Datashare 160

Geochemical characteristics of oils from the Sooner Trend Anadarko Basin, Canadian, and Kingfisher Counties and South-Central Oklahoma Oil Province plays, Anadarko Basin, Oklahoma

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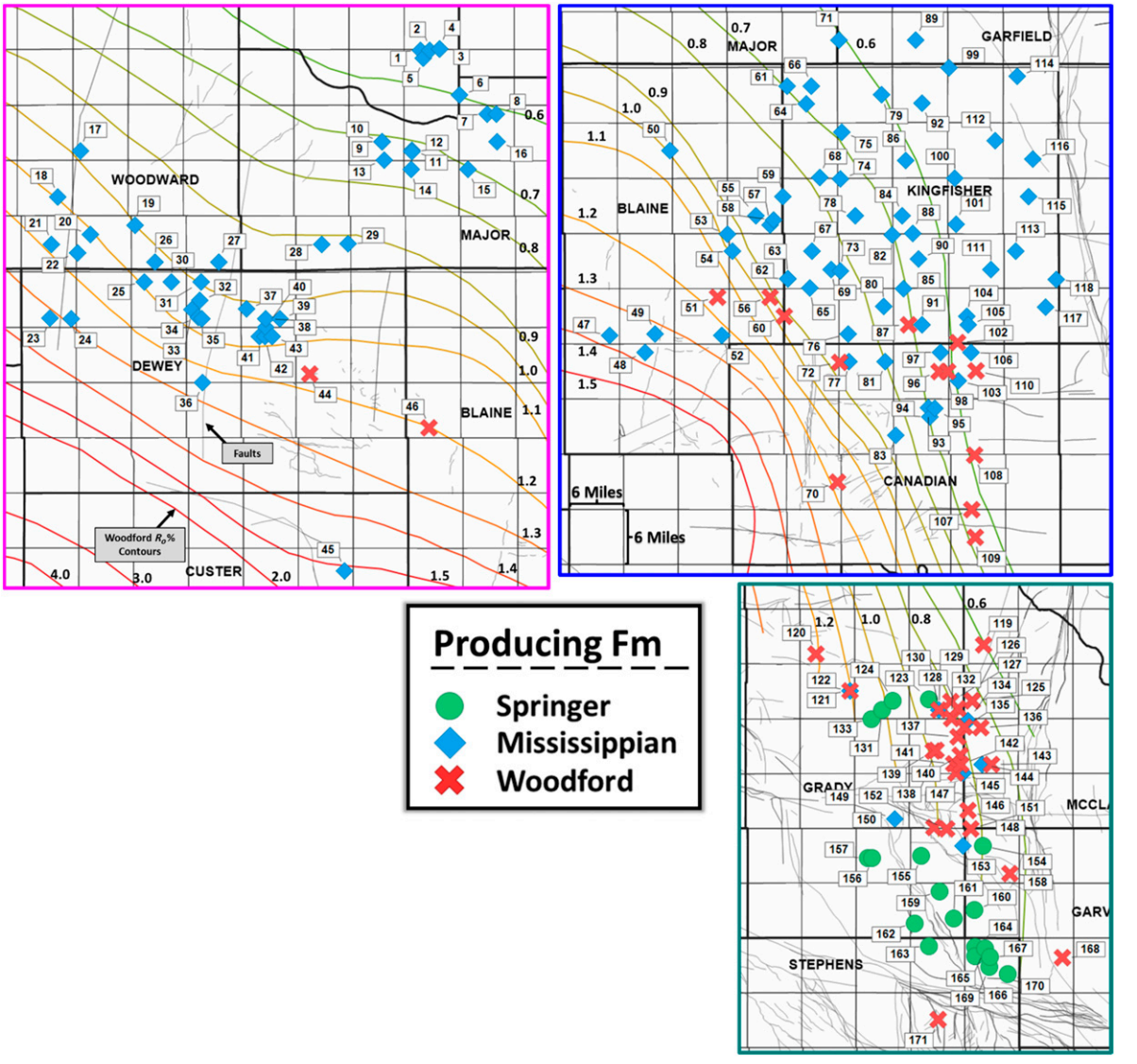

Figure S1. Sample map separated into the three play regions described in this study and numbered according to the "Well Key" column on the Oil CSV tab of Table S1. Fm = Formation; R_o% = vitrinite isoreflectance.

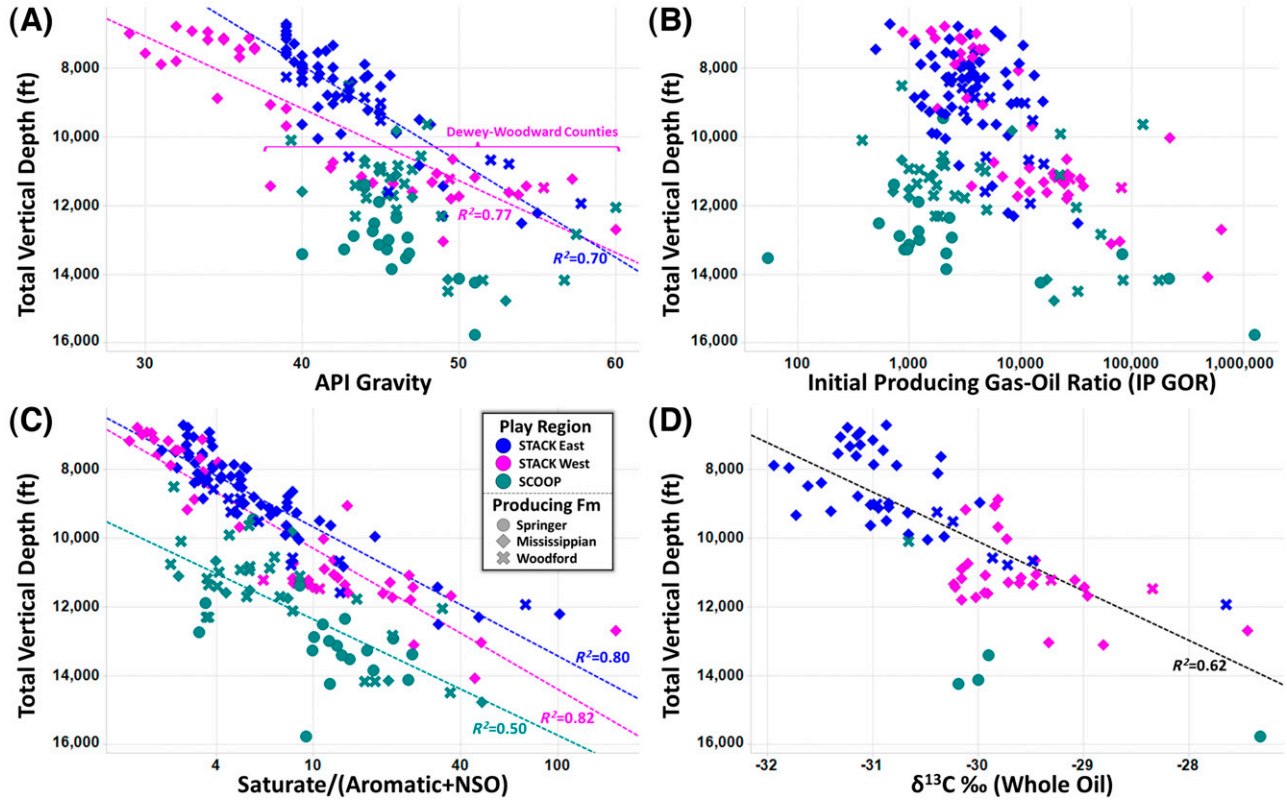

Figure S2. Trends with increasing total vertical depth for each of (A) API gravity; (B) initial production gas–oil ratios (IP GOR); (C) saturate/(aromatic + nitrogen, sulfur, oxygen organic compounds [NSO]); and (D) $\delta^{13}C$, respectively. Fm = Formation; R^2 = the square of Pearson's correlation coefficient; SCOOP = South-Central Oklahoma Oil Province; STACK = Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties.

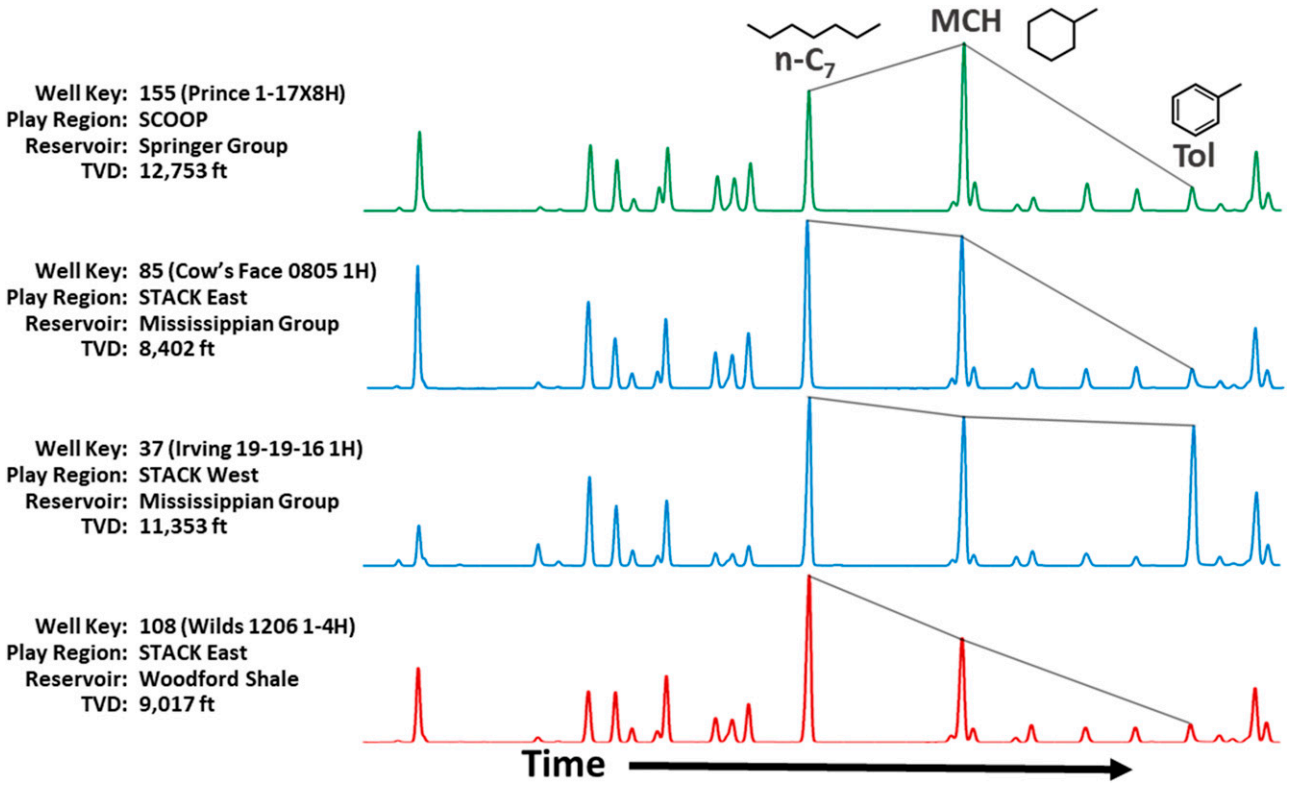

Figure S3. Representative light hydrocarbon chromatograms are shown and indicate varying proportions of the major constituents, n-heptane (n-C_7), methylcyclohexane (MCH), and toluene (Tol), in the oils from the different plays. SCOOP = South-Central Oklahoma Oil Province; STACK = Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties; TVD = total vertical depth.

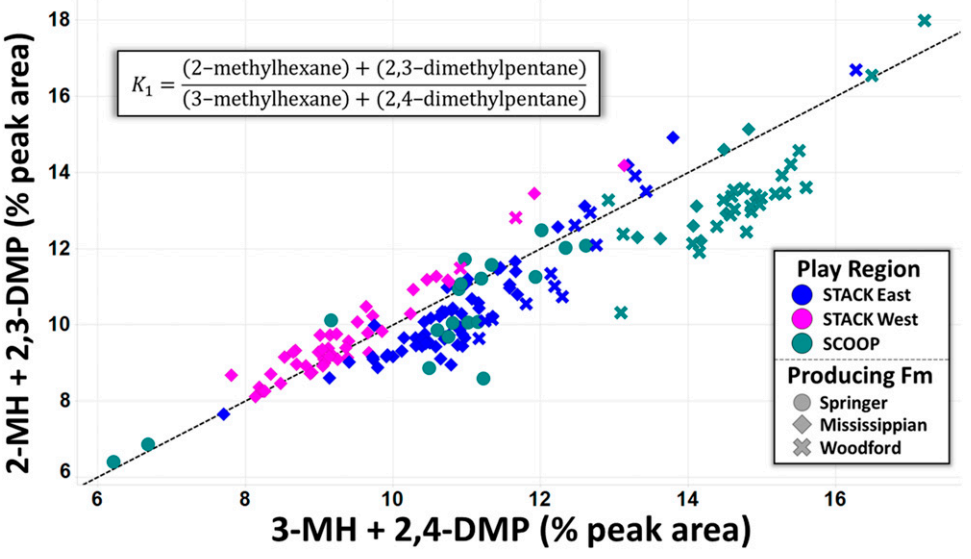

Figure S4. Crossplot of the numerator and denominator of the Mango K_1 parameter for all Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties (STACK)/ South-Central Oklahoma Oil Province (SCOOP) data shows strong invariance near unity. DMP = dimethylpentane; Fm = Formation; MH = methylhexane.

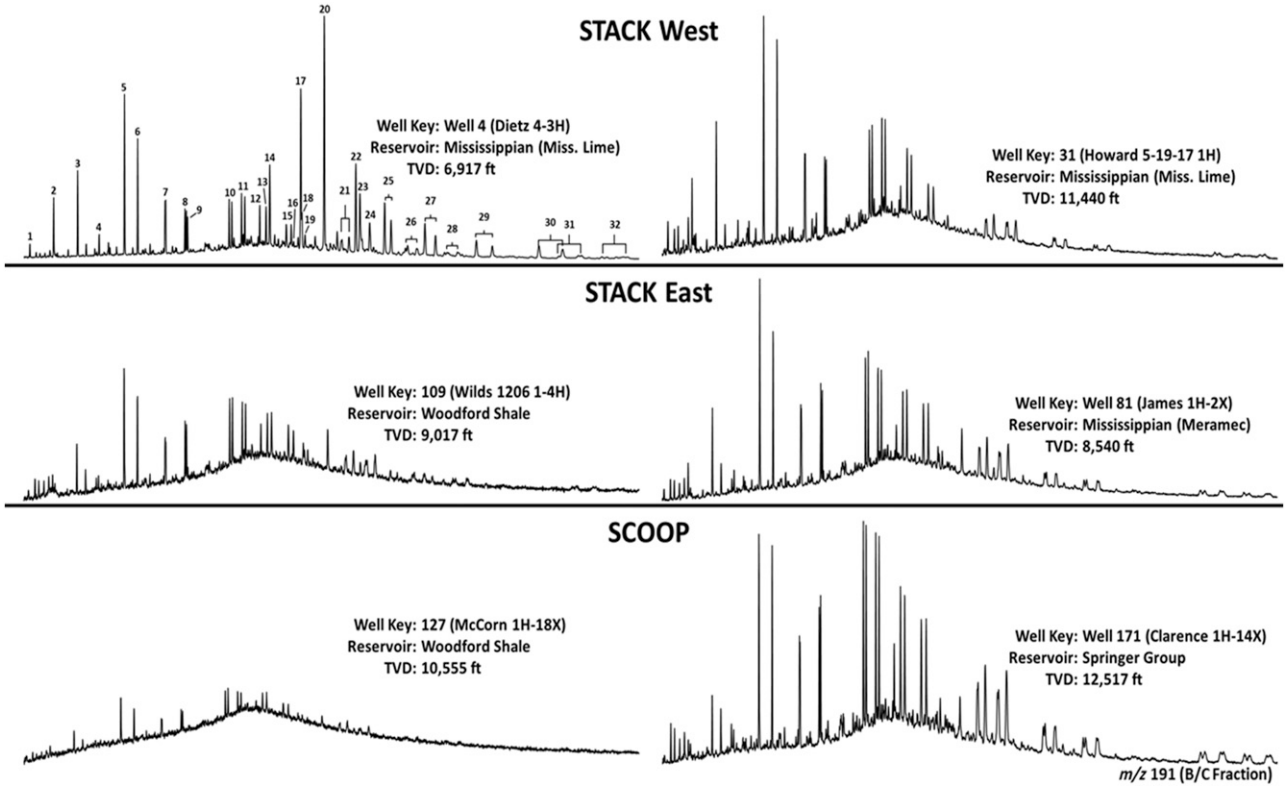

Figure S5. Terpane chromatograms (mass-to-charge ratio [*m/z*] 191) for representative oils from Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties (STACK) West, STACK East, and South-Central Oklahoma Oil Province (SCOOP). Peak identifications: (1) C_{19} tricyclic terpane; (2) C_{20} tricyclic terpane; (3) C_{21} tricyclic terpane; (4) C_{22} tricyclic terpane; (5) C_{23} tricyclic terpane; (6) C_{24} tricyclic terpane; (7) C_{25} tricyclic terpane (22S + 22R); (8) C_{26} tricyclic terpane (22S + 22R); (9) C_{24} tetracyclic terpane; (10) C_{28} tricyclic terpane (22S + 22R); (11) C_{29} tricyclic terpane (22S + 22R); (12) 18α(H)-22,29,30-trisnorhopane (Ts); (13) C_{30} tricyclic terpane (22S); (14) C_{30} tricyclic terpane (22R) and 17α(H)-22,29,30-trisnorhopane (Tm); (15) C_{31} tricyclic terpane (22S + 22R); (16) 17α(H),21β(H)-28,30-bisnorhopane; (17) 17α(H),21β(H)-30-norhopane; (18) 18β(H)-30-norneohopane; (19) 15α(H)-methyl-17α(H)-27-norhopane (diahopane); (20) 17α(H),21β(H)-hopane; (21) C_{33} tricyclic terpane (22S + 22R); (22) 17α(H),21β(H)-homohopane (22S); (23) C_{34} tricyclic terpane (22S) and 17α(H),21β(H)-homohopane (22R); (24) C_{34} tricyclic terpane (22R) and gammacerane; (25) 17α(H),21β(H)-bishomohopane (22S + 22R); (26) C_{35} tricyclic terpane (22S + 22R); (27) 17α(H),21β(H)-trishomohopane (22S + 22R); (28) C_{36} tricyclic terpane (22S + 22R); (29) 17α(H),21β(H)-tetrakishomohopane (22S + 22R); (30) 17α(H),21β(H)-pentakishomohopane (22S + 22R); (31) C_{38} tricyclic terpane (22S + 22R); (32) C_{39} tricyclic terpane (22S + 22R). B/C = branched/cyclic; Miss. = Mississippian; TVD = total vertical depth.

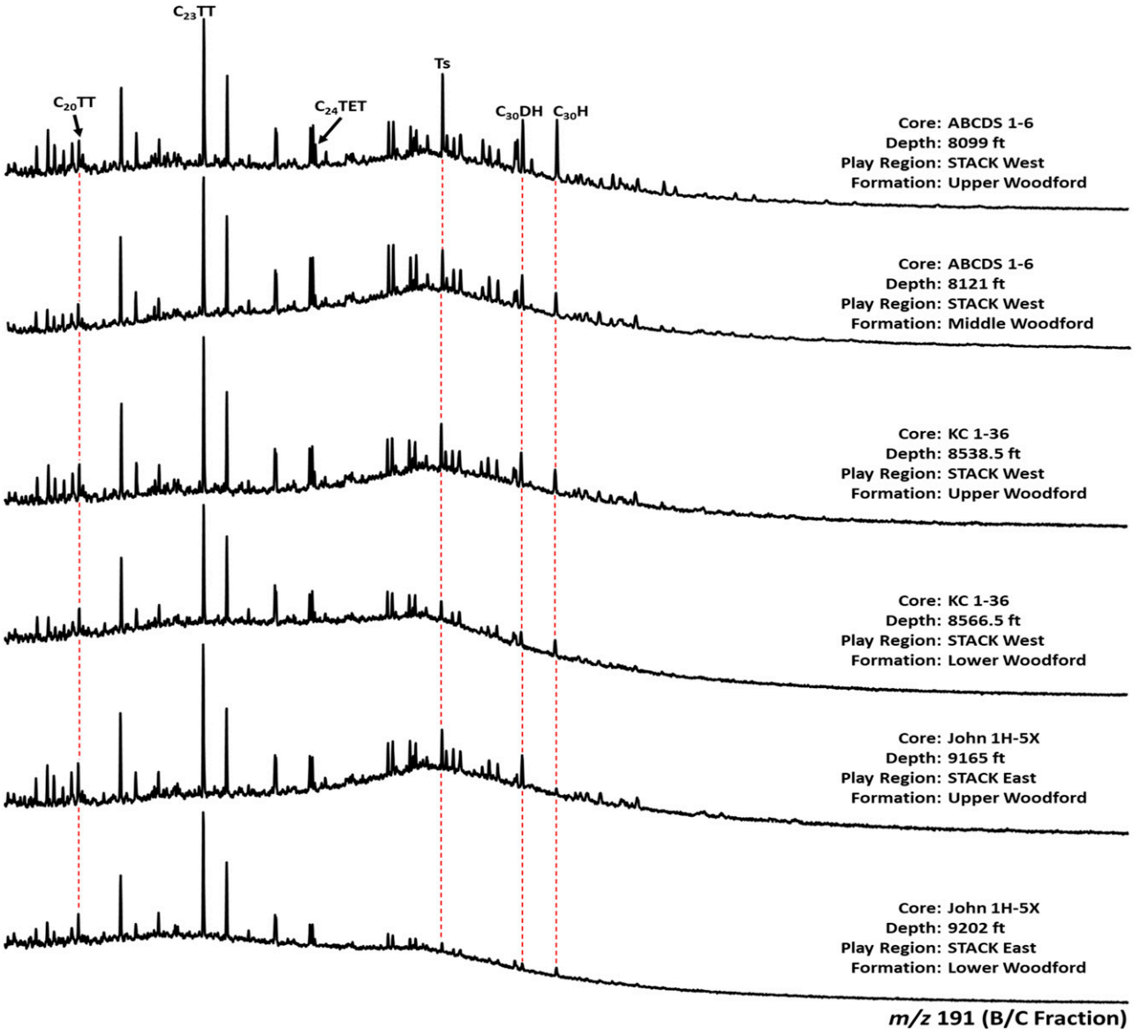

Figure S6. Terpane fingerprints taken from three different Woodford Shale core extracts in Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties (STACK) generally show less abundant hopanes and extended tricyclic terpanes compared to the C_{19}–C_{26} tricyclic terpanes (TT). *m/z* = mass-to-charge ratio; TET = tetracyclic terpane; Ts = 18α(H)-22,29,30-trisnorhopane.

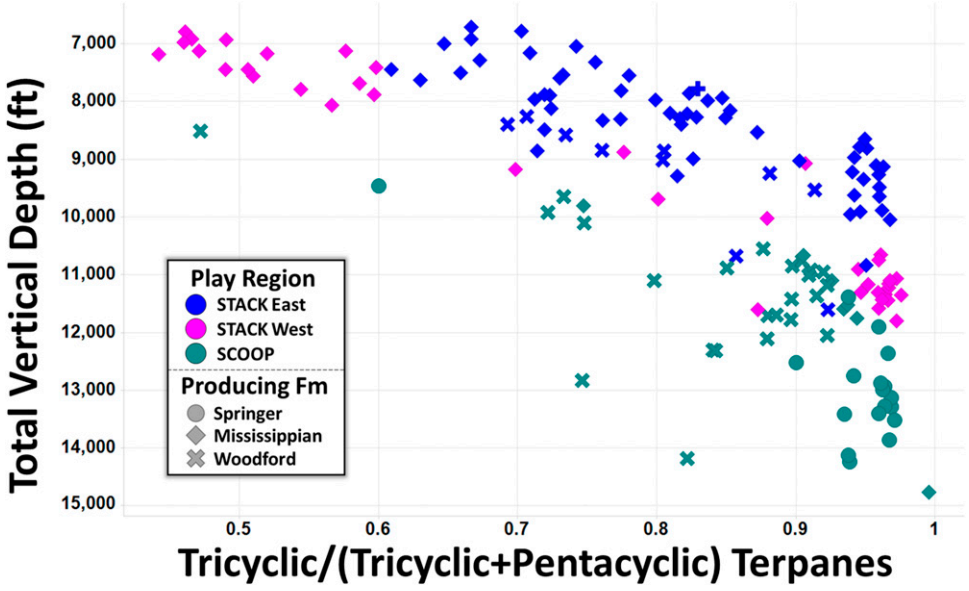

Figure S7. The tricyclic/(tricyclic + pentacyclic) terpane ratios show a modest correlation with total vertical depth in Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties (STACK) but poor correlation in South-Central Oklahoma Oil Province (SCOOP). Fm = Formation.

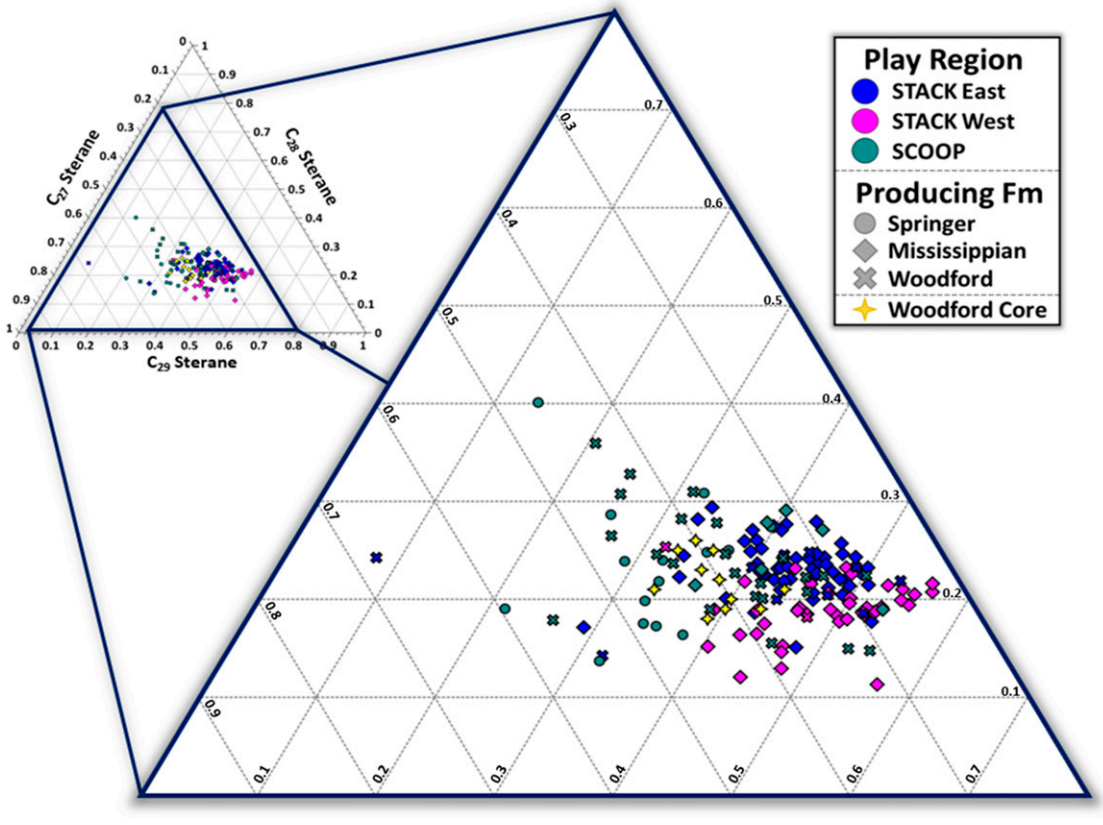

Figure S8. The $C_{27–29}$ sterane ternary diagram for the oils and source rock extracts in this study shows similarity between the majority of samples, with some notable exceptions. Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties (STACK) West and East oils show the greatest similarity for the Mississippian-produced oils. Some separation occurs in some of the Woodford-produced oils from the Mississippian oils. Fm = Formation; SCOOP = South-Central Oklahoma Oil Province.

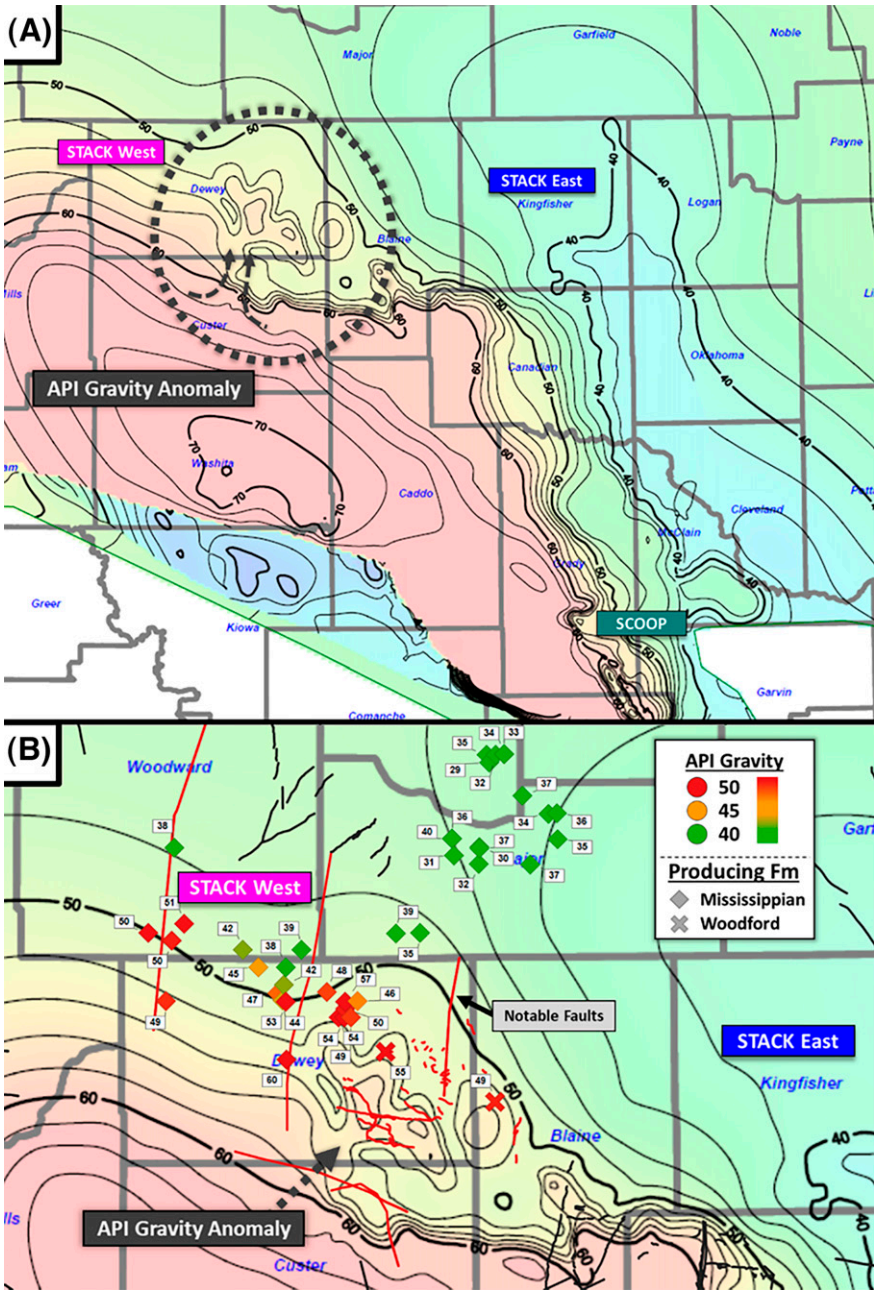

Figure S9. (A) A map showing the distribution of API gravities of oils produced from the Woodford Shale for the Anadarko Basin. Note the broad plateau of 40°–50° API gravity oils in Blaine, Kingfisher, and Canadian Counties, which increases rapidly to 60° API near the tri-county border. (B) Expanded view of the API gravity map showing a regional high API gravity anomaly in Sooner Trend of Anadarko Basin, Canadian, and Kingfisher Counties (STACK) West. Fm = Formation; SCOOP = South-Central Oklahoma Oil Province.

Table S1. Well location and geochemical data for the oils characterized in this study (Excel spreadsheet)