

The Source of the Hoxbar Oils based on their Geochemical Characteristics.

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**Note – this is a preliminary version and may
be revised prior to the workshop presentation**

Overview

- **The Pennsylvanian (Missourian) Hoxbar Group of rocks is economically important to the Oklahoma petroleum industry.**
- **Few papers have discussed possible source rocks for the oils, but overlying Pennsylvanian aged shales or underlying Ordovician aged Arbuckle Group have been mentioned.**
- **Geochemical data from 16 oils produced from the Hoxbar Group in Grady County will be described.**
- **Based on the geochemical characteristics possible source rocks for these oils will be discussed.**
- **The case for the Woodford being responsible for at least some of the oil produced from these sands will be discussed.**
- **At this point the case is based entirely on the geochemical data, future work should incorporate the results into petroleum system models.**

Goals of Study

- **Are all 16 Oils in study derived from the same source?**
- **Are the oils in the Marchand and Medrano Sands of a similar source?**
- **What is the source(s)?**
- **Possible sources-Pennsylvanian, Mississippian; Devonian, Ordovician.**
- **Mixed sources?**

Stratigraphic Column

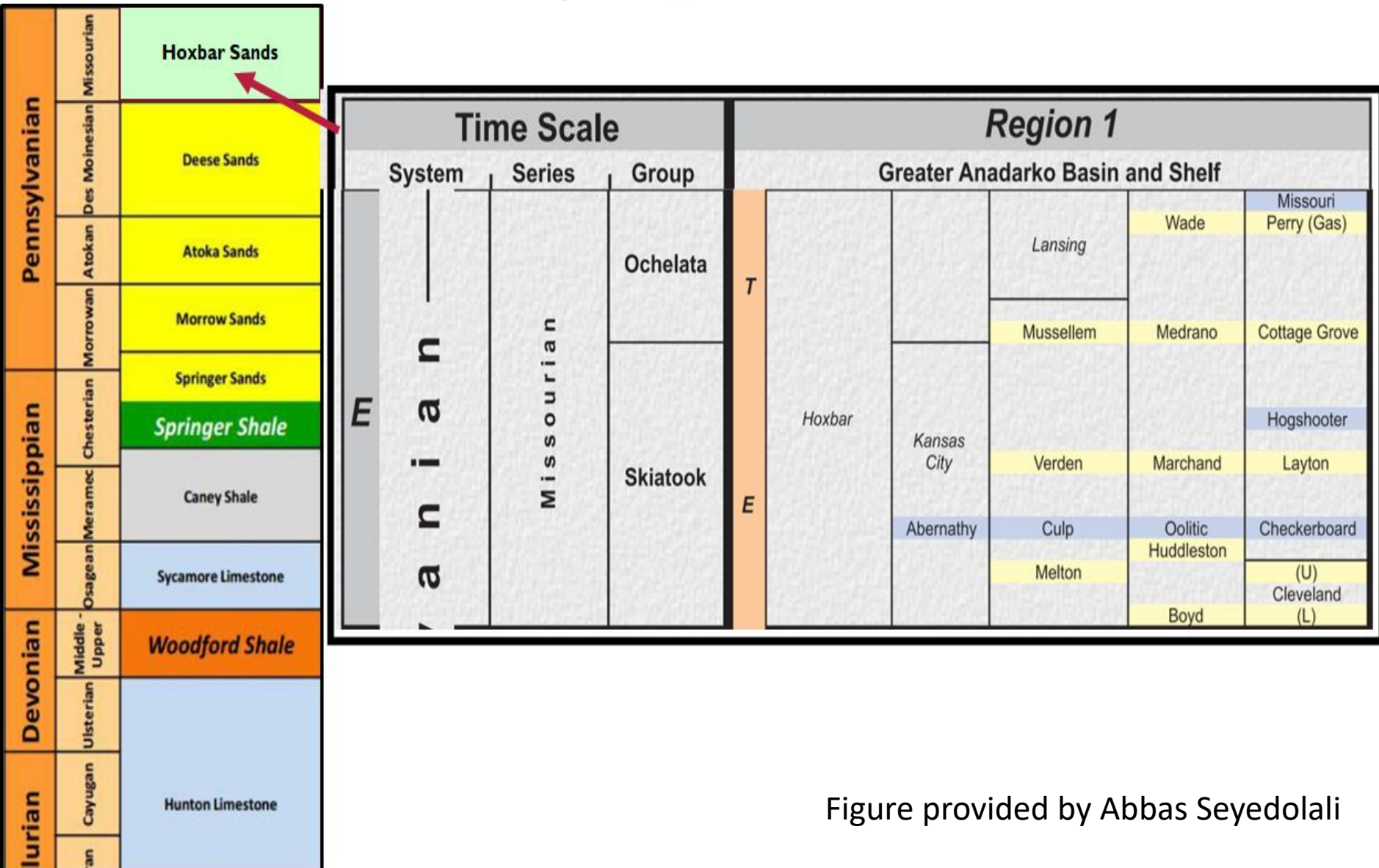
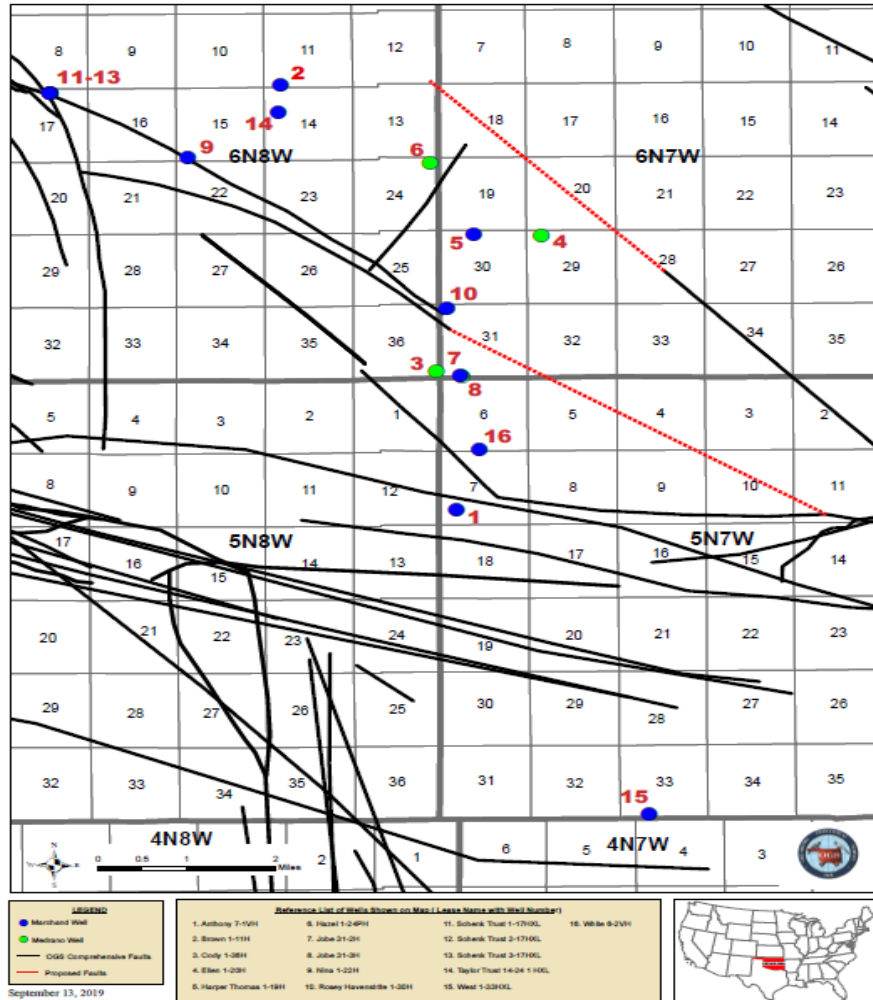


Figure provided by Abbas Seyedolali

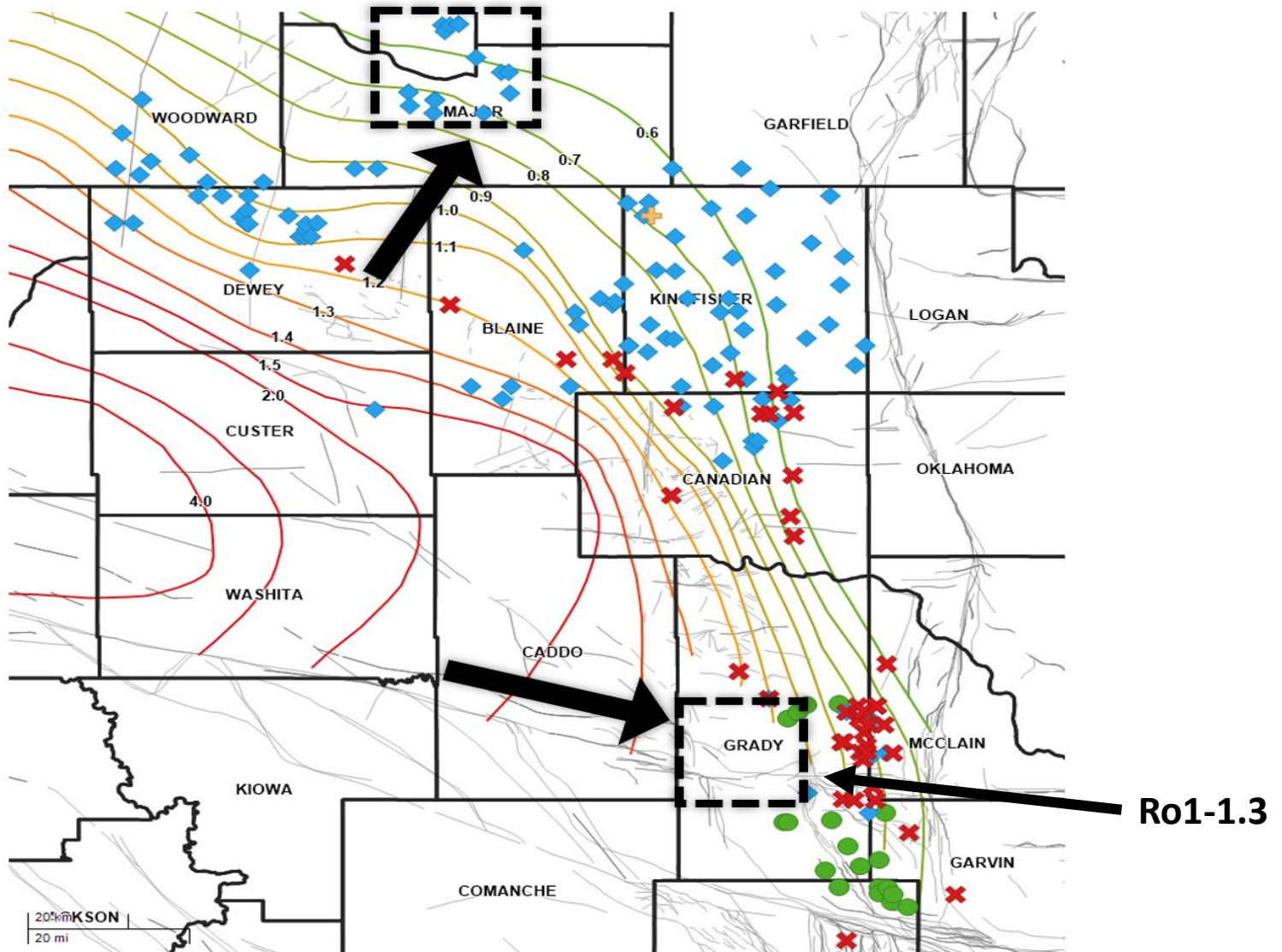
Samples and Locations



**Location of Analyzed Marchand and Medrano Wells
for Grady County, OK**

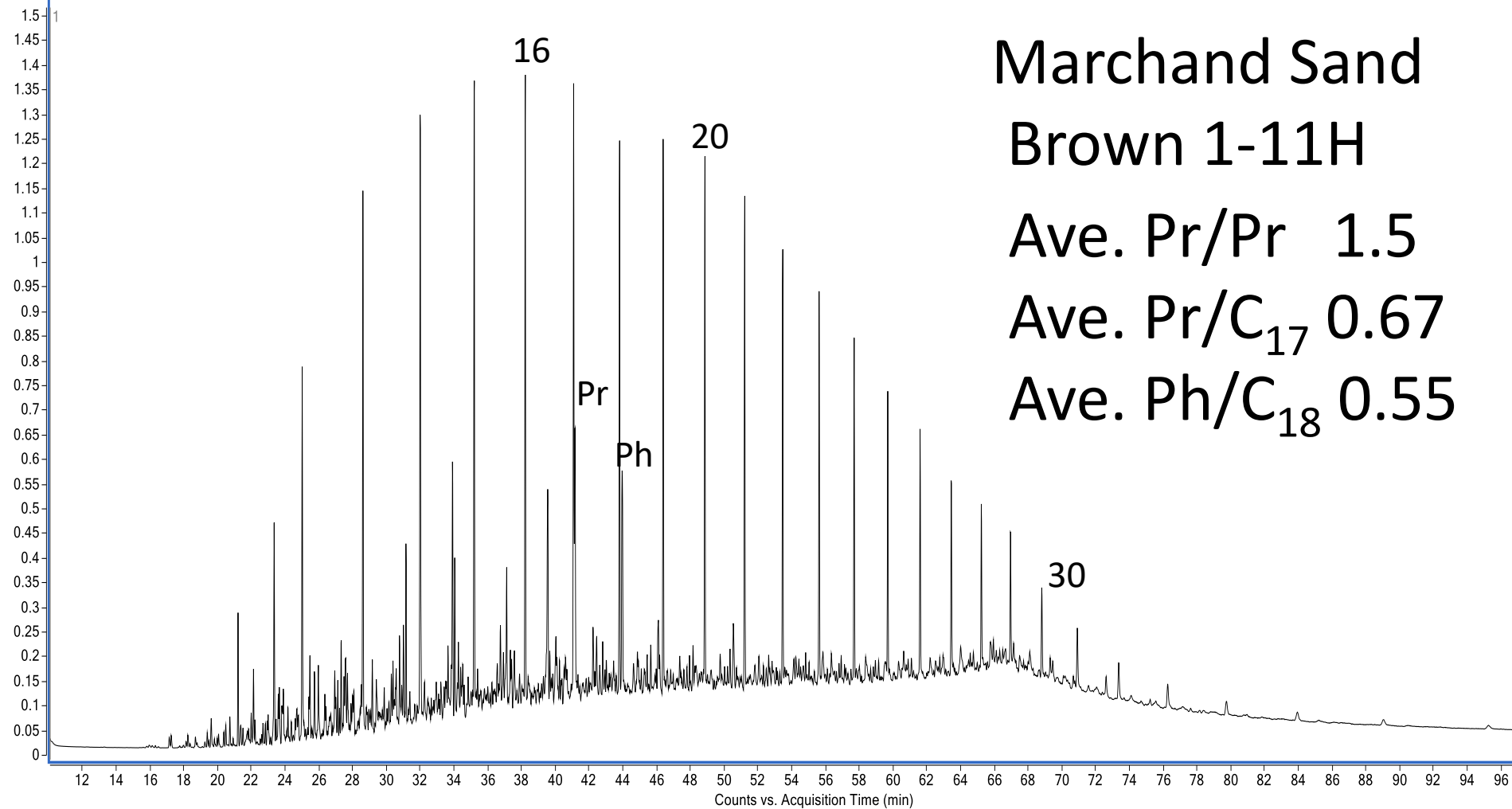
Oil Sample	Well Name
Medrano 1	Hazel 1-24PH
Marchand 2	Rosey Havenstrite 1-30H
Marchand 3	White 6-2VH
Medrano 4	Cody 1-36H
Marchand 5	Taylor Trust 14/24 1HXL
Marchand 6	Brown 1-11H
Marchand 7	Nina 1-22H
Medrano 8	Jobe 31-3H
Marchand 9	Schenk Trust 2-17HXL
Marchand 10	Schenk Trust 3-17HXL
Marchand 11	West 1-33HXL
Marchand 12	Jobe 31-2H
Marchand 13	Harper Thomas 1-19H
Medrano 14	Ellen 1-20H
Marchand 15	Schenk Trust 1-17HXL
Marchand 16	Anthony 7-1VH

Sample Locations



n-Alkane Distributions

x10⁵ + TIC SIM OGS11210.D

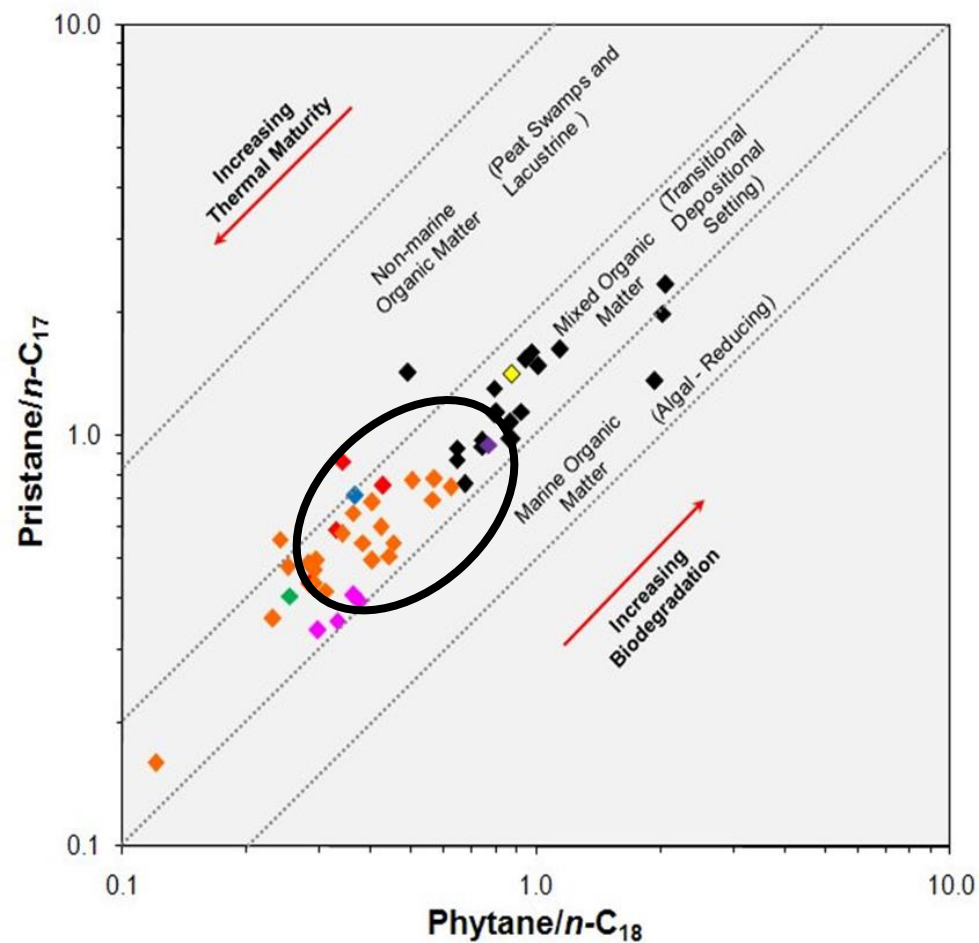


N-Alkane and Isoprenoid Ratios

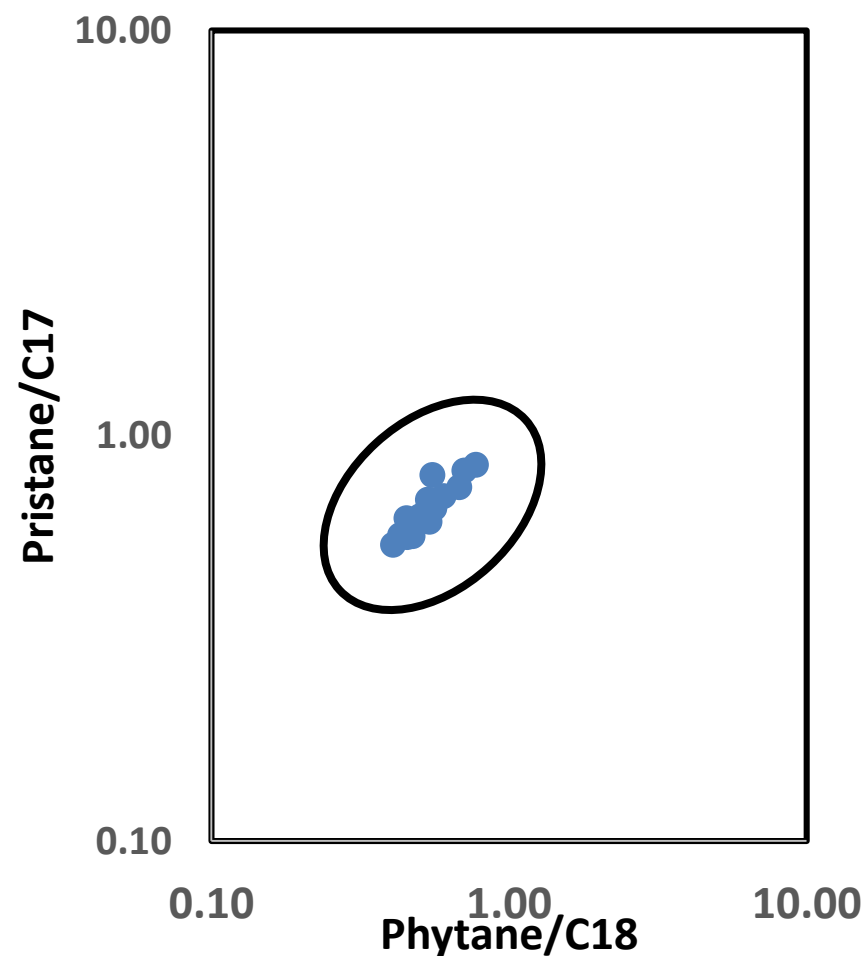
	Pr/Ph	Pr/C17	Pr/C18
#1	1.74	0.63	0.45
#2	1.47	0.66	0.56
#3	1.26	0.82	0.71
#4	1.56	0.69	0.53
#5	1.23	0.85	0.78
#6	1.38	0.61	0.54
#7	1.42	0.56	0.47
#8	1.46	0.66	0.53
#9	1.45	0.56	0.45
#10	1.6	0.54	0.41
#11	1.5	0.63	0.50
#12	1.18	0.75	0.68
#13	1.42	0.63	0.53
#14	2.56	0.80	0.55
#15	1.53	0.57	0.43
#16	1.34	0.71	0.60

Pr/C₁₇ vs Ph/C₁₈

Woodford



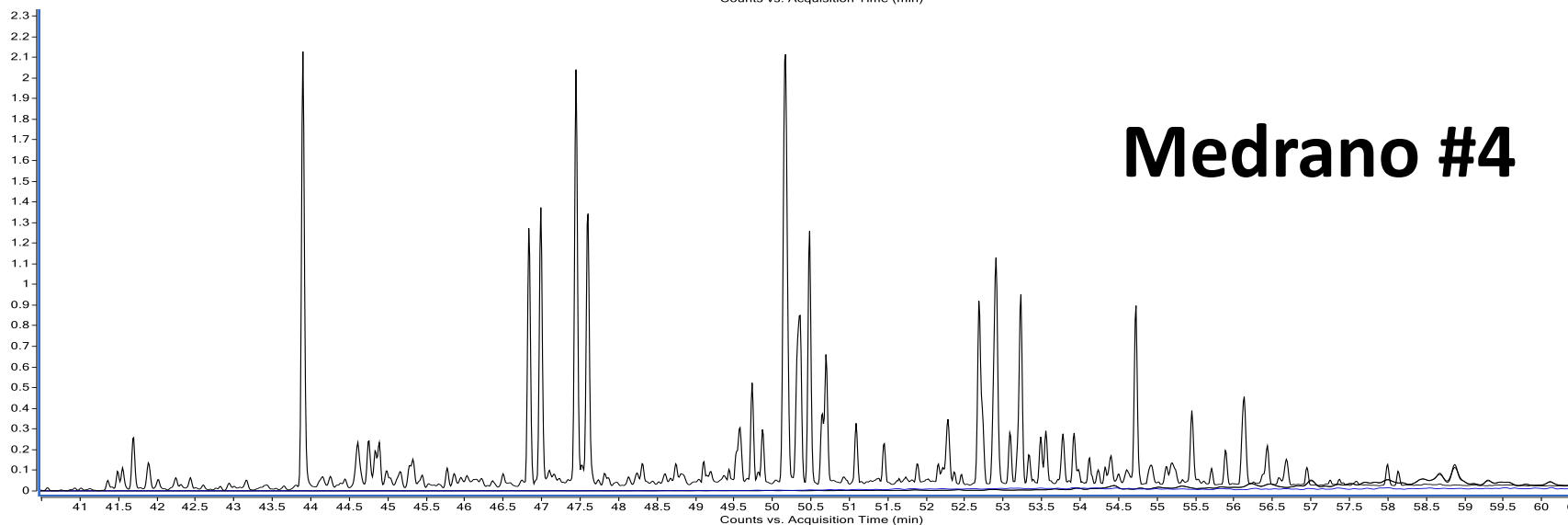
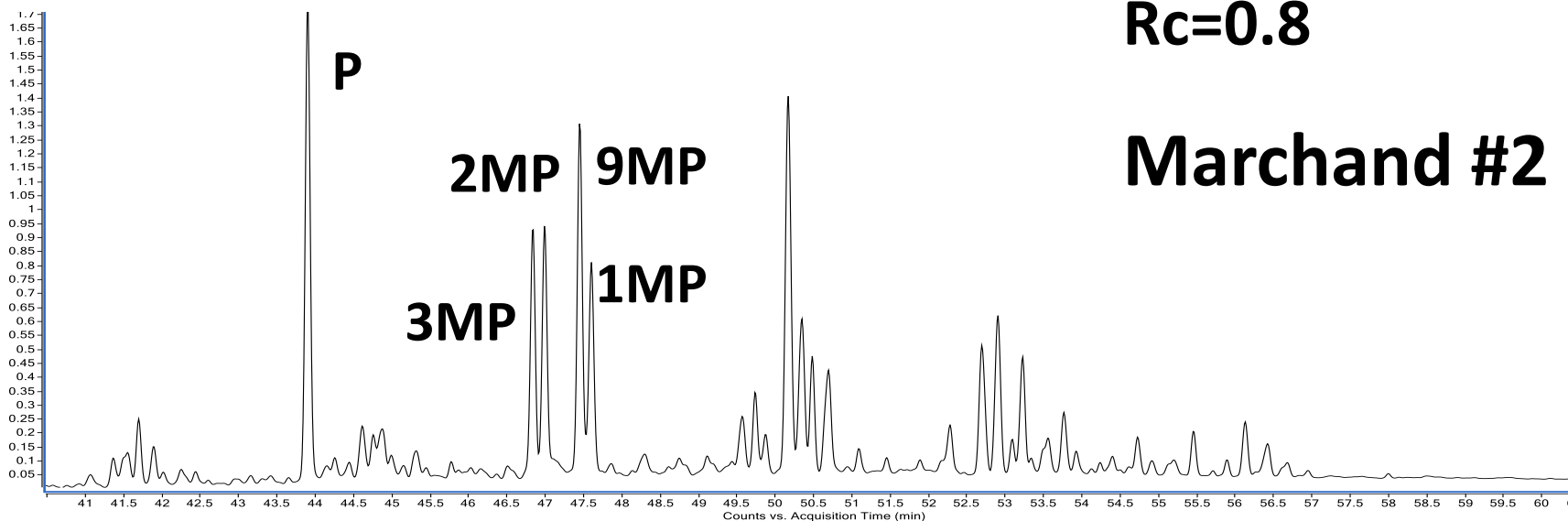
Hoxbar



Arylisoprenoids

- **A unique feature of the Woodford Shale and associated oils in Oklahoma is the presence of a family of compounds called carotenoids and associated arylisoprenoids.**
- **These compounds are associated with the presence of green sulfur bacteria growing under euxinic conditions.**
- **These compounds are not present in oils derived from other potential source rocks in Oklahoma such as the Springer, Caney, Viola or others.**

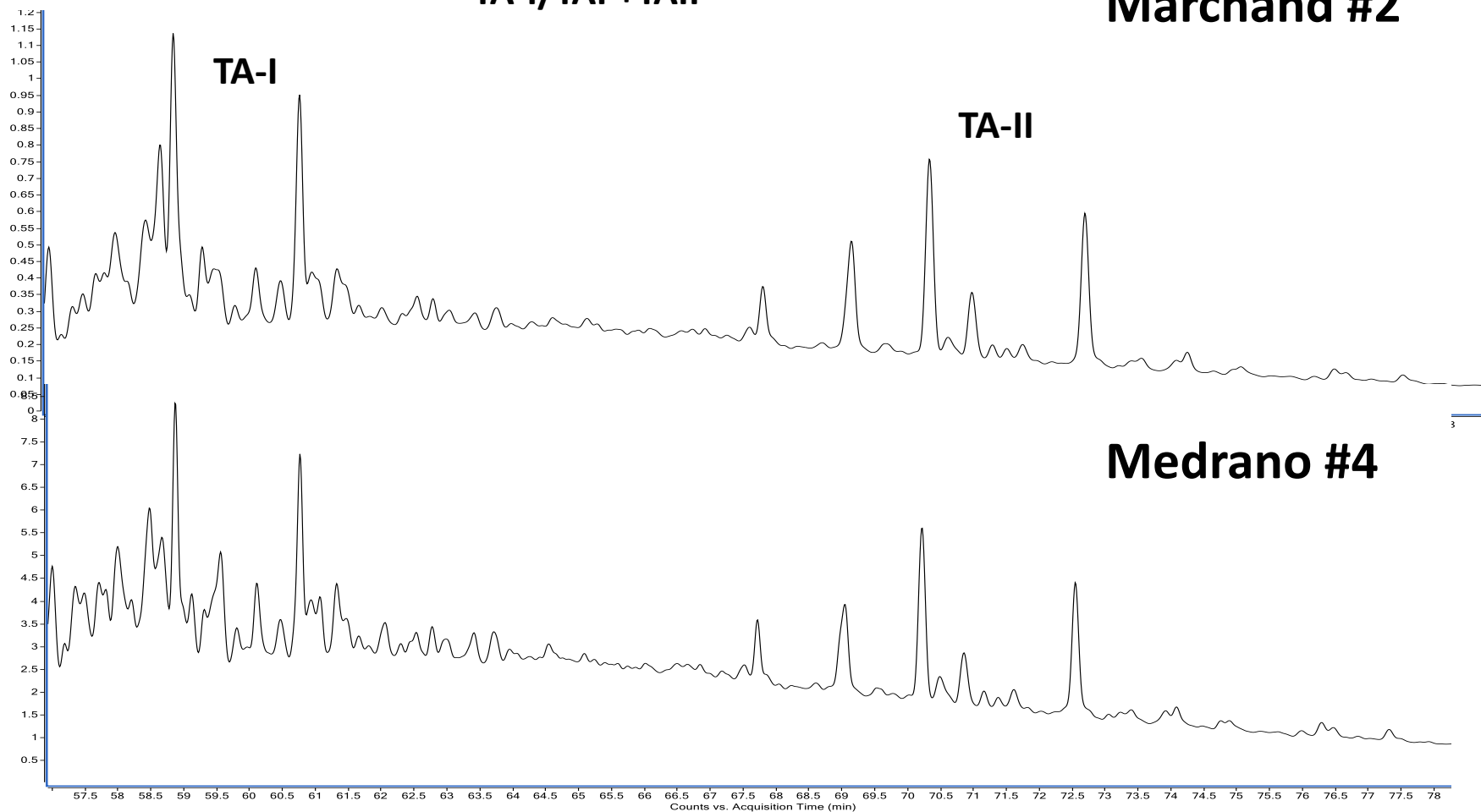
Maturity-Methylphenanthrenes



Maturity-Triaromatic Steranes

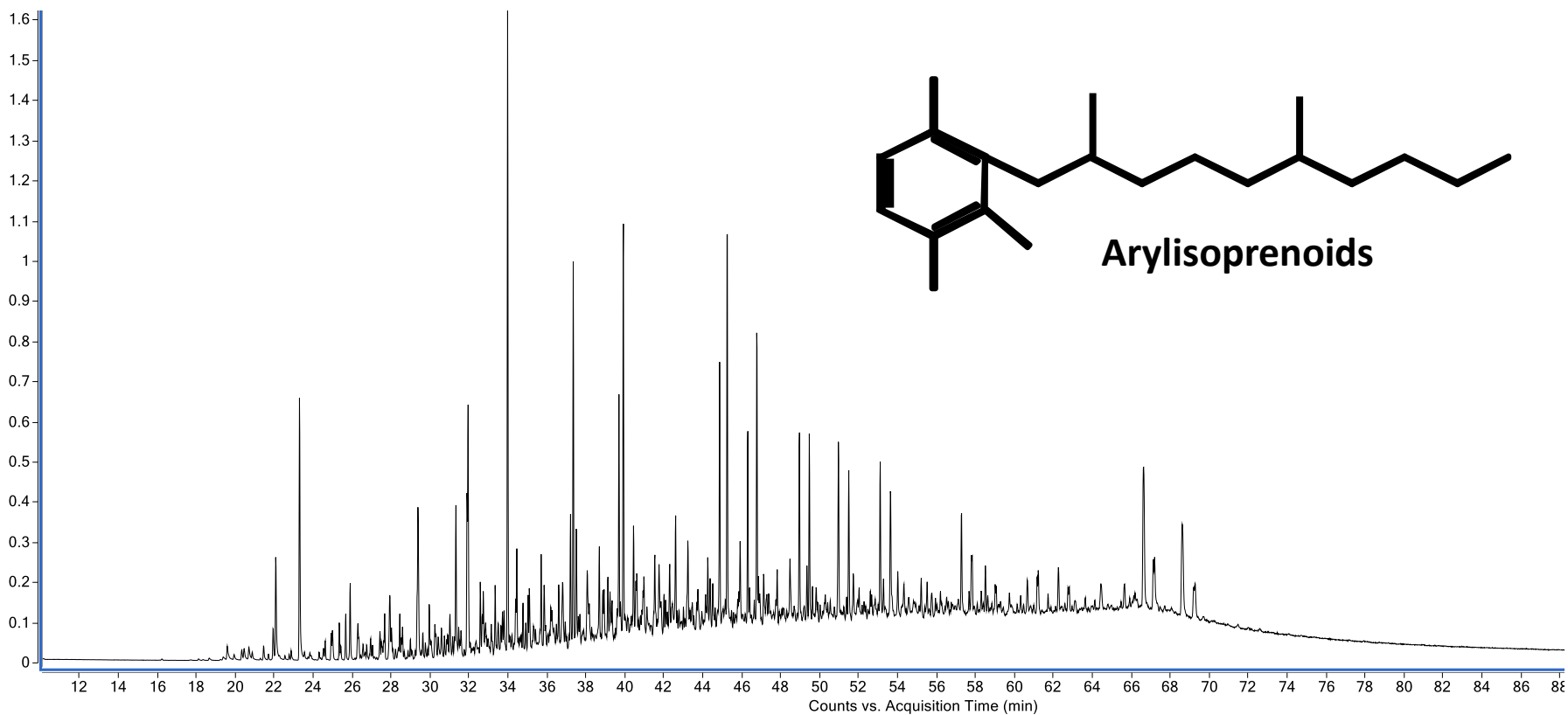
TA-I/TAI +TAII

Marchand #2

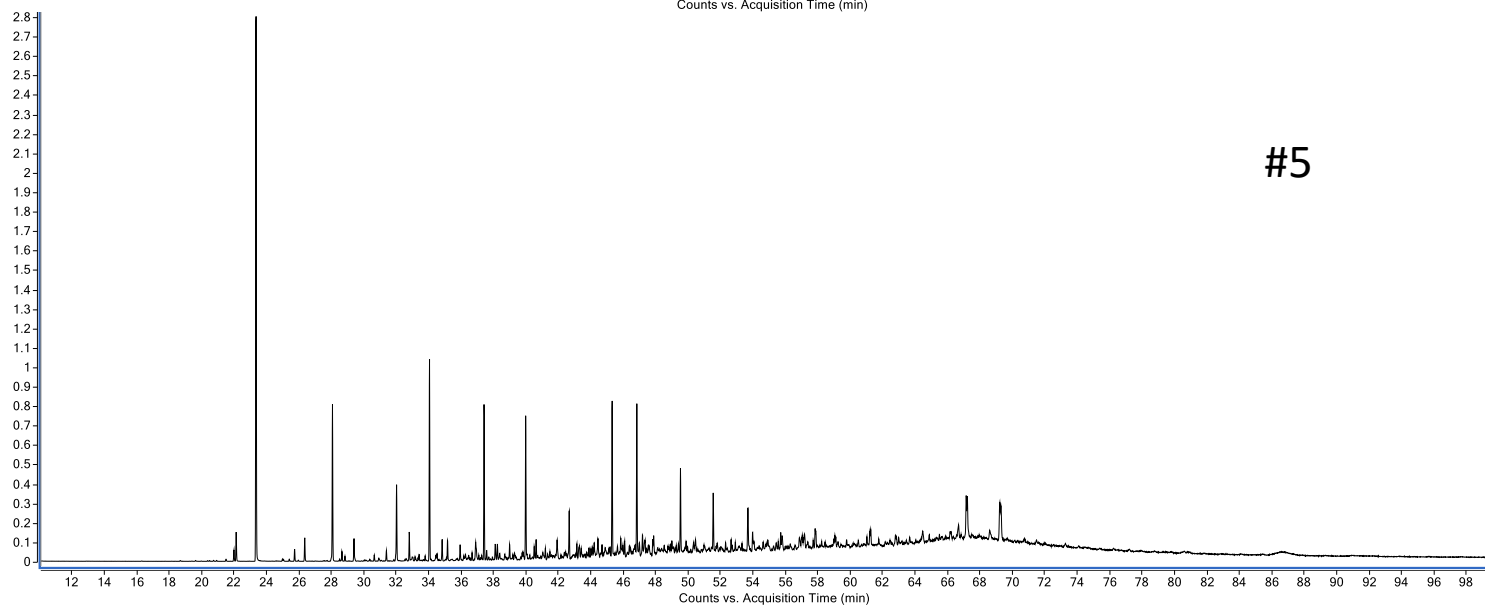
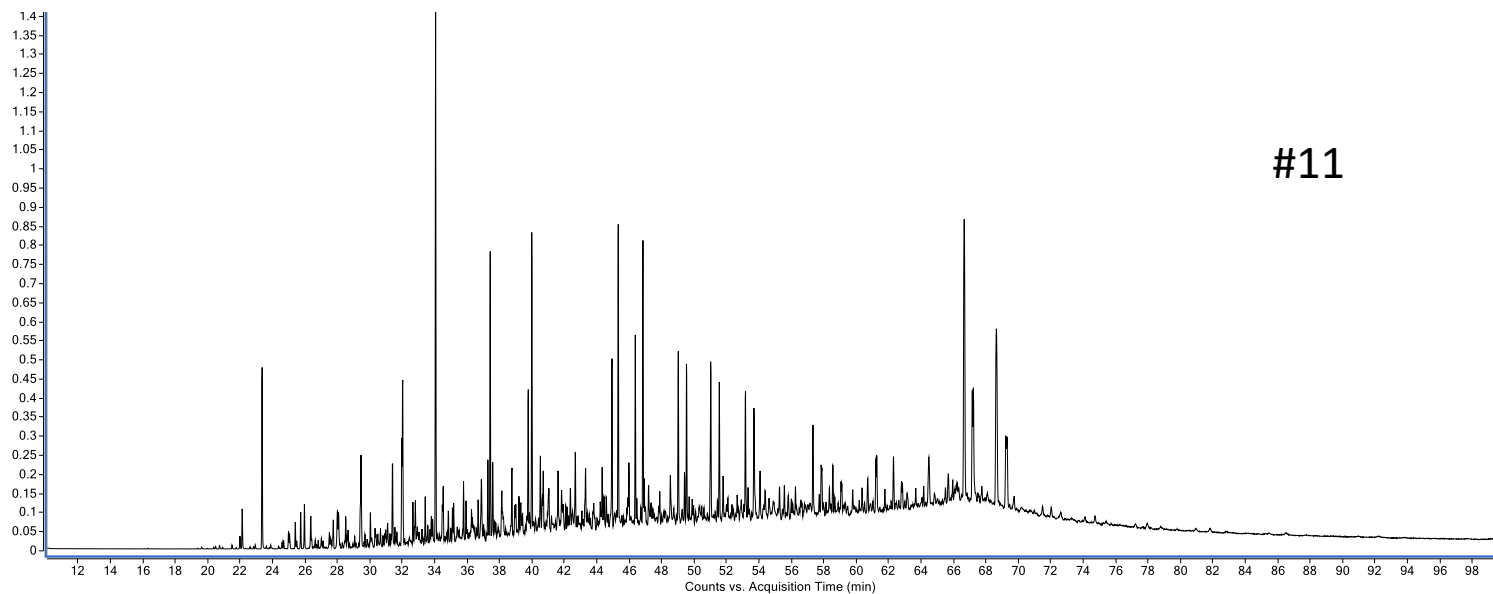


Arylisoprenoids

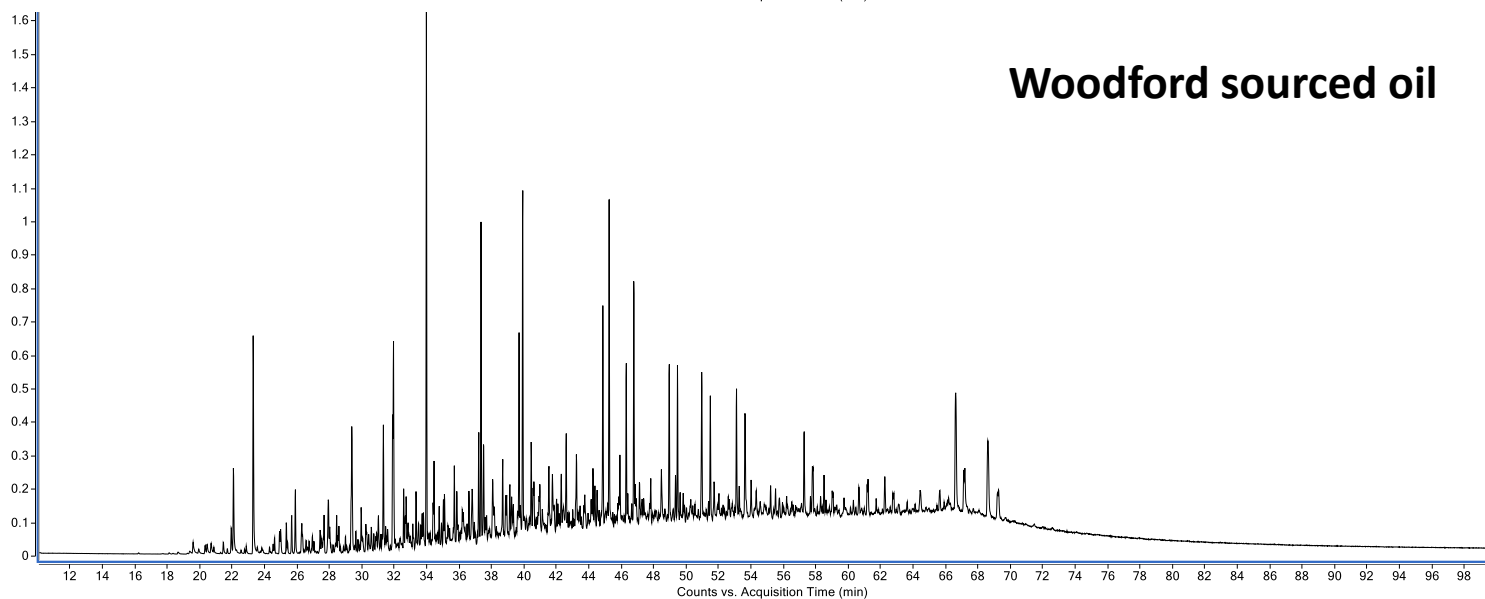
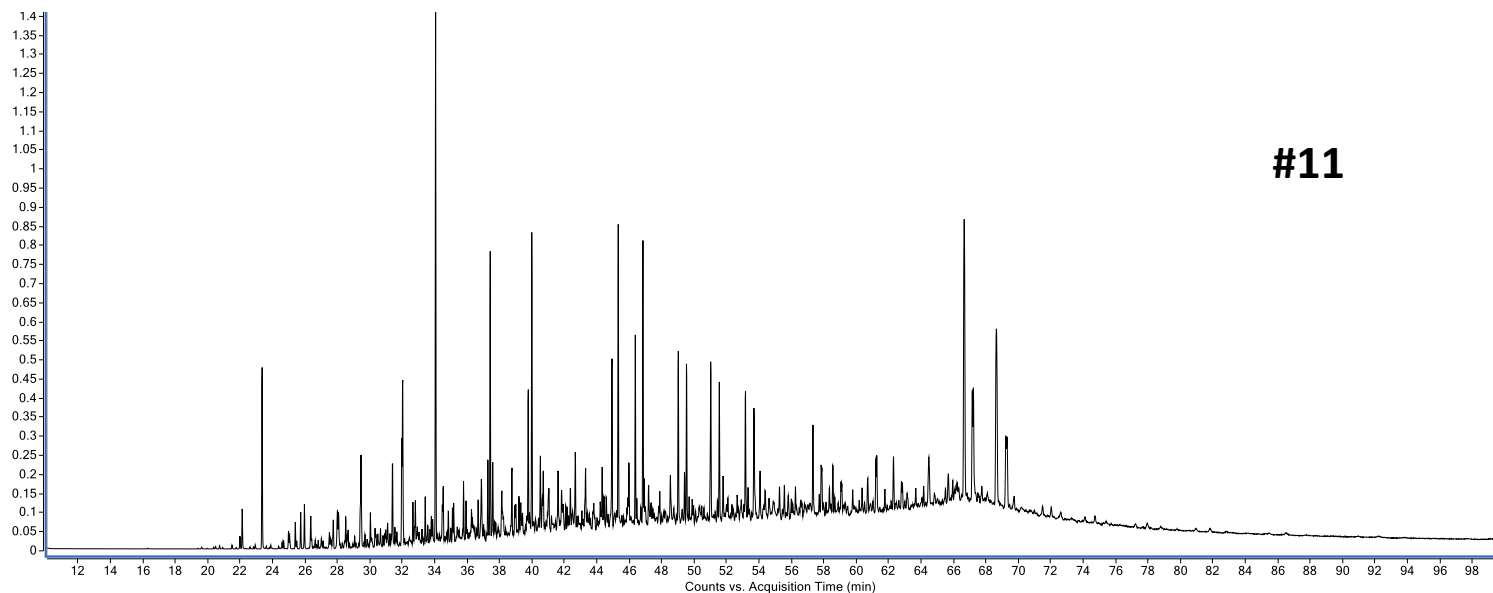
Woodford sourced oil



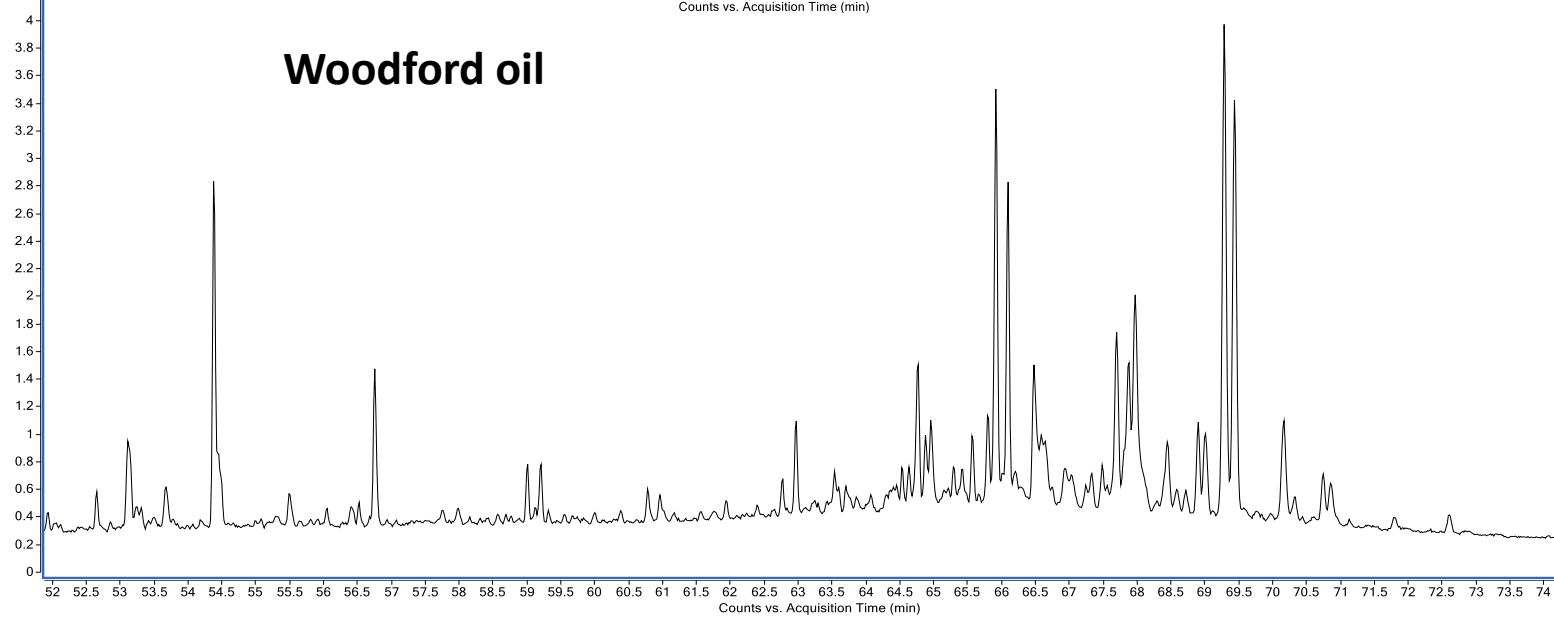
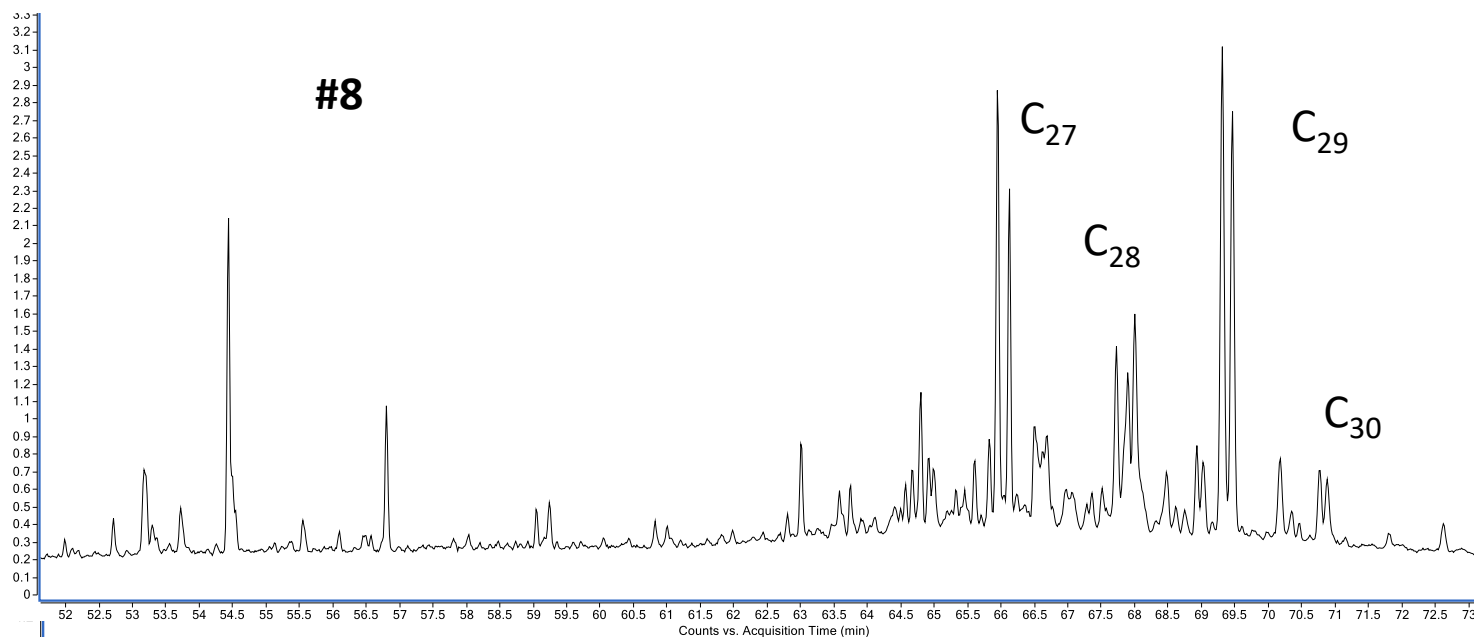
Arylisoprenoids



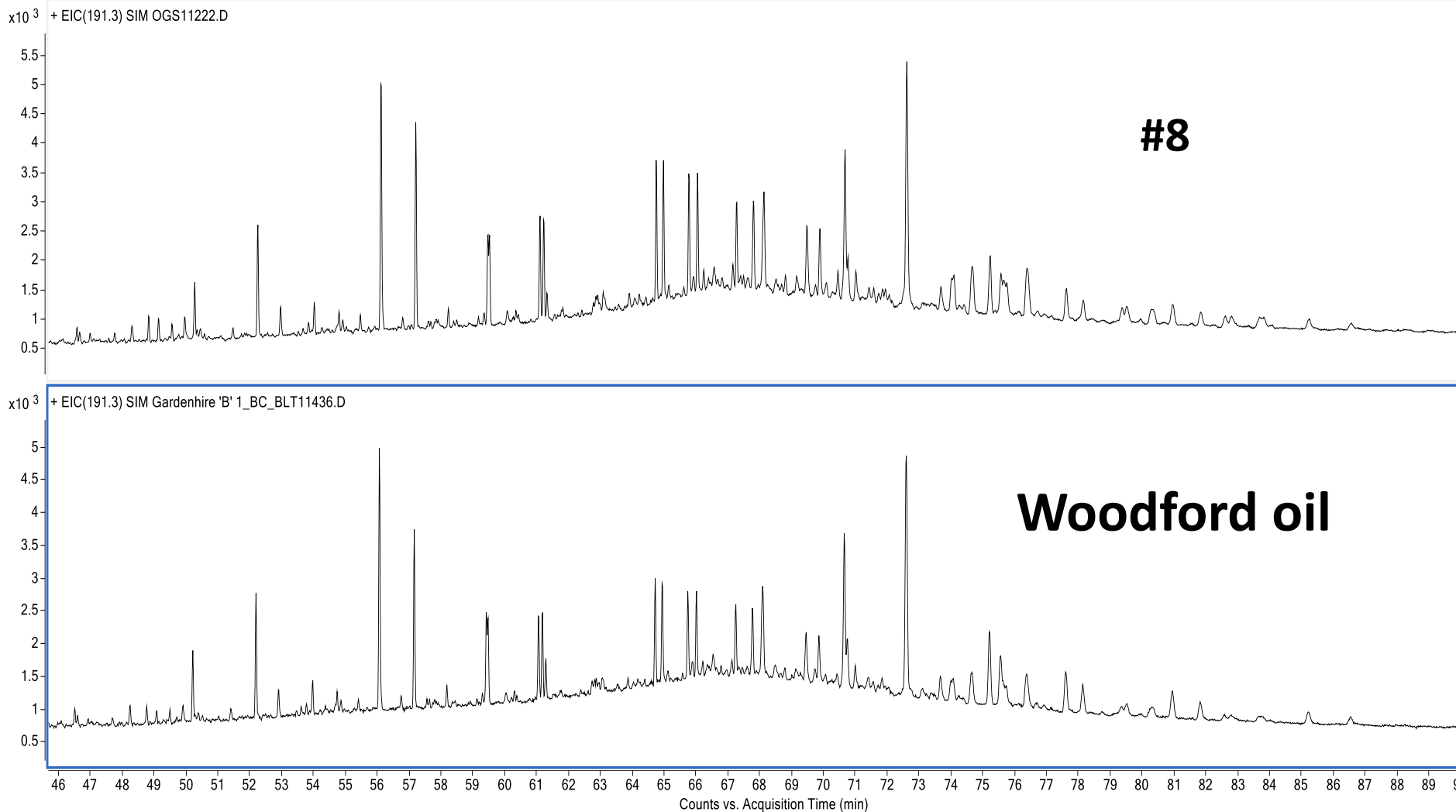
Arylisoprenoids



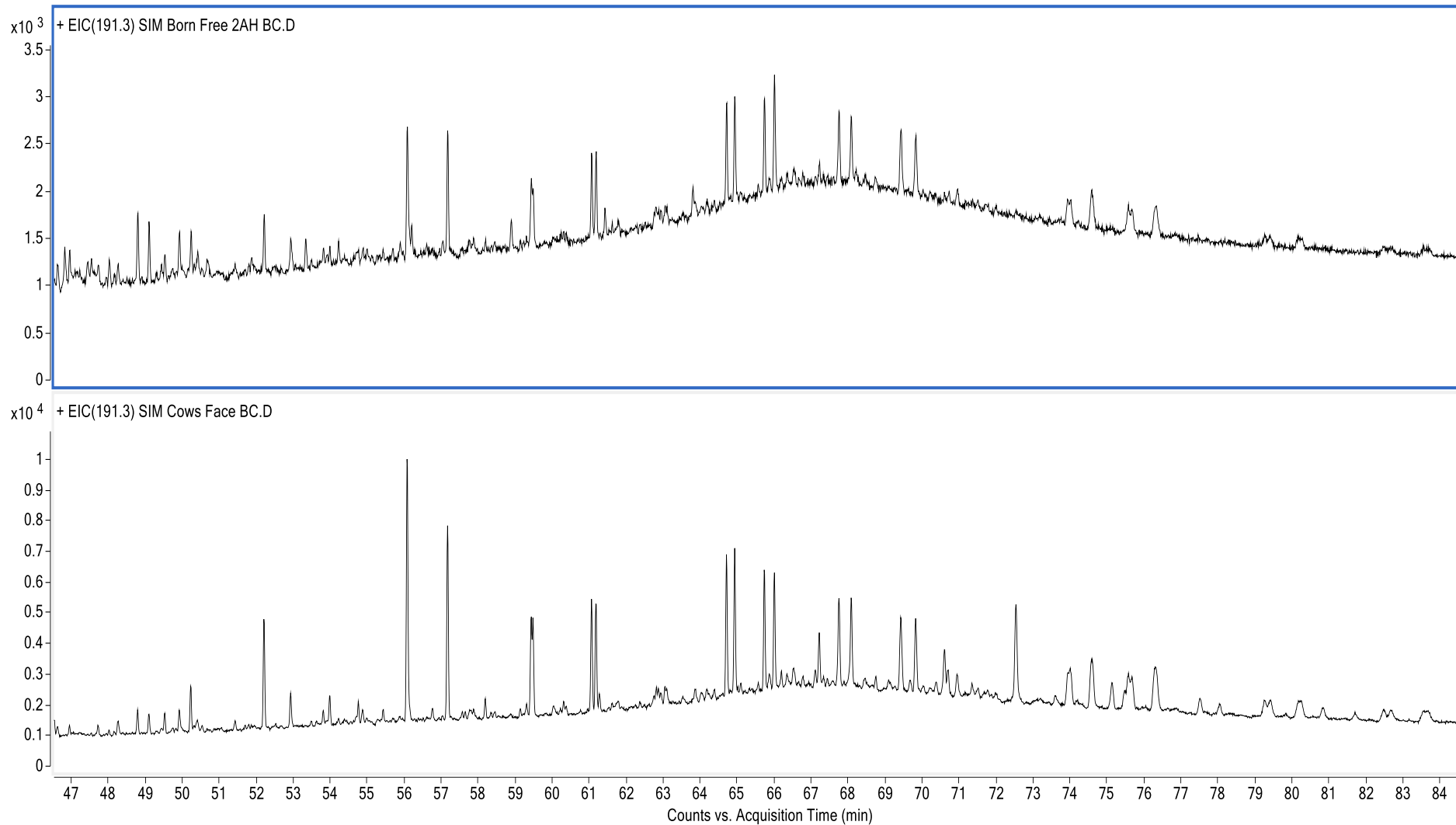
Steranes



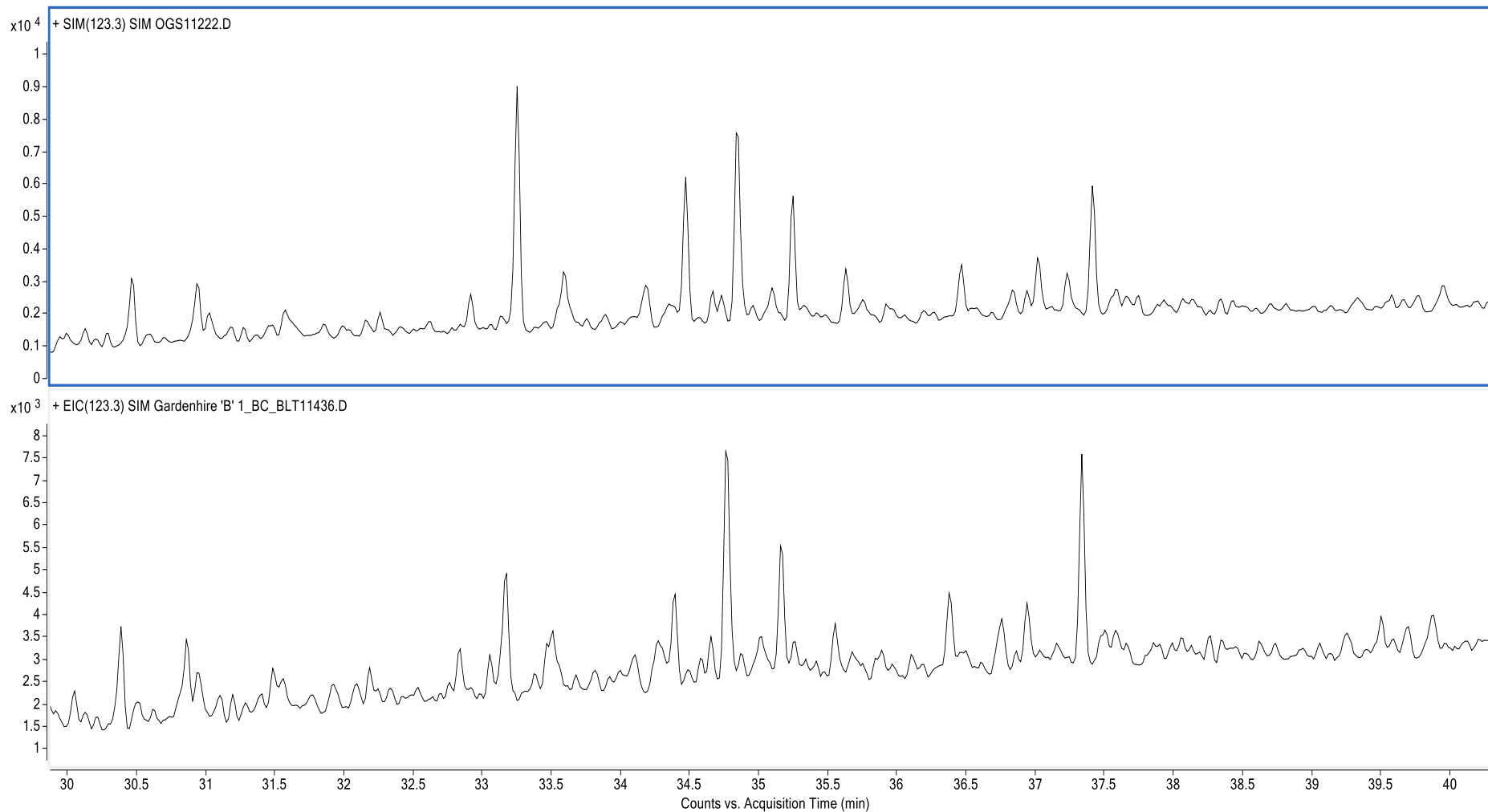
Terpane Distributions



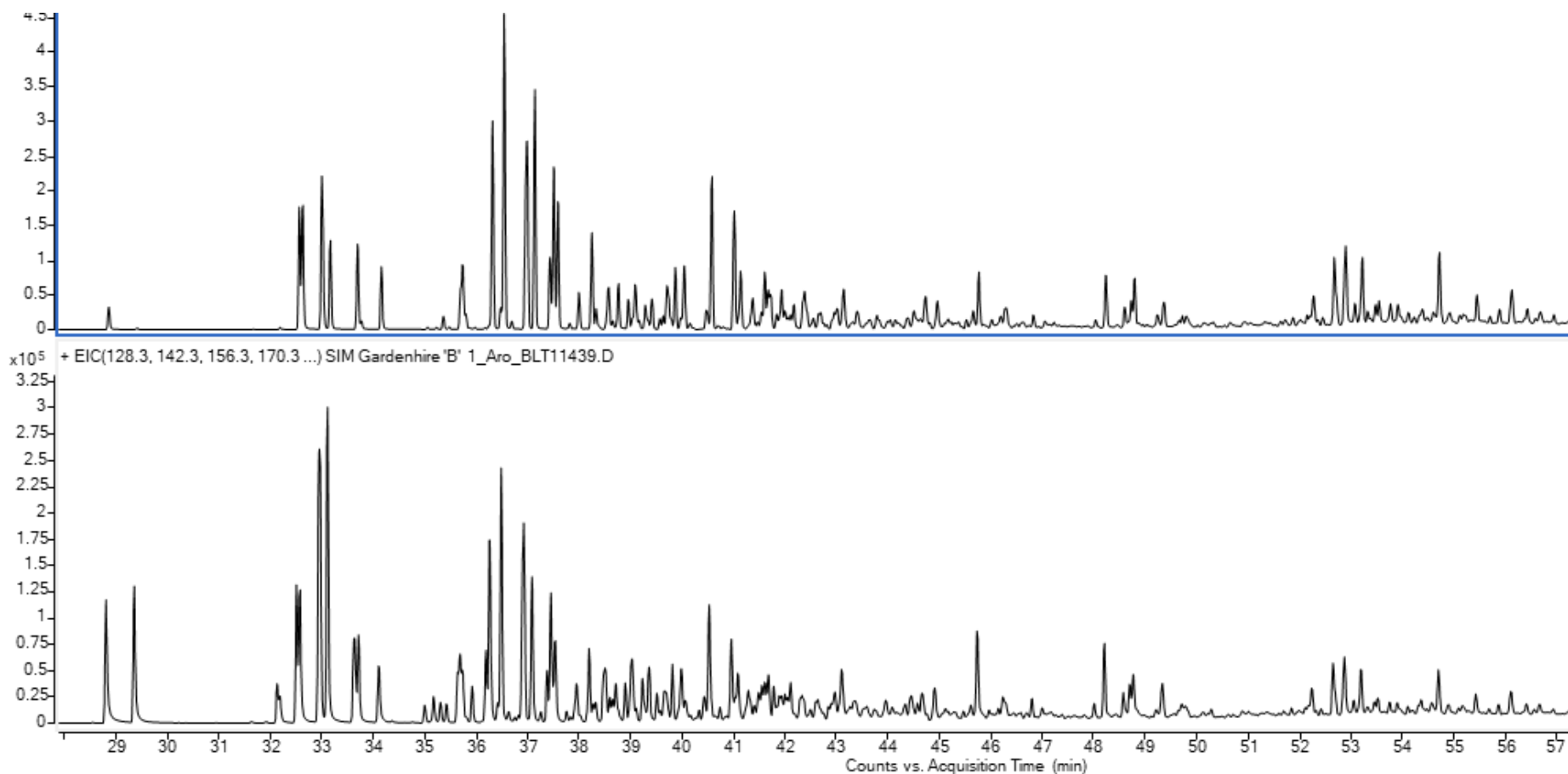
STACK/SCOOP oils



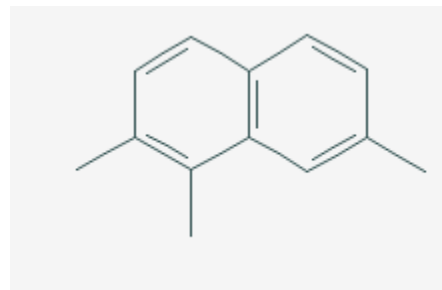
Sesquiterpanes



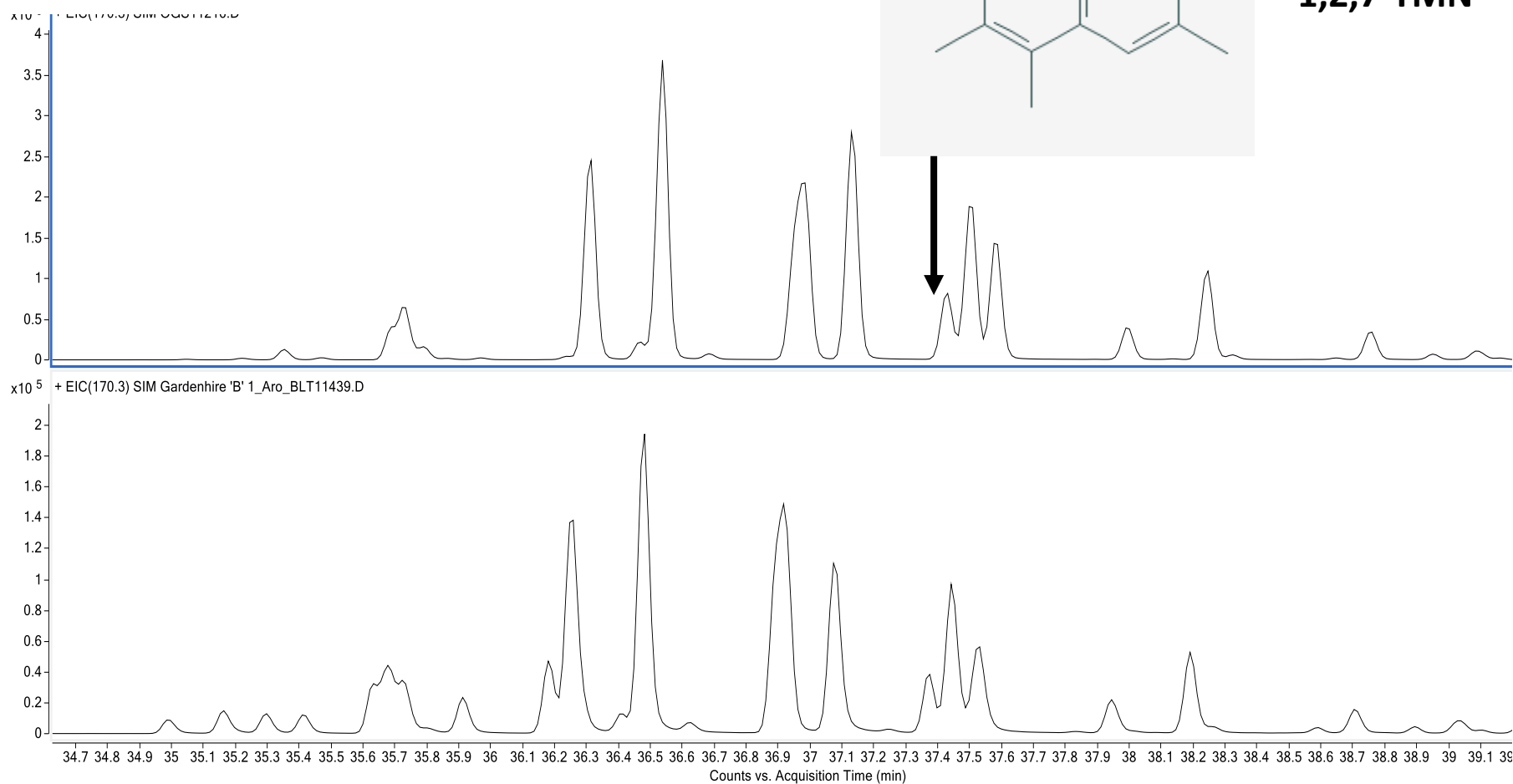
Naphthalene Distributions



Trimethylnaphthalene Distributions

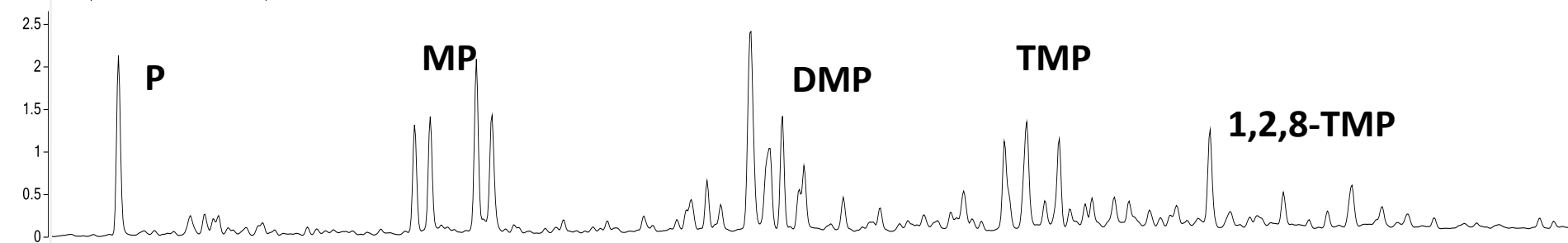


1,2,7-TMN

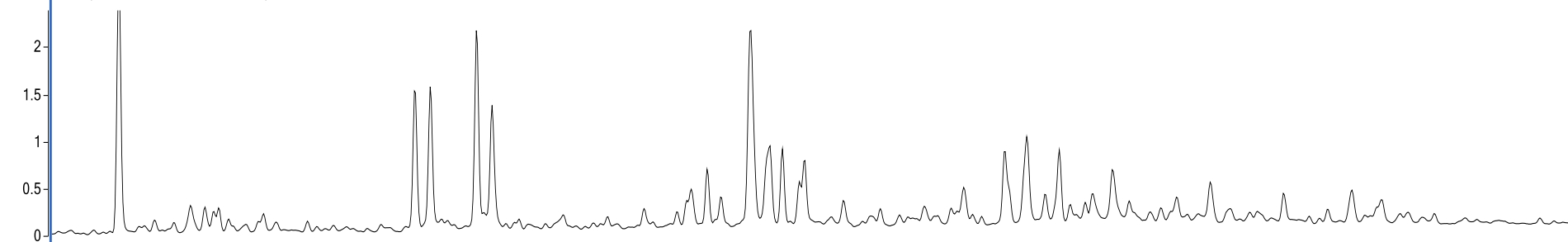


Trimethylphenanthrene distributions

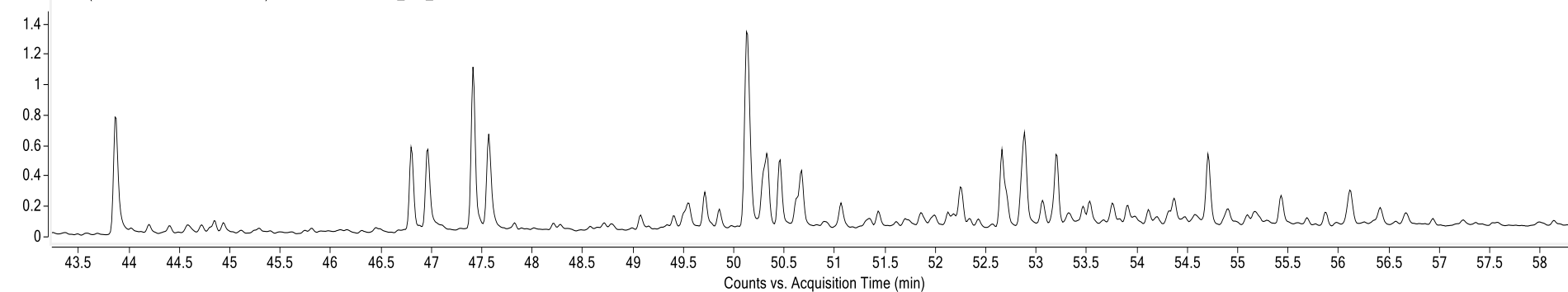
x10⁵ + EIC(178.3, 192.3, 206.3, 220.3 ...) SIM OGS11216.D



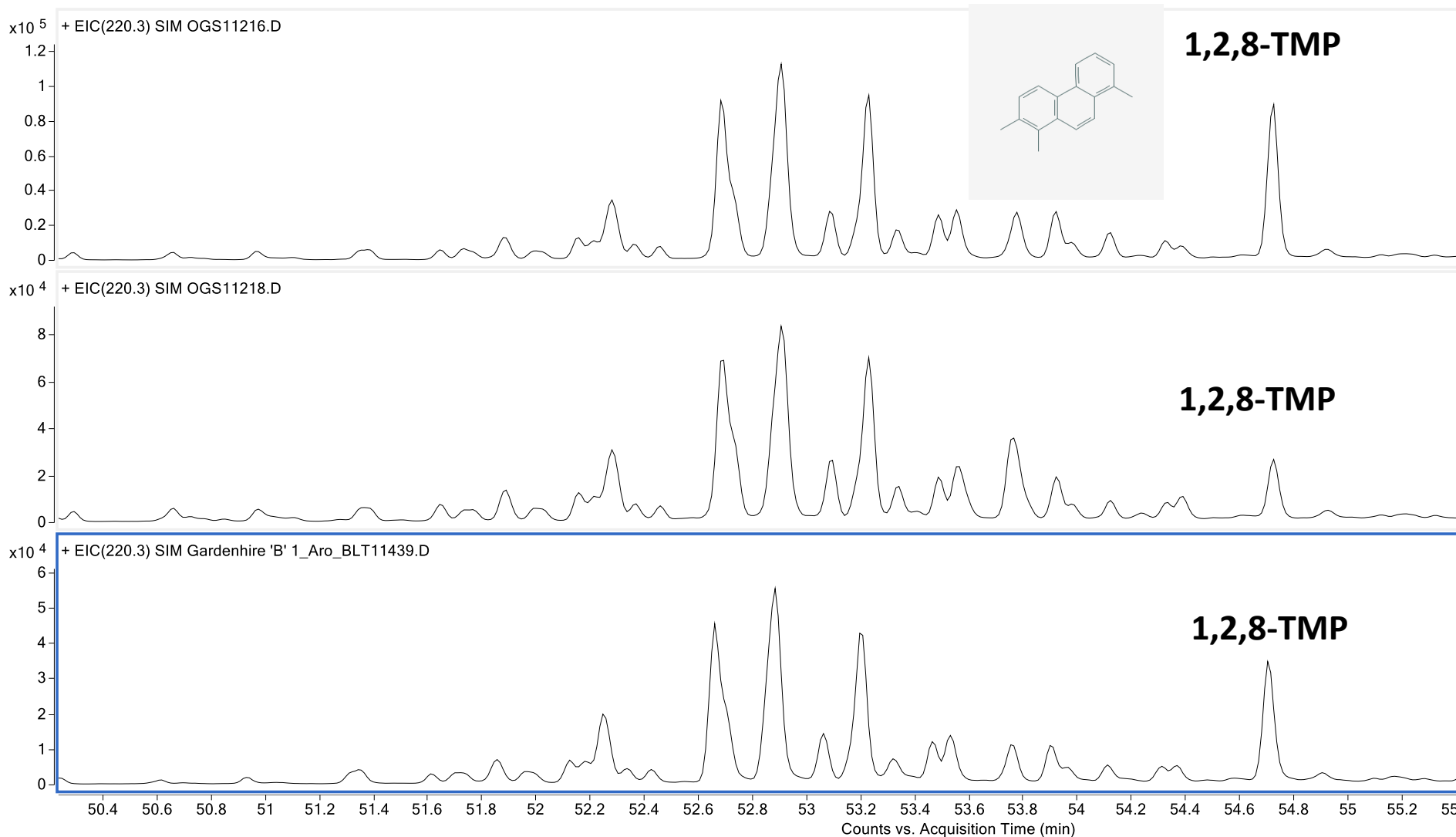
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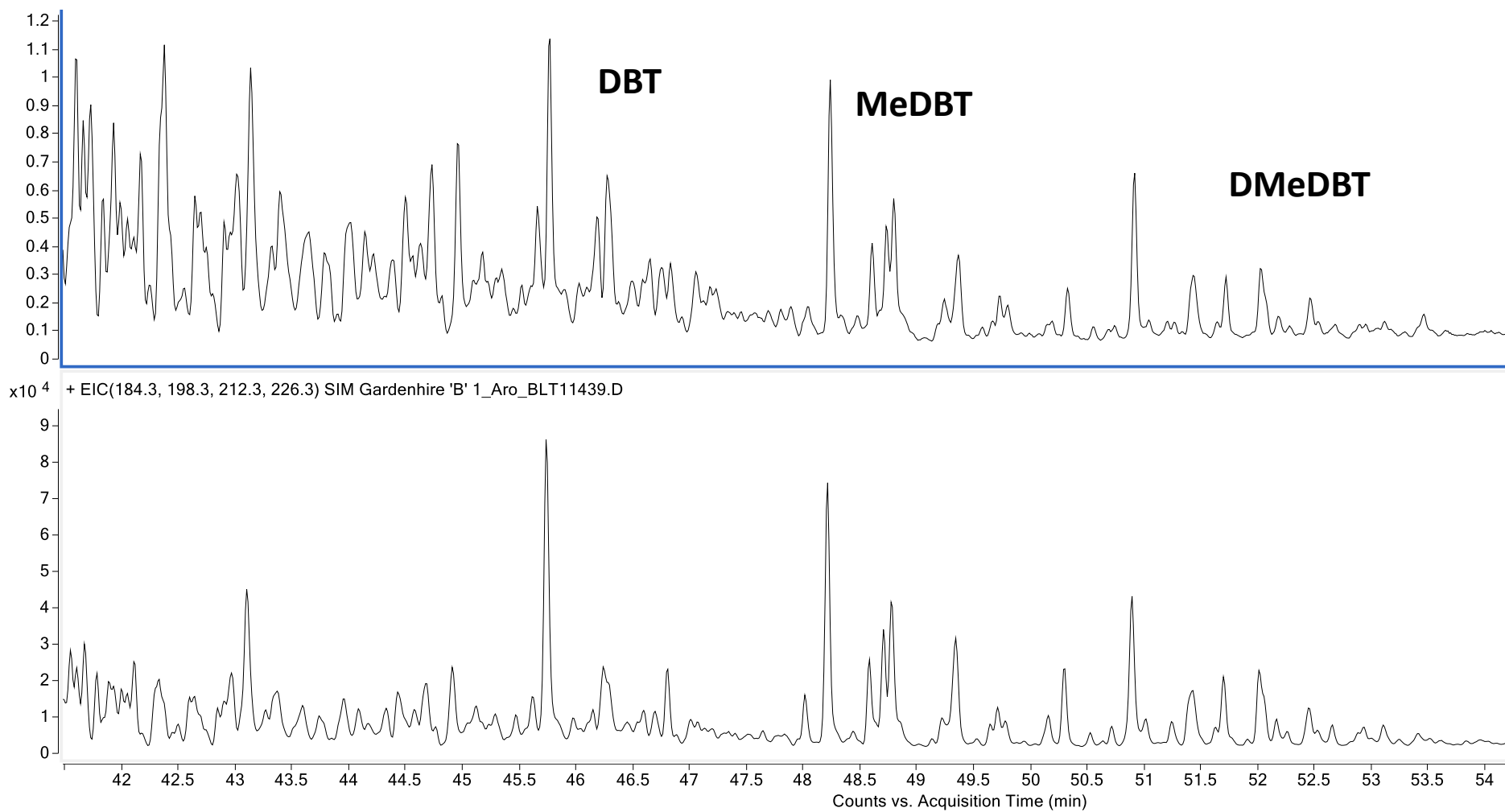
x10⁵ + EIC(178.3, 192.3, 206.3, 220.3 ...) SIM Gardenhire 'B' 1_Aro_BLT11439.D



Trimethylphenanthrene distributions



Dibenzothiophenes



Summary

- **All 16 oils from the Marchand and Medrano sands show very similar geochemical characteristics.**
- **Arylisoprenoids are a key property suggesting Woodford is probably a major source contributor.**
- **Estimated maturity level is around 0.8 vitrinite equivalent, in Grady County Woodford is >1.0, suggesting migrated not generated locally.**
- **Geochemical characteristics are significantly different than majority of SCOOP and STACK oils in the area.**