

<b>Sample</b>	<b>Fm/Mbr</b>	<b>Gr</b>	<b>Zr</b>	<b>Sp</b>	<b>Ca</b>	<b>Ep</b>	<b>Ap</b>	<b>Px</b>	<b>HgM</b>	<b>Rt</b>	<b>To</b>	<b>Cs</b>	<b>Other</b>	<b>Total</b>	<b>Others</b>
<b>CR20</b>	Colorado River	11.4	14.4	2.3	19.2	7.8	9.2	27.7	0.7	0.5	6.9	0.0	0.0	437	
<b>CR22</b>	Colorado River	5.1	7.5	2.2	29.4	6.0	8.2	33.5	0.0	0.9	5.7	0.0	1.5	547	
<b>CR23</b>	Colorado River	7.4	6.4	7.9	34.9	4.8	4.8	28.3	0.4	1.2	3.9	0.0	0.0	484	
<b>B1</b>	Alverson	21.7	2.2	43.0	1.4	8.7	9.7	0.0	1.4	5.4	2.9	0.0	3.6	277 ba/ce	
<b>B2</b>	Alverson	20.6	0.8	59.2	0.0	8.7	4.7	0.0	0.7	4.0	1.2	0.0	0.0	596	
<b>B3</b>	Elephant Trees	22.9	1.8	55.9	0.0	5.9	2.0	0.0	0.5	9.3	0.9	0.0	0.9	442 ba/ce	
<b>B4</b>	Elephant Trees	18.6	1.0	57.8	0.0	5.8	2.9	0.0	0.0	12.0	1.0	0.0	1.0	415 ba/ce	
<b>B5</b>	Lycium	30.0	3.0	44.7	4.4	4.4	2.3	0.0	0.0	9.6	1.2	0.0	0.2	427 ba/ce	
<b>B6</b>	Lycium	19.6	3.3	50.7	0.0	6.1	0.5	0.0	0.0	18.7	0.7	0.0	0.5	428 ba/ce	
<b>B7</b>	Lycium	18.8	3.4	56.5	0.2	3.1	6.7	0.0	0.0	9.4	1.9	0.0	0.0	416	
<b>WC 2</b>	U. Megabreccia	1.6	5.4	1.1	0.0	0.0	0.0	0.0	0.0	89.1	2.7	0.0	0.0	184 mo,	
<b>WC1</b>	Wind Caves	17.6	1.5	58.8	1.7	6.1	6.1	0.0	0.0	5.4	1.5	0.0	1.2	408	
<b>14-5</b>	Wind Caves	21.6	14.7	25.2	11.6	12.8	9.0	0.0	1.7	1.3	1.9	0.0	0.2	476	
<b>14-3</b>	Wind Caves	22.7	1.8	31.8	10.0	0.0	20.9	0.0	0.0	6.4	1.8	0.0	4.5	110	
<b>14-2</b>	Wind Caves	23.8	3.3	22.1	14.8	0.0	27.9	0.0	0.0	6.6	1.6	0.0	0.0	122	
<b>16-2</b>	Wind Caves	32.4	4.2	38.1	4.7	4.5	2.0	0.2	0.2	12.6	0.0	0.0	1.0	405	
<b>17-2</b>	Wind Caves	28.3	2.9	45.8	3.6	0.7	11.5	0.7	0.0	3.4	1.2	0.0	1.9	417 ba/ce	
<b>17-3</b>	Wind Caves	20.5	1.4	64.2	1.7	2.8	5.2	0.7	0.0	2.8	0.3	0.0	0.3	288 ba/ce	
<b>13-5</b>	Wind Caves	56.6	39.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	182	
<b>17-4</b>	Wind Caves	26.8	16.4	25.9	0.5	14.3	11.6	0.2	0.0	0.7	3.1	0.0	0.5	421 ba/ce	
<b>17-7</b>	Wind Caves	32.0	10.5	26.0	1.8	11.3	12.3	0.3	0.0	1.0	2.0	0.0	3.0	400 ba/ce	
<b>17-9</b>	Wind Caves	28.8	16.8	18.3	3.3	10.5	16.0	0.0	0.8	0.8	3.3	0.0	1.8	400 ba/ce	
<b>18-5a</b>	Wind Caves	33.6	14.4	18.9	2.1	15.5	12.6	0.2	0.2	0.5	1.8	0.0	0.2	438 ba/ce	
<b>18-6</b>	Wind Caves	30.6	20.3	14.2	0.2	11.5	14.4	0.2	3.8	1.0	3.1	0.0	0.7	576	
<b>18-7</b>	Wind Caves	31.2	12.2	13.6	0.2	22.1	16.0	0.0	0.2	0.7	3.1	0.0	0.7	426	
<b>18-10</b>	Wind Caves	29.7	13.3	17.7	0.8	20.0	13.3	0.0	0.6	0.6	3.3	0.0	0.6	481	
<b>18-11</b>	Wind Caves	36.5	10.3	18.1	1.4	17.6	12.0	0.8	0.0	0.4	2.8	0.0	0.0	493	
<b>18-12</b>	Wind Caves	31.1	8.6	22.7	1.2	18.0	10.6	0.5	0.0	1.2	4.2	0.0	1.7	405 ba/ce	
<b>18-15</b>	Wind Caves	24.6	3.6	22.9	0.6	23.1	17.6	0.2	2.3	0.4	3.6	0.0	0.8	471 ba/ce	
<b>18-16</b>	Wind Caves	31.5	10.4	18.8	0.0	20.2	11.8	0.2	0.4	0.9	5.2	0.2	0.5	559	
<b>18-17</b>	Wind Caves	35.6	10.2	21.3	2.2	15.3	11.6	0.2	0.0	1.5	1.9	0.0	0.2	413	
<b>19-14</b>	Wind Caves	37.8	5.0	27.5	3.3	14.2	8.6	0.0	1.7	0.0	1.9	0.0	0.0	360	
<b>25-11</b>	Wind Caves	26.1	7.2	26.6	4.0	12.7	12.7	0.2	0.0	1.0	6.7	0.0	3.0	403 ba/ce	
<b>Mh4b</b>	Mud Hills	50.7	30.3	5.0	0.0	0.6	8.5	0.0	0.2	2.5	2.3	0.0	0.0	519	
<b>Mh5a</b>	Mud Hills	39.7	5.4	11.1	0.8	0.2	26.8	0.0	0.2	11.7	4.1	0.0	0.0	514	
<b>Mh5b</b>	Mud Hills	24.3	9.0	1.7	0.0	0.3	20.2	0.1	0.0	2.2	5.7	0.0	36.4	687 ba/ce	

**Appendix 1.** Total non-opaque heavy mineral assemblages (%) of sand and sandstone samples from southwestern North America

<b>Sample</b>	<b>Fm/Mbr</b>	<b>Gr</b>	<b>Zr</b>	<b>Sp</b>	<b>Ca</b>	<b>Ep</b>	<b>Ap</b>	<b>Px</b>	<b>HgM</b>	<b>Rt</b>	<b>To</b>	<b>Cs</b>	<b>Other</b>	<b>Total</b>	<b>Others</b>
<b>25-2a</b>	Mud Hills	15.0	7.4	5.4	0.3	0.0	57.8	0.0	0.3	0.0	13.6	0.0	0.3	367	
<b>Yh 7</b>	Yuha	49.2	29.5	0.0	0.0	0.0	15.3	0.0	0.7	0.7	4.4	0.0	0.2	413	
<b>Yh 8</b>	Yuha	12.2	2.8	71.2	0.9	1.2	8.5	0.0	0.0	0.4	2.7	0.0	0.2	566	
<b>Yh9</b>	Yuha	33.5	29.9	19.0	0.4	2.8	9.3	0.0	0.9	1.1	2.8	0.0	0.2	462	mo,
<b>Ch10</b>	Camel's head	24.7	11.4	30.9	8.2	14.1	6.0	0.0	0.2	0.4	3.6	0.0	0.6	502	
<b>Ch11</b>	Camel's head	16.6	3.8	12.6	8.8	26.6	23.6	0.0	0.5	1.5	5.8	0.0	0.3	398	
<b>Db12</b>	Camel's head	29.5	8.9	13.6	0.0	18.1	18.6	0.0	1.2	1.0	5.5	0.0	3.5	403	
<b>Db 13</b>	Diablo	27.9	19.3	9.3	2.0	9.5	6.1	0.0	0.5	1.2	2.0	0.0	22.2	409	mo, ba/ce, co
<b>Db14</b>	Diablo	10.9	4.7	6.9	51.9	9.1	6.4	8.6	0.0	0.0	1.5	0.0	0.0	405	
<b>25-8b</b>	Olla	12.3	0.3	5.3	63.8	1.5	5.8	0.5	0.0	3.0	7.8	0.0	0.0	400	
<b>25-8c</b>	Olla	40.9	0.6	5.8	36.0	2.3	6.4	0.9	0.0	1.7	4.7	0.0	0.6	530	
<b>26-1a</b>	Olla	15.3	2.6	8.7	19.9	23.1	20.3	6.1	0.4	0.0	3.3	0.0	0.2	459	
<b>26-1b</b>	Olla	2.5	18.1	4.7	40.4	28.9	1.2	0.7	2.2	0.7	0.5	0.0	0.0	408	
<b>26-3</b>	Olla	22.8	3.2	15.8	28.4	7.4	5.9	12.2	0.5	1.1	0.5	0.0	2.3	443	mo, ba/ce
<b>25-9a</b>	Olla	19.5	1.0	5.7	62.3	0.0	6.0	0.0	0.2	0.7	2.5	0.0	2.0	401	ba/ce, co
<b>25-9b</b>	Olla	19.9	8.0	9.5	31.6	14.2	7.7	1.7	0.5	0.2	3.7	0.0	3.0	402	ba/ce
<b>CC16</b>	Canebrake	29.2	2.4	11.5	38.8	1.6	7.3	0.0	0.7	3.3	5.2	0.0	0.0	425	
<b>Hu17</b>	Hueso	22.9	3.0	7.8	50.5	2.2	7.3	0.0	0.0	3.2	2.8	0.0	0.2	463	
<b>BF 24</b>	Bouse	2.6	3.2	7.9	16.2	58.8	10.7	0.0	0.0	0.4	0.4	0.0	0.0	507	
<b>BF 27</b>	Bouse	3.0	1.5	5.0	26.1	59.7	3.7	0.0	0.0	0.2	0.6	0.0	0.2	464	
<b>150-1</b>	Palaeocene (?)	17.9	10.9	0.4	0.0	0.0	54.1	0.0	0.0	1.7	3.4	11.6	0.0	833	
<b>150-2</b>	Palaeocene (?)	29.2	7.7	20.2	0.0	37.6	1.9	0.0	0.0	1.9	0.9	0.4	0.0	465	
<b>2116</b>	San Francisquito	43.2	33.6	1.9	0.0	3.3	17.6	0.0	0.0	0.0	0.5	0.0	0.0	426	
<b>2101</b>	Coldwater	3.8	5.2	21.5	0.0	59.2	9.7	0.2	0.0	0.0	0.5	0.0	0.0	424	
<b>2102</b>	Sespe	9.1	6.3	22.1	0.5	44.8	17.2	0.0	0.0	0.0	0.0	0.0	0.0	429	
<b>2103</b>	Sespe	22.0	5.3	36.2	0.0	18.2	15.4	0.0	0.3	0.3	2.2	0.0	0.0	318	
<b>2110</b>	Sespe	16.6	4.6	37.5	0.0	29.6	9.6	0.0	0.0	0.5	1.7	0.0	0.0	416	
<b>2108</b>	Topanga	6.5	3.0	15.0	0.0	69.6	3.2	0.0	0.7	0.2	1.7	0.0	0.0	401	
<b>2111</b>	Topanga	9.3	1.9	18.2	0.0	54.3	14.8	0.0	0.0	0.0	1.4	0.0	0.0	418	
<b>2112</b>	Topanga	11.7	4.0	21.7	0.0	30.4	29.8	0.0	0.0	0.4	2.1	0.0	0.0	480	
<b>OT12</b>	Topanga	8.9	4.5	12.0	0.7	64.5	7.1	1.2	0.0	0.2	0.7	0.0	0.2	425	mu
<b>2100</b>	Topanga	31.9	12.7	0.0	0.0	0.9	49.8	0.0	0.0	1.1	3.4	0.0	0.2	536	
<b>2115</b>	Punchbowl	1.9	2.6	21.4	11.3	60.3	1.9	0.0	0.0	0.0	0.7	0.0	0.0	426	

**Appendix A1 (continued).** Total non-opaque heavy mineral assemblages (%) of 69 Palaeocene-Recent samples from southwestern North America