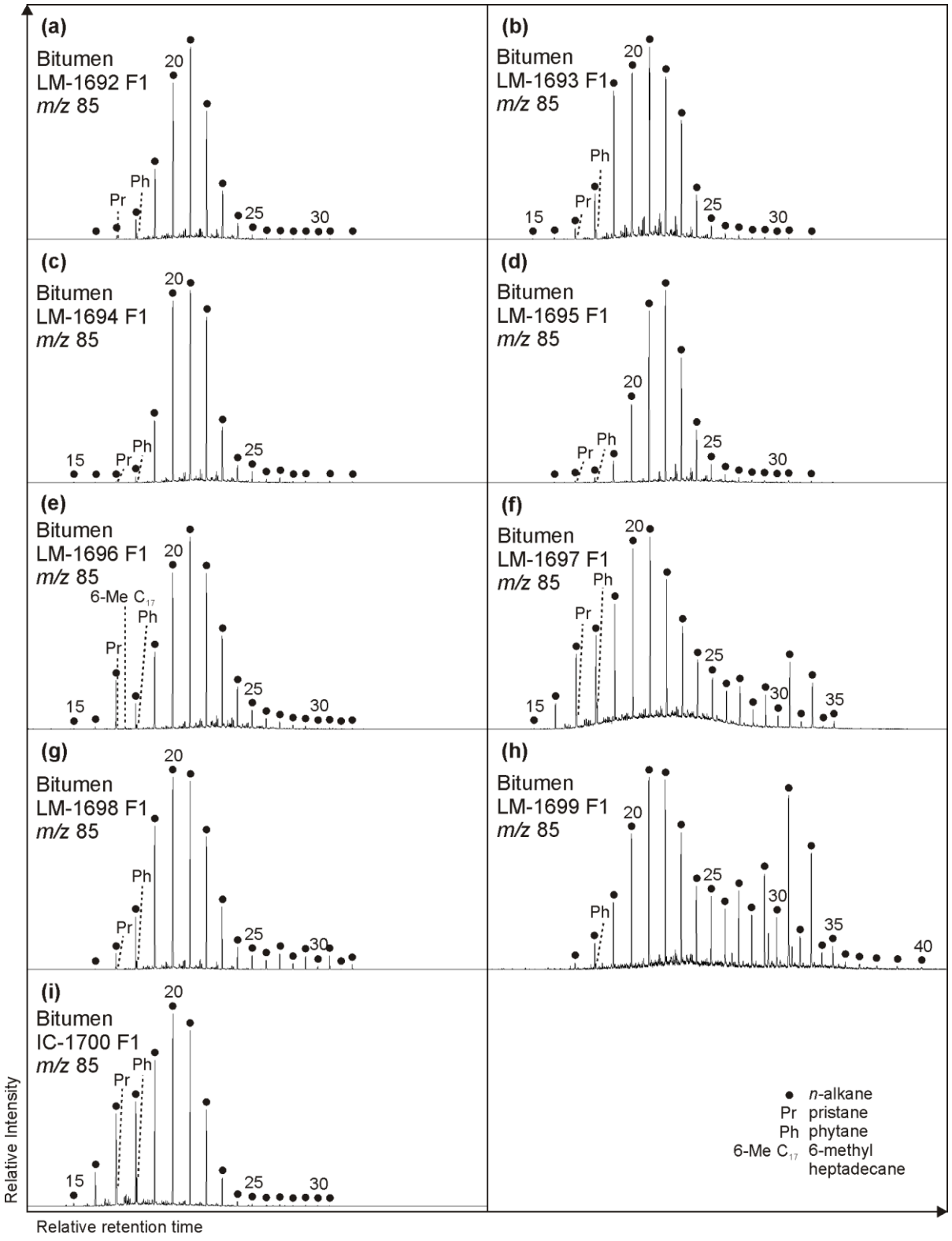
(a)
Bitumen
LM-1692 F1
m/z 85
(b)
Bitumen
LM-1693 F1
m/z 85
(c)
Bitumen
LM-1694 F1
m/z 85
(d)
Bitumen
LM-1695 F1
m/z 85
(e)
Bitumen
LM-1696 F1
m/z 85
(f)
Bitumen
LM-1697 F1
m/z 85
(g)
Bitumen
LM-1698 F1
m/z 85
(h)
Bitumen
LM-1699 F1
m/z 85
(i)
Bitumen
IC-1700 F1
m/z 85
Pr
Ph
6-Me C17
n-alkane
pristane
phytane
6-methyl heptadecane
Relative Intensity
Relative retention time

Figure S1. Partial GC-MS ion chromatograms (*m/z* 85; 10–60 min) of the hydrocarbon fractions (F1) from bitumens of the Magadi cherts (LM-1692–1699; a–h) and the Great Geysir reference sinter (IC-1700; i). A narrow bell-shaped *n*-alkane distribution in the mid-chain range (around *n*-C_{21}) is visible in all samples analyzed. Additionally, odd-numbered long-chain *n*-alkanes are abundant in bitumens from most of the Green Bed cherts (LM-1697–1699; f–h). Notably, 6-methyl heptadecane appears in LM-1696 (e).

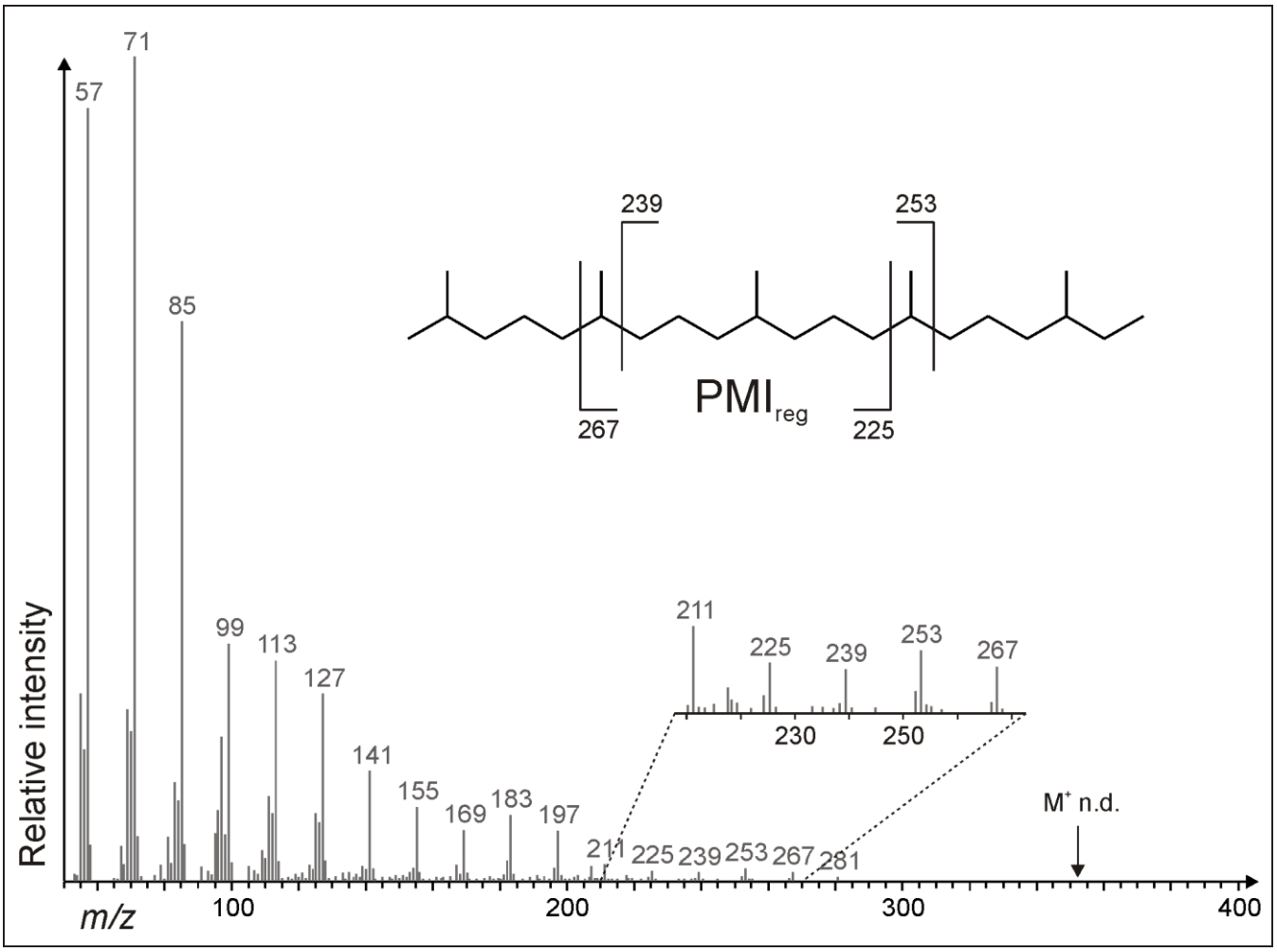

Figure S2. Mass spectrum of the regular C_{25} isoprenoid 2,6,10,14,18-pentamethylicosane (PMI_{reg}) from kerogen of LM-1693 (similar in kerogen pyrolysates from LM-1692 and LM-1695). Typical for this C_{25} isoprenoid isomer is the high abundance of the fragments at 225 and 253 amu, as compared to 239 and 267 amu (Risatti et al., 1984; Greenwood and Summons, 2003).The molecular ion (M^+) at 352 amu was not detected (n.d.).

Table S1. Mean $\delta^{13}C_{V\text{-}PDB}$ values in ‰ of fatty acids from bitumens

	LM-1692		LM-1693		LM-1694		LM-1695		LM-1696		LM-1697		LM-1698		LM-1699		IC-1700	
	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±
$C_{12:0}$	−25.7	0.1	−25.0	0.1													−26.5	0.1
$C_{13:0}$			−26.1	0.5													−21.2	0.2
$C_{14:0}$	−26.1	<0.1	−27.5	0.1	−27.4	<0.1	−32.2	0.1			−28.5	0.8					−26.4	0.2
i-$C_{15:0}$			−25.3	<0.1	−27.3	0.1											−18.2	<0.1
ai-$C_{15:0}$	−30.9	<0.1	−28.8	0.1	−29.5	0.1											−21.2	0.7
$C_{15:0}$	−27.8	0.1	−28.0	0.2	−26.1	0.1	−31.4	0.2			−21.5	0.4	−29.2	<0.1	−23.9	0.1	−24.8	0.2
$C_{16:1}$													−26.9	0.5				
$C_{16:1}$													−23.7	0.5				
$C_{16:0}$	−28.3	<0.1	−25.3	<0.1	−26.4	<0.1	−23.9	0.1	−27.0	0.5	−27.5	0.1	−23.9	<0.1	−25.3	0.1	−26.1	<0.1
ai-$C_{17:0}$	−34.0	<0.1	−30.0	0.3	−25.7	0.1												
$C_{17:0}$	−29.4	0.2	−27.3	0.2	−24.8	0.7	−27.3	<0.1	−18.8	0.1	−22.8	0.1	−24.1	0.9	−30.5	0.5	−24.2	0.2
$C_{18:2}$			−27.8	1.0	−18.3	0.7			−35.2	0.2			−27.5	0.2				
$C_{18:1}$	−29.1	0.1	−26.5	0.1	−25.8	<0.1			−26.9	<0.1	−28.1	0.5	−23.2	0.2	−30.2	0.1		
$C_{18:1}$	−21.7	0.2	−22.5	0.1									−21.2	0.2				
$C_{18:0}$	−28.3	0.2	−26.3	0.1	−29.1	0.1	−29.6	0.1	−26.2	0.4	−28.7	0.1	−25.1	0.2	−28.4	0.7	−27.2	0.1
$C_{19:0}$											−22.1	0.1	−32.0	0.1			−27.9	<0.1
$C_{20:0}$	−28.8	0.6	−28.2	<0.1	−27.2	<0.1			−20.2	0.1	−20.8	0.1	−27.3	0.7	−27.5	0.2	−21.1	0.1
$C_{21:0}$											−21.3	<0.1	−30.9	0.3				
$C_{22:0}$									−30.5	0.3	−24.3	0.1	−28.0	0.7	−26.7	<0.1	−33.7	0.3
$C_{23:0}$											−25.7	<0.1	−30.8	0.1			−30.6	<0.1
$C_{24:0}$	−24.5	0.1	−28.0	0.1	−22.2	0.1	−28.9	0.1	−28.5	0.3	−26.3	0.1	−27.5	0.1	−28.8	<0.1	−29.5	0.1
i-$C_{25:0}$			−24.8	0.2														
ai-$C_{25:0}$			−27.1	0.2														
$C_{25:0}$			−22.5	0.2							−26.8	0.1	−24.7	0.7			−33.8	0.1
$C_{26:0}$	−25.8	0.2	−30.6	<0.1	−30.4	0.4			−16.3	0.2	−24.6	0.2	−30.0	0.3	−30.5	0.3	−35.4	0.1
$C_{27:0}$											−22.5	0.2					−31.9	0.2
$C_{28:0}$											−25.4	<0.1					−32.0	<0.1

Table S2. Mean $\delta^{13}C_{V\text{-}PDB}$ values in ‰ of alcohols, ketones, mono- and diethers from bitumens

	LM-1692		LM-1693		LM-1694		LM-1695		LM-1696		LM-1697		LM-1698		LM-1699		IC-1700	
	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±
Alkan-1-ols																		
C_{12}																	−29.9	0.4
C_{13}																	−25.2	0.1
C_{14}	−28.5	0.2	−39.5	0.1	−37.3	0.1	−19.6	0.5	−27.1	0.7			−19.4	0.2			−30.2	0.1
C_{15}																	−27.3	<0.1
C_{16}	−34.8	0.2	−25.1	<0.1	−35.5	0.4	−36.0	0.3	−35.9	0.2	−33.1	0.2	−33.6	0.4	−30.9	0.3	−24.4	0.1
C_{18}	−37.2	0.3	−31.9	0.2	−35.0	0.3	−35.9	0.4	−34.8	0.1	−33.2	<0.1	−35.1	0.4	−32.8	0.4	−29.4	0.3
C_{20}	−30.9	0.1	−29.9	0.6	−32.7	0.1	−30.3	0.2	−29.8	0.1	−24.8	0.2	−29.5	0.1	−30.9	0.1		
C_{21}							−33.3	0.2										
C_{22}	−29.6	0.4	−32.4	0.3	−28.7	0.1	−30.3	0.2	−25.2	0.4	−34.6	0.2	−26.7	0.3	−31.5	0.3	−25.9	0.2
C_{23}													−31.1	0.1	−20.2	0.4		
C_{24}	−20.2	0.3	−36.5	0.1	−28.3	0.3	−32.3	0.6	−30.1	0.7	−22.6	0.8	−25.0	0.2	−30.0	0.3	−24.0	0.1
C_{25}													−17.5	0.2	−25.3	0.2		
C_{26}	−32.1	0.5	−33.8	0.7	−17.4	0.2	−28.5	0.9	−26.5	0.3	−29.2	0.1	−21.7	0.3	−21.8	0.2	−27.7	0.5
C_{27}													−26.4	0.3				
C_{28}	−21.3	1.0	−26.7	0.5	−20.6	0.4	−26.6	1.0	−18.7	0.3	−22.8	0.1	−25.4	<0.1	−23.5	0.1	−23.0	0.2
C_{30}					−14.6	0.3					−20.3	0.7			−19.6	0.1	−29.5	0.5
C_{32}	−26.4	0.7																
Glycerol mono- and diethers																		
i-$C_{16:0}$	−21.8	0.1	−20.3	<0.1	−12.2	<0.1												
$C_{16:0}$	−20.4	0.1	−20.2	0.7	−11.4	0.4												
10Me-$C_{16:0}$	−21.5	0.1	−23.0	0.1	−19.7	<0.1												
i-$C_{17:0}$	−25.2	0.2	−21.3	0.5														
ai-$C_{17:0}$	−17.4	0.1	−25.0	0.7														
$C_{17:0}$	−19.0	0.1	−26.9	0.1	−10.7	0.2												
Me-$C_{17:0}$	−22.1	0.1	−17.9	0.4	−10.9	0.1												
Me-$C_{17:0}$	−22.5	0.3	−9.8	<0.1	−9.4	<0.1	−18.6	0.1										
$C_{18:1}$	−20.9	0.2	−15.7	0.1														
$C_{18:1}$	−19.1	0.8	−22.9	0.7	−7.0	0.2												
$C_{18:0}$	−12.5	0.2	−19.0	0.8	−5.7	0.4												
A	−21.7	0.4	−18.5	0.5	−12.2	0.4	−22.2	0.1	−14.8	0.5					−16.6	0.4		
ExA	−18.3	0.6	−19.9	0.2	−15.3	0.4	−19.4	0.5	−19.6	0.5								
Other compounds																		
Tetrahym.							−33.3	0.3	−27.7	0.1	−25.4	0.2	−24.1	0.5	−29.3	0.2		

Table S3. Mean $\delta^{13}C_{V\text{-}PDB}$ values in ‰ of alkanes and isoprenoids from bitumens

	LM-1692		LM-1693		LM-1694		LM-1695		LM-1696		LM-1697		LM-1698		LM-1699		IC-1700	
	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±
n-C_{16}																	−37.1	0.1
n-C_{17}			−30.5	0.6					−30.1	0.6	−38.0	1.2					−32.9	<0.1
6Me-C_{17}									−30.3	0.2								
n-C_{18}	−32.5	<0.1	−32.1	<0.1	−31.8	0.5	−35.6	0.5	−33.8	<0.1	−34.4	0.1	−34.3	0.1			−33.4	<0.1
n-C_{19}	−32.0	0.2	−31.6	0.1	−32.0	0.1	−33.3	0.3	−32.9	0.5	−33.3	0.4	−32.9	<0.1	−14.7	0.5	−35.2	0.1
i-C_{20}	−31.1	0.1	−30.0	<0.1	−34.1	0.3							−29.8	0.2				
ai-C_{20}	−32.1	0.8	−33.2	0.1	−29.0	0.8							−27.5	0.1				
n-C_{20}	−31.4	<0.1	−30.7	0.2	−30.9	0.3	−32.3	0.4	−33.2	<0.1	−32.6	0.4	−32.7	0.2	−38.9	0.3	−33.6	<0.1
i-C_{21}	−32.3	<0.1	−31.2	<0.1	−32.7	<0.1	−30.9	0.1	−34.4	0.7	−35.3	0.5	−33.2	0.3				
ai-C_{21}	−29.8	<0.1	−31.5	<0.1	−30.5	0.3	−31.9	0.4	−28.6	0.1	−36.5	0.3	−32.2	0.1				
n-C_{21}	−31.6	<0.1	−31.0	0.2	−31.2	0.4	−31.9	0.1	−32.9	<0.1	−31.6	<0.1	−33.6	<0.1	−35.0	0.7	−34.0	<0.1
i-C_{22}	−29.9	0.8	−33.2	0.1	−29.6	0.1	−34.0	0.3	−34.1	0.1	−34.9	0.1	−33.6	0.1				
ai-C_{22}	−29.1	0.2	−37.4	0.8	−28.9	0.1	−34.4	0.2	−33.3	<0.1	−32.6	0.1	−33.3	0.3				
n-C_{22}	−32.1	0.2	−31.7	<0.1	−32.0	0.3	−32.3	0.1	−32.8	<0.1	−31.6	0.2	−34.4	0.2	−36.7	0.3	−37.5	<0.1
i-C_{23}	−33.8	0.1	−30.3	0.1	−29.1	0.1	−32.1	<0.1	−31.4	<0.1	−36.5	0.1	−31.3	0.2				
ai-C_{23}	−33.7	0.2	−27.3	0.1	−28.8	0.1	−33.1	0.1	−32.1	0.1	−39.1	0.4	−30.2	0.4				
n-C_{23}	−32.1	<0.1	−32.2	0.2	−32.2	<0.1	−32.4	0.1	−32.6	0.3	−34.5	<0.1	−33.4	0.1	−25.4	0.1	−39.6	0.1
i-C_{24}	−31.8	<0.1	−33.9	0.1	−32.5	<0.1	−29.8	0.4	−35.2	<0.1			−36.3	0.3				
ai-C_{24}	−26.2	0.5	−32.6	0.2	−31.5	0.1	−29.0	0.1	−34.3	0.3			−29.5	0.7				
n-C_{24}	−32.7	0.2	−33.7	<0.1	−31.6	<0.1	−31.8	0.2	−32.5	0.5	−30.6	0.2	−32.2	0.1	−27.6	0.2	−39.2	<0.1
i-C_{25}	−30.8	<0.1	−31.2	0.4	−25.3	<0.1	−34.6	0.1	−28.4	0.4								
ai-C_{25}	−26.8	0.4	−35.9	0.4	−22.6	0.2	−30.4	0.7	−28.0	0.2								
n-C_{25}							−32.0	<0.1	−30.2	0.1	−34.7	0.1	−34.9	0.2	−25.6	0.1		
n-C_{26}							−29.8	0.1	−29.9	0.2	−34.0	0.2	−25.8	<0.1	−34.8	0.3		
n-C_{27}											−36.3	0.2	−23.7	0.1	−30.8	0.1		
n-C_{28}											−33.8	0.2	−24.2	0.3	−27.9	0.1		
n-C_{29}											−28.8	0.4	−23.9	0.5	−21.5	0.2		
n-C_{30}															−26.9	0.1		
n-C_{31}											−20.9	0.6	−24.4	0.1	−21.1	0.4		
n-C_{32}															−24.5	0.2		
n-C_{33}															−25.8	<0.1		
Isoprenoids																		
Pr			−31.7	0.1					−30.2	0.1	−32.2	0.2	−35.8	0.1			−34.5	0.2
Ph	−33.3	<0.1	−30.9	0.4	−30.0	0.6	−36.1	1.2	−34.7	0.1	−33.8	0.1	−35.3	<0.1			−38.6	0.1

Table S4. Mean $\delta^{13}C_{V\text{-}PDB}$ values in ‰ of alkanes and isoprenoids from kerogens

	LM-1692		LM-1693		LM-1695		LM-1697		LM-1698	
	Mean	±	Mean	±	Mean	±	Mean	±	Mean	±
n-C_{15}					−30.5	0.6				
n-C_{16}					−30.4	0.1			−30.9	0.1
n-C_{17}					−30.3	<0.1	−26.0	0.3	−31.3	<0.1
n-C_{18}	−36.3	0.7	−35.0	0.9	−31.5	0.2	−25.4	0.4	−34.9	<0.1
n-C_{19}	−32.0	0.3	−29.2	0.7	−27.2	0.1	−24.0	<0.1	−34.6	0.1
n-C_{20}	−27.8	0.6	−33.7	0.8	−26.9	0.1	−22.1	<0.1	−35.8	0.2
n-C_{21}	−28.1	0.4	−31.5	0.3	−27.6	0.7	−22.0	0.2	−34.3	0.8
n-C_{22}	−31.1	<0.1	−30.9	0.2	−28.8	0.1	−23.0	0.9	−32.9	0.1
n-C_{23}	−31.8	0.1	−29.3	0.4	−27.3	<0.1	−22.4	0.1	−34.5	0.8
n-C_{24}	−26.5	0.6	−30.5	0.3	−26.9	0.2	−22.9	0.5	−35.3	0.2
n-C_{25}	−28.7	0.5	−30.9	1.0	−27.3	<0.1	−24.4	0.3	−34.9	<0.1
n-C_{26}	−26.6	0.5	−27.4	0.1	−25.4	<0.1	−24.1	0.1	−29.7	0.1
n-C_{27}	−29.8	0.3	−30.6	0.1	−24.8	<0.1	−22.9	0.4	−28.0	0.1
n-C_{28}	−30.4	0.4	−28.8	0.7	−23.6	0.3	−22.6	0.3	−28.0	0.1
n-C_{29}	−25.9	<0.1	−29.1	0.8	−25.8	0.2	−22.8	0.2	−26.3	0.3
n-C_{30}	−29.6	0.6	−32.3	0.4	−24.3	0.3	−22.1	<0.1	−26.0	0.1
n-C_{31}	−24.7	0.2	−31.0	0.4	−23.5	<0.1	−22.4	0.1	−27.1	0.6
n-C_{32}	−26.7	0.4	−31.3	1.0	−22.6	0.4	−21.5	<0.1	−24.1	0.6
n-C_{33}	−24.8	0.7			−23.6	0.2	−21.4	0.4	−26.2	0.2
n-C_{34}	−27.6	0.1			−23.2	0.1	−21.2	0.1	−25.4	<0.1
n-C_{35}	−28.9	0.3			−24.4	0.7	−20.4	0.5	−28.2	0.5
n-C_{36}					−27.4	0.7	−21.0	0.1	−23.7	0.4
n-C_{37}					−27.7	0.9	−20.8	0.4	−26.9	0.2
n-C_{38}					−25.6	<0.1	−19.3	0.6	−25.3	<0.1
n-C_{39}							−21.8	0.1		
n-C_{40}							−21.6	0.5		
Isoprenoids										
Far					−33.0	0.2				
Nor					−35.3	0.1				
Pr					−32.3	0.3				
Ph	−25.1	0.3	−26.8	0.2	−28.5	<0.1				
PMI_{reg}	−22.0	0.3	−24.0	0.4	−24.6	0.1				