



A special thanks to Binghamton Professors Tim DeSmet and Alex Nikulin, and DEC Field Researcher Nathan Graber

References

Our Project

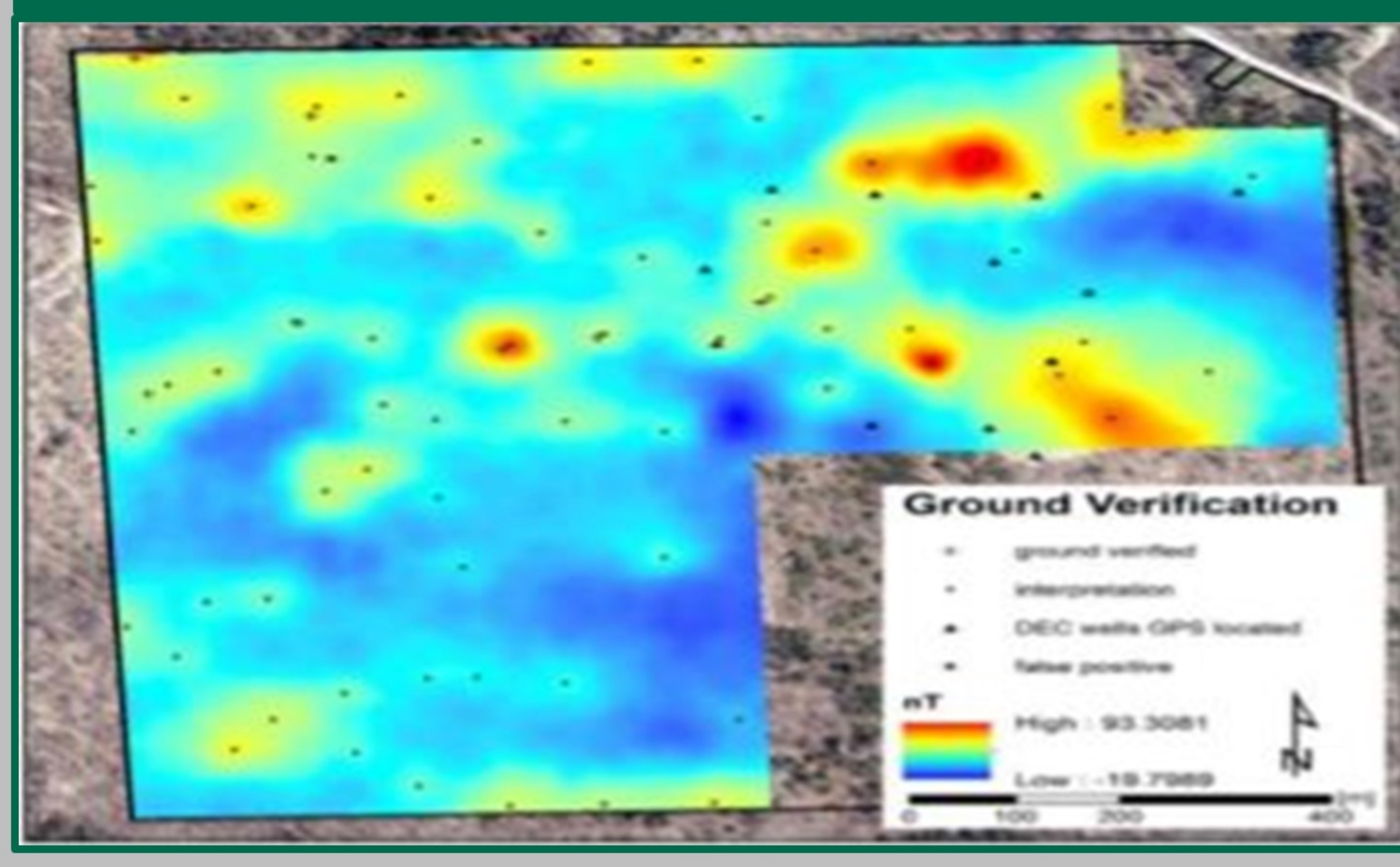
- As fracking died out in New York the remnants of the industry was left behind and forgotten about
- The old infrastructure of this industry is a leading point-source for natural gas emissions
- Using an aerial magnetometry set up our group has effectively detected the location of the wells
- We have verified the accuracy of the survey with ground based GPS units
- Separately we have collected methane emissions data for 31 of the wells that have been located
- Using GIS applications we are looking to find a correlation between the size/magnitude of the anomaly and the amount of natural gas emitted
- The two separate figures show that there is a strong relationship between the magnitude of anomaly and quantity of emissions

Image Set



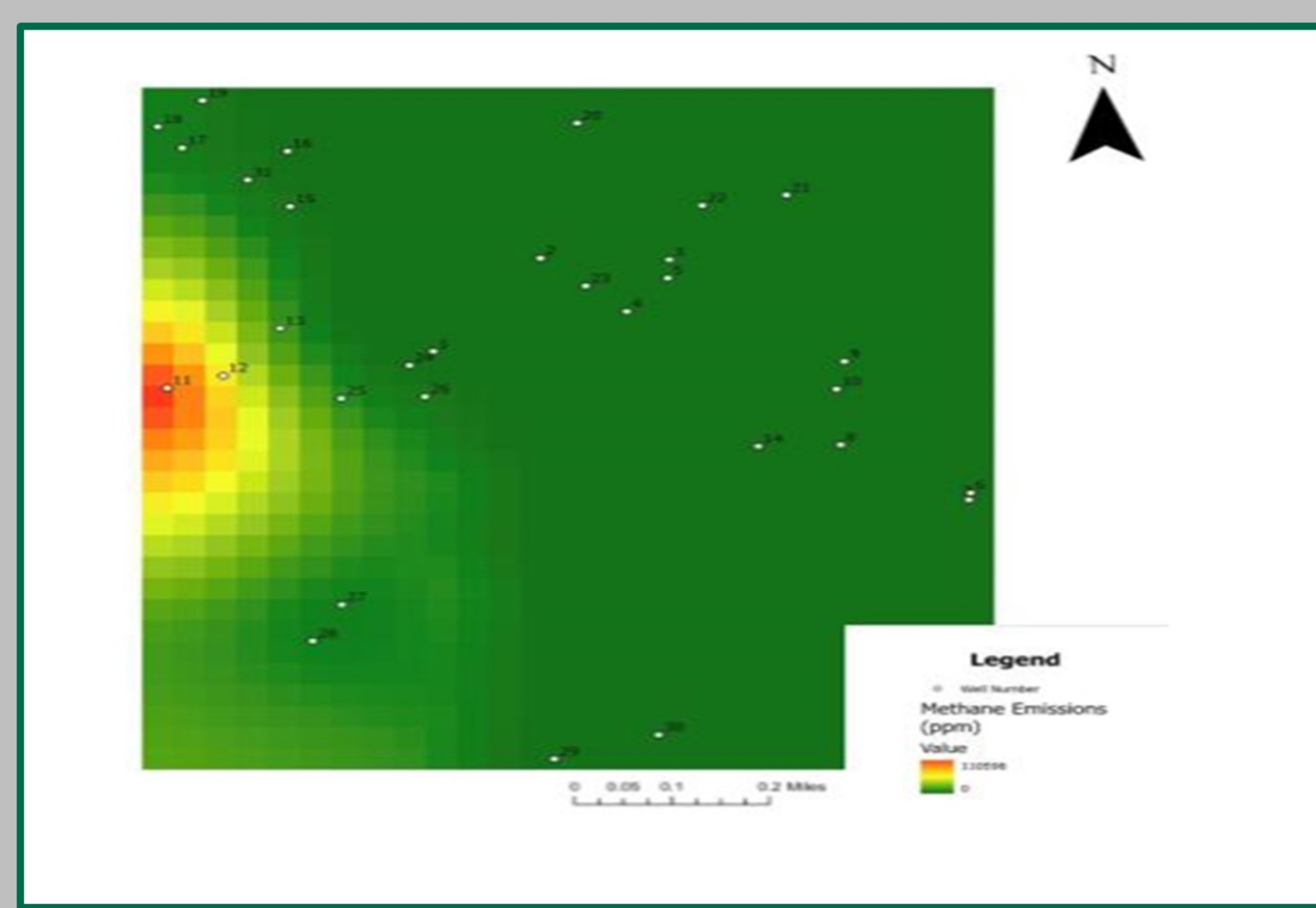
Image Set: Contains examples of both cased and uncased wells, as well as two pump jacks

Aerial Data



Methane Emission Data

Name/Number	Date/Time	GNSS_Height	Northing	Easting	Peak PPM	Name/Number	Date/Time	GNSS_Height	Northing	Easting	Peak PPM
UL Hall Well #1	1-Oct 09:44:57	603.999	4653708.215	713231.1	0	UL Hall Well #16	2-Oct 08:07:15am	585.415	4654084.101	713045.9	0
UL Hall Well #2	1-Oct 10:32:13	578.544	4653883.053	713366.43	0	UL Hall Well #17	2-Oct 08:29:32am	594.276	4654089.986	712912.18	1201
UL Hall Well #3	1-Oct 11:08:47am	568.833	4653880.254	713529.5	2	UL Hall Well #18	2-Oct 08:41:44am	582.814	4654129.651	712881.51	0
UL Hall Well #5	1-Oct 11:29:08am	572.721	4653845.857	713527.65	1	UL Hall Well #19	2-Oct 08:59:48am	567.815	4654179.218	712938.23	0
UL Hall Well #4	1-Oct 11:37:25am	584.185	4653783.027	713475.45	2	UL Hall Well #20	2-Oct 09:41:36am	543.803	4654136.278	713412.87	0
UL Hall Well #6	1-Oct 12:27:53pm	532.046	4653442.633	713911.36	0	UL Hall Well #21	2-Oct 10:56:57am	537.103	4654001.718	713677.95	205
UL Hall Well #7	1-Oct 12:29:35pm	529.2	4653429.385	713909.78	1	UL Hall Well #22	2-Oct 11:12:08am	547.15	4653982.252	713571.43	0
UL Hall Well #8	1-Oct 12:53:21pm	560.085	4653533.018	713746.78	1	UL Hall Well #23	2-Oct 11:43:23am	589.482	4653830.864	713423.47	0
UL Hall Well #9	1-Oct 01:34:39pm	550.832	4653689.497	713751.88	1	UL Hall Well #24	2-Oct 01:00:53pm	606.599	4653681.728	713200.35	0
UL Hall Well #10	1-Oct 01:51:10pm	562.32	4653637.347	713741.81	2	UL Hall Well #25	2-Oct 01:23:24pm	573.174	4653620.044	713113.83	0
UL Hall Well #11	1-Oct 03:48:54pm	567.235	4653639.427	712893.82	110598	UL Hall Well #26	2-Oct 01:45:52pm	597.718	4653623.154	713220.15	0
UL Hall Well #12	1-Oct 04:08:02pm	557.59	4653662.608	712964.34	86	UL Hall Well #27	2-Oct 02:38:01pm	505.406	4653232.854	713114.73	0
UL Hall Well #13	1-Oct 04:17:36pm	559.387	4653751.293	713036.51	21	UL Hall Well #28	2-Oct 02:49:38pm	521.275	4653164.35	713077.56	0
UL Hall Well #14	2-Oct 07:22:02am	549.259	4653529.962	713642.14	0	UL Hall Well #29	3-Oct 08:10:18am	551.132	4652943.137	713384.03	0
UL Hall Well #15	2-Oct 07:51:58am	612.744	4653980.165	713049.38	0	UL Hall Well #30	3-Oct 09:06:58am	510.754	4652988.607	713516.29	10
						UL Hall Well #31	3-Oct 10:15:36am	607.213	4654029.743	712995.52	8



Discussion

- Aerial-based sensor took approximately 1 hour to survey 1/4 mile²
- After 3 flights, 72 anomalies were detected
- 32 of the well locations have been verified
- Emissions from 31 wells have been collected and quantified
- Only two wells had a significant level of methane emissions
- The western side of the surveyed area had high methane emissions
- In verification we discovered remnants of the fracking industry, busted pipes, pump jacks, all which contribute to the variance in our aerial data

GIS Advantages and Disadvantages

- Using ARCGIS we are able to map out the emitting wells
- Quick analysis of data is possible, comparing aerial magnetometry and methane emissions
- GIS allows us to splice together 3 separate flights in one dataset
- Emissions Raster assigns emissions data for all locations, not just wells
- The processing of large aerial sensing data can take days
- Difficulty in creating comparable figures: Magnetometry data must be processed in additional program

Aerial Data: 3 separate drone flights with a magnetometer spliced together, covers 3/4 mile²
Methane Emission Data: This table shows the methane emissions of the 31 verified wells
Methane Emission Figure: Made in ARCGIS, a raster of the distribution of methane emissions