GSA Data Repository Item # 8707

Title of article Rates and Processes of Soil Development of Quaternary Terraces in Cajon Pass, Southern California

Author(s) Leslie D. McFadden and Ray J. Weldon

see Bulletin v. 98, p. 280 - 293

Contents 5 pages

Table A and Table B

TABLE A. SUMMARY OF MORPHOLOGICAL DATA FOR SOILS ON TERRACE AND FAN DEPOSITS OF THE CAJON PASS AREA, SOUTHERN CALIFORNIA

Deposit, Terrace	Profile Number	Horizon	Depth (cm)	Color, Matrix[1] (dry; moist)	Texture[2]	Structure[2]	Consistence[2] Dry Moist	Clay[2] Films
Qoa-c Qt1	RW-1,2[3,4]	A	0-2.5	10YR 4/2	LS	m	so ss,sp	n.o.
		BA	2.5-9	10YR 4/2	SL	m/1f&mgr	so ss,sp	n.o.
		Bt	9-26	10YR 4/3-4	gSL	2cosbk	so ss,sp	1&2npo;br
		BC	26-45	10YR 5/4	gLS	m	lo ss,po	n.o.
		Cox1	45-63	10YR 6/4	gLS	sg	lo no,po	n.o.
		Cox2	63+	2.5Y 3/2	gLS	sg	lo no,po	n.o.
Qoa-c, Qt-4	RW-3[4]	O	1-0					
		A	0-26	10YR 6/2	LS	m/1msbk	so no,po	n.o.
		AC	26-40	10YR 6/2	gcoS	sg	lo no,po	n.o.
		Cox	40-83	2.5Y 6/2	gcoS	sg	lo no,po	n.o.
		Cu	83+	5Y 5/2	gcoS	sg	lo no,po	n.o.
Qoa-c Qt1	RW-4[3]	A1	0-6	10YR 5/3	LS	m	lo ss,po	n.o.
		A2	6-18	10YR 5/3	SL	2msbk	so ss, po	n.o.
		2BA	18-42	10YR 5/4	gLS	m	- ss,po	co
		2Bt1	42-52	7.5YR 4/6	gSL	2msbk	- ss,po	1npo
		2Bt2	52-64	7.5YR 4/6	gSL	2msbk	h ss,sp	1npo
		2BC	64-78	8.75YR 6/6	gLS	m	h no,po	co
		2Cox1	78-213	10YR 6/4	gS	sg	lo no,po	n.o.
		2Cox2	213-283	10YR 6/3-4	gS	sg	lo no,po	n.o.
		2Cox3	283+	10YR 6/3	gS	sg	lo no,po	n.o.
		2Cox4	4000	2.5Y 6/2	gS	sg	lo no,po	n.o.
Qoa-c, Qt-1	RW-5[5]	O1	3-0					
		A1	0-7	10YR 4/2	SL	2msbk	sh ss,sp	n.o.
		A2	7-18	10YR 4/2	SL	2msbk	sh ss,sp	n.o.
		2BA	18-28	10YR 6/4	SL	2msbk	sh ss,sp	co
		2Bt1	28-60	7.5YR 6/6	gSL	2msbk	h ss,sp	1npo
		2Bt2	60-113	8.75YR 6/4	gSL	2msbk	sh ss,po	1npo
		2BC	113-136	10YR 5/4	gLS	sg	lo no,po	n.o.
		2Cox1	136-206	10YR 6/3	gcoS	sg	lo no,po	n.o.
		2Cox2	206+	2.5Y 6/2	gcoS	sg	lo no,po	n.o.
		2Cu	500	5Y 6/2	gcoS	sg	lo no,po	n.o.
Qoa-a, Qt-7	RW-7[3]	A1	0-36	2.5Y 5-6/2	LS	1msbk	so no,po	n.o.
		A2	36-48	2.5Y 5/2	LS	2fsbk/m	so no,po	n.o.
		2AC	48-64	2.5Y 5/2	gS	sg	lo no,po	n.o.
		2Cox	64-96	2.5Y 7/2	gS	sg	lo no,po	n.o.
		2Cu	96+	2.5Y 6/2	gS	sg	lo no,po	n.o.
Qoa-a, Qt-7	RW-8[6]	A	0-52	2.5Y 5/2	gS	m/1csbk	so no,po	n.o.
		Cox	52-60	10YR 6/4	gcoS	sg	lo no,po	n.o.
		Cu	60+	10YR 7/3	gcoS	sg	lo no,po	n.o.
Qal-O	RW-9	A	0-27	2.5Y 5/2; 4/2	gcoS	1fsbk	so no,po	n.o.
		Cu	27+	2.5Y 6/2; 4/2	gcos	sg	lo no,po	n.o.

Qoa-a, Qt-6	RW-18	O	1.0-0					
		A1	0-3	2.5Y 4/2; 5Y 2.5/1	gfSL	m	so ss,sp	n.o.
		2A2	3-18	2.5Y 5/2; 5Y 3/1	gLS	m	so so,po	n.o.
		2AC	18-34	2.5Y 5/2; 5Y 3/2	gLS	sg	lo sp,po	n.o.
		2Cox	34-55	2.5Y 6/4; 3/2	gcoS	sg	lo no,po	n.o.
		2Cu	55+	5Y 6/2; 5Y 3/2	gcoS	sg	lo no,po	n.o.
Qoa-a, Qt-6	RW-10	A1	0-5	10YR 4/3;3/2	gcoS	sg	lo no,po	n.o.
		A2	5-21	10YR 5/3; 2/2	gS	m	sh no,po	n.o.
		AC	21-26	10YR 5/3; 4/3	gS	m	so no,po	n.o.
		Cox	26-33	10YR 6/4; 4/4	gS	sg	lo no,po	n.o.
		Cu	33+	10YR 6/3; 5/4	gS	sg	lo no,po	n.o.
Qoa-c,	RW-12	A1	0-18	10YR/2.5Y 5/2; 2/2	LS	m	so no,po	n.o.
		A2	18-35	10YR-2.5Y 5/2; 3/2	gS	1csbk	sh no,po	n.o.
		Bw	35-63	2.5Y 6/3; 5/4	gS	m	sh no,po	n.o.
		Cox1	63-73	2.5Y 6/2; 5/4	gS	m	so no,po	n.o.
		Cox2	73-90	2.5Y 6/2;4/2	gcoS	sg	lo no,po	n.o.
		Cu/Cox	90+	5Y 5/2; 4/2	gcoS	sg	lo no,po	n.o.
Qoa-c Qt-4	RW-15	A1	0-6	2.5Y 4/2; 3/2	gSL	1mpl	so ss,ps	n.o.
		A2	6-25	10YR 4/3; 2.5Y/10YR 3/2	gSL	m/1msbk	so ss,ps	n.o.
		BA	25-32	10YR 5/3; 2.5Y/10YR 3/3	gLS	m	so ss,po	co
		Bw	32-45	10YR 5/4; 2.5Y/10YR 3/2	gLS	m	so ss,po	co
		Cox	45-89	2.5Y 5/4; 2.5Y/5Y 4/2	gS	sg	lo no,po	n.o.
		Cu	89+	5Y 6/2; 4/2	gS	sg	lo no,po	n.o.
Qoa-c	RW-13	A1	0-2.5	10YR 5/2; 2/2	LS	m	lo ss,ps	n.o.
		A2	2.5-7.5	10YR 5/3; 2/2	SL	sg	lo ss,po	n.o.
		AB	7.5-15	10YR 5/3; 4/3	LS	m	so ss,po	n.o.
		2Bw1	15-26	10YR 5/4; 3/4	gLS	m	so ss,po	co
		2Bw2	26-37	10YR/2.5Y 6/4 10YR 4/3	gLS	m	so ss,po	co
		2BC	37-53	10YR/2.5Y 4/4; 2.5Y 4/4	gcoS	sg	lo no,po	n.o.
		2Cox	53-100+	2.5Y 6/3	gcoS	sg	lo no,po	n.o.
		2Cu	3000+	5Y 5/2; 3/2 2.5Y 4/2	gcoS	sg	lo no,po	n.o.
Qoa-c Qt-2	RW-6	O1	4-0					
		A1	0-6	10YR 5/3; 3/2	LS	2fgr	so ss,np	n.o.
		A2	6-24	10YR 5/3;3/3	coSL	1f&msbk	sh no,po	n.o.
		2 Bt1	24-48	8.75YR 5/4; 3/4	gSL	1f&msbk	sh ss,po	vnpf&co
		2 Bt2	48-59	10YR 5/6; 4/3	gSL	1fsbk/m	sh ss,po	1npo&co
		2 Cox1	59-85	2.5Y 5/2;3/2	gS	sg	lo no,po	n.o.
		2 Cox2	85+	5Y 5/2; 3/2	gS	sg	lo no,po	n.o.

Qoa-c	RW-17	A1	0-3.5	10YR 4/3; 3/2	gLS	m	sh ss,ps	n.o.
Qt-1		A2	3.5-12	10YR 5/3; 3/3	gLS	2msbk	sh ss,ps	n.o.
		Bt1	12-21	10YR 5/4; 3/3	gLS	1msbk	so/sh ss,ps	vlnpo&co
		Bt2	21-37	10YR 5/3;4/3	gLS	1m&csbk/ 2f&mgr	so/sh ss,po	1npo&co
		Bt3	37-50	8.5YR 5/4; 8.75YR 4/4	gLS	m	h ss,po	vlnpo&co
		Bt4	50-65	10YR 5/4; 10YR 4/4	gLS	m	so ss,po	vlnpo;co
		BC	65-79	10YR-2Y 5/4 10YR 4/3	gS	m	so no,po	co
		Cox1	79-99	2.5Y 5/4;	gS	sg	lo no,po	co
		Cox2	99-110+	2.5Y 5/4 - 5Y 5/3;2.5Y 4/2	gcoS	sg	lo no,po	co
Qoa-d	RW-11	O1	7-0					
		Ba	0-9	7.5YR 5/3;3/4	SL	3msbk	h ss,po	1npo&co
		2 Bt1	9-42	5YR 4/6;4/4	gL	2msbk	h vs,p	2npo&co&br
		2 Bt2	42-77	5YR 5/6;4/4	gsCL	2f&msbk	h s,p	2mkpo&br&co
		2 Bt2	77-99	6.25YR 5/4;4/4	gSL	m	h s,p	1mkpo&br&co
		2BC	99-140	7.5YR 6/6; 4/6	gLS	m	so ss,po	co
		2Cox1	140-190	8/75YR 6/4;4/4	gcoS	sg	lo no,po	n.o.
		2Cox2	190+	10YR 7/4; 4/4	gcoS	sg	lo no,po	n.o.
Qoa-e	RW-14	2 BAt	0-13	2.5YR 4/6; 4/6	SL	2&3mabk	vh vs,vp	2kpf&2mkpo&br
		2 Bt1	13-36	2.5YR 4/6;4/4	SCL	3mabk	vh/vs,vp	3mkpf&2mkpo&br
		2 Bt2	36-54	3.75YR 4/4; 5YR 5/6	SCL	3msbk	vh/vs,vp	3mkpf&2mkpo
		2 Bt3	54-142	5YR 5/6; 4/6	SL	3cosbk	vh s,p	3mkpf&2mkpo
		2 Bt4	142-183	5YR 5/6; 4/6	SL	3cosbk	h s,p	2npf&1npo&co
		2 Bt5	183-335	5YR 5/6; 4/6	SL	3vcabk/m	vh s,p	1&2mkpo&br
		2 Bt6	335-701	5YR; 4/6	SL	m	vh s,ps	1&2npo&br
		2 Bt7	701-1460	6.25YR 5/6;4/6	gS	m	h ss,ps	co
		2 Cox	1460+	10YR 5/6; 4/6	sG	m	lo no,po	n.o.
Qhf	RW-16[7]	A1	0-3	10YR 3/2	gLS	m		
		A2	3-55	10YR 4/3	gLS	m		
		AB	55-80	10YR 5/3	gS	m		
		Bw1	80-110	10YR 6/3	gS	m		
		Bw2	110-154	10YR 5/4	gS	m		
		2Btb	154+	7.5YR 5/3	gLS	2msbk		

---

1 Munsell soil color chart

2 Explanation of soil morphologic terminology. Texture: g = gravelly; co = coarse; f = fine; S = sand; LS = loamy sand; SL = sandy loam; SCL = sandy clay loam; SiL = silt loam. Structure: Type - sg = single grain; pl = platy; m = massive; gr = granular; sbk = subangular blocky; abk = angular blocky; pr = prismatic. Grade - 1 = weak; 2 = moderate; 3 = strong. Size - f = fine; m = medium; c = coarse; vc = coarse. Consistence: Dry - lo = loose; so = soft; sh = slightly hard; h = hard; vh = very hard; eh = extremely hard. Moist - no, po = nonsticky, nonplastic; ss,

sp = slightly sticky, slightly plastic; s, p = sticky, plastic; vs, vp = very sticky, very plastic. Clay films: Frequency - v = very few; 1 = few; 2 = common; 3 = many; 4 = continuous. Thickness n = thin; mk = moderately thick; k = thick. Morphology - pf = ped face; po = line pores; br = bridges; co = colloid stains on grains; n.o. = none observed.

3 Parent materials primarily composed of granitic debris.

4 RW-1 described near eroded margin of Qoa-c. RW-2 was reoccupied and redescribed as RW-13, included in Table 1. RW-3 was decribed at exposed and eroded margin of Qt4.

5 Site near adjacent hillslope.

6 Site probably partly altered by construction activities.

7 Site located on surface of fan composed largely of bouldery sand and with interstratified debris flow deposits. Surface slope = 10°, age of surface ~ 2000 years, determined on basis of amount of offset of deeply incised channels cut into these deposits (Weldon, 1985).

TABLE B. SUMMARY OF TEXTURAL AND CHEMICAL DATA FOR SOILS ON TERRACE AND FAN DEPOSITS OF THE CAJON PASS AREA, SOUTHERN CALIFORNIA

Deposit, Terrace	Profile Number	Horizons	Particle size distribution, <2mm (%) Sand	Silt	Clay	pH	Organic Carbon (%)
Qoa-c, Qt-1	RW-4[1]	A1	76.1	21.7	2.2	5.0	1.7
		A2	70.3	24.6	5.6	5.4	0.9
		2BA	75.0	18.6	6.4	5.5	0.5
		2Bt1	68.5	24.6	6.9	5.6	0.4
		2Bt2	83.0	9.0	7.6	5.9	-
		2BC	86.5	8.8	4.8	5.9	-
		2Cox1	89.8	8.8	1.4	5.8	-
		2Cox2	86.0	10.8	3.2	6.0	-
		2Cox3	92.0	6.5	1.5	6.0	-
		2Cox4	92.5	6.3	1.2	6.4	-
Qoa-c, Qt-1	RW-5[1]	A1	57.4	36.9	5.7	6.1	2.9
		A2	59.0	33.5	7.5	5.8	1.6
		2BA	57.5	33.7	8.8	5.6	0.6
		2Bt1	61.5	31.0	7.5	5.4	0.5
		2Bt2	76.5	16.9	6.6	5.6	-
		2BC	85.0	11.5	3.5	5.7	-
		2Cox1	87.5	9.9	2.6	5.6	-
		2Cox2	92.7	6.0	1.3	5.6	-
		2Cu	96.5	3.1	0.4	7.1	-
Qoa-a, Qt-7	RW-7[1]	A1	79.5	19.8	0.7	5.9	0.6
		A2	85.1	14.1	0.8	5.6	0.4
		2AC	86.1	13.3	0.6	5.7	0.4
		2Cox	93.5	6.1	0.4	6.2	0.3
		2Cu	98.3	1.5	0.2	6.3	-
Qoa-a, Qt-7	RW-8[1]	A	89.2	9.2	1.6	6.1	0.6
		Cox	94.3	4.4	1.3	7.0	0.2
		Cu	97.8	1.6	0.6	6.9	-

1 See footnotes for Table A in which site location data, parent materials and other information concerning these profiles are included.