Datashare 125

Tectonic and paleogeographic controls on development of the Early–Middle Ordovician Shanganning Carbonate Platform, Ordos Basin, North China

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AAPG Bulletin, v. 105, no. 1 (January 2021), pp. 65–107

Table S1. Absolute Concentrations of n-Alkanes of the Oils in the Ordovician Carbonate Rocks Used in This Study

n-Alkanes	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
SHB1	0.39	1.55	2.85	3.52	3.75	3.53	3.28	2.89	2.66	2.44	2.17	1.91	1.73	1.56	1.42	1.33	1.17	0.98	0.83	0.63	0.43	0.33	0.23	0.15	0.11	0.06
SHB1-1H	0.98	2.06	2.95	3.28	3.18	2.97	2.67	2.36	2.05	1.82	1.55	1.34	1.20	1.02	0.87	0.73	0.61	0.49	0.35	0.27	0.19	0.13	0.10	0.06	0.05	0.03
SHB1-2H	0.05	0.53	1.59	2.39	2.93	2.88	2.70	2.44	2.14	1.90	1.64	1.39	1.20	0.99	0.83	0.61	0.42	0.31	0.21	0.14	0.09	0.06	0.04	0.02	0.01	0.00
SHB1-3CH	0.04	0.60	1.70	2.30	2.38	2.32	2.15	1.97	1.66	1.44	1.24	1.04	0.89	0.74	0.58	0.45	0.32	0.23	0.14	0.11	0.07	0.05	0.04	0.03	0.02	0.01
SHB1-9	0.76	1.77	2.80	3.23	3.25	3.00	2.74	2.36	2.14	1.92	1.64	1.42	1.25	1.08	0.97	0.84	0.73	0.63	0.47	0.40	0.29	0.22	0.17	0.11	0.07	0.04
SHB1CX	1.13	2.60	3.79	4.18	4.17	3.64	3.32	3.02	2.59	2.32	1.95	1.69	1.49	1.26	1.12	1.01	0.83	0.70	0.52	0.46	0.34	0.27	0.21	0.16	0.12	0.09
SHBP1H	1.80	2.94	3.67	3.95	3.88	3.41	3.21	2.84	2.51	2.24	1.95	1.71	1.56	1.39	1.23	1.04	0.94	0.82	0.63	0.53	0.39	0.29	0.21	0.15	0.11	0.07
SHB3	0.88	1.76	2.67	3.21	3.27	3.07	3.09	2.81	2.57	2.49	2.35	2.27	2.15	2.12	1.95	1.78	1.55	1.36	1.13	0.82	0.60	0.43	0.30	0.18	0.13	0.07

Table S2. Absolute Concentrations of Terpanes of the Oils in the Ordovician Carbonate Rocks Used in This Study

Well	C19TT	C20TT	C21TT	C22TT	C23TT	C24TT	C25TT	C24TeT	C26TT	C28TT	C29TT	Ts	Tm	C30TT	C29H	C29Ts	C30H	C31H(22S)	C31H(22R)
SHB1	13.0	34.8	24.5	10.1	55.8	36.4	34.4	10.0	27.5	27.9	40.6	14.2	5.2	36.0	9.2	5.4	17.1	14.9	20.4
SHB1-1H	8.8	14.8	5.6	3.3	13.1	7.1	6.6	3.8	7.1	6.4	10.7	5.3	4.8	6.7	7.2	1.9	13.2	2.6	5.9
SHB1-2H	6.6	13.1	3.9	2.1	9.1	5.4	4.2	1.7	4.8	4.5	6.1	1.3	1.5	5.5	/	/	/	/	/
SHB1-3CH	5.2	12.8	3.2	1.6	9.0	5.1	4.2	2.1	6.7	3.5	5.1	1.8	1.4	4.7	/	/	/	/	/
SHB1-9	7.6	19.6	5.9	2.2	11.3	6.6	5.9	2.1	4.4	5.8	11.0	3.6	2.3	7.9	2.4	1.3	4.8	/	/
SHB1CX	9.5	19.9	7.0	3.8	16.2	7.3	6.7	3.9	7.1	5.7	12.5	2.4	2.3	7.7	1.5	1.2	2.7	/	/
SHBP1H	8.1	19.8	15.0	6.0	32.8	22.1	18.4	2.1	16.2	17.5	25.2	4.7	3.0	20.8	2.6	0.8	6.3	7.4	10.4

Abbreviations: / = no data; H = hopane; TeT = tetracyclic terpane; Tm = 17α(H)-trisnorhopane; Ts = 18α(H)-trisnorneohopane; TT = tricyclic terpane.

Table S3. Absolute Concentrations of Aromatic Hydrocarbons of the Oils in the Ordovician Carbonate Rocks Used in This Study

Well	N	MN	EN	M-EN	DMN	TMN	TeMN	P	MP	C2-P	TMP	DBT	MDBT	DMDBT	TMDBT	FL	MFL	DMFL	DBF	MDBF	C2-DBF	TAS	BNT
SHB1	0.1	0.9	0.5	145	55	219	125	96	357	519	295	63	289	581	341	35	120	225	3.4	24	80	5.6	21.7
SHB1-1H	0.0	0.7	0.2	47	16	105	62	76	243	314	163	85	297	483	242	35	133	234	1.7	13	50	4.0	18.9
SHB1-2H	0.0	1.1	0.2	143	95	163	72	75	255	345	182	65	246	434	239	32	127	232	1.4	13	63	4.0	15.6
SHB1-3CH	0.1	1.1	0.2	119	81	152	62	80	243	299	147	94	321	489	242	37	139	243	1.8	14	62	3.6	20.6
SHB1-9	0.2	24.4	8.7	160	320	177	73	72	238	317	171	82	286	466	234	34	129	227	1.7	17	64	2.8	19.0
SHB1CX	0.1	1.6	0.5	139	112	162	66	79	243	310	158	95	337	534	264	41	152	260	2.6	19	67	5.3	19.3
SHBP1H	0.2	65.4	9.7	238	485	231	98	90	311	432	233	40	199	421	256	35	121	217	3.0	21	/	4.0	13.6
SHB3	0.2	1.1	1.3	122	95	151	88	47	185	290	163	3	11	28	23	17	74	134	1.3	21	50	1.7	1.3

Abbreviations: / = no data; BNT = benzonaphthothiophene; C2-DBF = dimethyl and ethyl dibenzofurans; C2P = dimethyl and ethyl phenanthrenes; DBF = dibenzofuran; DBT = dibenzothiophene; DMDBT = dimethyl dibenzothiophene; DMFL = dimethyl fluorene; DMN = dimethyl naphthalene; EN = ethyl naphthalene; FL = fluorene; MDBF = methyl dibenzofuran; MDBT = methyl dibenzothiophene; M-EN = methyl-ethyl naphthalene; MFL = methyl fluorene; MN = methyl naphthalene; MP = methylphenanthrenes; N = naphthalene; P = phenanthrene; TAS = triaromatic steroid; TeMN = tetramethyl naphthalene; TMN = trimethyl naphthalene; TMP = trimethylphenanthrenes.

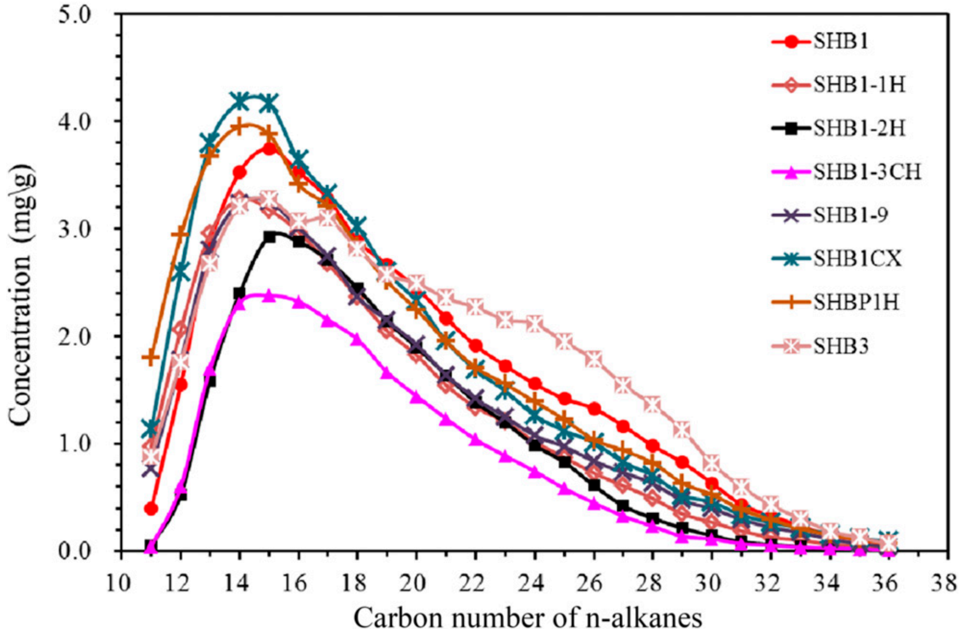

Figure S1. Distribution of absolute concentration of n-alkanes in the Ordovician oils from the Shuntuoguole low uplift in the Tarim Basin.

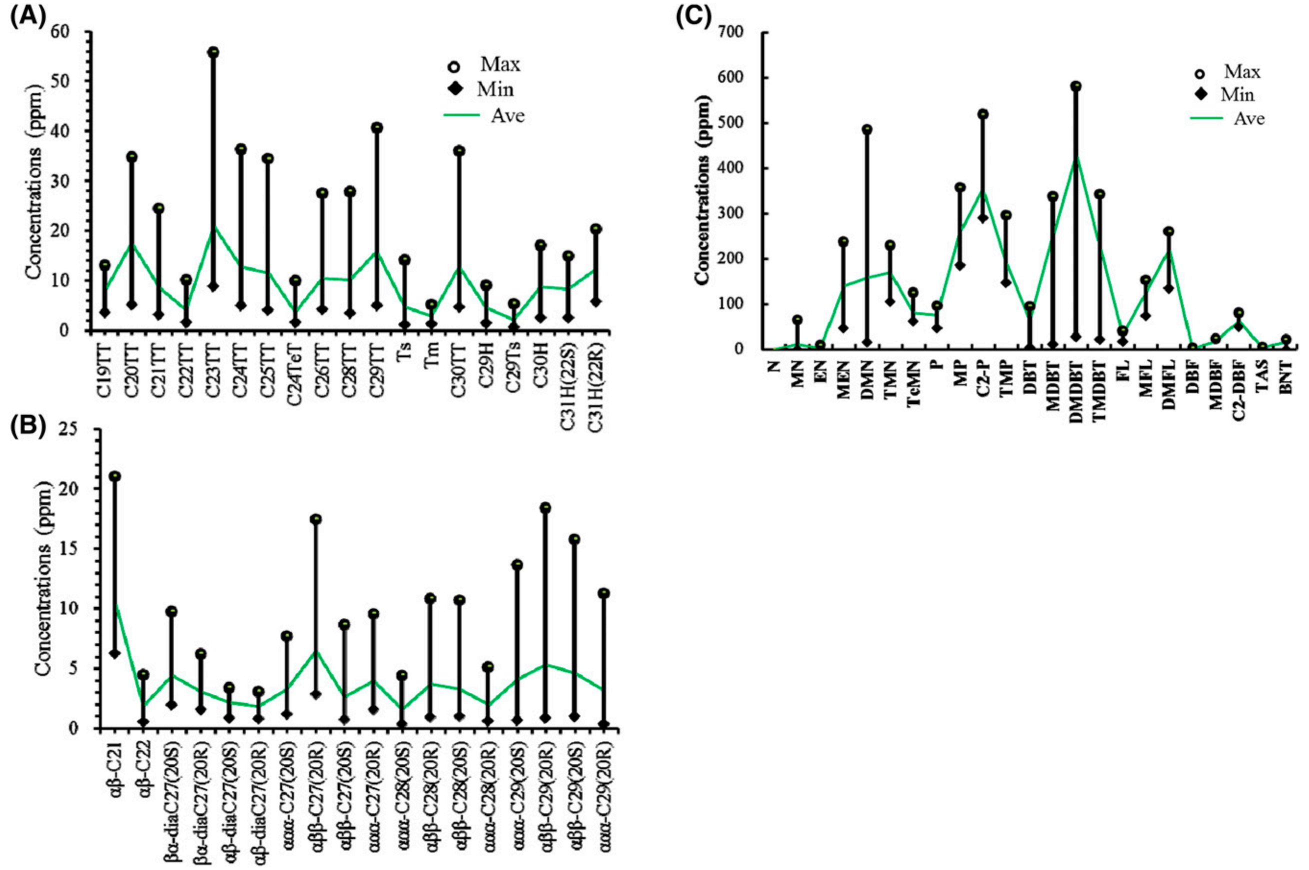

Figure S2. Absolute concentrations of terpanes (A), steranes (B), and aromatic hydrocarbons (C) of the oils in the Ordovician carbonate rocks used in this study. Ave = average; BNT = benzonaphthothiophene; C2-DBF = dimethyl and ethyl dibenzofuran; C2P = dimethyl and ethyl phenanthrene; DBF = dibenzofuran; DBT = dibenzothiophene; Dia = diasterane; DMDBT = dimethyl dibenzothiophene; DMFL = dimethyl fluorene; DMN = dimethyl naphthalene; EN = ethyl naphthalene; FL = fluorene; H = hopane; Max = maximum; MDBF = methyl dibenzofuran; MDBT = methyl dibenzothiophene; M-EN = methyl-ethyl naphthalene; MFL = methyl fluorene; Min = minimum; MN = methyl naphthalene; MP = methylphenanthrene; N = naphthalene; P = phenanthrene; TAS = triaromatic steroid; TeMN = tetramethyl naphthalene; TMN = trimethyl naphthalene; TMP = trimethylphenanthrenes; TT = tricyclic terpane.

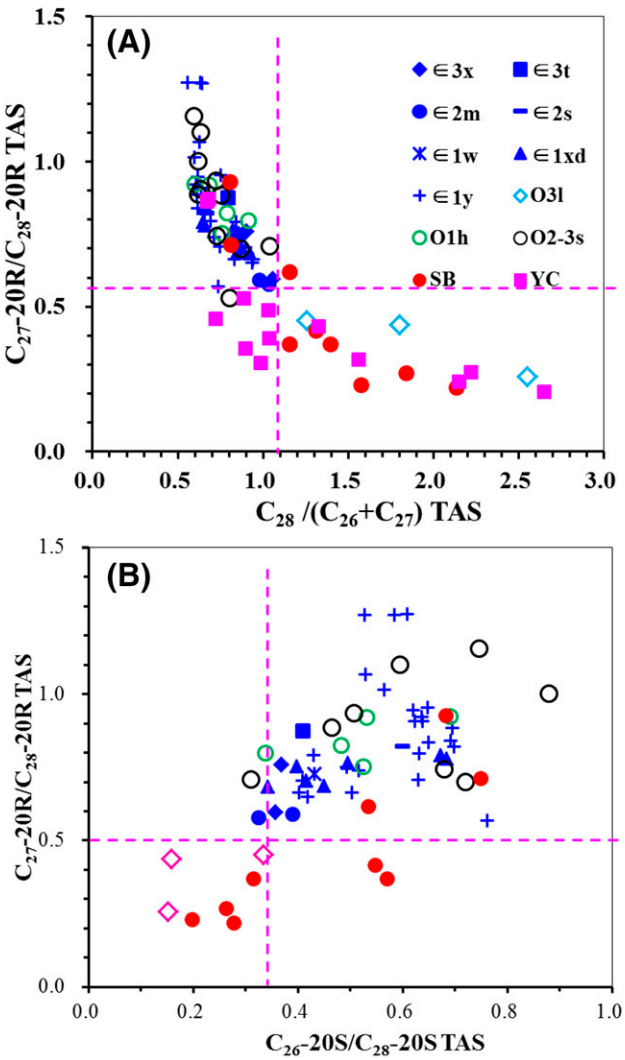

Figure S3. An oil–source rock correlation using the triaromatic steroid (TAS) parameters C_{28}-/(C_{26} + C_{27}) TAS, C_{27}-20R/C_{28}-20R TAS, and C_{26}-20S/C_{28}-20S TAS and a set of source data based on the previous study (Chen et al., 2018b). (A) Crossplot of the triaromatic steroid parameters C_{28} /(C_{26} + C_{27}) TAS versus C_{27}-20R/C_{28}-20R TAS. (B) Crossplot of the triaromatic steroid parameters C_{26}-20S/C_{28}-20S TAS versus C_{27}-20R/C_{28}-20R TAS. $Є_3x$ = Upper Cambrian Xiaqiulitage Formation; $Є_2m$ = Middle Cambrian Moheershan Formation; $Є_1w$ = Lower Cambrian Wusonggeer Formation; $Є_1y$ = Lower Cambrian Yuertusi Formation; O_1h = Lower Ordovician Heituao Formation; $Є_3t$ = Upper Cambrian Tuershaketage Formation; $Є_2s$ = Middle Cambrian Shayilik Formation; $Є_1xd$ = Lower Cambrian Xidashan Formation; O_3l = Upper Ordovician Lianglitage Formation; $O_{2-3}s$ = Middle to Upper Ordovician Saergan Formation; SB = Shunbei oils.

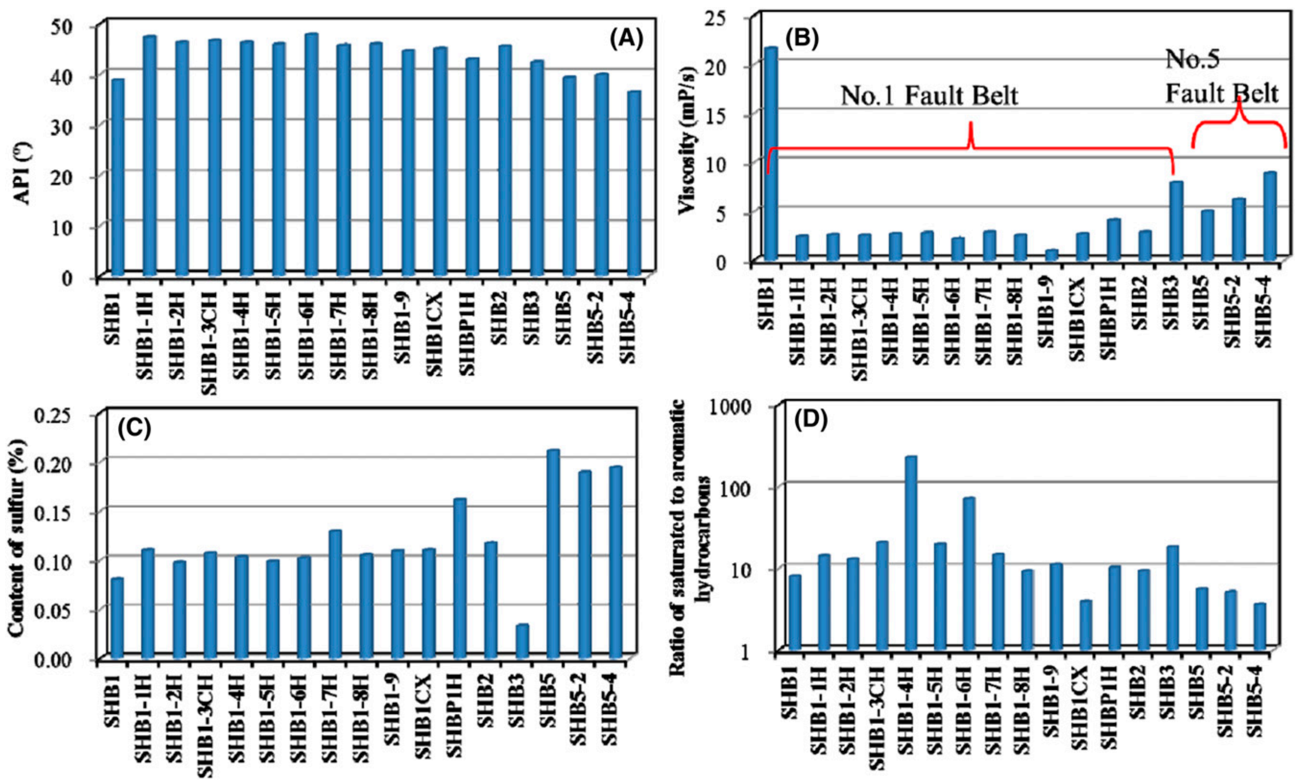

Figure S4. Statistical results of the API (A), viscosity (B), sulfur content (C), and ratio of saturate to aromatic hydrocarbon contents (D) of Ordovician crude oils from the Shunbei no. 1 fault belt and Shunbei no. 5 fault belt in the SLU in comparison.

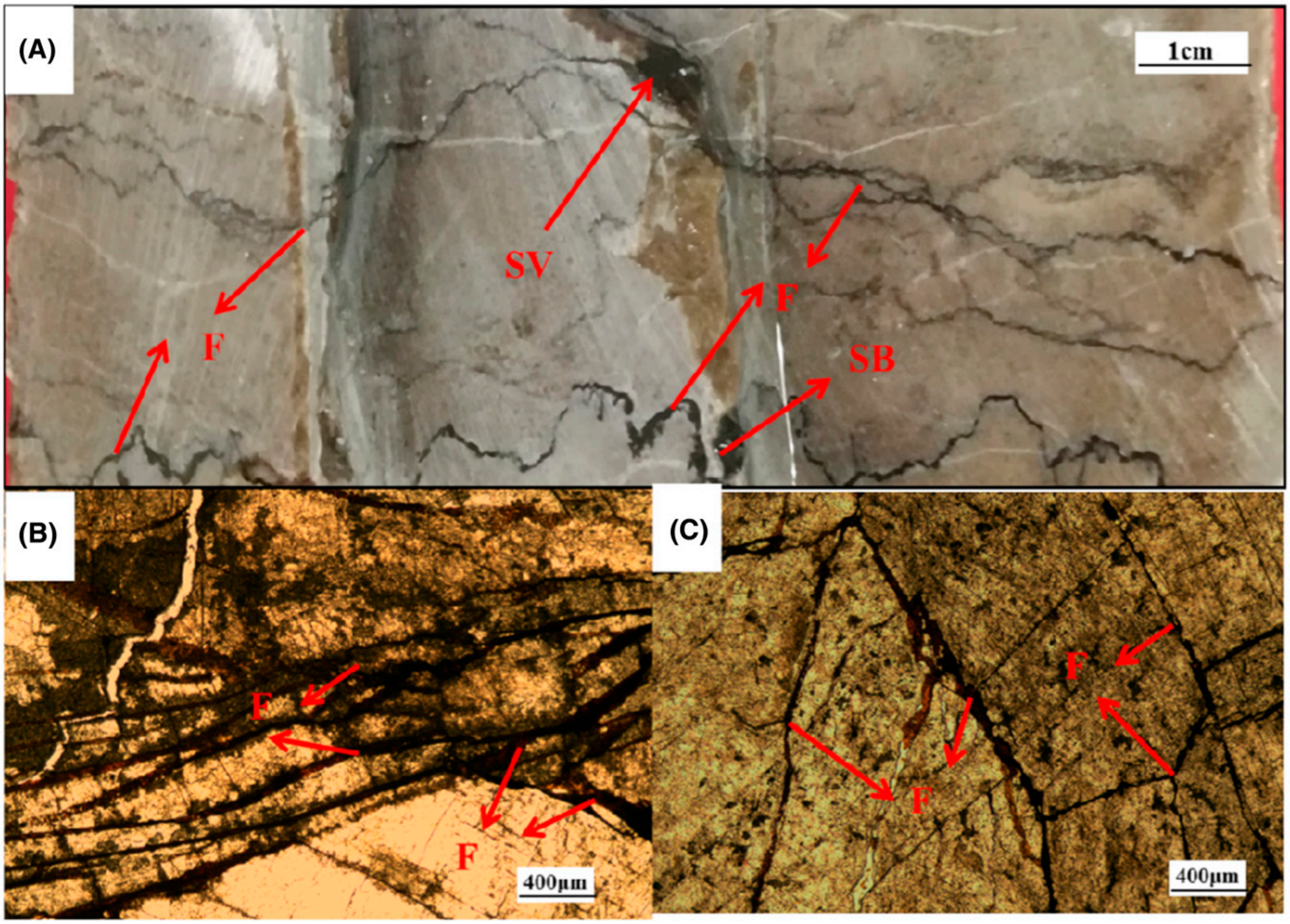

Figure S5. The drilling cores (A) and petroscopic photographs (B, C) showing that microscale sutures and fractures (F) are also well developed in the Ordovician carbonate rocks in the Tarim Basin. (A) The drilling cores of the Ordovician Yijianfang Formation at 7443.9m of the well SB2 showing that sutures are well developed and filled by solid bitumen (SB). (B, C) The microscopic photographs of the Ordovician Yingshan Formation in the Xikel Grand Canyon in Bachu area showing that transverse F (B) vertical F (C) are both developed. SV = solution void.

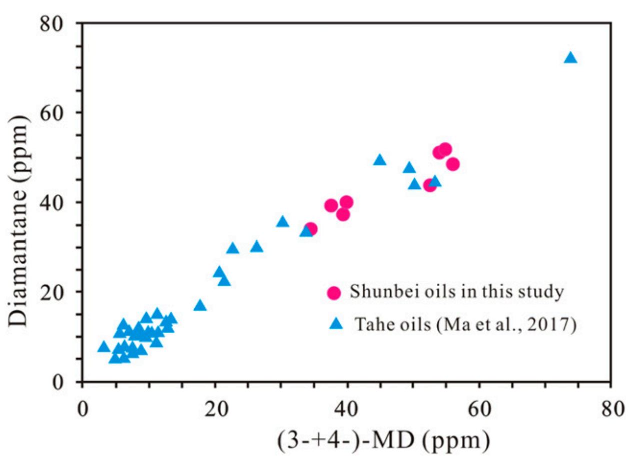

Figure S6. Plot of the absolute concentration of (3-+4-) methyldiamantane (MD) versus diamantane of the Ordovician crude oils from the Shunbei and Tahe oilfields in the Tarim basins.

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Chen, Z., T.-G. Wang, M. Li, F. Yang, and B. Cheng, 2018b, Biomarker geochemistry of crude oils and Lower Paleozoic source rocks in the Tarim Basin, western China: An oil-source rock correlation study: Marine and Petroleum Geology, v. 96, p. 94–112, doi:10.1016/j.marpetgeo.2018.05.023.