

Measurements of VOCs at Longview CAMS 19 During 2005-2006

**Presentation to the NETAC
Technical Committee**

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Overview

- Non-methane VOC samples collected
- VOCs are ozone precursors
- Identifying VOCs present at Longview can lead to “fingerprinting” of VOC sources
- Improve conceptual model of ozone formation in Northeast Texas
- Today, presenting a summary of analysis to date.

Sampling Days

- 15 sampling days, 72 samples
- 2005 Days: Nov. 1 and Dec. 9
- 2006 Days: Feb. 28, Mar. 2, 9, 16, 17
Aug. 16-18, 24 Sep. 1-2, 9, 14
- 7 of the 2006 days were Ozone Action Days in Northeast Texas

Summer 2006 Sample Summary

- Most frequently detected VOCs are **alkanes**
- Natural gas?
- Alkenes (HRVOCs)
- Isoprene is primarily biogenic in origin

Compound	Top 5 Frequency	Max	Median
Ethane	38	122.0	27.9
Propane	38	73.1	14.6
N-butane	37	60.6	6.9
Isobutane	32	28.9	5.6
Isopentane	18	23.6	2.2
Isoprene*	12	4.2	1.3
Benzene	5	13.1	2.4
N-pentane	3	8.1	2.6
Propylene	3	2.8	0.3
2-methylpentane	2	1.0	1.9
Toluene	2	15.4	1.5

* Indicates biogenic species

Winter 2006 Summary

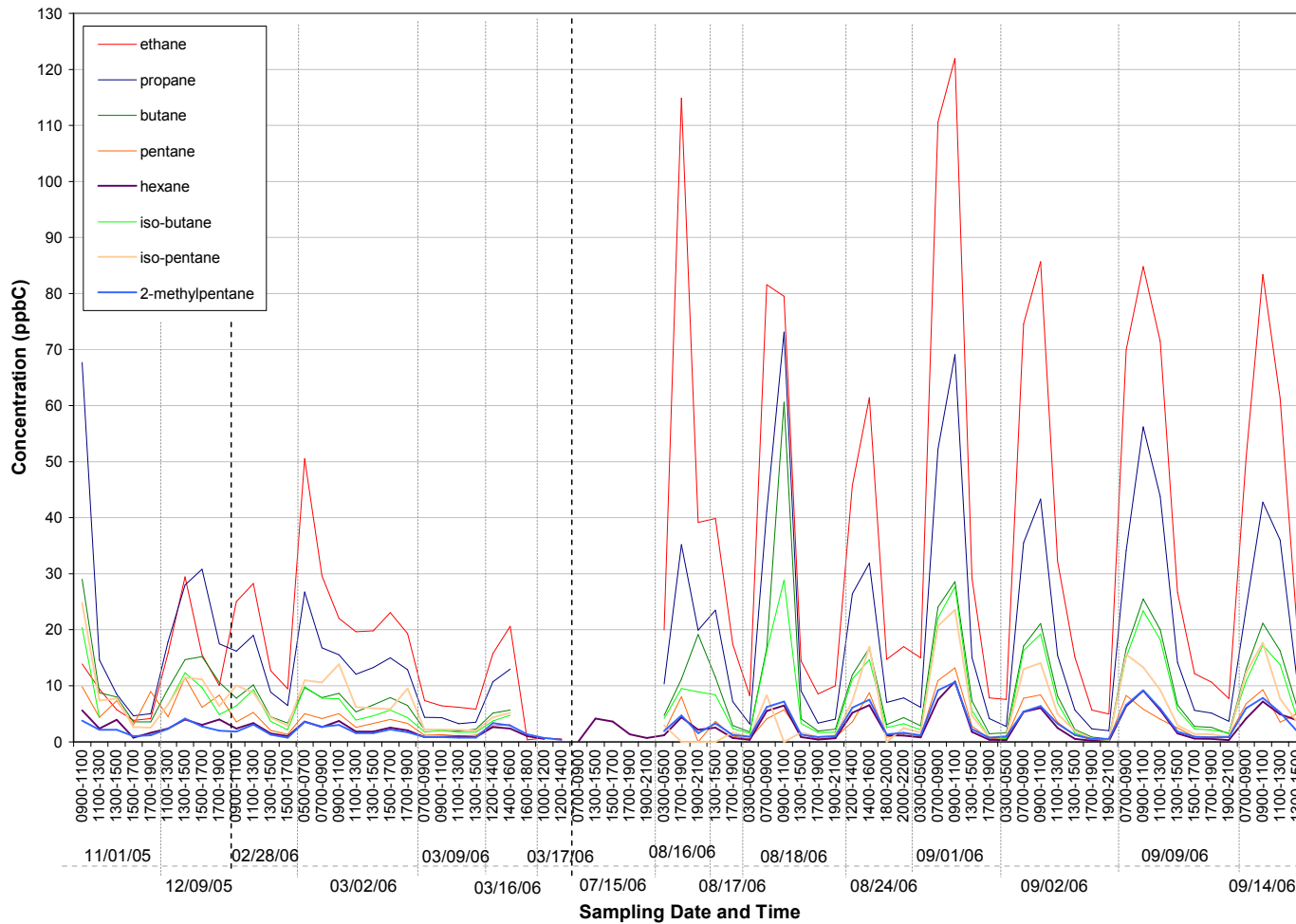
- Winter samples to understand high VOCs at night
- Most frequently detected VOCs are **alkanes**
- Alkanes similar to those detected in summer
- No isoprene in winter

Compound	Top5 Frequency	Max	Median
Ethane	27	50.5	13.9
Propane	26	67.7	13.1
butane	23	29.0	7.2
Isopentane	19	24.8	6.3
Isobutane	9	20.4	4.7
Cis-2-pentene	6	15.0	4.2
Ethylene	5	7.3	3.1
pentane	5	8.9	3.8
1-pentene	5	10.0	4.1
Beta-pinene*	4	13.5	1.3
2-methylpentane	3	1.3	1.8
Trans-2-pentene	2	5.3	4.9

* Indicates biogenic species

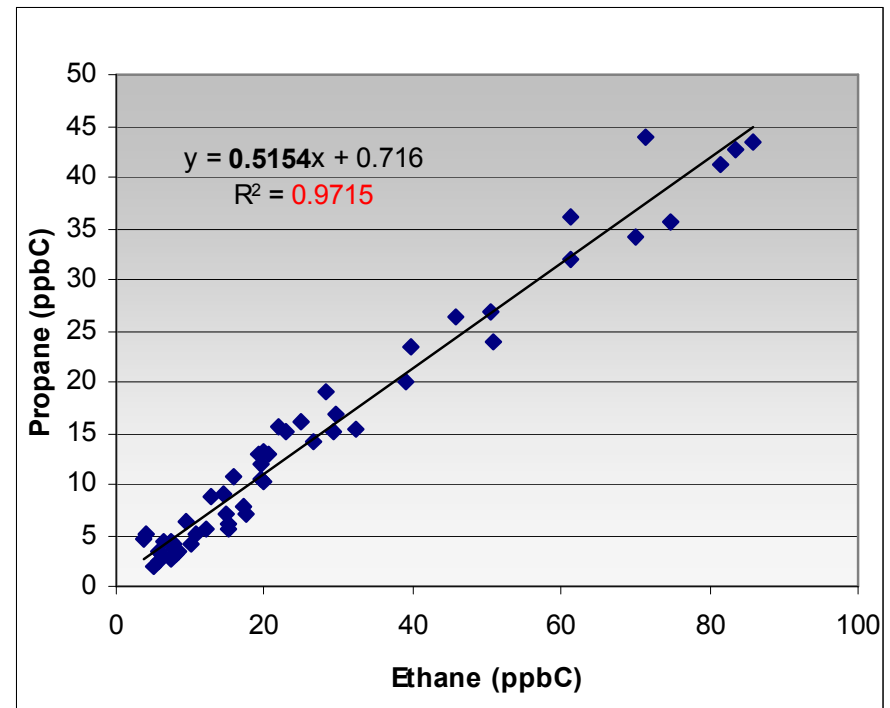
Time Series of Alkane Concentrations

- Alkanes vary together



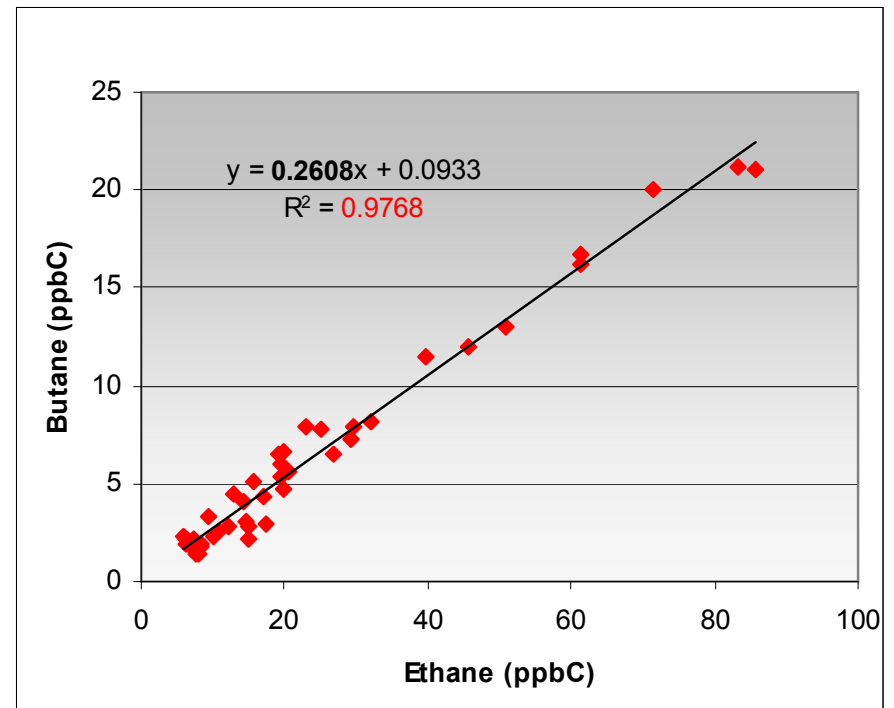
How do Alkanes Vary Together?

- Regression analysis
- Each point represents one sample
- Excellent correlation (0.97) between ethane and propane
- Ethane is the second largest component of natural gas
- Propane also from natural gas



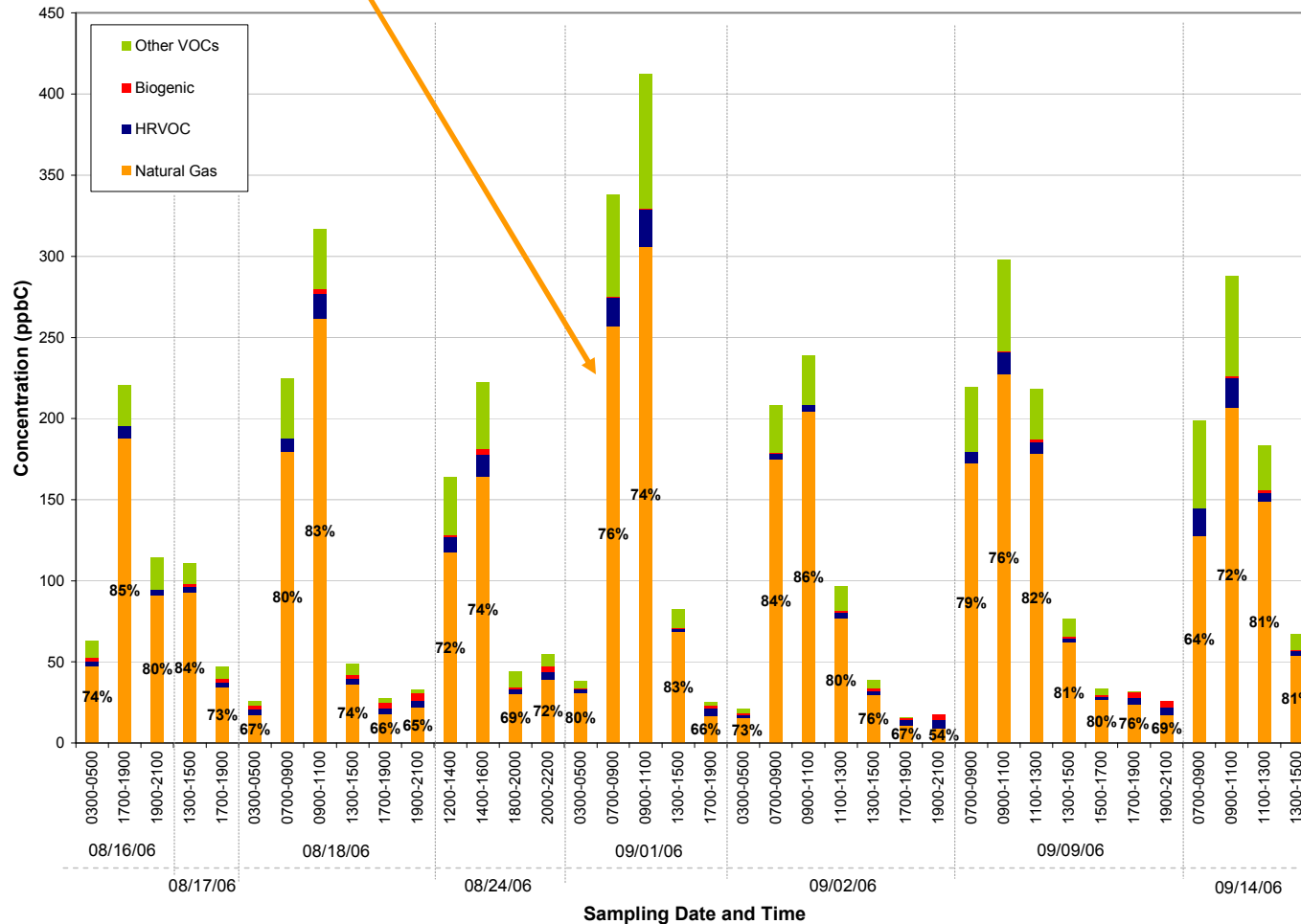
Correlation Between Alkanes

- Ethane and butane very well correlated (0.98)
- Similar results for pentane and hexane
- Alkanes vary together
- Suggests contribution from natural gas production



Summer 2006 VOC Percent Composition

- Alkanes dominate the total VOC profile



Summary

- Alkanes consistent with composition of natural gas are the most frequently detected VOCs at Longview
- Natural gas has a very low ozone-forming tendency
- Biogenic contribution small at CAMS 19, but airfield is not representative of the regional biogenic contribution
- HRVOC contribution is variable, and infrequent canister samples may miss maximum impacts

Further Work

- Use EPA's Model UNMIX to improve fingerprinting
- VOC sampling continues in 2007
- Test different technology
- Update conceptual model of ozone formation