

Champaign-Urbana Transect Ambient Ammonia Study

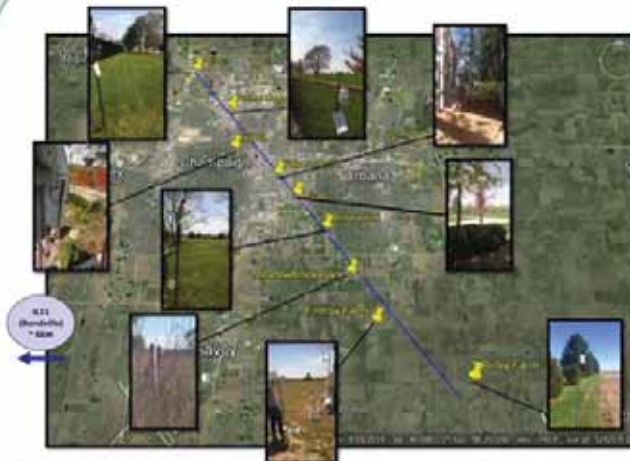
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STUDY DESIGN:

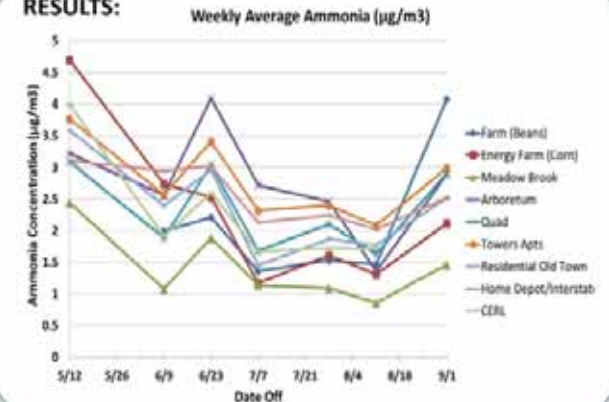
The Champaign-Urbana region (CU) is a micro-urban area surrounded by cropland, so there are a number of possible sources of ammonia including agriculture, urban centers, interstates, parks, and a major university campus. This research study is looking at a transect of CU, roughly perpendicular to prevailing winds. Radiello[®] passive samplers were deployed following AMON's sampling protocol for 7 1-week sampling periods along a 13 mile transect of CU during the growing season (5/5/14 - 9/1/14). The aim of the research is to both help illuminate how representative ammonia concentrations are of a surrounding region and to examine the impact of land use on those ambient concentrations.

SAMPLING LOCATIONS:



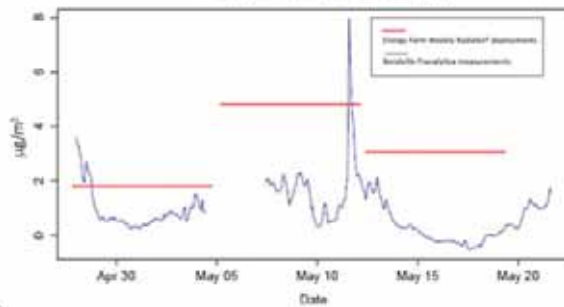
Receptor #	Receptor Name	Description
CUT 1	Farm (Bean)	next to a soy bean farm, near CR 130 highway.
CUT 2	Energy Farm	in a clearing in the middle of corn, location of intensive ammonia flux measurements.
CUT 3	Meadowbrook Park	restored prairie; agriculture plots are less than 0.5 miles away.
CUT 4	UofI Arboretum	graduate housing nearby; university tree farm just south of location.
CUT 5	UofI Quad	central part of U of I campus.
CUT 6	Tower Apartments	near Champaign urban area; next to a parking garage; several ventilation outlets.
CUT 7	Hill St.	city residential; gardens
CUT 8	Home Depot	next to onramp for I-74; busy intersections nearby
CUT 9	CERL	U.S. Army Construction Engineering Research Laboratory, across the street is truck depot, light industrial zone.

RESULTS:



The study used 1 week samples; shown below are data from (ILI) Bondville (16 km SW of the Energy Farm) that show the variability that is typical of the region.

Bondville Ambient Ammonia Concentrations
 Pranalytica Results (1 hour averages)



FUTURE WORK:

An 8th week of data will be collected following harvest at the Energy Farm.

More special studies of ambient ammonia are underway in Illinois, Colorado and North Carolina to further understand regional correlations.

CONCLUSION:

Though the sites regional sites do follow a similar trend of increasing and decreasing concentrations, there is a large variation in the actual concentrations.

OBSERVATIONS:

- Cluster analysis was run with a number of weather variables, including weekly average temperature, average humidity, average wind direction and average wind speed. The only site that showed a possible link with meteorological data was Meadowbrook Park with average wind speed. This is believed to be an area of few local sources of ambient ammonia and is influenced by regional sources.
- The Energy Farm had its highest concentrations of ambient ammonia during the week following planting.
- The Tower Apartment (Urban) and Home Depot (Interstate) had the least amount of variability. These are both sites that have sources that are not related to agriculture.
- The Arboretum has a different pattern than other sites, possibly due to the tree farm and UofI's nearby greenhouses.
- At the time of the last week of data (9/1) there was no regional harvesting, as reported by USDA for the Illinois - East.

ACKNOWLEDGEMENTS:

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