DR2004102

DATA REPOSITORY ITEM

Appendix DR1. Provenance Methods

Compositional data from sandstone point counts and conglomerate clast counts were collected from seven measured stratigraphic sections (56 sandstone samples and 65 clast counts; Fig. 2) in the Charleston-Nebo salient region and from roadside outcrops of the Blackhawk Formation in Price River Canyon (8 sandstone samples).

Standard petrographic thin sections for 64 medium-grained sandstones were cut, stained with potassium rhodizonate for plagioclase identification, stained with sodium cobaltinitrite for potassium feldspar identification, and analyzed using a modified Gazzi-Dickinson method of point counting (Gazzi 1966; Dickinson 1970, 1985; Ingersoll et al. 1984). A total of 450 framework grains were identified per thin section. Although diagenetic effects such as compaction, alteration of feldspar to clay minerals, cementation, and secondary porosity development are observed in most samples, original framework grains are recognizable. Similar to previous investigations (Lawton, 2003, personal communication), we note that some chert grains and detrital carbonate grains, commonly twinned, partially absorb the potassium rhodizonate stain (pink) for plagioclase feldspar. Misidentification of such grains would lead to a greater proportion of feldspar, particularly plagioclase, possibly explaining the discrepancy between previous studies (Fig. 3C; Lawton, 1986; Franczyk et al., 1990; Miall and Arush, 2001). Lithic fragments include grains of chert, carbonate, mudrock, sandstone, metamorphic rocks (phyllitic and schistose), and limited amounts of volcanic rocks (both lathwork and microlitic varieties). Petrographic counting parameters and recalculated modal point-count data are presented in Tables DR1 and DR2, respectively.

Clast counts were performed on outcrops of principally clast-supported, moderately organized beds containing subrounded to well-rounded pebbles to boulders. For most counts, 100–125 clasts were identified. Clast lithologies and age assignments are as follows: Precambrian–Cambrian quartzite (red, violet, and tan quartzite of the Caddy Canyon, Mutual, and Tintic Formations); Paleozoic carbonate (gray carbonate, commonly mottled and banded, of several Cambrian–Mississippian carbonate units); Pennsylvanian–Permian quartzite and quartzose sandstone (white, gray, and tan quartzite and quartzose sandstone of principally Oquirrh Group with subordinate Diamond Creek Sandstone); Paleozoic chert, commonly of Mississippian age (gray to black chert); Permian–Jurassic carbonate (gray carbonate, commonly fossiliferous, of Kirkman Limestone and Park City, Thaynes, and Twist Gulch Formations); and Triassic–Jurassic siltstone and sandstone (red siltstone of the Woodside, Thaynes, Ankareh, and Twist Gulch Formations, and red eolian sandstone of the Navajo Sandstone).

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Table DR1.—*Parameters for sandstone point counts.*

Grain Categories		Recalculated parameters
Qm	Monocrystalline quartz	Q-F-L:
Qp	Polycrystalline quartz	Q = Qm + Qp + Qpt + C
Qpt	Polycrystalline quartz with tectonic fabric	F = P + Ksp + Kmp
C	Chert	L = Lv + Lm + Ls
P	Plagioclase feldspar	Qm-F-Lt:
Ksp	Potassium feldspar	Qm = Qm
Kmp	Microcline and perthitic potassium feldspar	F = P + Ksp + Kmp
Lmp	Phyllite lithic fragments	Lt = Lv + Lm + Ls + Qp + C
Lms	Schistose metamorphic lithic fragments	Qm-P-K:
Lvl	Lathwork volcanic lithic fragments	Qm = Qm
Lvm	Microlitic volcanic lithic fragments	P = P
Lss	Sandstone lithic fragments	K = Ksp + Kmp
Lsm	Mudrock lithic fragments	Lm-Lv-Ls:
Lsc	Carbonate lithic fragments	Lm = Lmp +Lms
A	Accessory minerals (dense minerals and micas)	Lv = Lvl + Lvm
		Ls = Lss + Lsm + Lsc

Table DR2.—*Recalculated modal point-count data.*

				Q-F-L %			Qm-F-Lt %			Qm-P-K %			Lm-Lv-Ls %		
Sample		Fm.	m level	Q	F	L	Qm	F	Lt	Qm	P	K	Lm	Lv	Ls
							Indianola								
1	DH1	Ki	3	96	3	1	87	3	10	97	2	1	33	0	67
2	DH2	Ki	33	89	10	1	80	10	10	89	1	10	20	0	80
3	DH3	Ki	58	90	8	2	81	8	11	91	1	8	0	0	100
4	DH4	Ki	119	94	5	1	84	5	11	95	1	4	0	0	100
5	DH5	Ki	147	98	2	0	87	2	11	98	1	1	0	0	100
6	DH6	Ki	219	95	5	0	83	4	13	95	0	5	0	0	100
7	DH7	Ki	261	98	1	1	77	1	22	99	0	1	0	0	100
8	HC1	Ki	2	77	20	3	70	20	10	78	6	16	0	8	92
9	HC2	Ki	50	77	20	3	72	20	8	78	9	13	0	0	100
10	HC3	Ki	70	82	11	7	74	11	15	87	5	8	3	0	97
11	HC4	Ki	100	81	13	6	73	13	14	84	7	9	0	8	92
12	HC5	Ki	150	74	21	5	63	21	16	75	15	10	0	10	90
13	HC6	Ki	240	83	15	2	75	15	10	84	5	11	0	0	100
14	HC7	Ki	284	85	12	3	75	12	13	87	4	9	0	0	100
15	HC8	Ki	360	87	11	2	80	11	9	88	3	9	0	0	100
16	HC9	Ki	612	99	1	0	58	1	41	99	1	0	0	0	100
17	HC10	Ki	751	98	1	1	72	0	28	99	1	0	0	0	100
18	HC11	Ki	833	93	1	6	78	1	21	99	0	1	11	0	89
Average				89	9	2	76	9	15	90	3	7	4	1	95
Std. Dev.				8	7	2	7	7	8	8	4	5	5	3	6
							Blackhawk								
1	RC1	Kbh	3	78	19	3	74	19	7	80	11	9	0	0	100
2	RC2	Kbh	7	85	6	9	79	6	15	93	2	5	0	0	100
3	RC3	Kbh	20	87	11	2	79	11	10	88	2	10	25	0	75
4	RC4	Kbh	145	94	4	2	73	4	23	95	3	2	0	0	100
5	RC5	Kbh	247	97	2	1	89	2	9	98	2	0	0	0	100
6	RC6	Kbh	308	95	4	1	85	4	11	95	1	4	0	0	100
7	RC7	Kbh	475	92	1	7	85	1	14	98	1	1	23	0	77
8	RC8	Kbh	510	80	1	19	58	1	41	98	1	1	1	0	99
9	RC9	Kbh	605	93	1	6	85	1	14	98	1	1	0	4	96
10	RC10	Kbh	680	96	1	3	78	2	20	98	1	1	0	0	100
11	RC11	Kbh	720	89	5	6	72	4	24	94	1	5	4	3	93
12	BC1	Kbh	2	90	1	9	78	1	21	99	0	1	5	0	95
13	BC2	Kbh	17	95	0	5	79	0	21	100	0	0	0	0	100
14	BC3	Kbh	32	89	4	7	78	4	18	96	1	3	0	0	100
15	BC4	Kbh	47	88	5	7	73	5	22	94	1	5	0	0	100
16	BC5	Kbh	62	93	2	5	83	2	15	98	0	2	0	0	100
17	BC6	Kbh	73	93	1	6	78	1	21	99	0	1	3	0	97
18	BC7	Kbh	95	95	1	4	71	1	28	99	0	1	6	0	94
19	BC8	Kbh	112	94	2	4	85	2	13	98	0	2	0	0	100
20	PC1	Kbh	26	91	1	8	68	1	31	99	0	1	3	0	97
21	PC2	Kbh	45	95	1	4	66	1	33	99	0	1	26	0	74
22	PC3	Kbh	64	93	2	5	70	1	29	98	0	2	17	0	83
23	PC4	Kbh	75	93	1	6	74	1	25	99	0	1	12	0	88
24	PC5	Kbh	80	96	2	2	86	2	12	98	0	2	0	0	100
25	PC6	Kbh	99	92	5	3	75	5	20	94	0	6	0	0	100
26	PC7	Kbh	107	89	1	10	73	1	26	98	0	2	4	0	96
27	PC8	Kbh	120	95	4	1	77	4	19	95	0	5	20	0	80

Table DR2.—*continued*

Sample			m level	Q-F-L %			Qm-F-Lt %			Qm-P-K %			Lv-Lm-Ls %		
				Q	F	L	Qm	F	Lt	Qm	P	K	Lv	Lm	Ls
Blackhawk—*continued*															
Average				91	3	6	77	3	20	96	1	3	6	0	94
Std. Dev.				4	2	4	7	2	8	3	1	2	9	1	9
Castlegate / Price River															
1	HC12	Kcp	1209	97	2	1	85	2	13	98	0	2	25	0	75
2	HC13	Kcp	1253	96	3	1	86	2	12	97	0	3	40	0	60
3	HC14	Kcp	1305	97	0	3	91	0	9	100	0	0	0	0	100
4	RC12	Kcp1	730	94	3	3	84	3	13	97	0	3	25	0	75
5	RC13	Kcp1	734	93	6	1	89	6	5	94	0	6	29	0	71
6	RC15	Kcp1	843	97	3	0	90	3	7	97	0	3	50	0	50
7	RC16	Kcp1	879	98	2	0	92	2	6	98	0	2	0	0	100
8	RC17	Kcp1	920	98	2	0	81	2	17	98	0	2	0	0	100
9	RC18	Kcp2	954	98	2	0	94	2	4	98	0	2	0	0	100
10	RC19	Kcp2	975	98	1	1	84	1	15	99	0	1	0	0	100
11	RC20	Kcp2	1070	96	0	4	89	0	11	100	0	0	22	0	78
12	BC10	Kcp1	125	100	0	0	92	0	8	100	0	0	0	0	100
13	BC11	Kcp1	151	98	1	1	89	1	10	99	0	1	0	0	100
14	BC12	Kcp2	165	99	0	1	90	0	10	100	0	0	0	0	100
15	BC13	Kcp2	192	100	0	0	88	0	12	100	0	0	0	0	0
16	BC14	Kcp2	236	99	0	1	91	0	9	100	0	0	0	0	100
Average				97	2	1	88	2	10	98	0	2	13	0	87
Std. Dev.				2	2	1	4	2	4	2	0	2	18	0	18
North Horn															
1	BC15	KTnh	275	98	0	2	69	0	31	100	0	0	12	0	88
2	BC16	KTnh	330	94	0	6	86	0	14	100	0	0	4	0	96
3	BC17	KTnh	362	96	0	4	91	0	9	100	0	0	0	0	100
Average				96	0	4	82	0	18	100	0	0	5	0	95
Std. Dev.				1	0	1	4	0	4	0	0	0	3	0	3

Appendix DR2. Seismic Acquisition and Processing Parameters

EXX8212 Recording Parameters

Date	October 24, 1982
Location	Utah County, Utah
Contractor	Northern Geophysical Inc., Crew 102
Client	Exxon Exploration Company, Houston, Texas
Instrument	DFS-V
Recording format	SEB-B
Number Channels	124
Sample Rate	2 milliseconds
Record Length	5 seconds
Low Cut Filter	12 Hz, 18 dB/octave
High Cut Filters	64 Hz, 72 dB/octave
Notch Filter	OUT
Fold	60
Energy Source	Surface dynamite
Source Pattern	Inline 165 feet
Source Interval	165 feet
Charge Size	50 pounds
Receiver Pattern	Split-spread
Number Groups	120
Group Interval	165 feet
Number Geophones/Group	24
Geophone Type	Mark L10A 10 Hz
Geophone spacing	13.75 feet
Geophone Array	Inline 330 feet
Offset Ranges	990 -10725 feet
Source Gap	990 feet
Depth Point Interval	82.5 feet

EXX8212 Processing Sequence

Date: May 5, 1992
Contractor: Excel Geophysical Services, Greenwood Village, Colorado.
Demultiplex SEG-B Field Tapes
Geometry & Trace-Record Edit
Refraction Statics Analysis - GMG Method
First Break Mute
Amplitude Recovery From Amplitude Decay Analysis
Spectral Whitening 5-10-80-90 Hz, 7 Gates
Sort To Common Midpoint Gathers
Apply Static Corrections Calculated From Refraction Statics Analysis
Correct To Floating Datum
Velocity Analysis
Surface Consistent Residual Statics: Window 300-2640 milliseconds
Velocity Analysis
Normal Moveout Correction
Trace Mute
Static Correction To Flat Datum
Surface Consistent Residual Static Corrections: Two Windows - 600-2640 milliseconds @ SP 200 and 200-3500 milliseconds @ SP 2625
CMP Stack
Finite Difference Time Migration
Tau-P Noise Rejection
Bandpass Filter: 0 milliseconds 10-15-50-60 Hz, 2000 milliseconds 8-13-45-55 Hz, 2800 milliseconds 5-10-40-50 Hz