

A Preliminary Geochemical Investigation into Shales and Oil-Saturated Sands from the Simpson Group in the Anadarko Basin.

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Acknowledgements

- **Many people helped to put this talk together very quickly from getting the samples to providing the data.**
- **I would like David Brown, Vy Jordan and all the others at OPIC that held pull the cores and cut samples after Rick Andrews and Brian Cardott identified potential shales for examination.**
- **The graduate students and technicians in the Geochemistry Group at OU that helped with the analyses and again Brian Cardott for helping with the petrography.**
- **Geomark provided the Rock Eval data very quickly.**
- **Carl, my coauthor, was responsible for much of the extraction and analytical work**
- **Jerry McCaskill also provided me with the Eola oils many years ago and since we never throw anything away so it was good to have those samples for this study.**

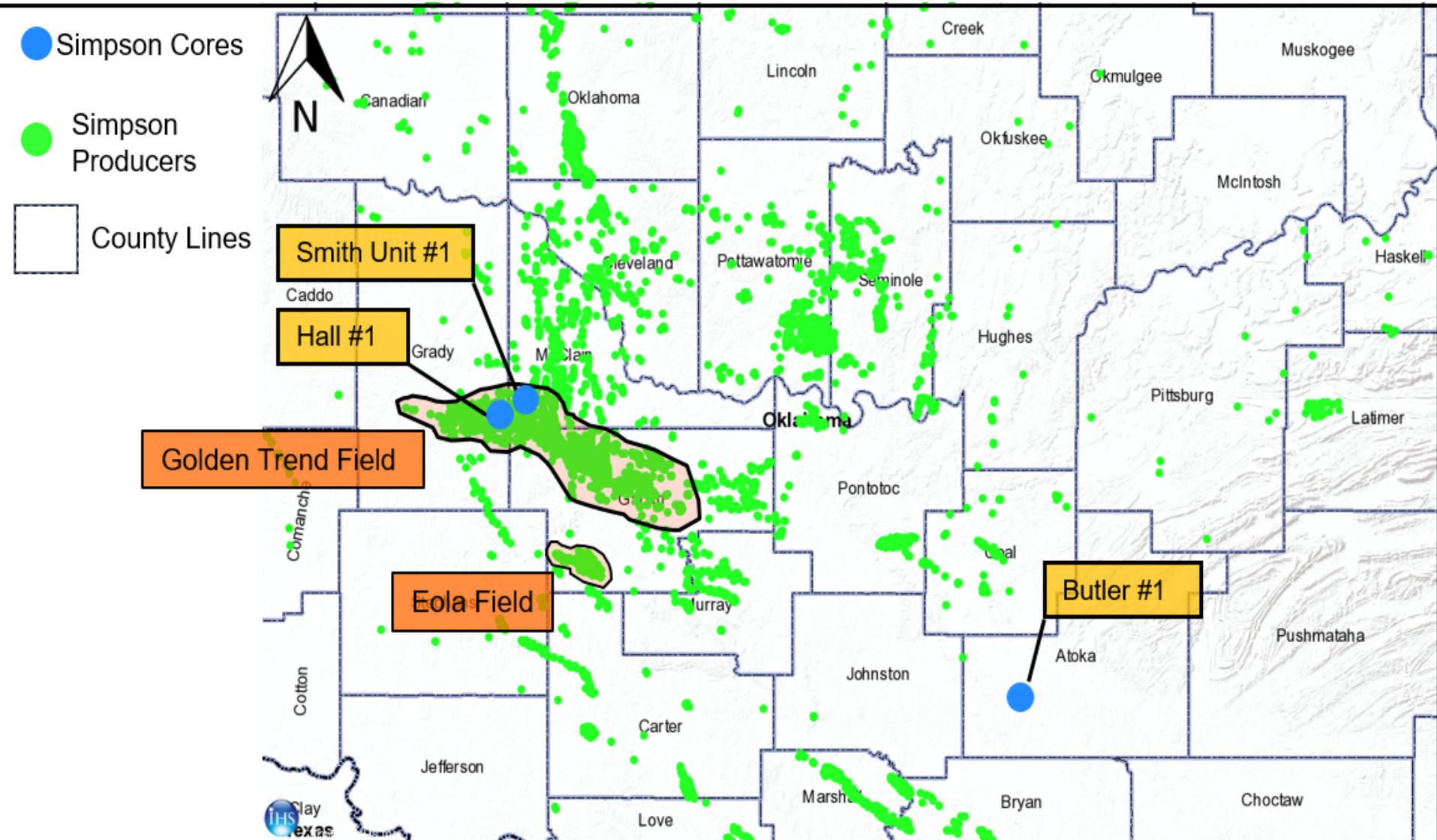
The Simpson Group

- **In general the Ordovician age Simpson Group of shales and sand has received relatively little attention from explorationists and geochemists over the years.**
- **For example Burruss and Hatch (1989) included a small amount of Simpson data in their OGS Circular 90 paper, and that volume also includes a paper on diagenesis of hydrocarbon bearing rocks in the Simpson.**
- **This presentation will provide a more detailed geochemical investigation into characteristics of shale extracts and oils associated with the Simpson group and other Ordovician aged samples in the region.**

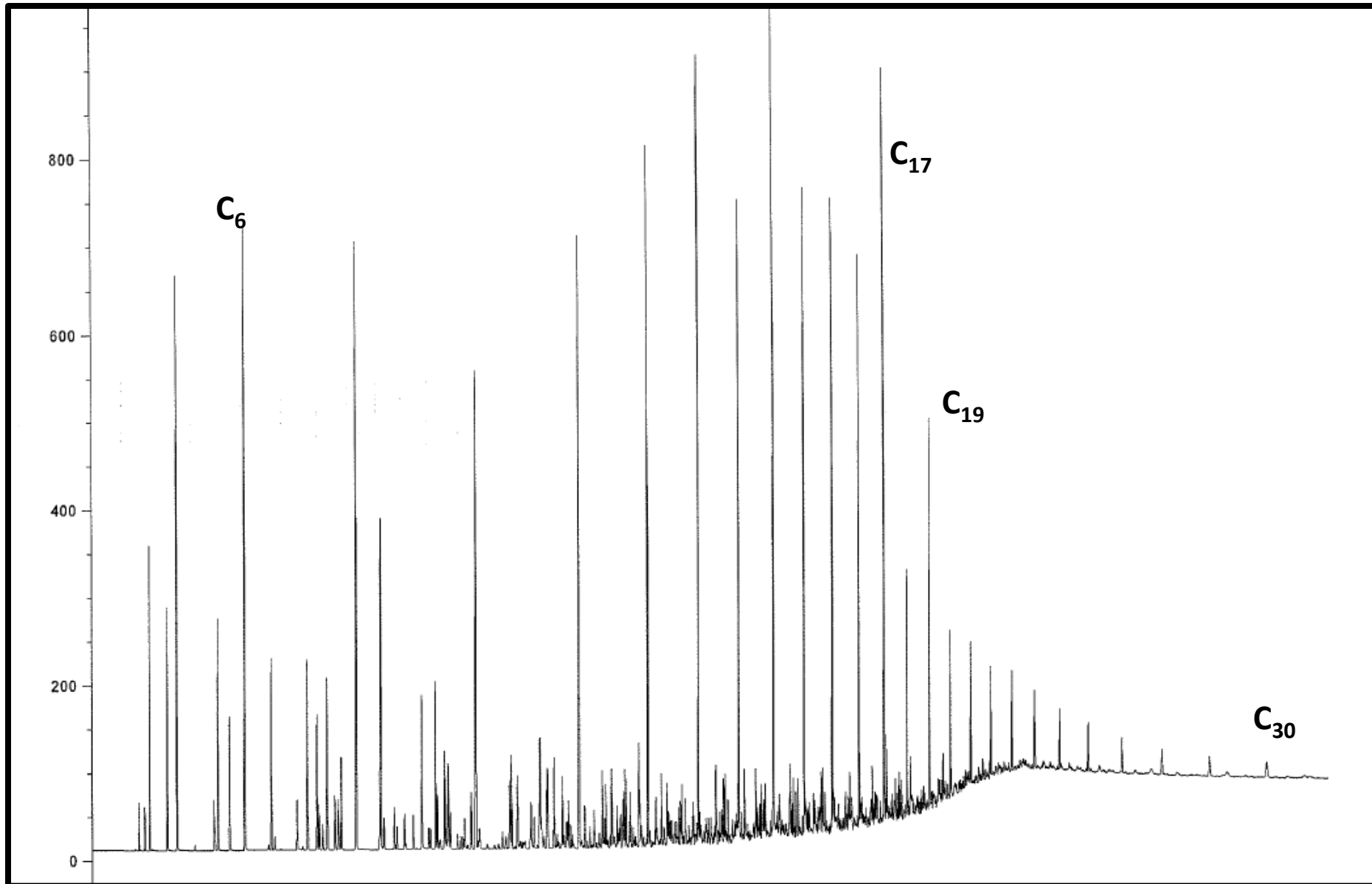
The Simpson Group

- **One important aspect of this study is to initially clearly define the goals. When a geochemist is discussing the source of an oil, the geochemist is referring to the source rock generating the oil and not the reservoir producing the oil. In unconventional systems, source and reservoir are generally one and the same.**
- **To illustrate this initially I will use data from oils produced from the Bromide Formation, considered part of the Simpson group in the Eola field, then move on to Simpson cores and oil-stained sands.**
- **First locations of samples examined in this study.**

Sample Locations

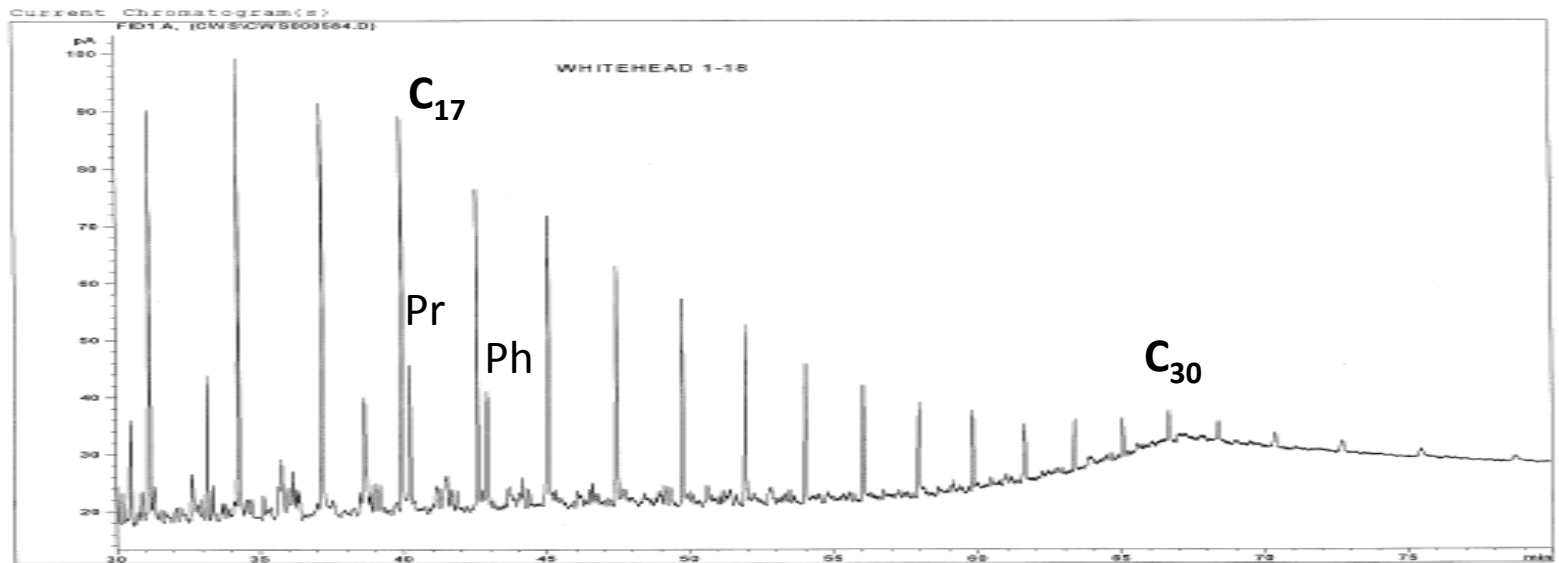


A Classic Ordovician Oil

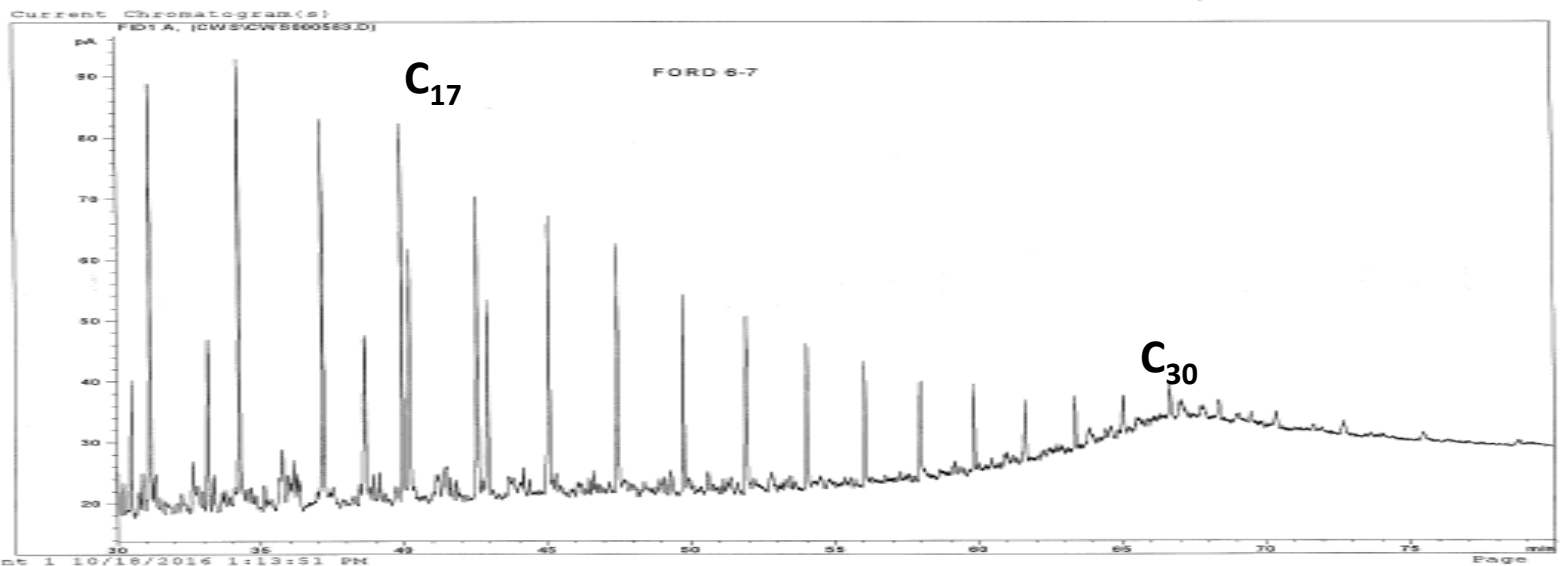


Eola Bromide Oils

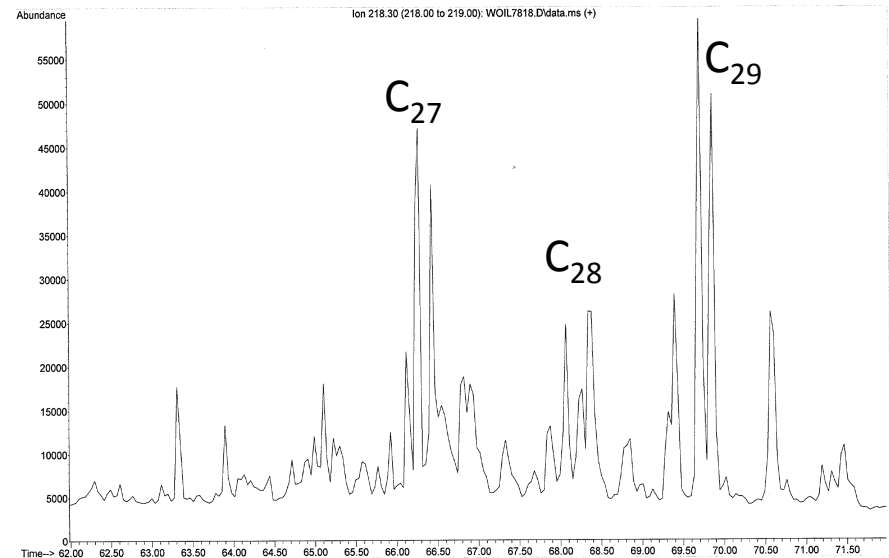
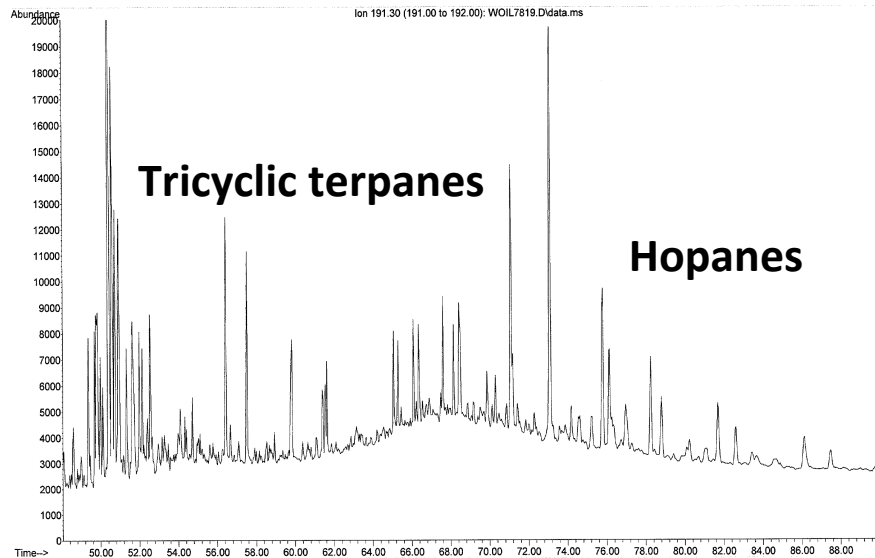
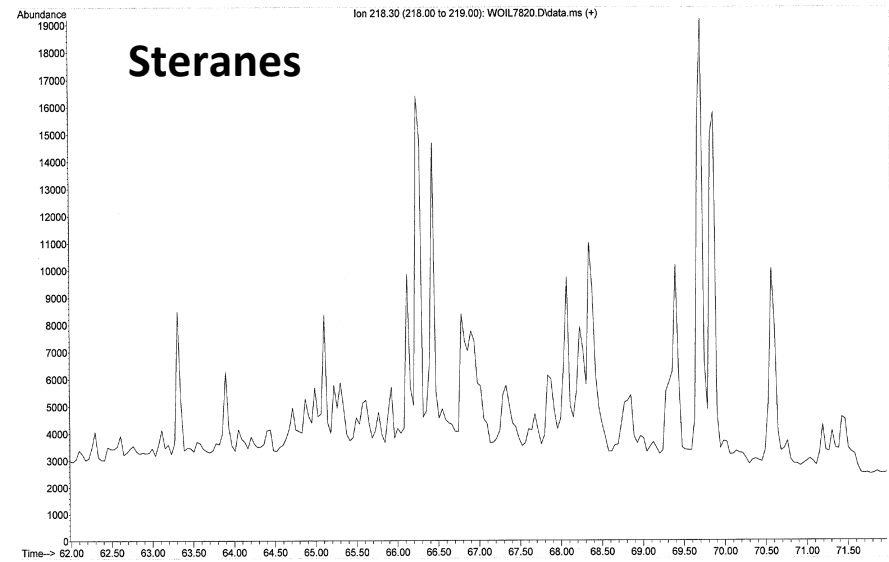
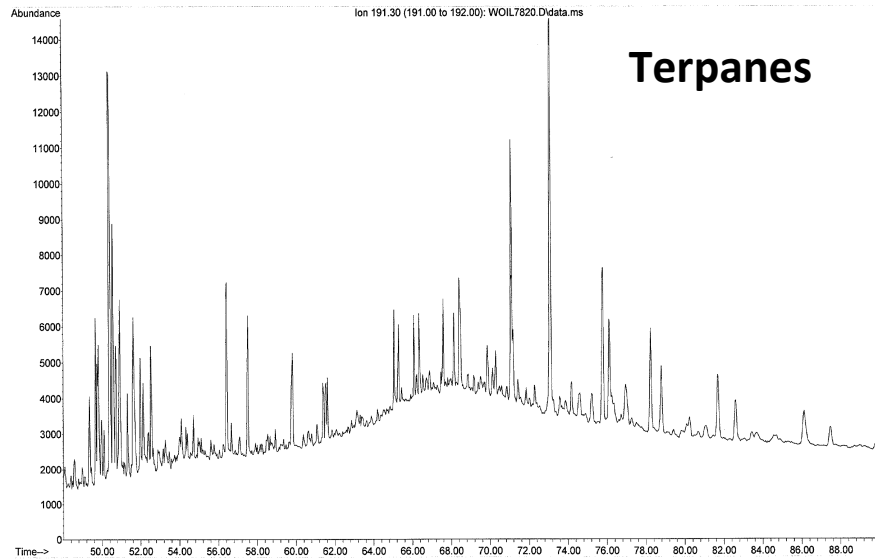
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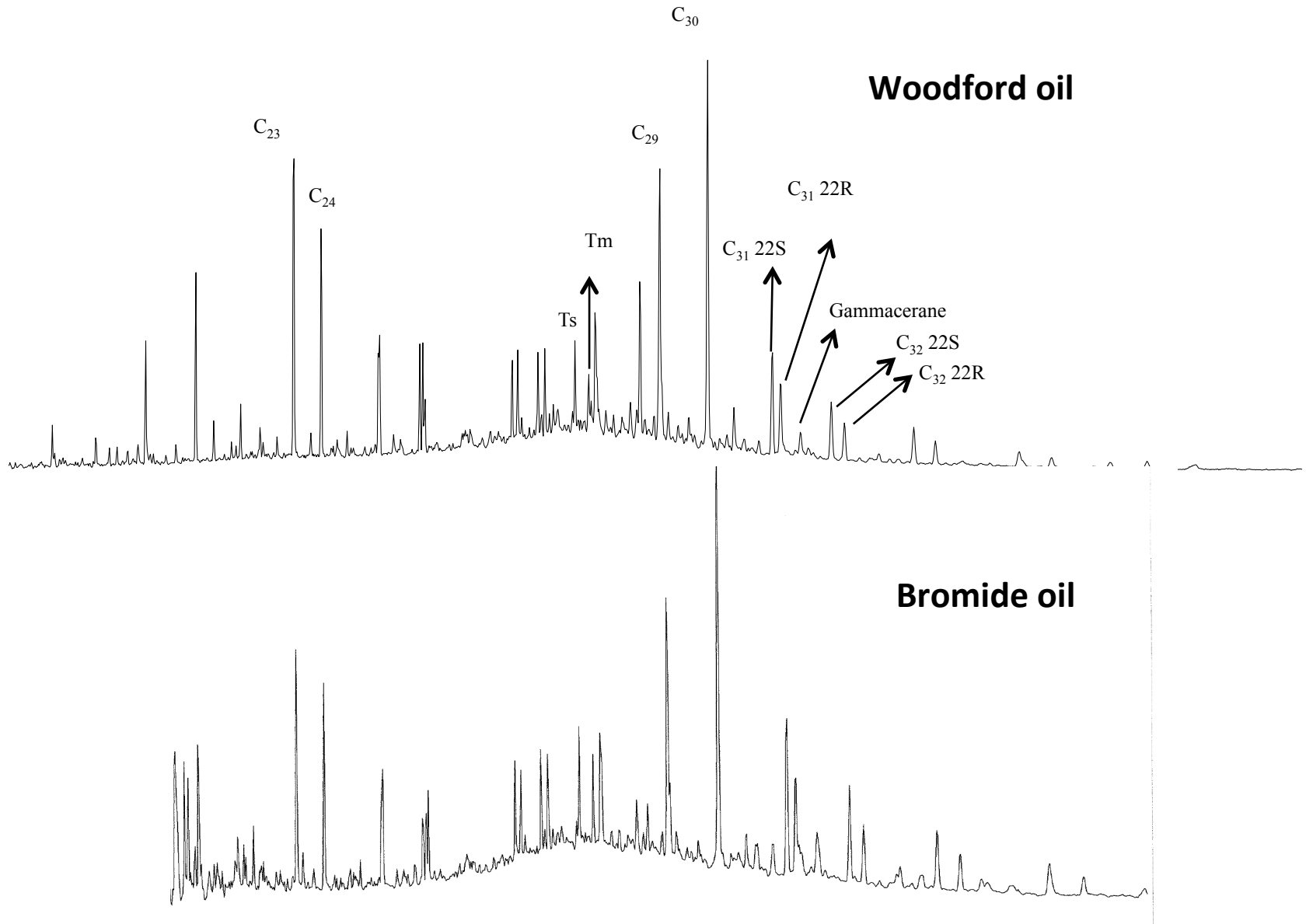
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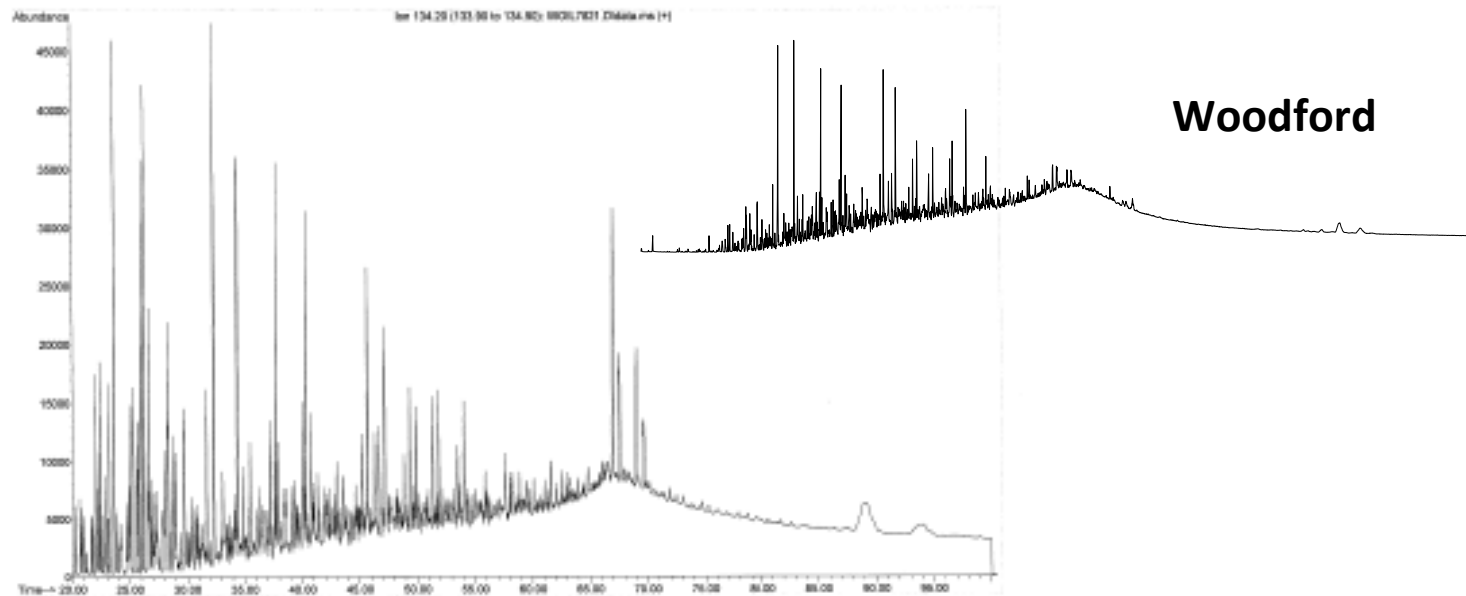
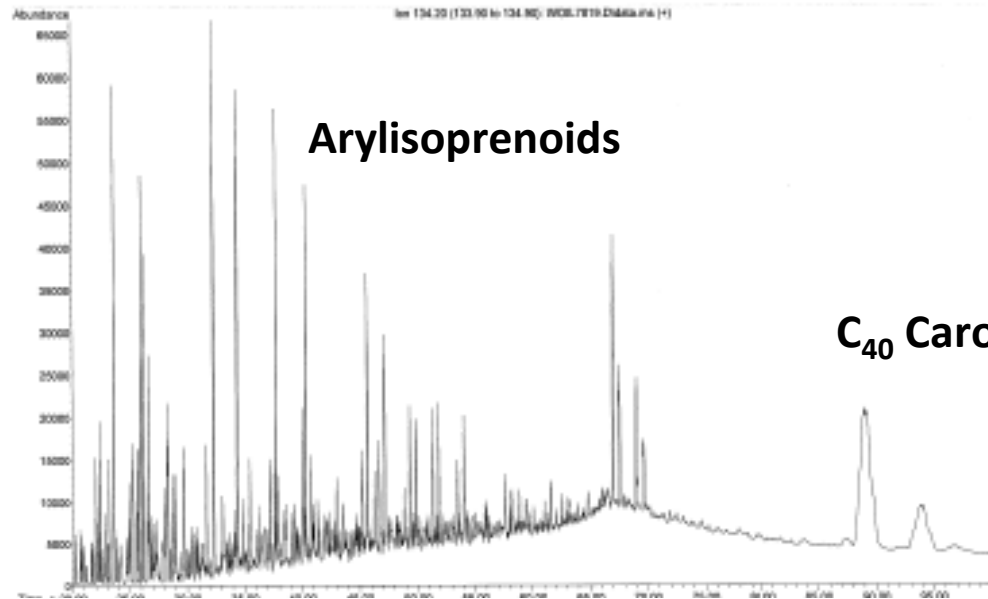
Biomarkers in the Eola Bromide Oils



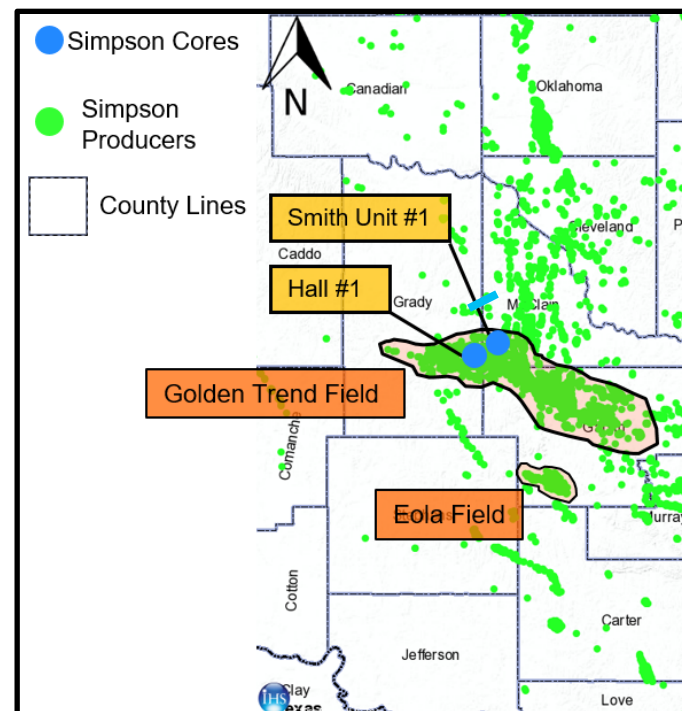
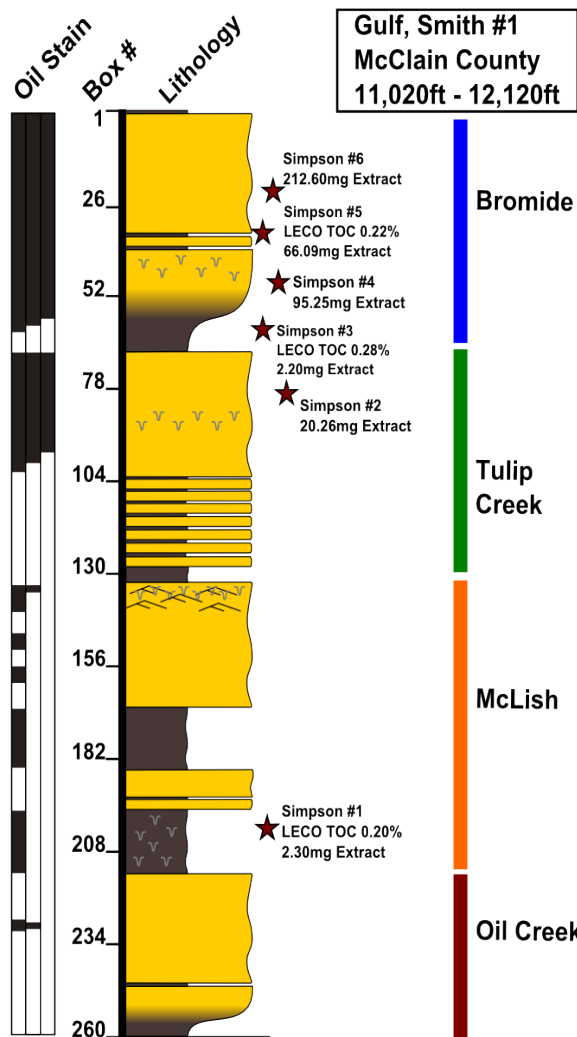
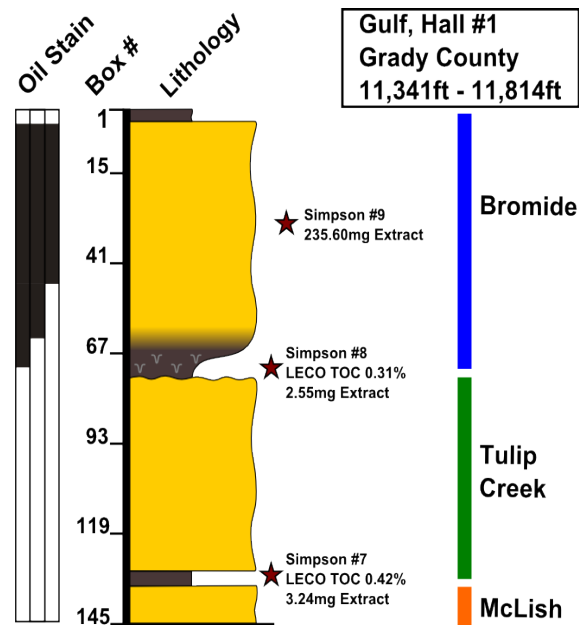
Terpanes in the Woodford Oils



Eola Bromide Oils



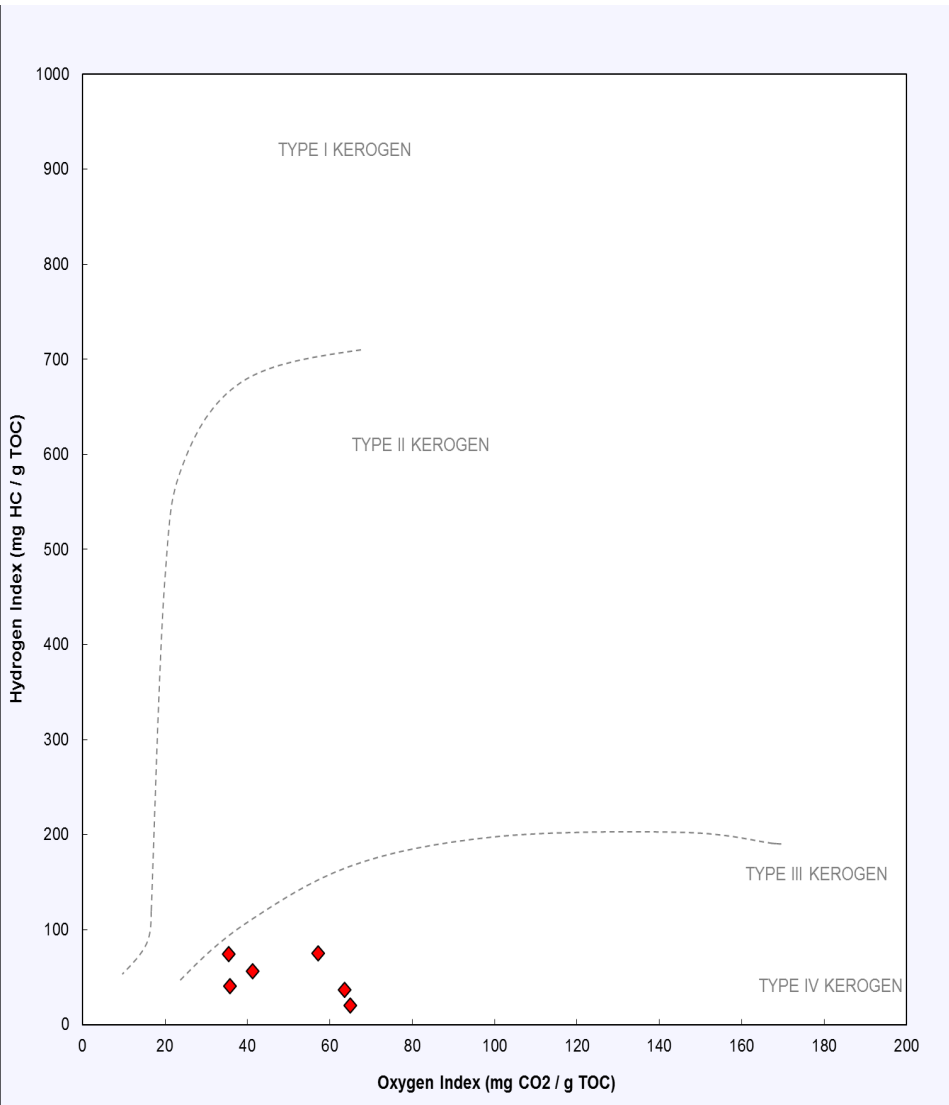
Basic Stratigraphy-Simpson Shales and Sands



MISSISSIPPIAN + DEVONIAN + SILURIAN	CHESTERIAN		GODDARD SHALE, CANEY SHALE, SYCAMORE LIMESTONE		
	OSAGEAN		BOONE CHERT, MISSISSIPPI CHAT, WOODFORD SHALE, MISENER SAND		
	KINDERHOOKIAN				
ORDOVICIAN	ORISKANIAN to ALBION	HUNTON			
	CINCINNATIAN		SYLVAN SHALE, VIOLA LIMESTONE		
	TRENTONIAN				
CAMBRIAN	BLACK RIVERIAN	SIMPSON	BROMIDE / WILCOX SAND, MCLISH SAND, OIL CREEK SAND		
	CHAZYAN				
	CANADIAN	ARBUCKLE	SILICEOUS LIME		
	CROIXIAN				
	TIMBERED HILLS		REAGAN SAND		
PRECAMBRIAN CRYSTALLINE ROCKS					



Simpson Shale Bulk Characteristics



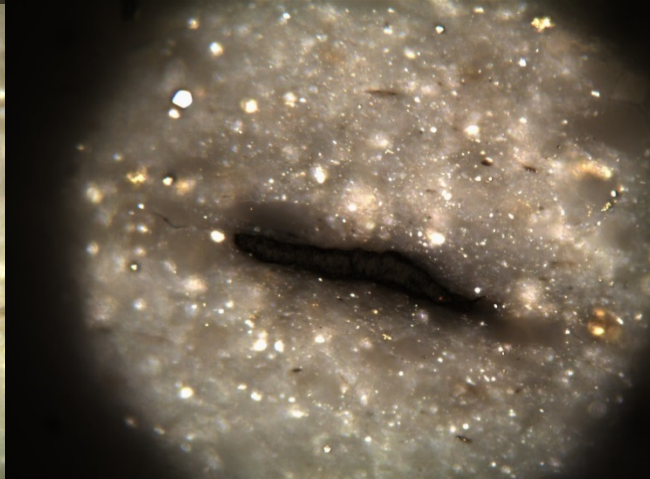
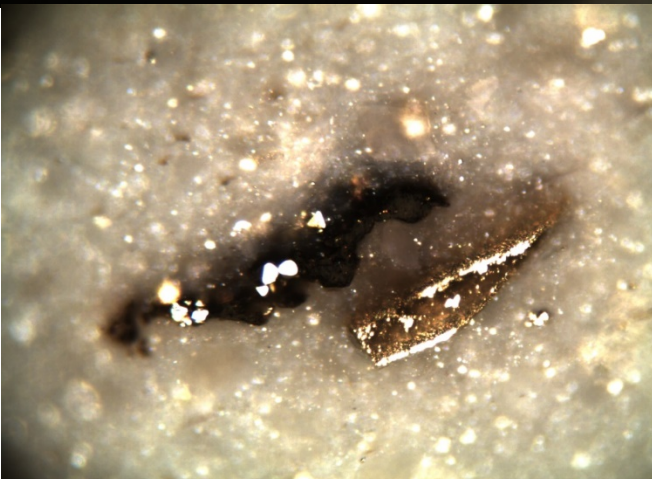
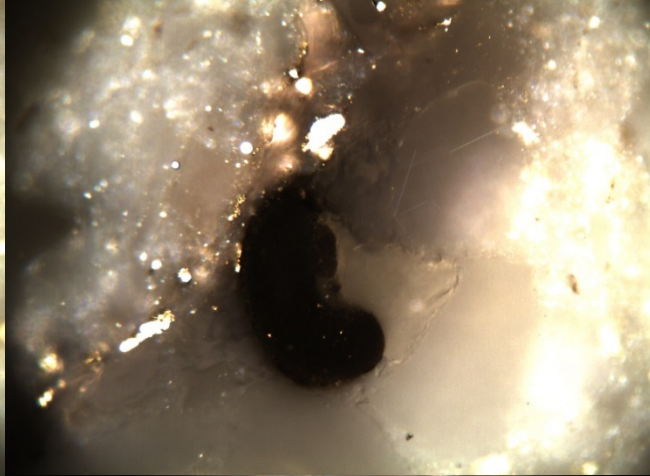
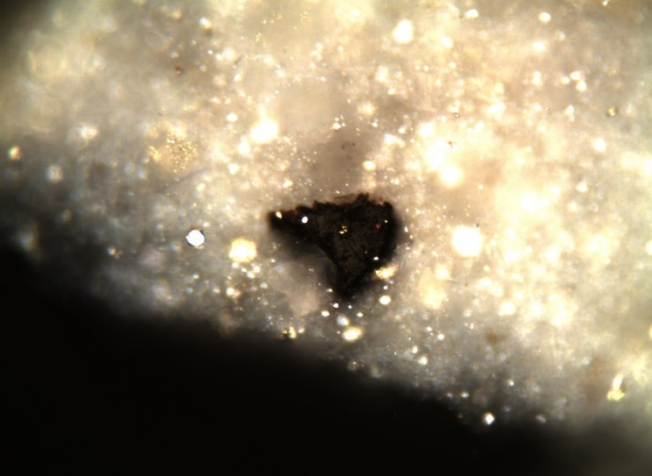
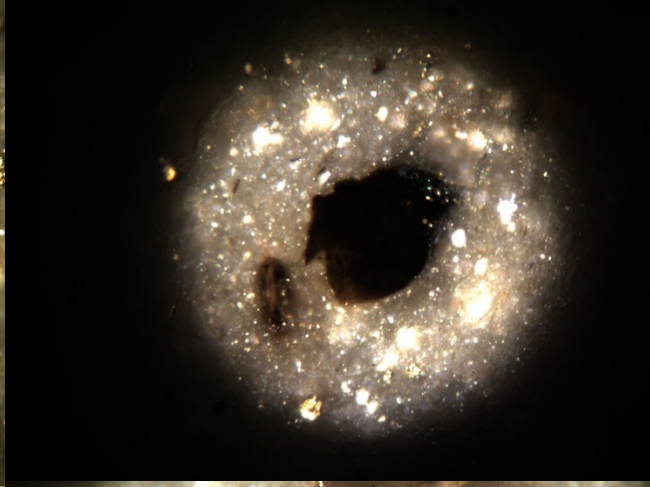
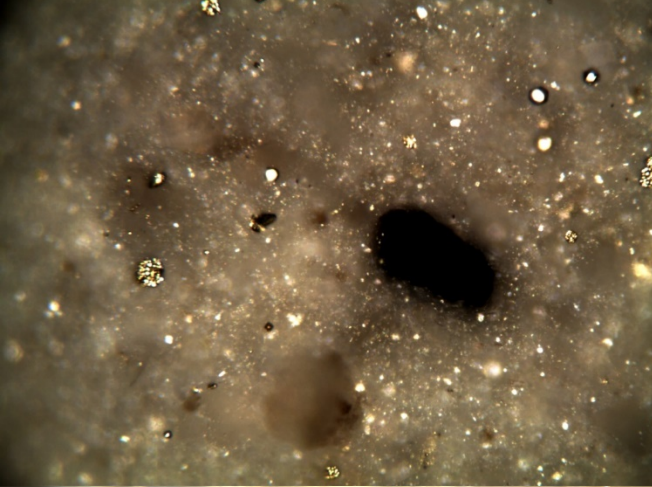
Sample	% Carbonate	TOC %	Calculated Ro %	HI
1	1.98	0.20	0.00	20.00
3	7.34	0.28	0.80	75.00
5	2.94	0.22	0.00	36.36
7	12.55	0.42	0.00	40.48
8	1.37	0.31	0.81	74.19
10	24.30	0.46	0.67	56.52

Petrography

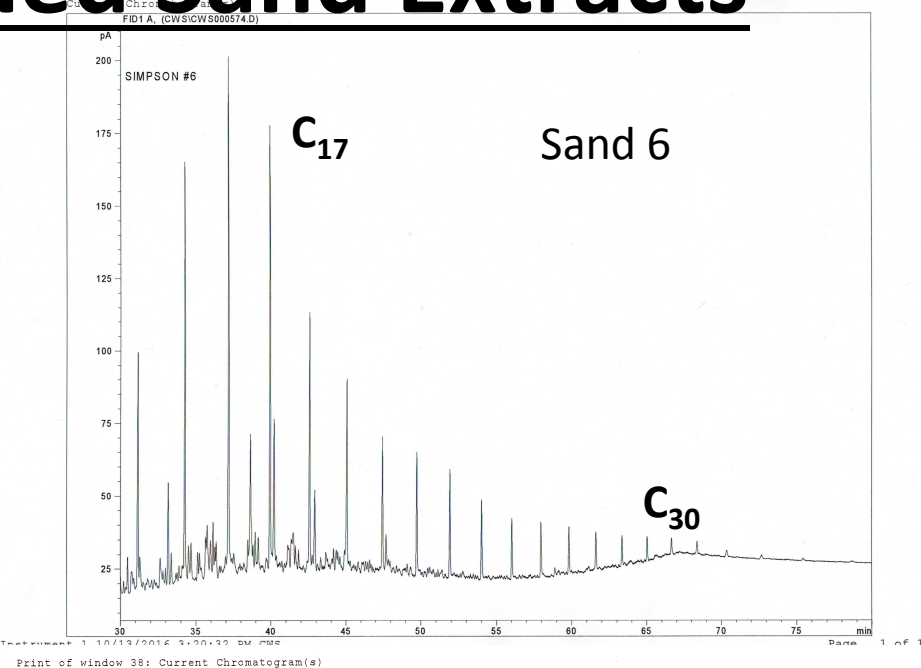
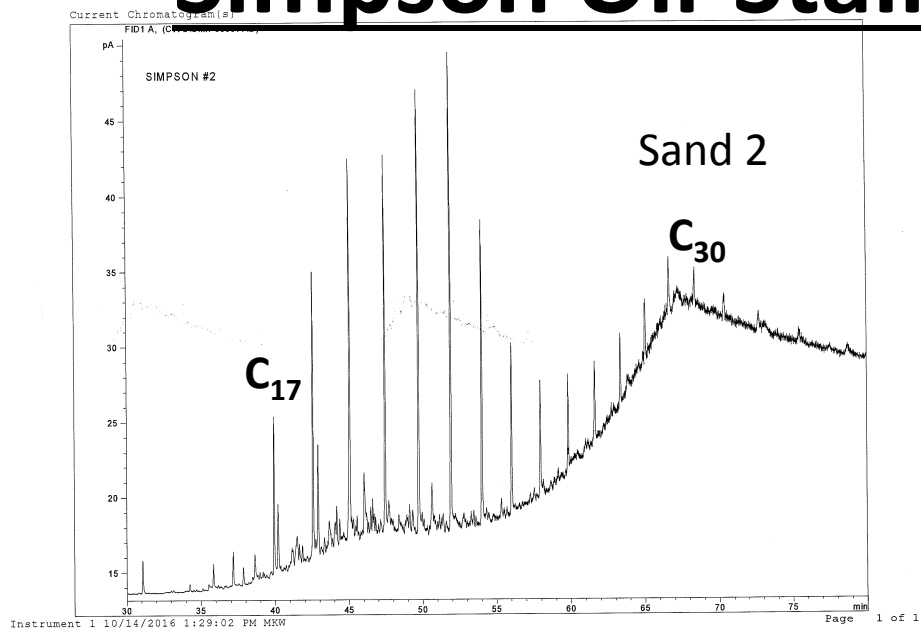
Smith well

Core samples were examined petrographically but little additional information was obtained.

Maturity estimations based on bitumen reflectance indicated maturity of these samples was around 1.1% Ro.

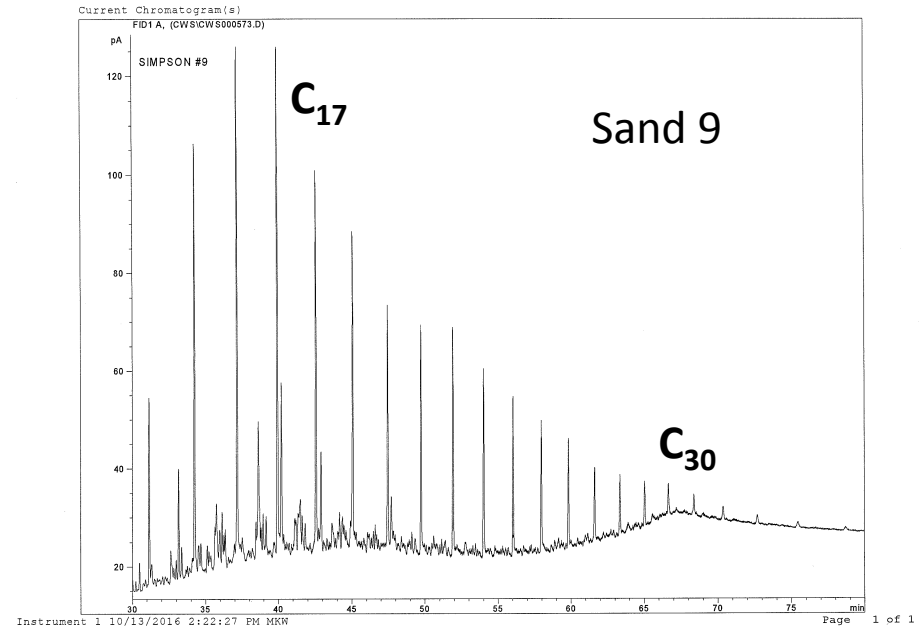
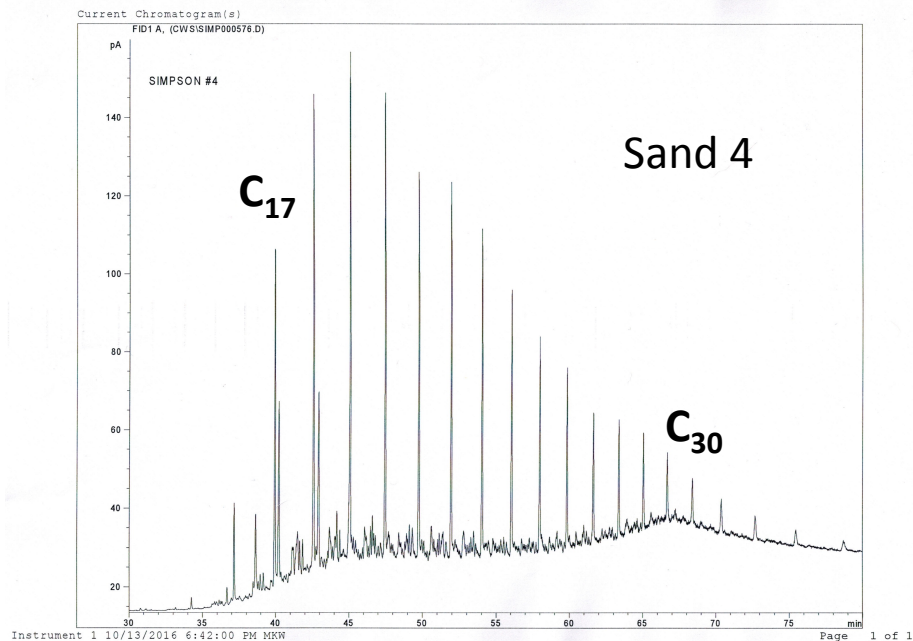


Simpson Oil-Stained Sand Extracts



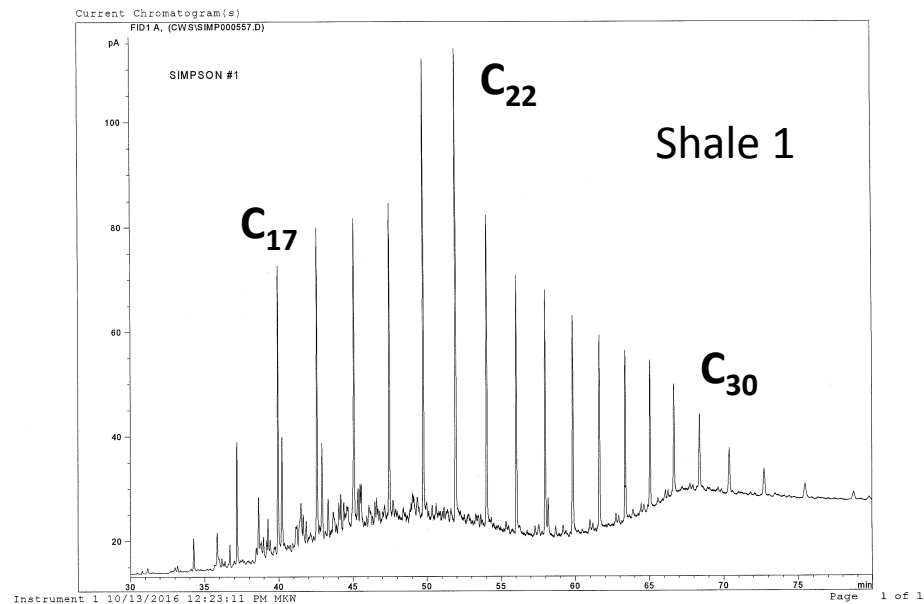
Print of window 38: Current Chromatogram(s)

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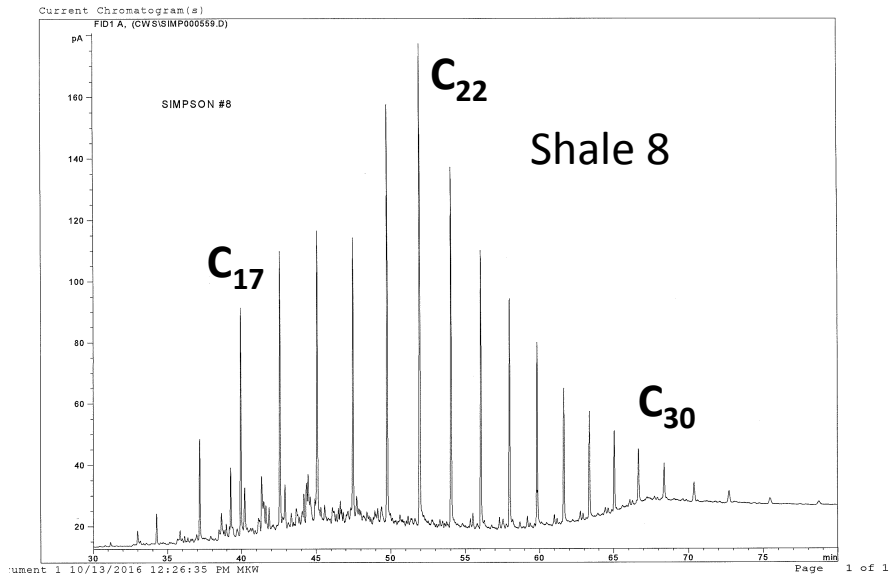


Simpson Shale Extracts

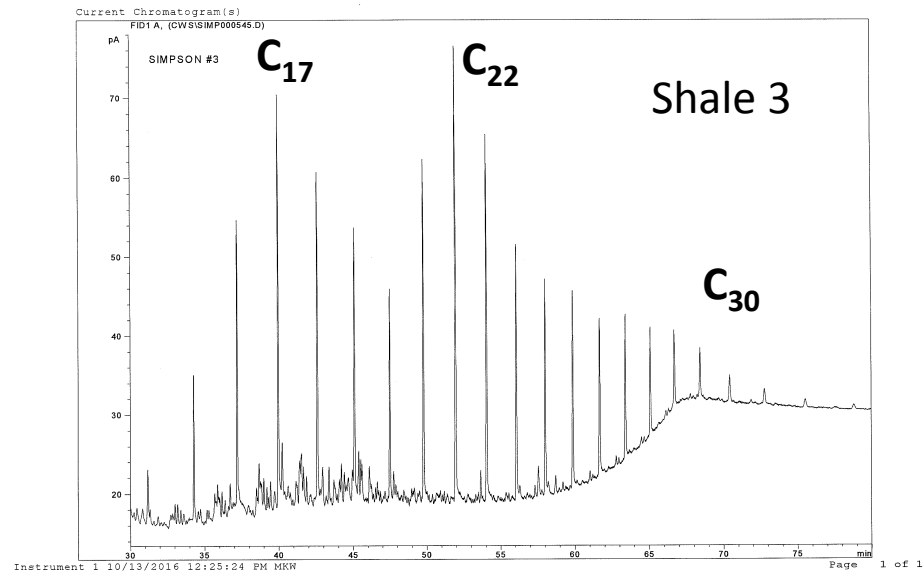
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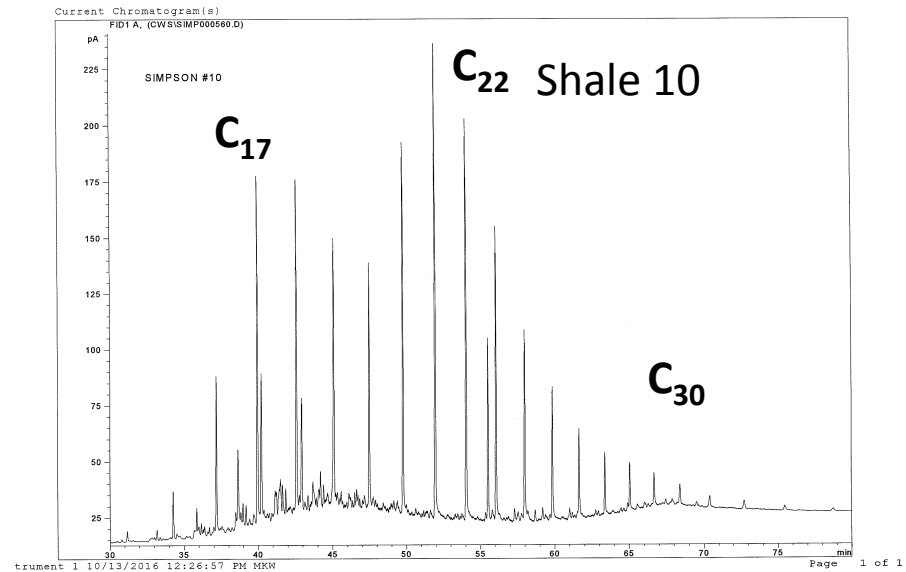
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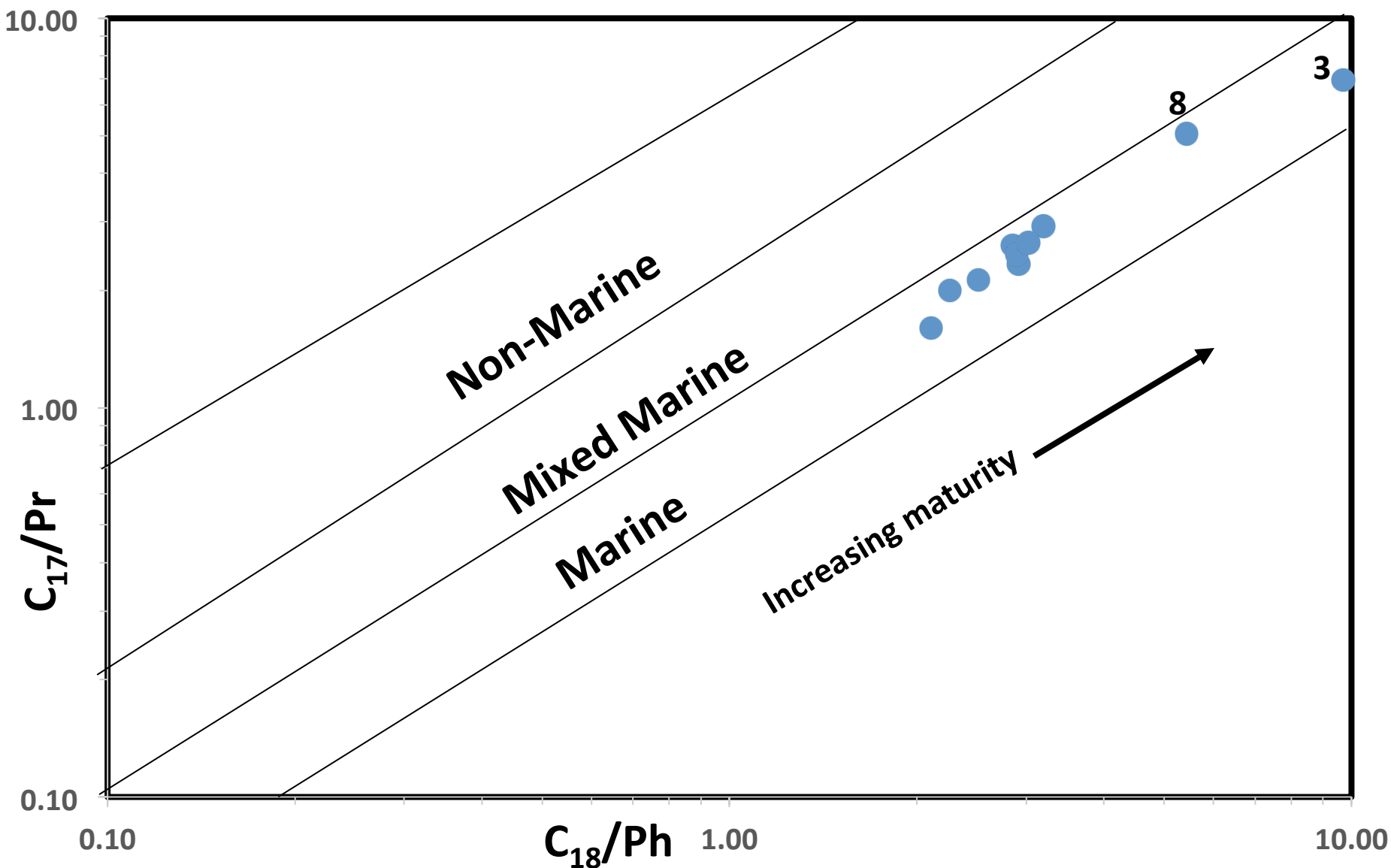
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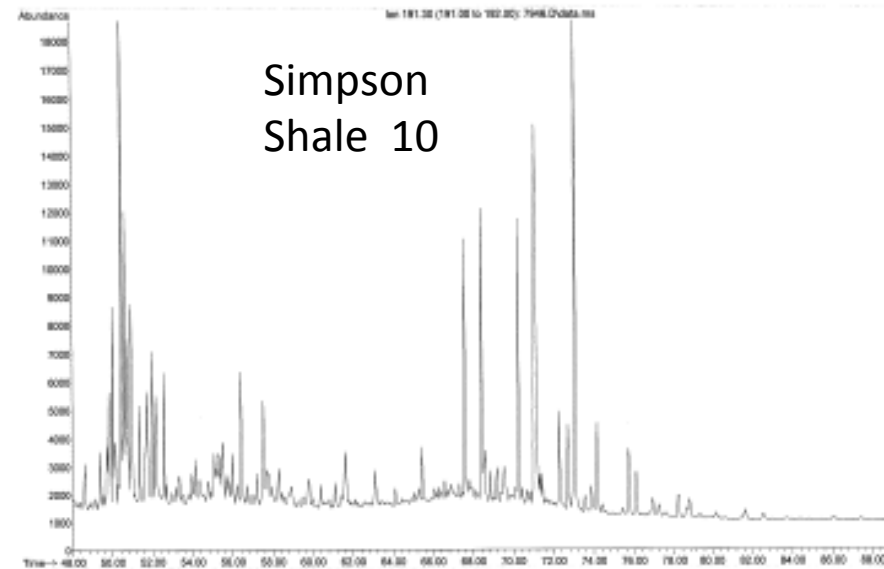
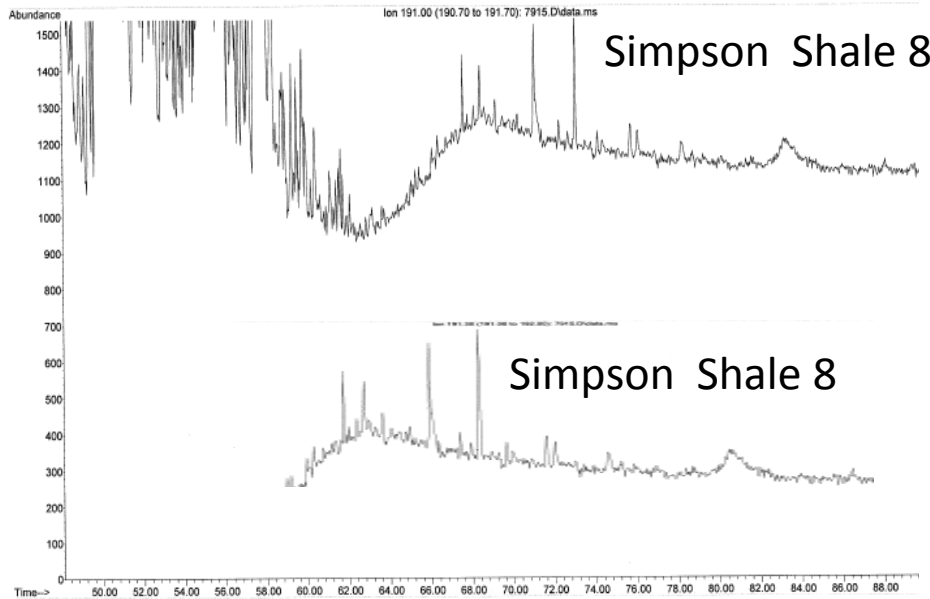
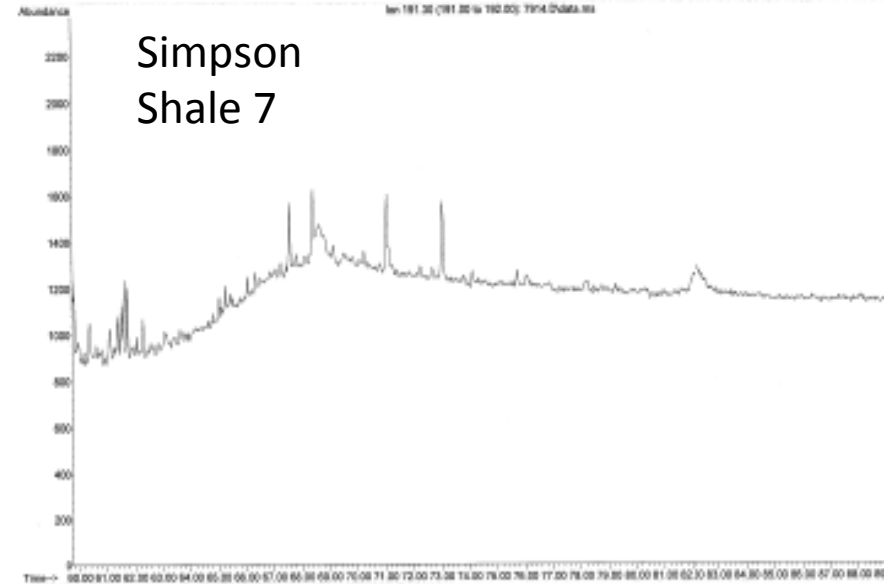
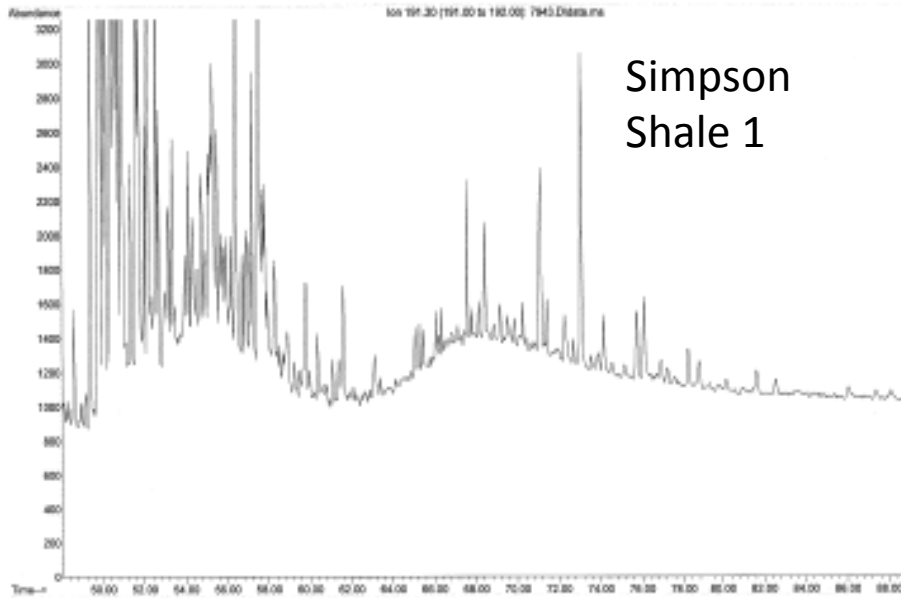
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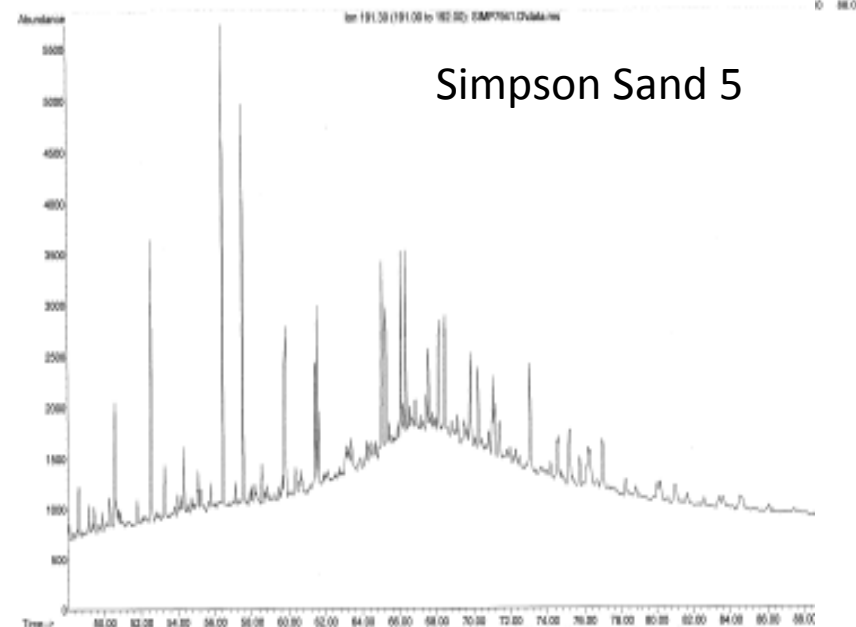
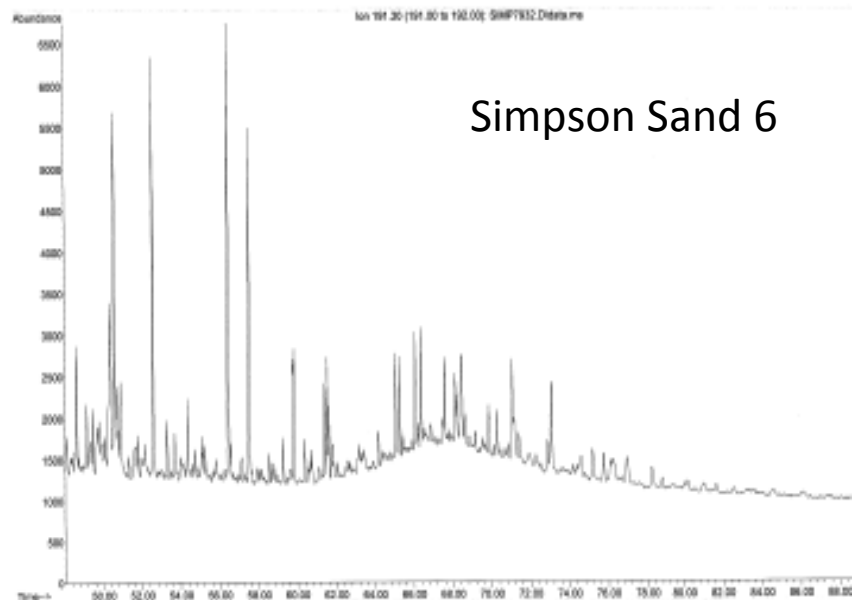
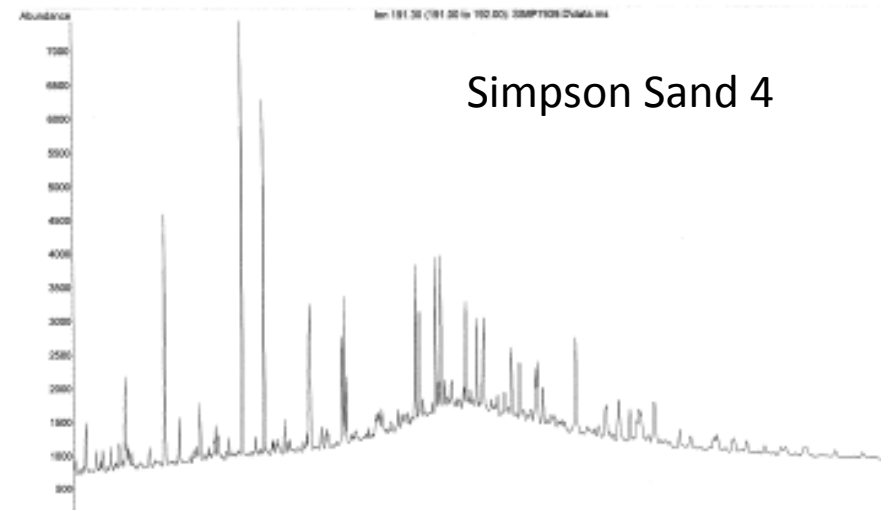
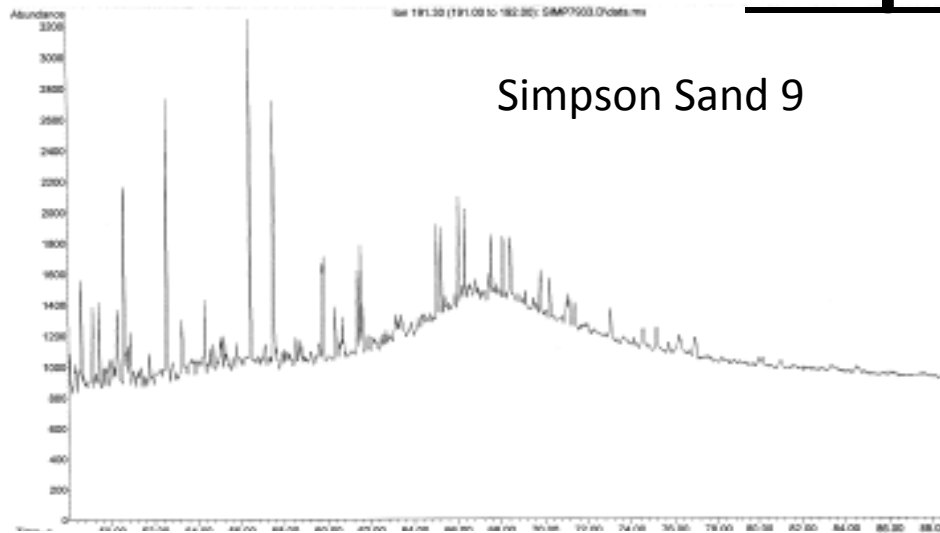
nC_{17}/Pr vs nC_{18}/Ph



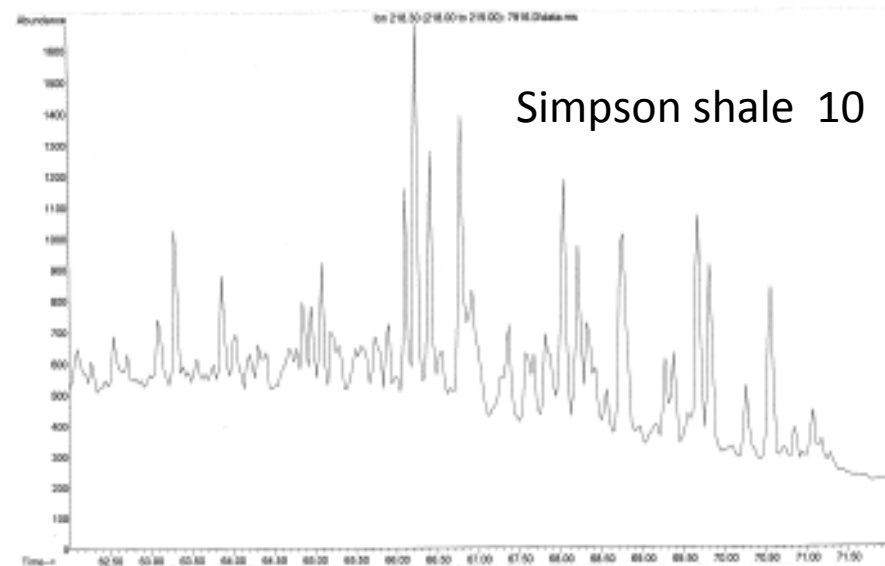
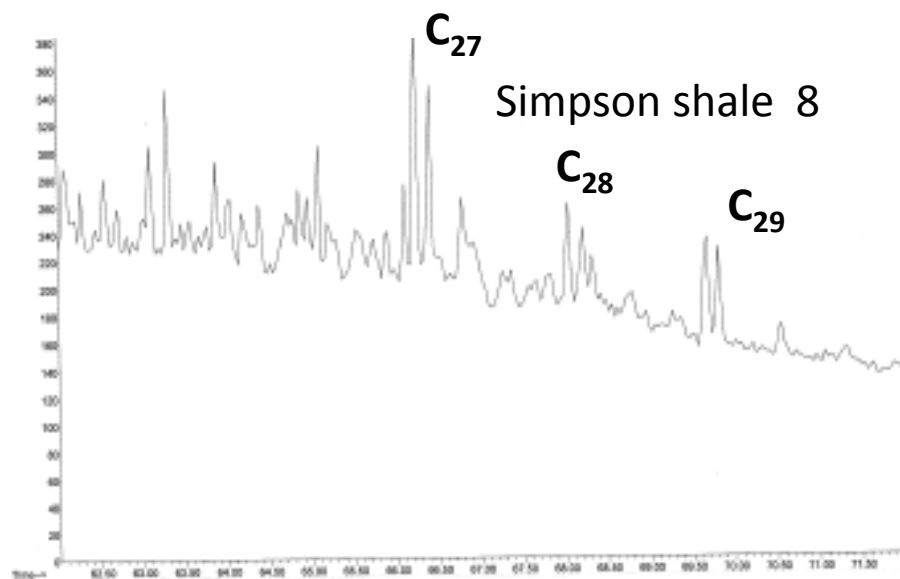
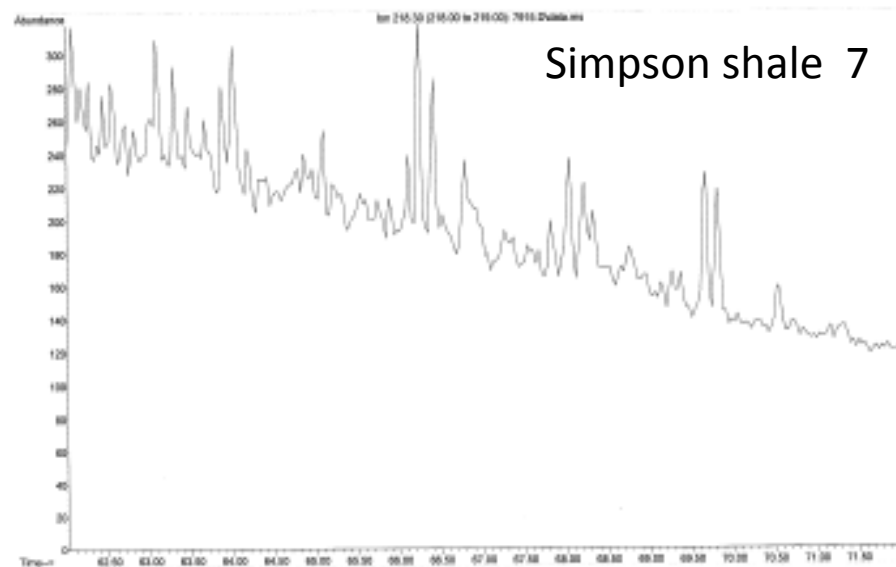
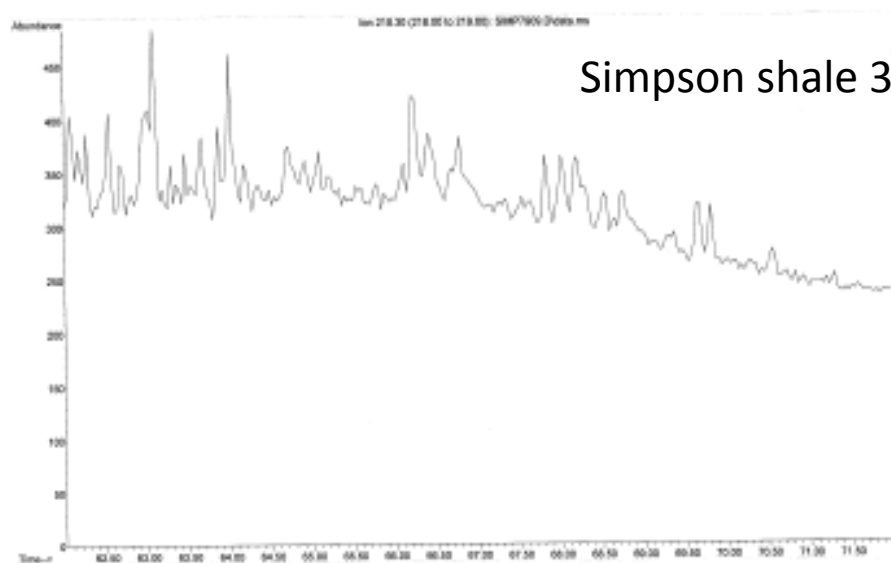
Simpson Shale Extracts-Terpanes



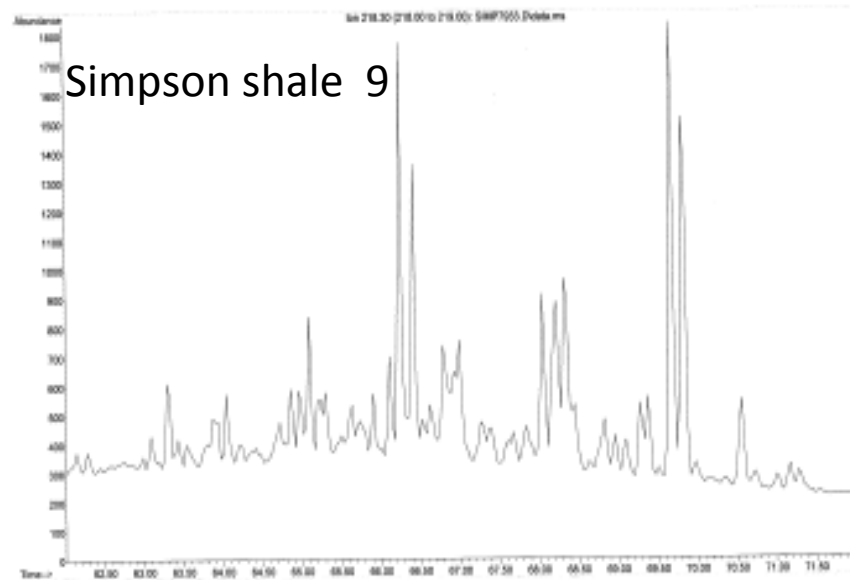
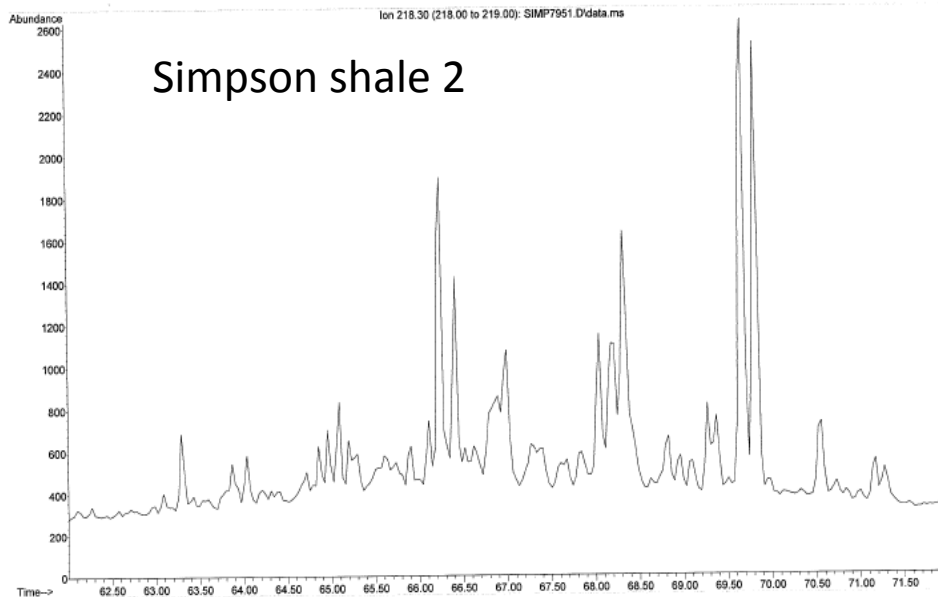
Simpson Oil-Stained Sand Extracts- Terpanes



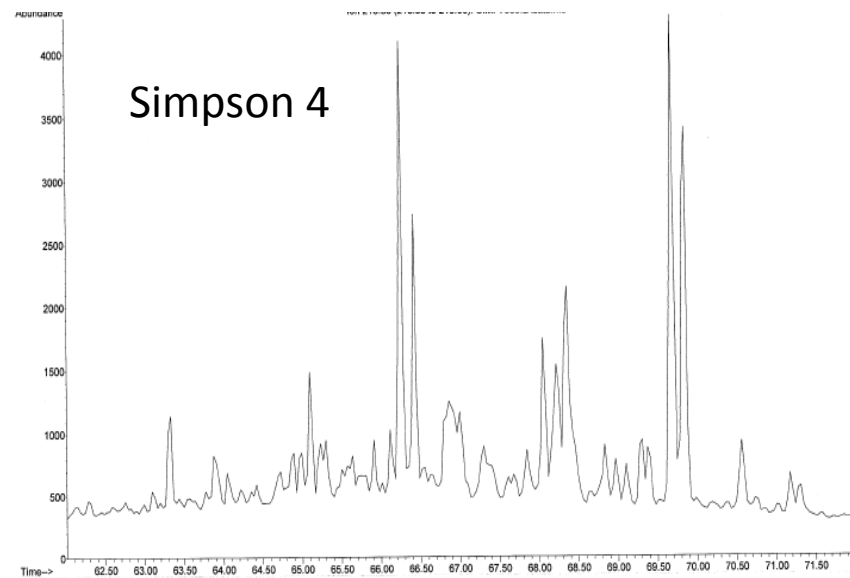
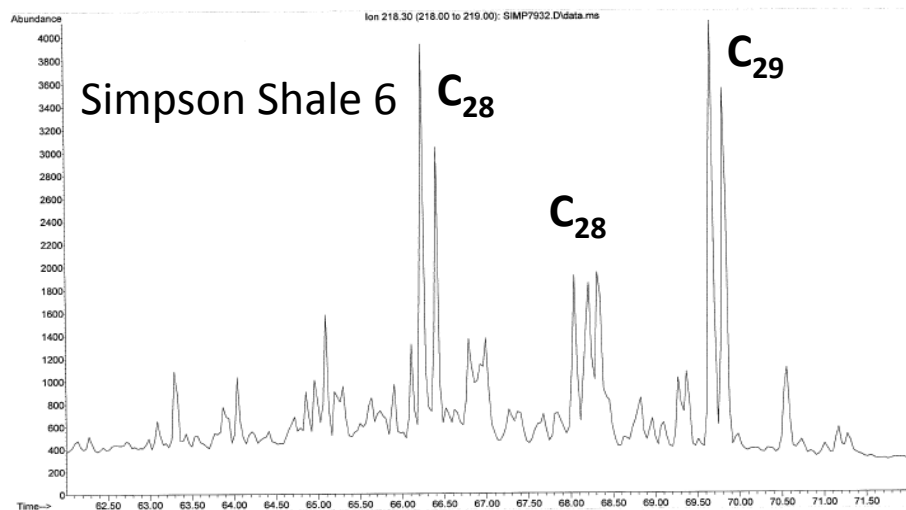
Simpson Shale Extracts-Steranes



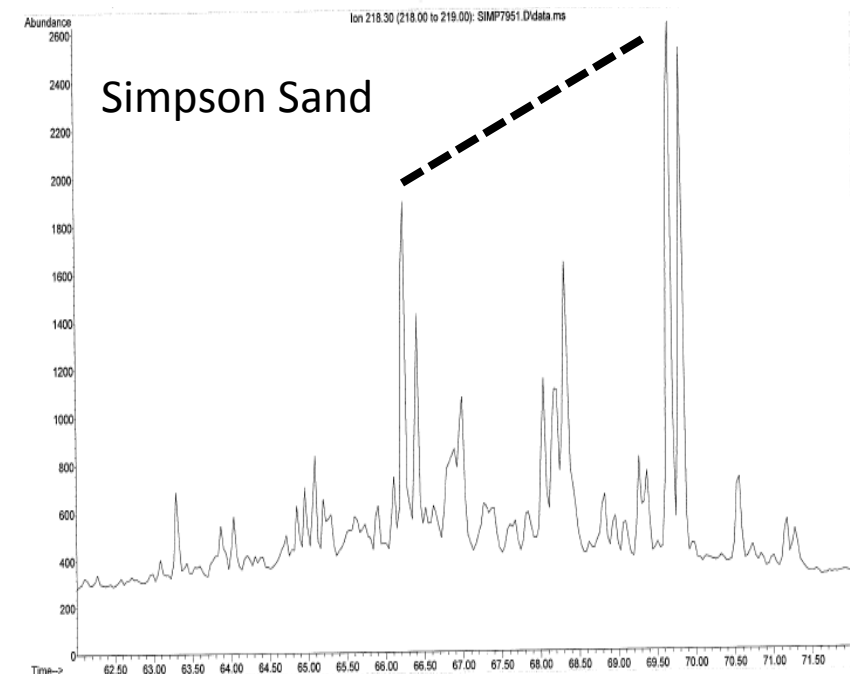
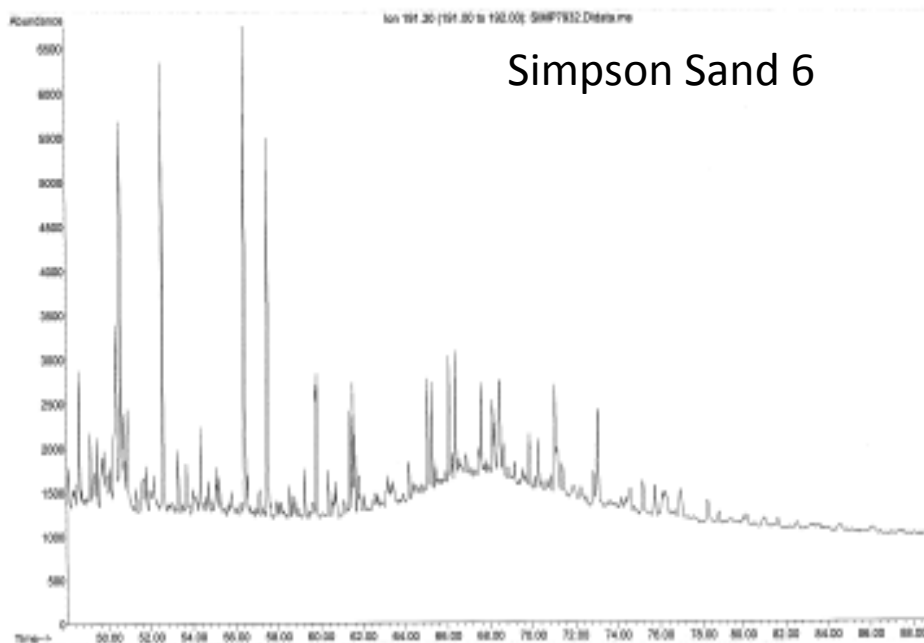
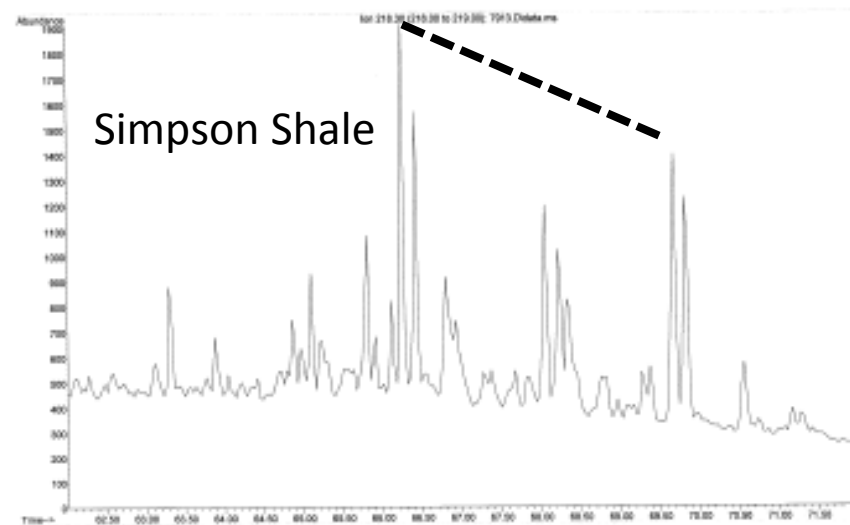
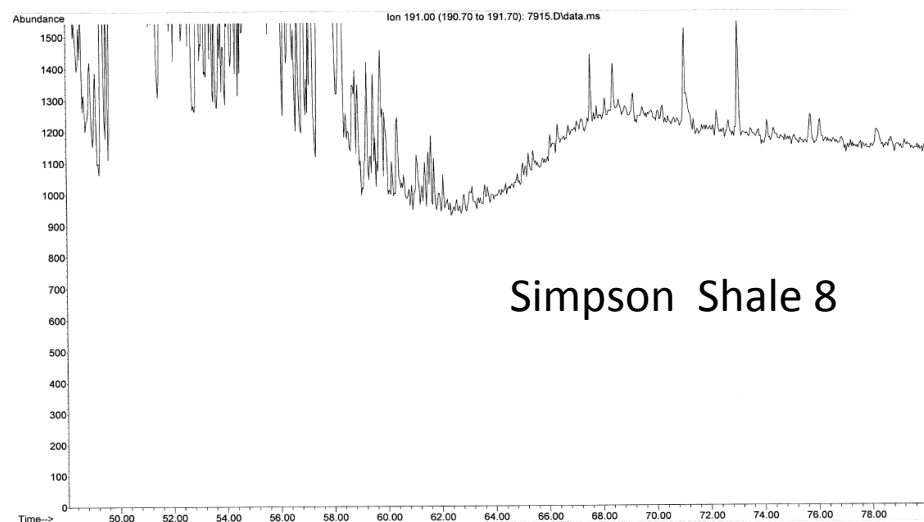
Simpson Oil Stained Sand Extracts-Steranes



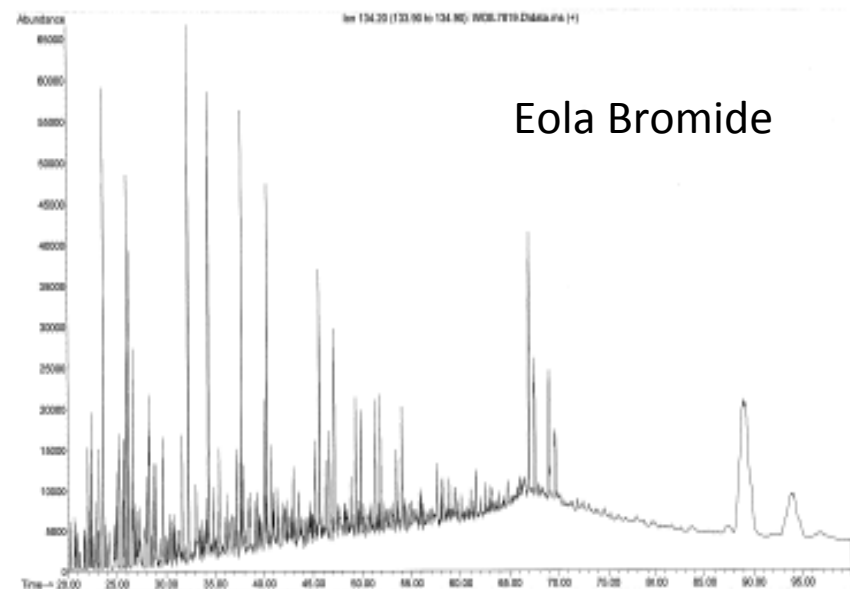
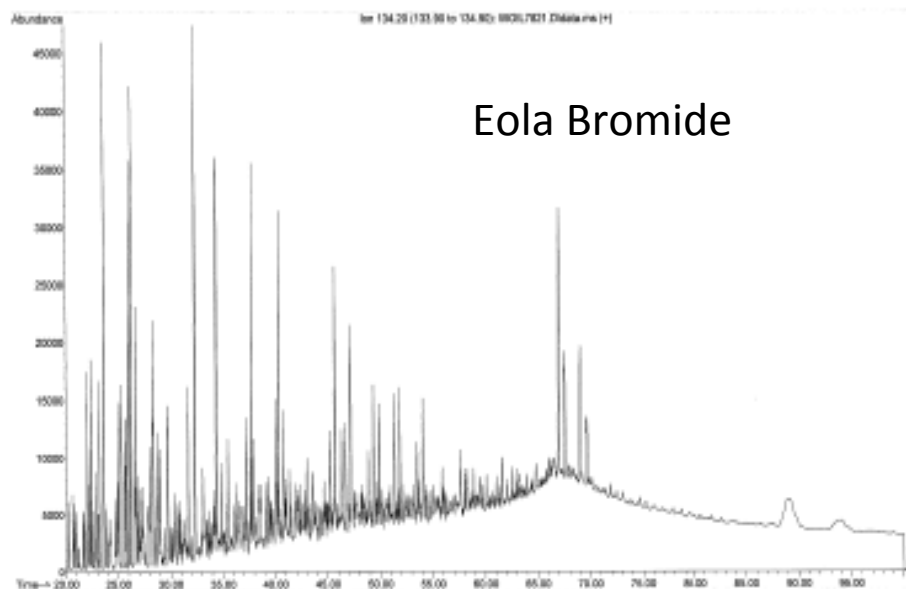
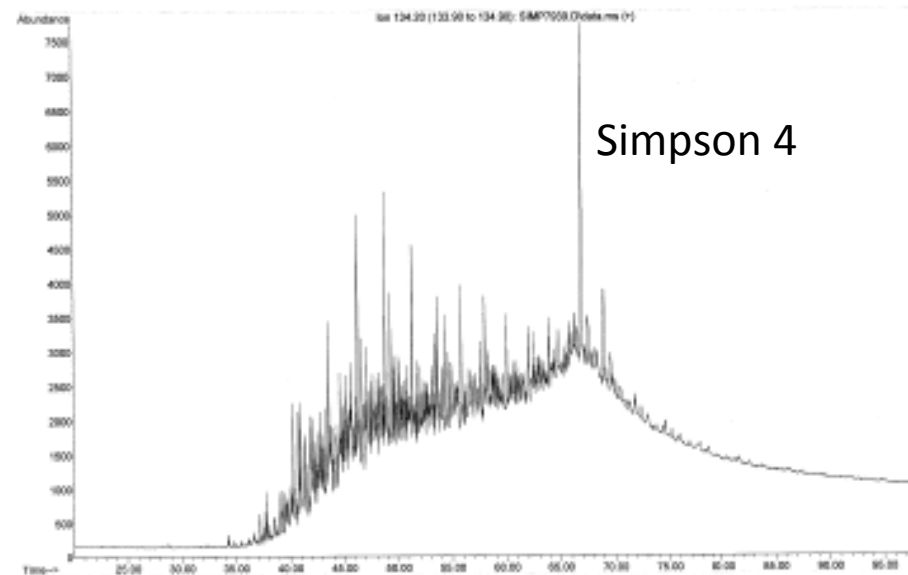
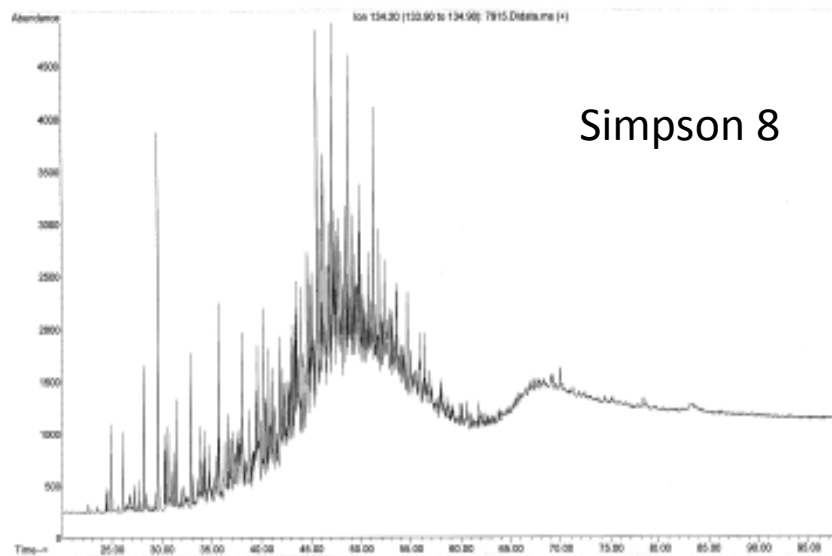
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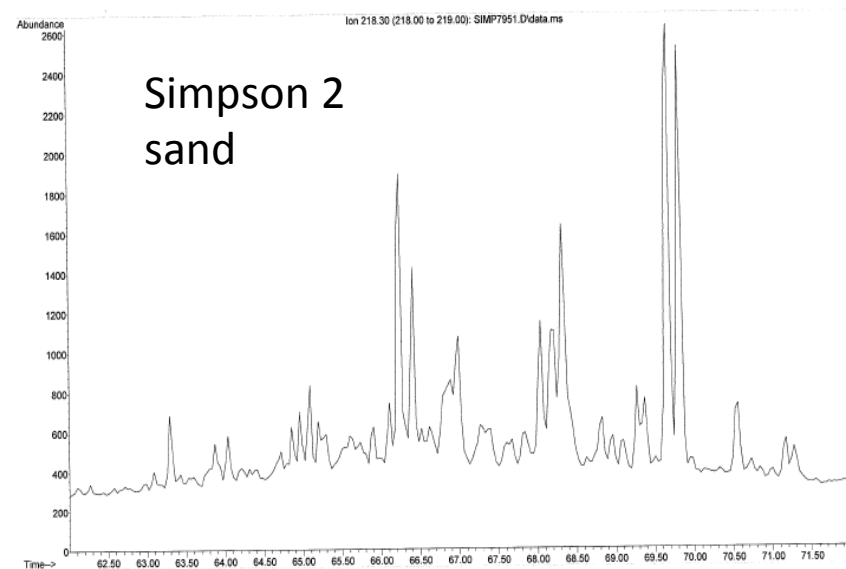
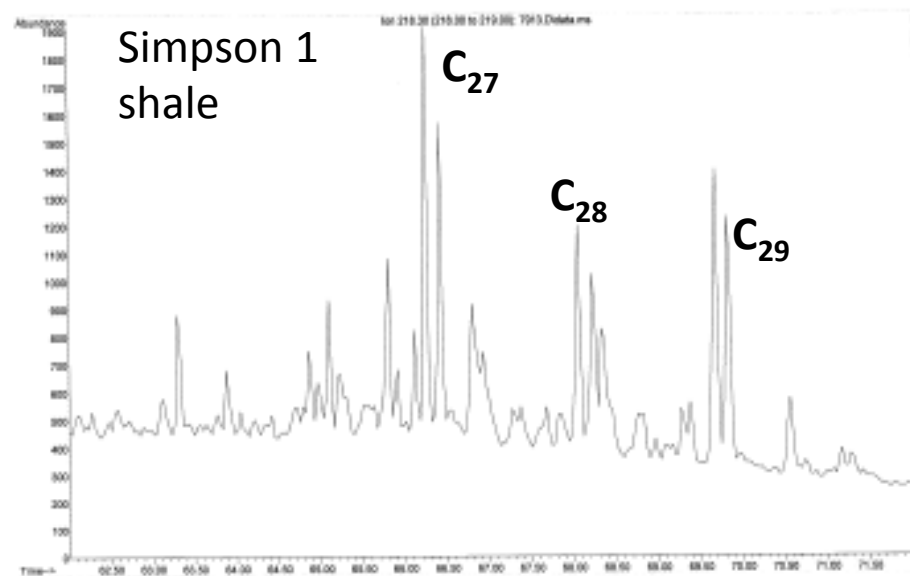
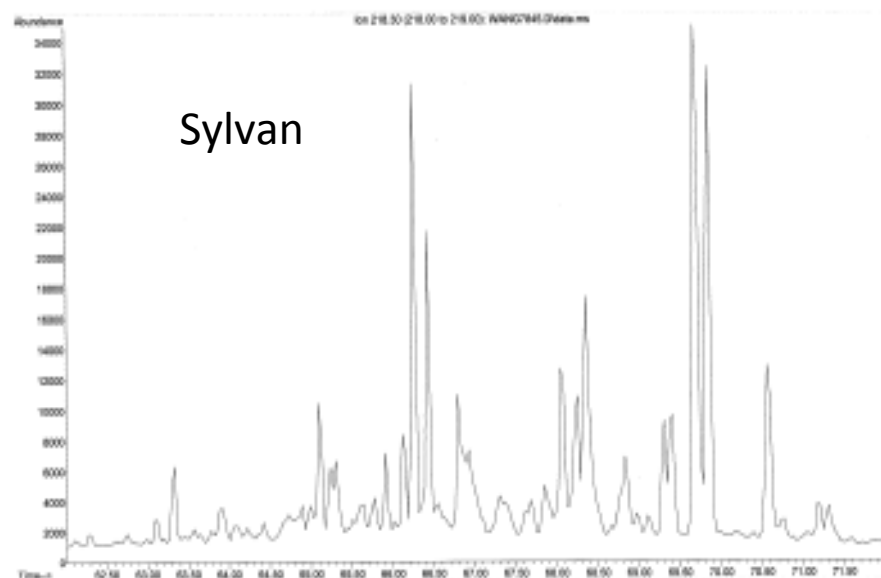
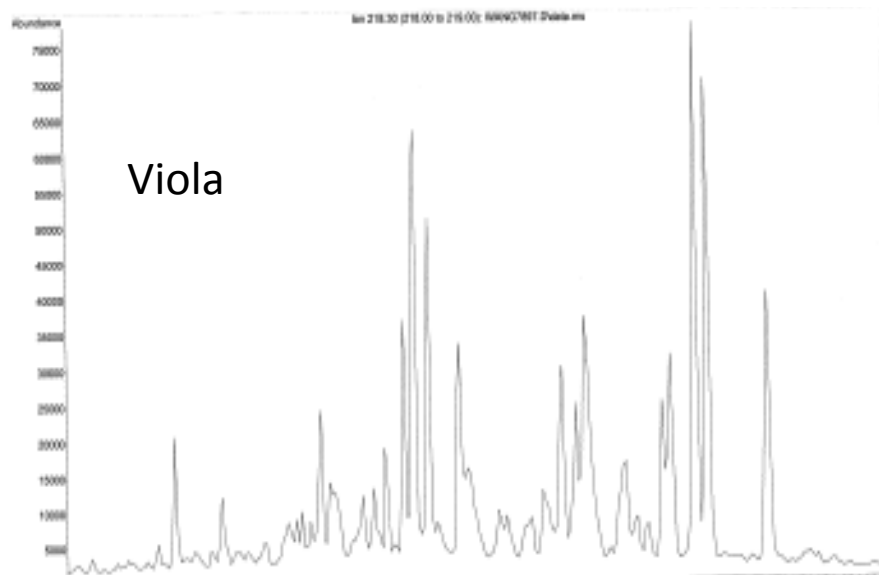
Comparison of Shale and Sand Extracts



Arylisoprenoids in Simpson vs Eola Oils

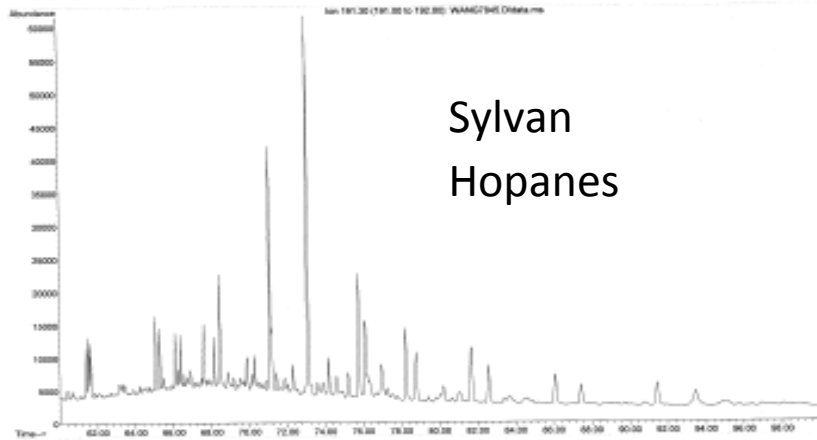


Sylvan and Viola Extracts



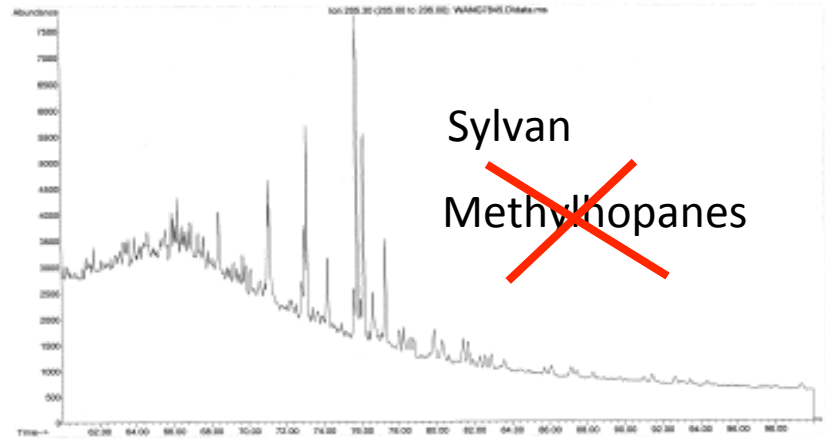
Sylvan and Viola Extracts

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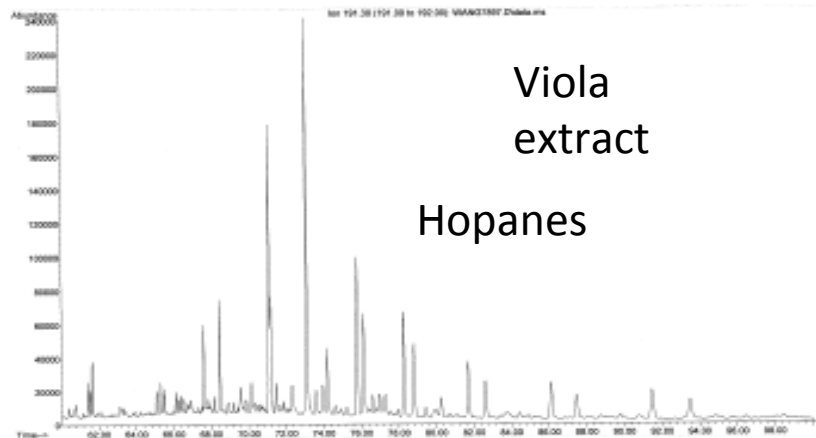
Sylvan
Hopanes

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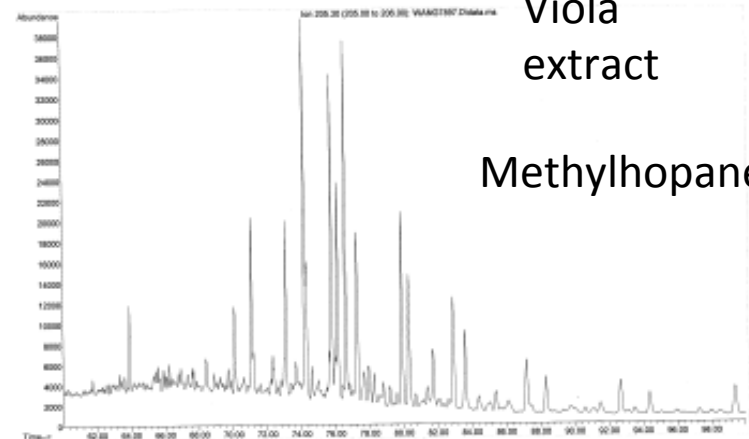
Sylvan
~~Methylhopanes~~

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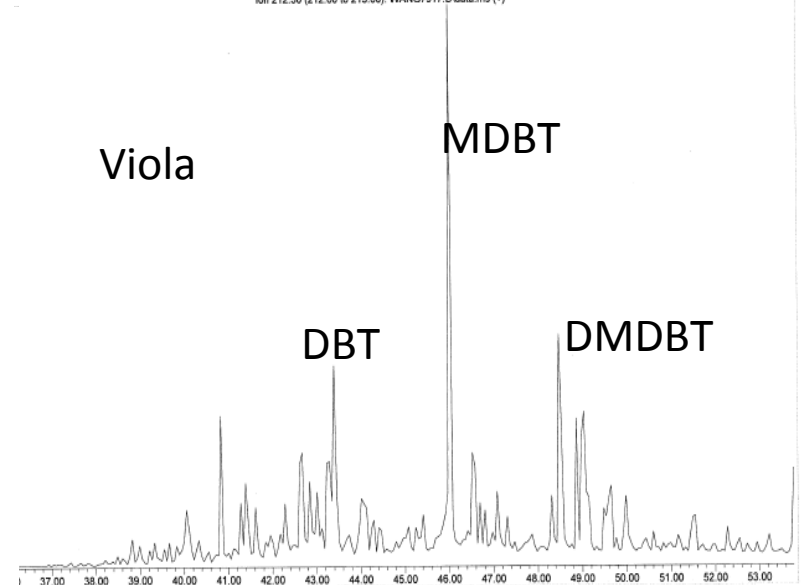
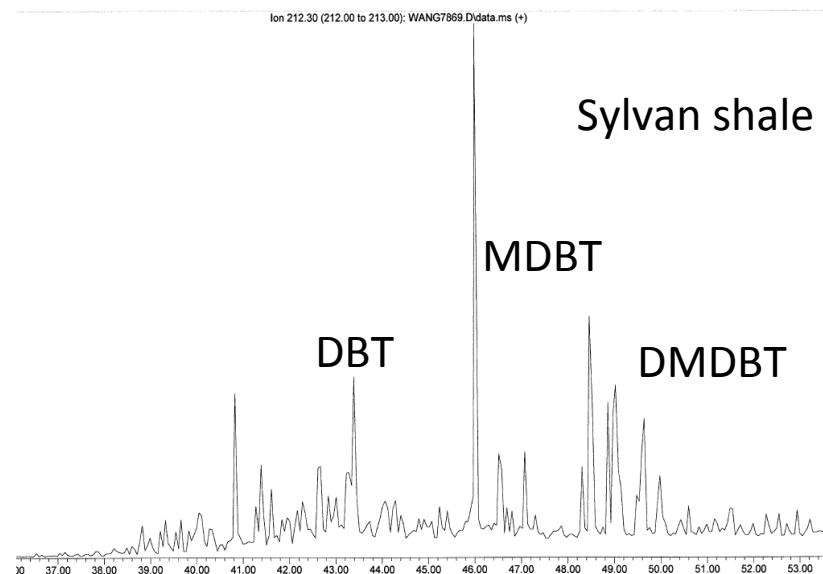
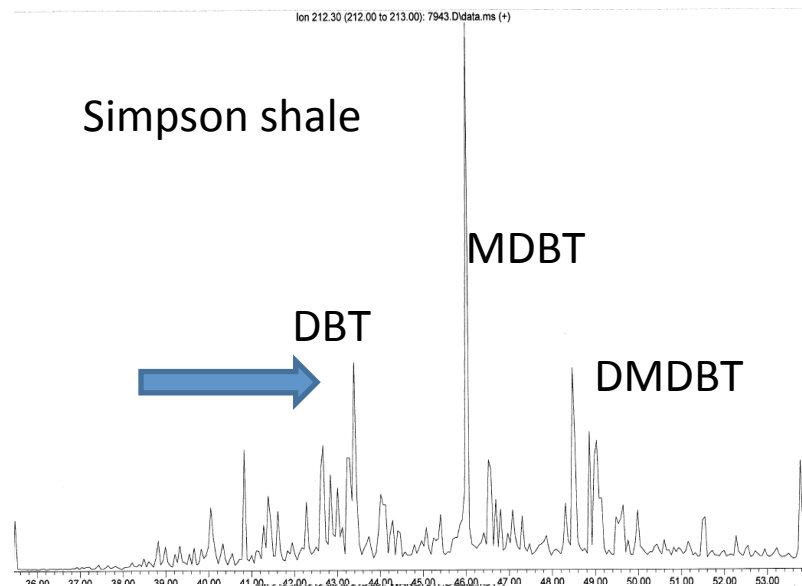
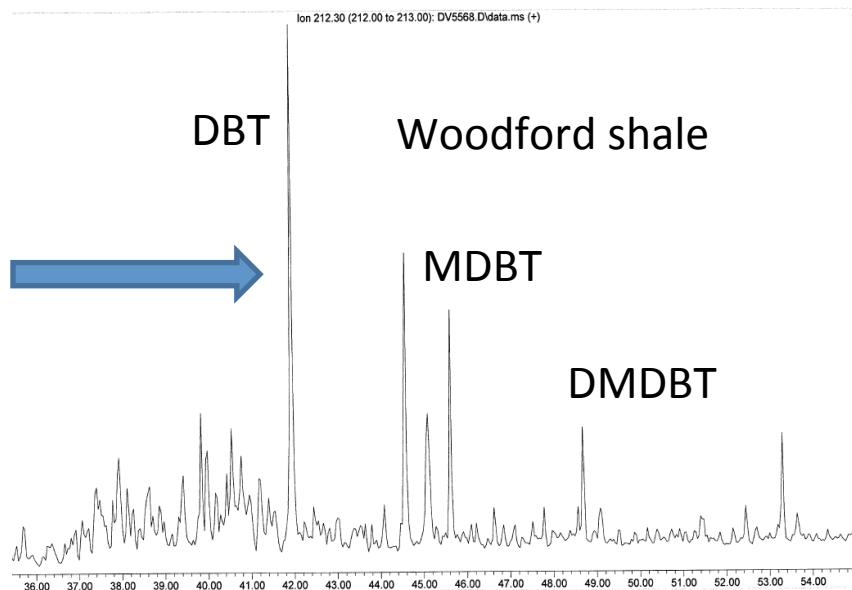
Viola
extract
Hopanes

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Sample Name: VIO-02.DAT
Misc Info :
Vial Number: 1



Viola
extract
Methylhopanes

Dibenzothiophenes



Summary

- Eola Bromide oils probably sourced from Woodford.
- Simpson shale extracts and oil stains have a number of subtle differences.
- Unfortunately samples examined had relatively low TOC values but some useful information could be obtained.
- Do not have the classic Ordovician fingerprints.
- Geochemically possible to distinguish samples derived from Woodford, Viola, Sylvan and Simpson using a variety of parameters.