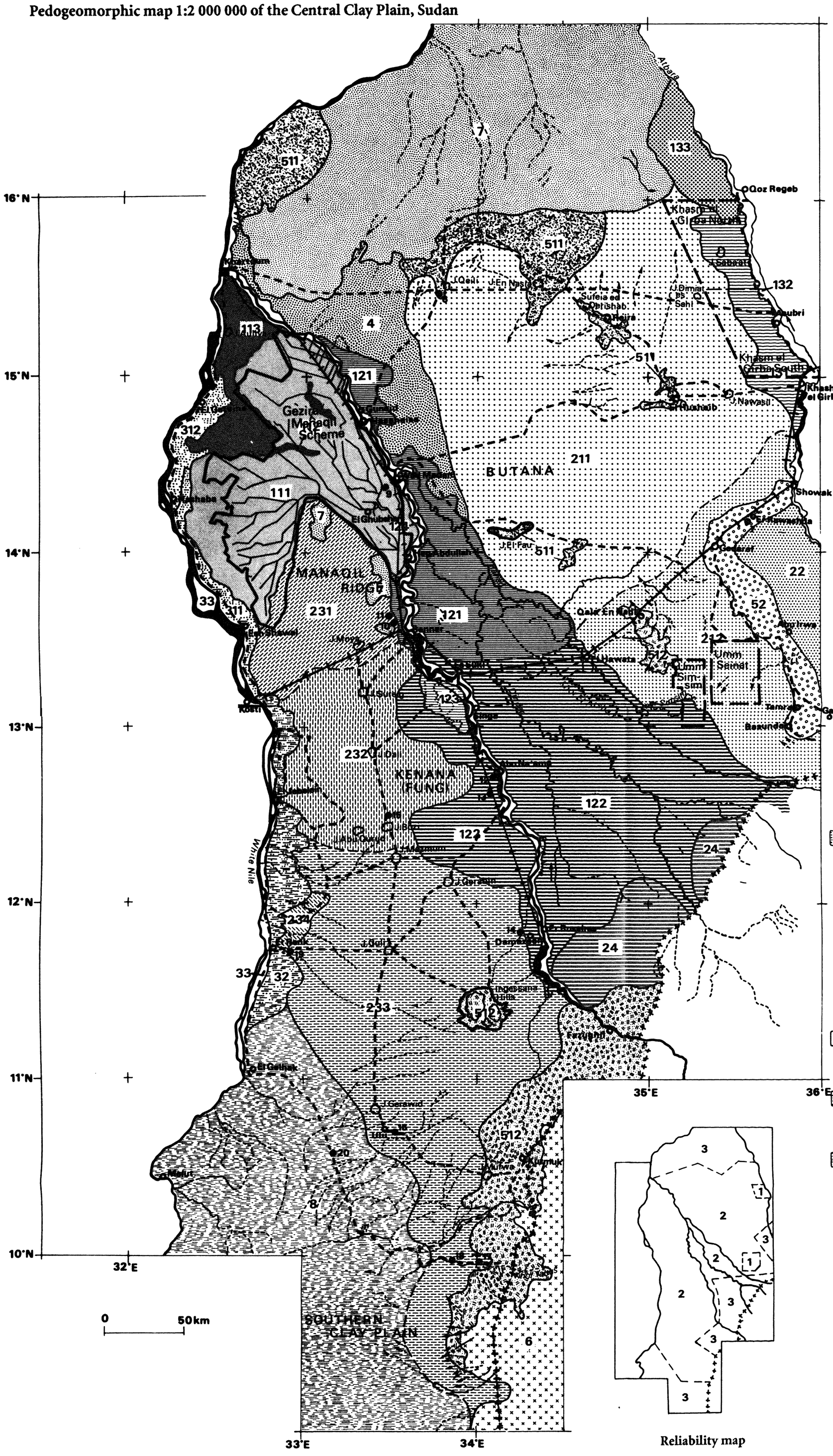
Appendix 3

Geographic map 1:2 000 000 of the Central Clay Plain, Sudan, with location of representative profiles and soil survey areas

Appendix 4 (1)

Pedogeomorphic map 1:2 000 000 of the Central Clay Plain, Sudan



Reliability map

Appendix 4 (2)

Legend of pedogeomorphic map 1:2 000 000

1 AGGRADATIONAL CLAY PLAINS

11 *Gezira fan*
- 111 clay plain
- 112 stream channels
- 113 lower end of fan

12 *Clay plain of Blue Nile, Dinder and Rahad*
- 121 clay plain, Northern part
- 122 clay plain, Southern part
- 123 Singa meander belt
- 124 'kerrib' land of the Blue Nile

13 *Clay plain of Atbara*
- 131 clay plain
- 132 'kerrib' land of the Atbara
- 133 clay plain / Nubian Formation transitional zone

2 DEGRADATIONAL CLAY PLAINS

21 *Butana / Gedaref clay plain*
- 211 Butana clay plain
- 212 Gedaref clay plain

22 *Abu Irwa clay plain*

23 *Kenana clay plain and Managil ridge*
- 231 Managil ridge
- 232 Northern Kenana clay plain
- 233 Southern Kenana clay plain
- 234 clay plain and sandy ridges

24 *Ethiopian footslope clay plain*

3 WHITE NILE EASTBANK PLAIN

31 *Northern part*
- 311 clay plain
- 312 sanddunes and sandcovered clay plain

32 *Southern part*

33 *present White Nile flood plain*

4 DEGRADATIONAL CLAY PLAIN AND NUBIAN FORMATION TRANSITIONAL ZONE

5 CLAY PLAINS AND IGNEOUS ROCK OUTCROPS AND HILLS

51 *Basement Complex landscape*
- 511 lower - rainfall region
- 512 higher - rainfall region

52 *Gedaref basalt landscape*

6 HILLS AND ROCK LAND ASSOCIATED WITH IGNEOUS ROCKS

7 NUBIAN FORMATION SANDSTONE OUTCROPS AND DENUDATIONAL PLAINS

8 SOUTHERN CLAY PLAIN

Table 4.1. Correlation table for Quaternary climates, river regimes and sedimentation in the Central Clay Plain area, Sudan and elsewhere in eastern Africa

Period Years before present	Blue Nile regime (and Rahad and Dinder)	Gezira clay plain	Rahad-Dinder-Blue Nile Gezira	Atbara regime	Khashm el Girba clay plain	White Nile regime	White Nile clay plain	Climate Central Clay Plain	African lake levels (mainly East Africa and Ethiopia)	Climate East Africa and Ethiopia	Aeolian sedimentation Central Clay Plain area	YBPx10³
0	incision of rivers	rubefaction of surface soil	rubefaction of surface soil	incision of river	rubefaction of surface soil							1
1 000												2
2 000												3
3 000			? ?									
4 000		*Limicolaria* stage	? ?						relatively short-term higher lake levels (Lakes Rudolf, Nakura and Chad)	drier, but wetter than Late Pleistocene	Period IV, rather wet	4
5 000		(end of deposition)	(end of deposition)		(end of deposition)							5
6 000		deposition of dark grey (dark grayish brown) upper clay layer and silty to sandy channel fill	braided-river deposits by palaeochannels of Rahad, Dinder and Blue Nile	slow river flow; paludal deposits?	deposition of dark grayish brown upper clay layer as fan-like or paludal deposit	White Nile stable at level of 386 m and (later) 382 m	dune formation → ?	wetter than at present — drier phase?				6
7 000	period with high B.N. flood levels					high flood levels				less wet? transitory dry period	Period III, dry; "High Qoz" formed	7
8 000	Blue Nile forms radiating distribution pattern of palaeochannels over the Gezira						¹⁴C age *Pila*					8
9 000		*Cleopatra*							lake levels relatively high	wet and warm	Period II, very wet; "Low Qoz" stabilised	9
10 000	Early Holocene Blue Nile model	*Pila/Lanistes* stage.....							rising lake levels — minor recession (Lake Victoria a closed basin)			10
11 000							¹⁴C age of freshwater and riverbottom snails			moderately dry		11
12 000	period with high B.N. flood levels				¹⁴C age of *Lanistes* and *Cleopatra* shells in layer between the two major clay deposits; stand-still in sedimentation; locally marshy conditions; arid climate	high flood levels			overflow of Lake Victoria	moderately wet; warm		12
13 000		stand-still in sedimentation; locally marshy conditions; arid climate							lake levels relatively low — Lake Victoria a closed basin	dry and cold		13
14 000										? ?		14
15 000												15
16 000												16
17 000	Late Pleistocene Blue Nile model									extremely dry	Period I, very dry. "Low Qoz" formed	17
18 000												18
19 000									lake levels lowering	?		19
20 000												20
21 000	Blue Nile a braided river?		? ?	meandering river	? ? deposition of yellowish-brown clay or silty/sandy substratum ?				lake levels high	wet and warm		21
22 000												22
23 000		deposition of yellowish-brown clay substratum and silty/sandy lenses										23
24 000		ash deposits in Blue Nile palaeochannels										24
25 000												25
26 000												26
27 000		¹⁴C age of hard, black carbonate nodules		braided river	deposition of sediments varying from clay to sand							27
28 000												28
29 000												29
30 000		?			?							30

Table 6.1 Soil profiles, sites, pedogeomorphic units, and Soil Taxonomy subgroups and family classes (Soil Survey Staff 1990)

profile number	profile name	analytical data available	approx. annual rainfall	pedogeomorphic unit name	ped. geom. unit number	Soil Taxonomy subgroup	family classes		
							particle size	mineralogy	soil temperature
	clay-plain sites								
1	Khashm el Girba 213	x	400	Atbara clay plain	131	Typic Chromustert	very-fine	montm.	isohyp.
2	Khashm el Girba 215	x	400	Atbara clay plain	131	Typic Chromustert	very-fine	montm.	isohyp.
3	Khashm el Girba 251	x	400	Butana clay plain	211	Typic Chromustert	very-fine	montm.	isohyp.
4	Khashm el Girba 238	-	400	Atbara clay plain	131	Typic Chromustert	very-fine	montm.	isohyp.
5	Khashm el Girba 256	-	400	Butana clay plain	211	Typic Chromustert	very-fine	montm.	isohyp.
6	Jebel Qeili	x	200	Butana clay plain	211	Entic Chromustert	fine	montm.	hyperth.
9	GARS 141	x	400	Gezira clay plain	111	Typic Chromustert	very-fine	montm.	isohyp.
10	Sennar 49	x	450	Blue N./Dinder/Rahad clay plain, northern part	121	Typic Chromustert	very-fine	montm.	isohyp.
11	Sennar 71	-	450	Blue N./Dinder/Rahad clay plain, northern part	121	Entic Chromustert	very-fine	montm.	isohyp.
12	Jebel Abel	x	600	Blue N./Dinder/Rahad clay plain, southern part	122	Entic Chromustert	very-fine	montm.	isohyp.
13	Tozi	x	600	Blue N./Dinder/Rahad clay plain, southern part	122	Entic Pellustert	very-fine	montm.	isohyp.
14	Damazeen A (depr.)	x	800	Blue N./Dinder/Rahad clay plain, southern part	122	Typic Chromustert	very-fine	montm.	isohyp.
	Damazeen B (mound)	x	800	Blue N./Dinder/Rahad clay plain, southern part	122	Typic Chromustert	very-fine	montm.	isohyp.
15	Bozi	x	600	Northern Kenana clay plain	232	Typic Chromustert	very-fine	montm.	isohyp.
16	Ulu	x	800	Southern Kenana clay plain	233	Typic Chromustert	very-fine	montm.	isohyp.
19	Renk	-	500	Southern Kenana clay plain	233	Typic Chromustert	very-fine	montm.	isohyp.
21	Simsim B27	x	800	Gedaref clay plain	212	Typic Chromustert	very-fine	montm.	isohyp.
26	Seinat B50	x	800	Gedaref clay plain	212	Typic Chromustert	very-fine	montm.	isohyp.
27	Seinat B55	x	800	Gedaref clay plain	212	Entic Pellustert	very-fine	montm.	isohyp.
	other sites								
7	Er Rawashda	x	600	Gedaref basalt landscape	52	Typic Pellustert	very-fine	montm.	isohyp.
8	Hadeliya	x	150	- [1]	-	Typic Ustifluvent	fine	montm.	hyperth.
17	Khadiga	x	1000	Southern Kenana clay plain [2]	233	Typic Chromustert	fine	mixed	isohyp.
18	Boing	x	1000	Southern Kenana clay plain [2]	233	Typic Pellustert	very-fine	montm.	isohyp.
20	El Gelhak	x	500	Southern clay plain	8	Udic Pellustert	very-fine	mixed	isohyp.
22	Seinat B7	x	800	Gedaref clay plain [3]	212	Typic Chromustert	fine	mixed	isohyp.
23	Seinat B10	x	800	Gedaref clay plain [3]	212	Lithic Ustorthent	loamy-skeletal	mixed	isohyp.
24	Seinat B47	x	800	Gedaref clay plain [3]	212	Typic Ustropept	fine	mixed	isohyp.
25	Seinat B48	x	800	Gedaref clay plain [3]	212	Ultic Paleustalf	fine-loamy	kaolinitic	isohyp.

[1] Hadeliya is a profile at the Gash delta, outside the Central Clay Plain [2] Situated in Southern Kenana clay plain; representative of Basement Complex landscape, higher-rainfall region (pedogeomorphic unit 512) [3] Situated in Gedaref clay plain; representative of Basement Complex landscape, higher-rainfall region (pedogeomorphic unit 512)

Table 7.1: Macromorphological features 1: horizon code and Munsell soil colour at seven standard depths

pro-file nr.	profile name	at 20 cm		at 40 cm		at 70 cm		at 100 cm		at 130 cm		at 160 cm		at 190 cm	
		hori-zon code	Munsell colour	hori-zon code	Munsell colour	hori-zon code	Munsell colour	hori-zon code	Munsell colour	hori-zon code	Munsell colour	hori-zon code	Munsell colour	hori-zon code	Munsell colour
	clay-plain sites														
1	Khashm el Girba 213	A	10YR3/4	A/Bwk1	10YR3/4	A/Bwk2	10YR3/4	B/Awk	10YR3/4+3/2 [1]	B/2Cwky	10YR3/2+3/4	2C/Bwky	10YR3/2+5YR3/3	2Cky1	5YR3/3(+10YR3/2) [2]
2	Khashm el Girba 215	Au1	10YR3/4	Au2	10YR3/4	A/Bwk	10YR3/4+2/2	B/Awk	10YR3/4+2/2	B/2Cwk	10YR2/2+N5	2Ck	7.5YR+N5	2Ck	7.5YR+N5
3	Khashm el Girba 251	A	10YR3.5/2	A/Bwk1	10YR3.5/2(+2/1)	A/Bwk2	10YR3.5/2+2/1	A/Bwk2	10YR3.5/2+2/1	B/Awky	10YR2/1(+3.5/2)	B/Cwky	10YR2/1+(10YR/2.5Y4/2)	C/Bwky	10YR/2.5Y4/2(+10YR2/1)
4	Khashm el Girba 238	Au1	10YR3/4	Au2	10YR3/4	Ak	10YR3/4	B/Ak	10YR3/4(+2/2)	Bwk	10YR2/2	B/2Cwk	10YR3/1+2/2+others	B/2Cwk	10YR3/1+2/2+others
5	Khashm el Girba 256	Au1	10YR3/3	Au2	10YR3/3	A/Bwk	10YR3/3+3/1	B/Awky	10YR3/1(+3/3)	B/Cwky	10YR3/2(+others) [3]	C/Bwky	10YR/2.5Y3/2	Ckr	10YR4/2
6	Jebel Qeili	A	10YR4/3	Ak	10YR4/3	A/Bwk	10YR4/3	B/Awk	10YR3.5/1(+4/3)	Bwky	10YR3.5/1+others	BCwky	10YR3/1.5+others	Cky	10YR/2.5Y4/2
9	GARS 141	Ak1	10YR3/3.5	Ak2	7.5YR3/2	A/Bwk	7.5YR3.5/2	B/Awky	10YR4/1.5(+7.5YR3.5/2)	2Cky1	10YR5/3	2Cky1	10YR5/3	2Cky3	10YR5/4
10	Sennar 49	Au2	10YR/2.5Y3/2	Au2	10YR/2.5Y3/2	A/Bwk	10YR3/2(+3.5/2+4/3)	B/Awky	10YR3/2+3.5/2	Bwky	10YR3/1	B/2Cwky	10YR3/1+4/2	2Cky	10YR4/2+4/3(+7.5YR4/4)
11	Sennar 71	Au1	10YR/2.5Y4/2	Au2	10YR/2.5Y4/2	Ak	10YR3.5/2	Ak	10YR3.5/2	A/Bwk	10YR/2.5Y4/2+10YR3/2	A/Bwk	10YR/2.5Y4/2+10YR3/2	B/2Cwk	10YR3/2+4/3
12	Jebel Abel	Au2	2.5Y4/2	Au3	2.5Y4/2	Bw1	(10YR)/2.5Y3/2	Bw2	10YR3/2	Bwk1	10YR2.5/1	Bwk2	10YR2.5/1	Bwk2	10YR2.5/1
13	Tozi	-[4]	10YR/(2.5Y)4/1	-	10YR/(2.5Y)4/1	-	10YR/(2.5Y)4/1	-	10YR4/2	-	10YR4/1	-	10YR4.5/2(+2.5Y4/2)	-	-[5]
14	Damazeen A (depr.)	-	2.5Y3/2	-	2.5Y4/2	-	2.5Y4/2	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y4/2	-	-
	Damazeen B (mound)	-	10YR/2.5Y3.5/2	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y3/2	-	-
15	Bozi	A	2.5Y3/2	Bw1	10YR/2.5Y3/1.5	Bw2	2.5Y3/1	Bwk	10YR/2.5Y3/1	Bwk	10YR-2.5Y3/1	B/Cwk	10YR/2.5Y3/2+others	C/Bwky	10YR/2.5Y3/3(+3/2)
16	Ulu	A	2.5Y3/2	Bw1	2.5Y3/2	Bw2	2.5Y3/2	Bw2	2.5Y3/2	Bwk	2.5Y3/2	Ck	10YR/2.5Y4/3	Ck	10YR/2.5Y4/3
19	Renk	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y3/2	-	2.5Y3/2	-	10YR/2.5Y3/2+10YR2/1	-	-
21	Simsim B27	Au2	10YR3.5/2	Au2	10YR3.5/2	Bw	10YR3/2	Bwk	10YR/2.5Y3/2	Cky	10YR3/3(+3/2+4/3)	Cky	10YR3/3+3/2+4/3	-	-
26	Seinat B50	A	2.5Y4/2	Bw1	2.5Y3/2	Bw1	2.5Y3/2	Bw2	2.5Y3/2	B/Cwk	10YR3/3(+4/3)	B/Cwk	10YR3/3(+4/3)	B/Cwk	10YR3/3(+4/3)
27	Seinat B55	A	10YR4/1	Bw1	10YR3/1.5	Bw1	10YR3/1.5	Bw2	10YR3/1	Bw2	10YR3/1	BCwk	10YR2.5/1.5	-	-
	other sites														
7	Er Rawashda	A	10YR3/1.2	Bw1	10YR3/1.2	Bw1	10YR3/1.2	Bw2	10YR3/1.8	Bw3	10YR3/1.4	CR	rock boulders	-	-
8	Hadeliya	-	10YR5/2.5	-	10YR4.5/2.5	-	10YR4/3	-	10YR4/3	-	10YR4/3	-	10YR4/2.5	-	-
17	Khadiga	A	5YR3/2	Bw1	5YR3/2	Cr	5YR3/3+rock	-	-	-	-	-	-	-	-
18	Boing	A	10YR3/1	A	10YR3/1	Bw1	10YR/2.5Y3/1	Bw2	10YR/2.5Y3/1	BCw	2.5Y3/1.5	Ckr	weathered rock	-	-
20	El Gelhak	Bwg	10YR3/0.5+5YR4/4+N4	BCwg1	10YR3/0.5	BCwg1	10YR3/0.5	BCwg2	10YR3/0.5	Ck	10YR3.5/1	Ck	10YR3.5/1	-	10YR3.5/1
22	Seinat B7	A	7.5YR2/2	Bw	10YR3/3(+N4)	Bw	10YR3/3(+N4)	Bw	10YR3/3(+N4)	Bw	10YR3/3(+N4)	BCwk	10YR3/3+3/2+5YR4/8+N4	BCwk	10YR3/3(+3/2+N4+5YR4/8)
23	Seinat B10	AR	5YR3/2.5+others	R1	N4-N8(+5YR3.5/3)	R2	mica schist	-	-	-	-	-	-	-	-
24	Seinat B47	A	10YR2.5/2+others	Bw1	10YR3/3	Bw1	10YR3/3	Bw1	10YR3/3	Bw2	10YR/2.5Y4/4	Bw2	10YR/2.5Y4/4	2C	pea-iron gravel
25	Seinat B48	AB	5YR3/2(+7.5YR2/2)	Bt1	5YR3/3	Bt2	2.5YR4/6(+3/6)	Bt3	2.5YR4/6(+3/6)	BC	2.5YR4/6(+5YR4/6+N4+N5)	C	10YR4/6+7.5YR4/6(+N4+N6+N3)		-

[1] mixture of 10YR3/4-soil and 10YR3/2-soil in about equal quantities [2] 5YR3/3-soil with some admixture of 10YR3/2-soil [3] 10YR3/2-soil with some admixture of soil pockets with different colours [4] no horizon code was added to the field description [5] below depth of soil pit

Table 7.2: Macromorphological features 2: microrelief, surface characteristics, aspects of soil structure, soft and hard forms of calcitic glaebules, soft iron-manganese concentrations

profile nr	profile name	microrelief			surface		parallelepipeds and/or lamination and/or tilted wedges		shiny or slickensided ped surfaces and/or slickensides		ca-specks		soft powdery lime without hard nodules		soft powdery lime and included hard nodules		Fe Mn-mottles cutans, impregnations		remarks
		gilgai or otherwise; type of gilgai	wavelength (m)	amplitude (cm)	mulch or crust	mulch well- or poorly developed	from	to	from	to	from	to	from	to	from	to	from	to	
	clay-plain sites																		
1	Khashm el Girba 213	uneven	-	-	mulch	w	0	300+	130	300+	40	130	130	300+	130	300+	175	300+	
2	Khashm el Girba 215	uneven	-	-	mulch	w	0	140	55	140	55	(85)	-	-	-	-	140	300+	sandy/silty substratum
3	Khashm el Girba 251	patchy	-	-	mulch	w	0	205	115	235	65	115	65	350+	205	350+	140	350+	
4	Khashm el Girba 238	gilgai-like	1.5	10	crust	-	0	255	160	255	60	(160)	(160)	(200)	(160)	(200)	160	300+	sandy/silty substratum
5	Khashm el Girba 256	-	-	-	n.r.	n.r.	0	125	110	180	45	110	110	125	-	-	125	210+	
6	Jebel Qeili	-	-	-	mulch	w	25	200	+	+	50	140	140	200	180	200	140	200+	
9	GARS 141	uneven	-	-	mulch	w	2	130	90	250+	15	90	90	250+	-	-	130	250+	
10	Sennar 49	-	-	-	mulch	w	3	260	85	260+	55	85	85	260+	-	-	190	260+	salt efflorescence
11	Sennar 71	-	-	-	mulch	p	0	280+	105	280+	50	165	165	280+	165	280+	165	280+	
12	Jebel Abel	uneven	-	-	mulch	w	0	110	60	190+	-	-	110	150	110	190+	60	110	
13	Tozi	uneven	-	-	mulch	w	90	170+	60	90	-	-	-	-	-	-	-	-	sandy pockets in substratum
14	Damazeen A (depr.)	normal gilgai	8-12	20-30	mulch	w	0	180+	60	180+	-	-	-	-	-	-	30	90	sandy pockets in substratum
	Damazeen B (mound)				mulch	w	0	180+	30	180+	0	30	-	-	-	-	15	90	
15	Bozi	normal gilgai	2-3	5-20	mulch	w	0	200+	60	200+	-	-	-	-	100	200+	170	200+	
16	Ulu	wavy gilgai	6.8	10-20	mulch	w	0	150	30	150	-	-	-	-	110	190+	30	190+	
19	Renk	-	-	-	mulch	w	15	180+	90	180+	-	-	-	-	-	-	(150)	(180)	
21	Simsim B27	normal gilgai	6	25	mulch	w	5	140	5	140	-	-	-	-	100	170	-	-	
26	Seinat B50	normal gilgai	5-7	15-25	mulch	w	30	250+	30	250+	-	-	-	-	130	350+	200	470+	
27	Seinat B55	normal gilgai (weak)	6	15	mulch	w	15	180	30	180	-	-	150	180	-	-	-	-	
	other sites																		
7	Er Rawashda	normal gilgai (weak)	2-3	15	mulch	w	35	160	35	160	-	-	-	-	-	-	-	-	
8	Hadeliya	sinkholes	-	-	n.r.	-	(0)	(150)	-	-	0	150	0	150	-	-	0	150	
17	Khadiga	(weak gilgai)	(3)	(20)	crust	-	0	60	20	60	-	-	-	-	-	-	40	60	
18	Boing	weak gilgai	n.r.	n.r.	mulch	w	0	140	40	140	-	-	140	160	-	-	-	-	ca in regolith
20	El Gelhak	weak gilgai	1.5	20	mulch	w	0	15	15	90+	-	-	240	270+	270+	270+	180	270+	
22	Seinat B7	irregular	-	-	crust	-	30	200	30	200	-	-	-	-	150	200	?	?	
23	Seinat B10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
24	Seinat B47	normal gilgai	10	10-20	crust	-	40	170	-	-	-	-	-	-	-	-	-	-	
25	Seinat B48	-	-	-	crust	-	-	-	-	-	-	-	-	-	-	-	-	-	

- characteristic not present

n.r. not recorded

+ characteristic present, but no details available

Table 7.3: Micromorphological features

Legend

Vosepic plasmic fabric, associated with skew planes
(+) present, weakly expressed
\+ present, well-expressed
++ present, strongly expressed

Other plasmic fabrics
(+) present, but in relatively few areas, and/or weakly expressed
\+ present, well-expressed
++ the dominant plasmic fabric(s) when two or more types occur well-expressed

Voids (skew planes/joint skew planes)
(+) few, or indistinct
\+ present
++ the dominant void type(s), estimated from total length of voids; not necessarily the void type(s) covering the largest surface area

Plasma concentrations, other pedological features
(+) one or two occurrences
\+ present (very few, few, or common)
++ exceptionally abundant (to be read with care: the size of the thin section does not always allow an estimate to be made)
? type not identified with certainty

Size of thin section
s small (diameter ± 2 cm)
m medium (diameter ± 5 cm)
l large (diameter > 5 cm)

pro-file nr.	profile name	number of thin section	size of thin section	sample		plasmic fabric					voids		plasma concentrations										other pedological features			notes
				nr.	depth (cm)	argillasepic	insepic	mosepic	masepic	vosepic	skew planes	joint skew planes	carbonate					ferri-manganiferous					argillans	papules	intercalary gypsum	
													A	B	C	D	E	1	2	3	4	5				
	clay-plain sites																									
1	Khashm el Girba 213	64230	s	1	0-40	+	(+)			(+)	(+)				++	+										
		64232	s	5	130-155	+	(+)	(+)		+	+		+		+	+		+			+				+	
		64233	s	7	175-200	+	+	+	(+)	+	+		+	++	+	+	+	+				+			+	
		64234	s	9	240-300	+				+	(+)			++	+	+	+	+								
2	Khashm el Girba 215	64235	s	1	0-35	+	(+)			+	(+)		+	+	+	++										
		64236/7	s	3	55-85	+	(+)			(+)	(+)		+	+	+	++		(+)								
		64238	s	5	120-140	+	(+)			(+)	+		+	++	+	+	+	(+)								
		64241	s	9	220-245	+					(+)			++				+								
3	Khashm el Girba 251	64243	s	3	65-115	+	+			+	(+)			+		+		++								
		64245	s	6	175-205		+			+	+			++	+	+		++				(+)				
		64246	s	9	310-350		+			+	+					+		++				(+)			?	
4	Khashm el Girba 238	64252	s	1	0-30		+	(+)	(+)	(+)	(+)					(+)		(+)					+	+		
		64253	s	3	60-100	+	+			+	+		+	+		+		(+)								
		64255	s	7	200-230	+				(+)	(+)			+				+								
		64257	s	9	255-300	(+)	+	+			(+)			+		(+)	(+)	+						+		1)
5	Khashm el Girba 256	64248	s	1	0-25	+				+	+			+	+	+										1)
		64249	s	4	80-110	+				+	++		+	++	+	+		+				(+)			+	
6	Jebel Qeili	64258	s	1	0-25			+		+	+				+	+										
		64259	s	3	50-75	+	+			+	+		+	+	+	+		+								
		64260	s	5	100-140		+	+	(+)	+	++	+		+	+	+	?	+								
9	GARS 141	67328	m	1	0-46	+	++	+		+	+	+	+	+	+	+		+				+	+	+		
		67329	m	2	46-102	+	++	+	(+)	+	+		+	+	+	+	+	+				+				
		67330	m	3	102-140		++	+	+	+	+	+	+		+	+	+	+				+			+	
		67331	m	4	140-210	+	++	+	+	+	+	+	+	++			+	+							+	

(To be continued)

(Continued)

pro-file nr.	profile name	number of thin section	size of thin section	sample		plasmic fabric					voids		plasma concentrations										other pedological features			notes
				nr.	depth (cm)	argillasepic	insepic	mosepic	masepic	vosepic	skew planes	joint skew planes	carbonate					ferri-manganiferous					argillans	papules	intercalary gypsum	
													A	B	C	D	E	1	2	3	4	5				
	clay-plain sites																									
10	Sennar 49	64186	m	1	0-3	+		+		+	+		+		+			+			+					
		64187	m	2	3-25	+				(+)	+		+	+	++	+										
		64188	m	3	25-55	+	(+)	+		+	+	+		(+)	+	++										
		64189	m	5	85-130	+	++	+		+	+			++	+	+	?	+							+	
		64190	m	6	130-160	+	+		+	+	++		+	++	+	+		+			?					
		64226	s	7	160-190	+				(+)	+			++	+	(+)		(+)								
		64191	m	8	190-260	+	+		+	(+)	+	(+)	+	++	+	+	+	++								
11	Sennar 71	64227	s	4	50-105		+			(+)	++		+	+	+	+										
		64229	s	8	215-280	+					(+)		+	+	+			+								
12	Jebel Abel	64192	m	1	0-15	+				+	+	+			+	(+)										
		64193	m	2	15-30	+		+	(+)	+	+	+			+											
		64194	m	4	60-90	++	+		+	+	++				+											
		64195	m	5	90-110		+	+	(+)	+	+		+		+	+										
		64196	m	6	110-150			++	+	+	+		+		+			+			?					
		64197	m	7	150-190	+	+		(+)	+	+		+	+	+			+			+					
14	Damazeen A (depression)	64198	m	1A	0-15	+	(+)			(+)	(+)							+		(+)	+	(+)				
		64199	m	2A	15-30	+	(+)			(+)	+							+	+	+	+	+				
		64200	m	3A	30-60		+		(+)	(+)	+	+						+			+	+			?	
		64201	m	4A	60-90	+	(+)	+	(+)	(+)	++			+				+				+			?	
		64202	m	5A	90-120		++	+	+	+	++			+				+				+			?	
		64203	m	6A	120-150	+	+		(+)	(+)	++		+		+			+			+	+				
		64204	m	7A	150-180	+				(+)	+		+	+	+			+	+		+					
	Damazeen B (mound)	64205	m	1B	0-15		+	(+)		(+)	+		+									+				
		64206	m	2B	15-30	+				(+)	++		+		+	+				+		+				
		64207	m	3B	30-60	+				(+)	++		+		+					+		+				
		64208	m	4B	60-90		+		(+)	+	++		+		+			+	+							
		64209	m	5B	90-120	+	+		(+)	(+)	++		+			+		+		+		+			+	
		64210	m	6B	120-150		+			(+)	++		+	+	+			+			+	+			+	
		64211	m	7B	150-180	+	(+)			(+)	++		+	+	+			+				+			+	
13	Tozi	64219	s	7	150-170		++		+	(+)	+			++	+	+		(+)								

(To be continued)

(Continued)

pro-file nr.	profile name	number of thin section	size of thin section	sample		plasmic fabric					voids		plasma concentrations										other pedological features			notes
				nr.	depth (cm)	argillasepic	insepic	mosepic	masepic	vosepic	skew planes	joint skew planes	carbonate					ferri-manganiferous					argillans	papules	intercalary gypsum	
													A	B	C	D	E	1	2	3	4	5				
	clay-plain sites																									
15	Bozi	68285	l	1	0-30			++	+	(+)	(+)	+	+		+	+		+			+	+				
		68286	l	2	30-60			++	+	+	+	+	+		+	+	+	+			+	+				
		68287	l	3	60-100			++	+	(+)	+	(+)	+		+	+	+	+			+	+				
		68288	l	4	100-140			++	+	+	+		+	+	+	+	+	+			+	+				2)
		68289	l	5	140-170		+	++	+	+	+		+	+	+	+	+	+			+	+				
		68290	l	6	170-200	+	++	+	+	(+)	+		+	++	+	+	+	+			+					
16	Ulu	68062	l	1	0-30			+	+	+	+	+		(+)	+	+		+		+	+	+				
		66059	m	2	30-70		+	+	(+)	+	+	(+)	+	+	+	+		+	+		+	+				
		66060	m	3	70-110		+		(+)	+	+	+	+	+		+		+	+		+					
		66061	m	4	110-150	+	++		+	+	+		+					+		+	+	+				
		68063	l	5	150-190	+			+	+	+		+	+				+		+	+					
19	Renk	64221	s	1	0-15		+			+	+	+	+		+	+		+								
		64222	s	3	30-60	++	+			(+)	+	+			+											
		64223	s	5	90-120	++	+	+	+	+	++	+	+		?											
		64224	s	7	150-180	+	(+)			+	+	(+)	?		+			+								
21	Simsim B27	66023	m	2	5-50		++	(+)	+	+	+				+	+		+			+					
		66024	m	3	50-95/105		++	+	+	+	+		?		+	+		+		+	+					3)
		66025	m	4	95/105-130/140		++	+	+	+	+	+	+	+	+	+		+	+		+	+				4)
		66026	m	5	130/140-175	++	++		+	+	+	+		++	+	+	+	+			+	+			++	
26	Seinat B50	68057	l	5	200-250		+	++	+	+	+		+	+	?	+	+	++			+	+				
27	Seinat B55	68058	l	1	0-30		++		+	+	+				(+)	(+)		(+)				+				
		68059	l	2	30-90			++	+	+	+		?					+			+	+				
		68060	l	3	90-150		+	++	++	+	+	+			++	+		+	+		+	+				
		68061	l	4	150-180			++	+	+	+	+	+	+	+	+		+	+		+	+				

(To be continued)

(Continued)

pro-file nr.	profile name	number of thin section	size of thin section	sample		plasmic fabric					voids		plasma concentrations										other pedological features			notes
				nr.	depth (cm)	argillasepic	insepic	mosepic	masepic	vosepic	skew planes	joint skew planes	carbonate					ferri-manganiferous					argillans	papules	intercalary gypsum	
													A	B	C	D	E	1	2	3	4	5				
	other sites																									
7	Er Rawashda	68064	l	1	0-35		++	+	+	+	+	+	+	+	+	+		(+)			+					5)
		68065	l	2	35-75	+	+	(+)	(+)	(+)	+	+	+	+	+	+					(+)					
		68066	l	3	75-120		+	(+)	(+)	(+)	+	+	++	++	+	+	+	+			+					
		68067	l	4	120-150		++	++	+	(+)	+	+	+	++	+	+	(+)	+			+					
8	Hadeliya	64268	s	1	0-15	+				(+)	(+)							+				+				
		64269	s	3	30-60	+			(+)	+	+							+				+				
		64270	s	5	90-120	++	+		+		+			+				+				+				6)
		64271	s	6	120-150	+				+	+		+	+			(+)	+				+				
17	Khadiga	66050	m	2	20-40		+		+	+	+										+					
		66051	m	3	40-50/60		+		+	+	+							+			+					
		66052	m	4	50/60-70/90		+		+	+	+										+					
18	Boing	66054	m	2	40-70		+	+	(+)	+	+		+	+	?			+		+	+	+				7)
		66055	m	3	70-100			++	+	+	+	+	+	+	?			+		+	+	+				8)
		66056	m	4	100-125/140			+	+	+	+	+		+	?			?	+	+	+	+				8)
		66057	m	5	125/140-125/160		+			+	(+)			+	?			+	+	+	+	+				8)
20	El Gelhak	68068	l	1	0-15	(+)	+	(+)	+	+	+							+		+	+					
		68069	l	2	15-30	(+)		++	+	+	+							+	+		+					
		68070	l	3	30-60	(+)	(+)	+	+	+	+							+		+	+					
		68071	l	4	60-90			++	+	+	++							+	+		+					9)
22	Seinat B7	66033	m	2	at 40		+		(+)	(+)	+							?		+	+					10)
		66034	m	3	at 100		++		+	+	+							+	+	+	+	+				10)
		66035	m	3/4	at 140		++	+	+		+							+	+	+	+					11)
		66036	m	4	at 190	+	+		(+)	(+)	+		+	+		+		+	+	+	+	+				12)

[1] crystic plasmic fabric only

[2] 5% of plasma is omnisepic

[3] ferri-manganiferous concentrations taken together: ++

[4] more masepic than in sample 3

[5] 20% of the soil consists of ca-concentrations, type B being dominant

[6] vosepic fabric along channels

[7] type B ca-concentrations, but no intercalary calcite crystals

[8] all ferri-manganiferous concentrations taken together: ++

[9] part of the plasma is omnisepic

[10] type 3 ferri-manganiferous concentration is probably pisolithic laterite

[11] like [10]; also: ferri-manganiferous concentrations taken together: ++

[12] some crystic fabric only