

Analysis of 2006 VOC Data from Longview

Presentation to the NETAC
Technical Committee

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Summary

- VOC samples were collected at Longview (CAMS 19) on ozone action days in 2006
 - 38 two hour canister samples analyzed by GC-MS
- Goal to improve understanding of ozone formation
- Results analyzed and summarized in a memorandum to NETAC (Enclosure TC3)
- Natural Gas dominates VOCs, but has low ozone forming potential
- Biogenic and highly-reactive VOCs (HRVOCs) are important when accounting for ozone reactivity
- HRVOCs are highly variable

VOCs from Natural Gas Vary Together

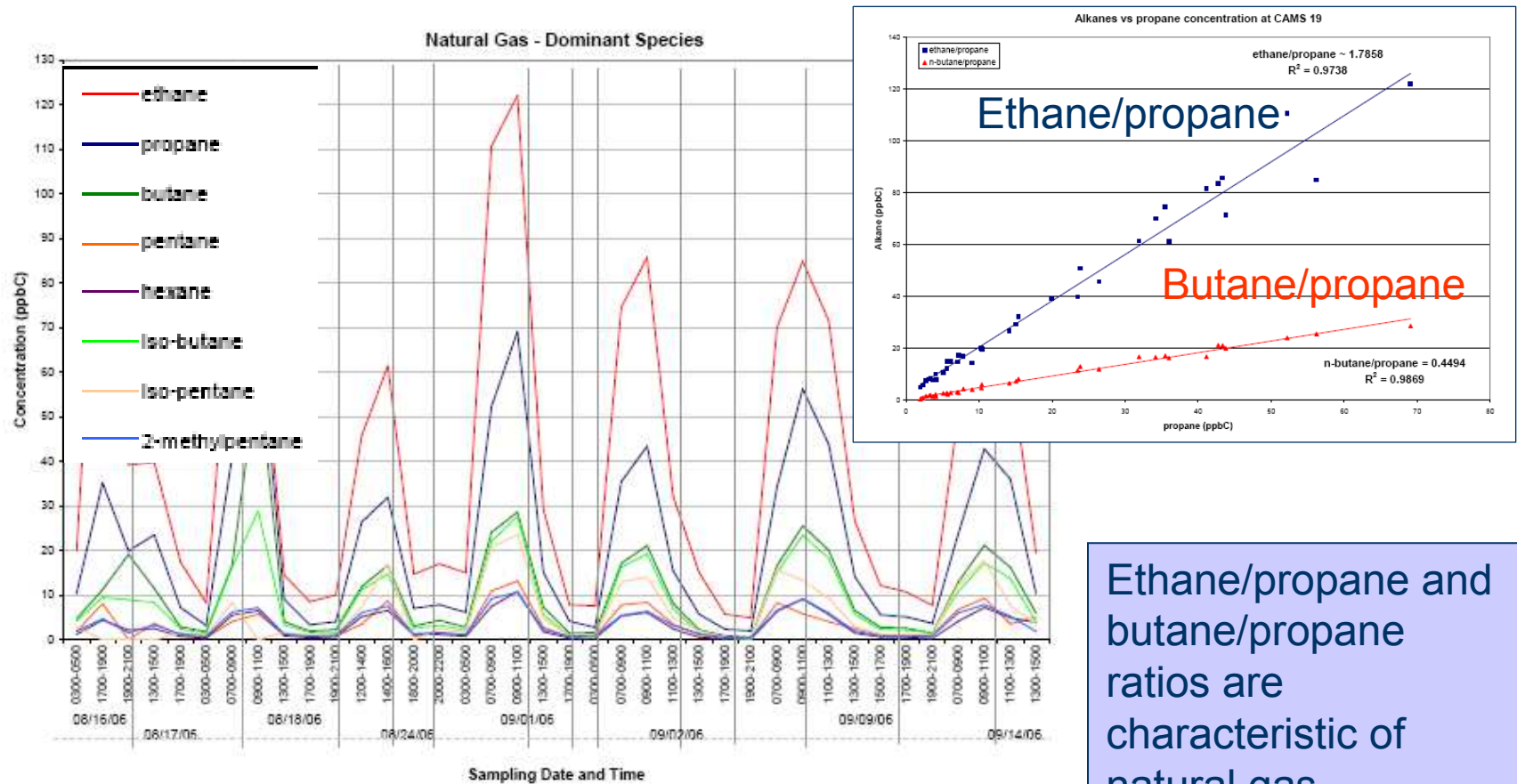
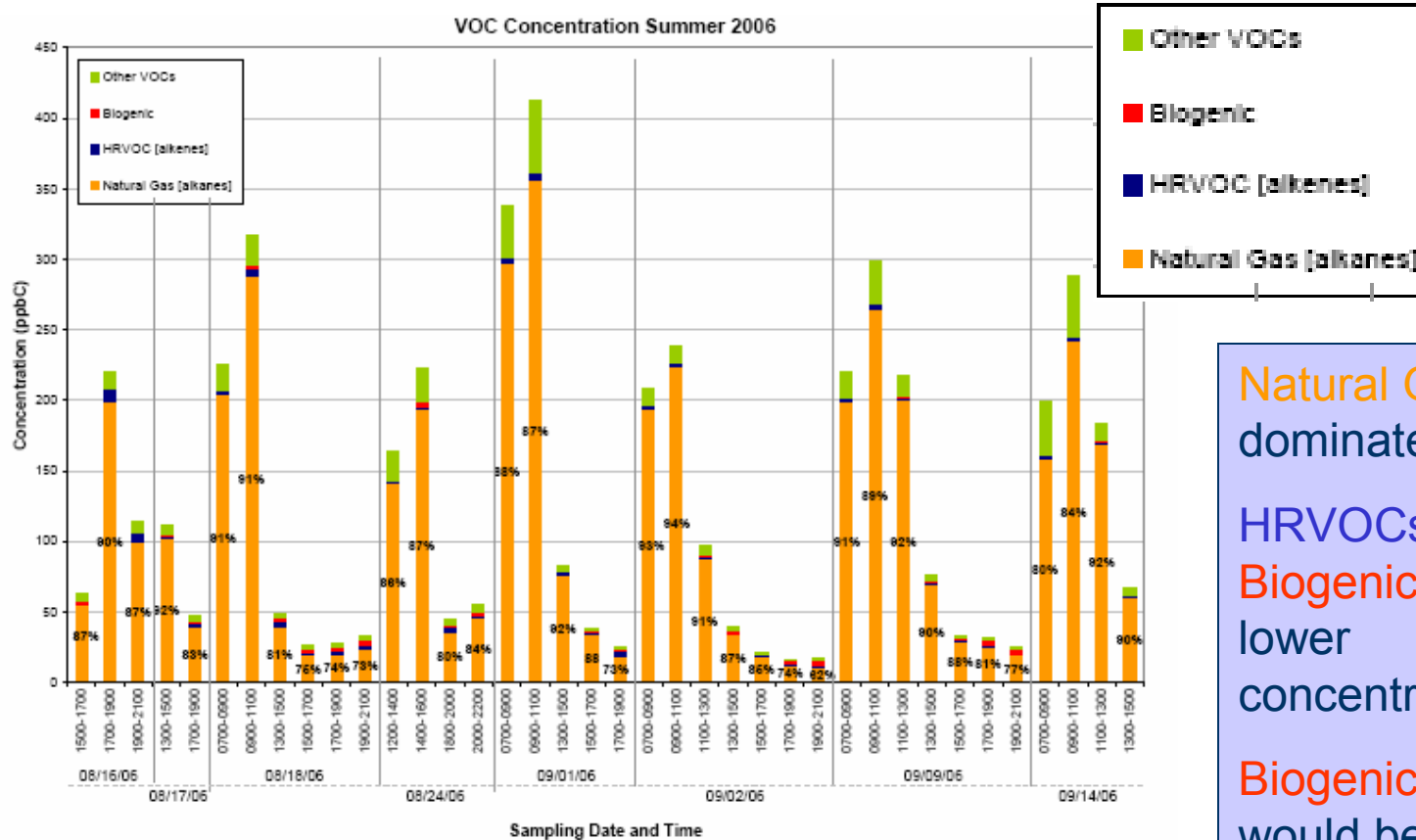


Figure 1. Time series of species that are the dominant components of natural gas from VOC samples collected at Longview (CAMS 19) during August-September, 2006.

Ethane/propane and butane/propane ratios are characteristic of natural gas

Categorized VOC Concentrations



Natural Gas dominates

HRVOCs and Biogenics have lower concentrations

Biogenics would be larger at forest sites

Figure 3. Total VOC concentration of VOC species in each category from samples collected at Longview (CAMS 19) during August-September, 2006. Percentages show contribution to total concentration from constituents of natural gas.

Ozone Forming Potential

- Natural gas concentrations are high, but VOCs in gas have low ozone forming potential or “reactivity”
- Biogenics and HRVOCs have lower concentrations but higher reactivity
- Use “MIR” factors to approximate reactivity difference:
 - MIRs are calculated using a simple model

Table 4. Average incremental reactivity (MIR) factors for VOC categories at CAMS 19.

	Natural Gas	HRVOCs	Biogenic	Other VOC
Average VOC (ppbC)	113	2.32	1.61	11.4
Average potential ozone (ppb)	43.2	11.9	7.44	9.25
Average MIR factor (ppb/ppbC)	0.38	5.1	4.6	0.81

- Ozone Potential = VOC x MIR
 - a simple estimate of the amount of ozone that *could be formed* by the VOCs in each sample under *optimum conditions*
 - *Optimum NOx*
 - Note that ozone generally is limited by NOx in East Texas

Ozone Forming Potential of VOC Samples

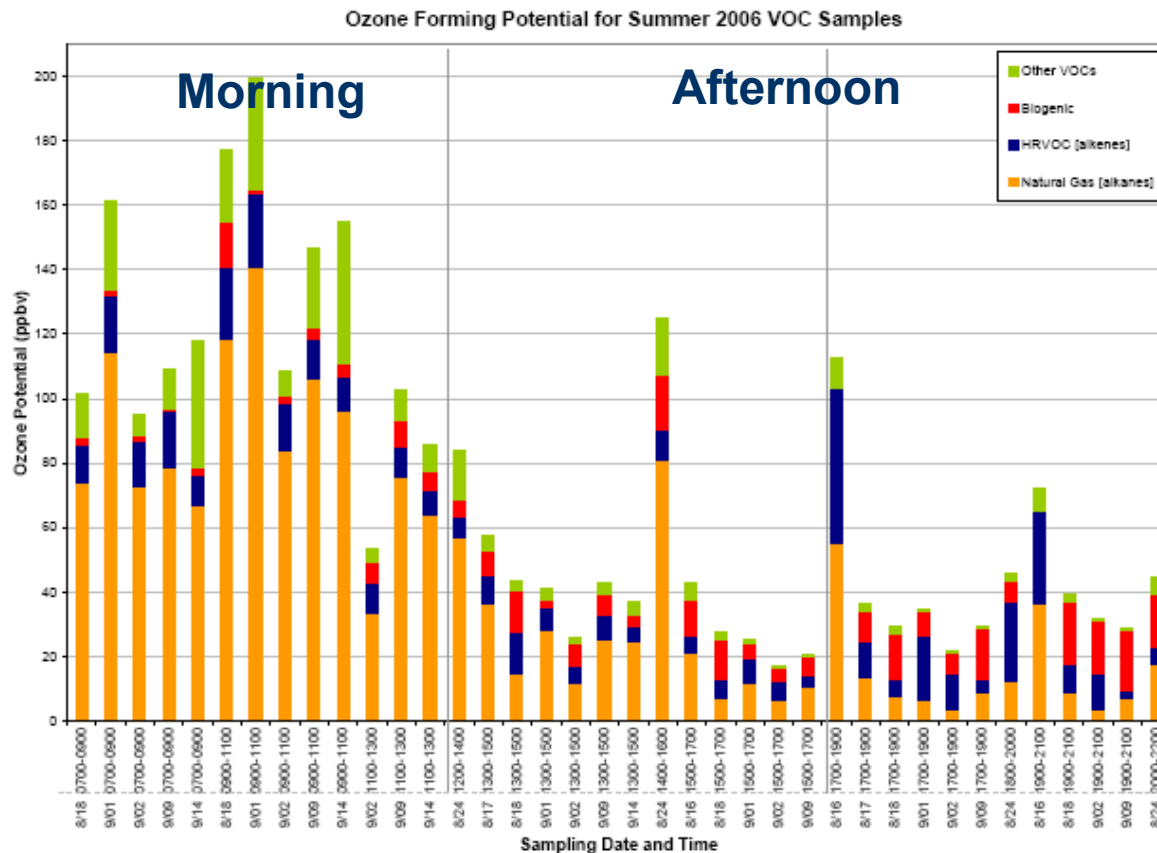


Figure 5. As in Figure 4, except that the samples are arranged by time of day, with morning samples on the left, afternoon samples in the middle and evening samples on the right.

HRVOCs and Biogenics also important after accounting for reactivity

Biogenics become more important later in day

HRVOC contribution is variable, and therefore hard to characterize well

High-frequency measurement method desirable