricultural (cropland and feedlot) air emissions, their spatial distributions, their daily variability, and their seasonality.

Providing information to the agricultural industry: By working with key academic and industry partners in Colorado, this research is identifying the causes of day-to-day variability in emissions, providing information on best management practices that simultaneously minimize the climate, air quality, visibility, and stratospheric ozone layer impacts of agricultural emissions to air.



Cattle feedlot in Greeley, CO

Agricultural and animal husbandry practices produce atmospheric emissions of ammonia, nitrous oxide, reactive nitrogen, and methane.

These emissions can increase climate forcing, degrade local and regional air quality, reduce visibility, and deplete the stratospheric ozone layer.

Better knowledge is needed to understand these coupled emissions to address the challenges of feeding a global population that is increasingly dependent on nitrogen-containing fertilizers.

Strategies to control agricultural emissions are hampered by major and systematic errors in existing inventories.

- Atmospheric emissions from fertilizer use are poorly represented in state and federal inventories.
- Airborne studies from NOAA and Harvard University have shown **large deficiencies in the magnitude, spatial distribution, and timing** of emissions calculated from agricultural inventories.



A new NOAA approach: NOAA CSD is carrying out source studies using an instrumented van to measure simultaneously emissions of major nitrogen-containing species, methane, and other gases.

These new measurements are necessary to **attribute emissions to specific sources** and to identify the best agricultural management practices to minimize emissions to the air.

The Bottom Line:

Atmospheric studies with industry partners are yielding information needed to address environmental impacts while optimizing fertilizer use.