

Reference soil Mozambique 7: Planosol

Description

CLASSIFICATION: USDA-subgroup : Thapto Haplustultic.

FAO : coarse textured.

PHYSIOGRAPHY: slope length: 300 m. pattern macro relief: uniform. irregular meso relief of remnants of termite mounds, 6-12/ha, 20-50 cm high, diameter 5.2 m. Besides small (20-40 cm high, diameter 20-30 cm) active termite mounds (15-40/ha); old ones with bush. Old >4%, new <2%. sealing: rather compacted. crusting: frequently with not very hard crust of 1-4 mm. AGGRADATION: Deposition of bleached quartz grains. VEGETATION: Coverage(%): regional local shrubs 1-3 1 herbs 30-40 30 grasses 40-50 40 bare ground 20-30 30 SOIL FAUNA: Very high activity of all kinds of termites and ants.

BRIEF CHARACTERIZATION OF THE SOIL: Normal A-horizon, overlying a deep E-horizon. E is mottled, especially in EB, structureless, well rooted, hard when dry. Abrupt transition to Bt, which's top is also bleached in the same fashion as the tongues reaching to the top of Bt2, thick dark cutans, with many orange mottles. Bt2 has even more pronounced cutans, without mottles. The calcaric C has lost the structure of the rock through rooting to great depth. In both Bt2 and C the rooting is also horizontal and tubular pores occur.

ADDITIONAL NOTES ON PROFILE DESCRIPTION: A1 - pores: interstitial, vesiculair and tubular. - roots: also few medium roots. E - pores: also common fine-medium interstitial, vesiculair and tubular pores. - roots: also few medium roots. EB - sometimes top prisma still visible. - roots: also few medium roots. - pores: also common fine-medium interstitial, vesiculair and tubular pores. Bt1 - structure: also moderate coarse prismatic. - mottles: also few black fine distinct sharp mottles. - cutans: also in pores. - second pores: also vesiculair. - roots: also few medium. - tonguing of bleached sand rather clear. - top prisms bleached. Bt2 - pores: also common very fine-fine tubular and vesiculair. - roots: also few medium. C - inclusion type II: also ferrigenous.



Classification

WRB 2006:

Luvic Planosol (Albic Sodic Epidystric)
105-135 cm natric horizon
15-58 cm albic horizon
58-105 cm argic horizon
abrupt textural change
reducing conditions
stagnic colour pattern

WRB 1998:

Luvi- Hyposodic Planosol (Albic Epidystric)

FAO-UNESCO-ISRIC 1988:

Epidystri- Stagnic Solonetz
0-15 cm ochric A horizon
105-135 cm natric B horizon
15-58 cm albic E horizon
stagnic properties

FAO-UNESCO 1974:

Solodic Planosol
0-15 cm ochric A horizon
15-58 cm albic E horizon
58-135 cm natric B horizon
abrupt textural change
hydromorphic properties

Site description

General information:

Names of person(s) who described the profile : Konstapel K & M Vilanculos
General description of location of profile (e.g., town, province) : Limpopo valley, Magude District, Timanguenen
Date : July 1983
Latitude / Longitude : S ° / E °

Physiography:

The altitude of the soil profile relative to mean sea level, specified in meters : m asl
Regional landform : plain
Topography of the surrounding country : undulating
Physiographic Unit in the immediate surrounding of the site : slope
The slope refers to the inclination of the land immediately surrounding the site. The measured or estimated slope angle is specified to the nearest per cent : 0 %
The physiographic position of the site where the profile is located : crest
Form of the slope surrounding the site : concave
Slope Aspect of the site : west

Parent material:

The main parent rock/ material over which the soil has been formed (1st entry) : sediment, unconsolidated
Mode of Accumulation or deposition of parent material (1st entry) : marine sediments
Texture of parent material (1st entry) : sandy clay
Weathering status of solid rock (1st entry) : partially or moderately
Resistance against weathering (solid rock) (1st entry) : moderate
Depth1 of lithological boundary : cm
The main parent rock/ material over which the soil has been formed (2nd entry) :
Resistance against weathering (solid rock) (2nd entry) :
Soil Depth; depth to which roots can easily penetrate throughout the year : cm

Hydrology and drainage:

Depth of groundwater table : cm
Groundwater Top : cm
Groundwater Bottom : cm
Kind of groundwater table : no groundwater table observed
Top Stagnating Layer : cm
Bottom Stagnating Layer : cm
Runoff : slow
Flooding frequency : never
Estimated permeability (class) of least permeable part of the profile : slow
Drainage Class : imperfect
To Drainage Class :
Moisture conditions of the profile: dry from -to : cm
Moisture conditions of the profile: moist from -to : cm
Wet From - To : cm

Land use / vegetation:

Current land use at the site : semi-natural grassland, grazed
Major crops :
Main type of irrigation :
Rotation scheme :
Vegetation Type;The natural vegetation at the site : grassland
Status of vegetation :
Remarks on Land Use / Vegetation : VEGETATION: shrubs mainly on termite mounds

Erosion and aggradation:

Soil erosion type (1st entry) : sheet
Intensity of the soil erosion type (1st entry) : slight
Occurrence of soil aggradation : present
Slope Stability :

Surface characteristics:

Microrelief type: small-scale differences in relief in the direct vicinity of the site : termite/ant mounds
Microrelief Height : 30
Rockiness : none
Stoniness : none
Average size of stones :
Shape of stones (on average) :
Cracks : no cracks observed
Slaking of aggregates by tillage, rainfall or frost : surface slaked; sorted sand/silt, some clay films
Evidence of salt : non-saline
Evidence of alkali : slightly alkaline

Nearest climate station:

Station : No representative climate station available for this site

Profile description:

- | | | |
|----------------|---|---|
| Ah 0-15 cm | : | dark greyish brown (10YR 4/2, dry) very dark greyish brown (10YR 3/2, moist), loamy sand, moderately coherent porous massive and weak medium brown and coarse subangular blocky, slightly hard very friable non sticky non plastic, common very fine and fine discontinuous inped pores and few medium discontinuous inped pores, many fine and common medium roots, coarse quartz grains, non calcareous, clear smooth boundary to, |
| E 15-38 cm | : | (10YR 5.5/2, dry) (10YR 4/2.5, moist), loamy sand, moderately coherent porous massive, slightly hard very friable non sticky non plastic, common (5-15%) fine faint diffuse mottles 10YR4/4 (dark yellowish brown), many micro to coarse discontinuous inped interstitial pores and few very fine discontinuous inped vesicular pores, many fine and common medium roots, coarse quartz grains, slightly calcareous (0-2%), clear smooth boundary to, |
| EB 38-58 cm | : | brown (10YR 5/3, dry) (dark) brown (10YR 4/3, moist), loamy sand, moderately coherent porous massive, hard very friable non sticky non plastic, many (15-40%) fine faint clear 10YR4/4 mottles and (dark yellowish brown) many (15-40%) medium distinct diffuse 10YR4/6 (dark yellowish brown) mottle, many micro to coarse discontinuous inped interstitial pores and few very fine discontinuous inped vesicular pores, many fine and common medium roots, slightly calcareous (0-2%), abrupt smooth boundary to, |
| Bt 58-105 cm | : | greyish brown (2.5Y 5/2, dry) dark greyish brown (2.5Y 4/2, moist), sandy clay loam, moderate coarse and very coarse prismatic parting to moderate very coarse angular blocky, extremely hard friable sticky slightly plastic, many (15-40%) medium distinct clear mottles and 7.5YR5/6 (strong brown) many (15-40%) coarse prominent clear 7.5Y5/8 (Invalid Code:) mottles, continuous thick clay and humus cutans on horizontal and vertical pedfaces, common micro and very fine discontinuous inped interstitial pores and few very fine and fine discontinuous inped tubular pores, common fine and few medium and coarse roots, slightly calcareous (0-2%), clear smooth boundary to, |
| Btn 105-135 cm | : | greyish brown (2.5Y 5/2, dry) dark greyish brown (2.5Y 4/2, moist), sandy clay loam, moderate coarse angular blocky, very hard friable sticky slightly plastic, patchy moderately thick clay and humus cutans, many micro to fine continuous inped interstitial pores and few very fine to medium discontinuous inped tubular pores, common fine and few medium and coarse roots, slightly calcareous (0-2%), clear smooth boundary to, |
| Cn 135->135 cm | : | (2.5Y 5/3, dry) (2.5Y 4/3, moist), sandy clay loam, moderate very coarse angular blocky, hard friable sticky slightly plastic, many micro to fine discontinuous inped interstitial pores and few very fine discontinuous inped vesicular pores, few fine and medium roots, very few medium irregular hard calcareous concretions and very few small spherical hard manginiferous concretions, moderately calcareous (2-10%), |

Physical

Particle size distribution:

[illegible]

Water retention characteristics

Depth (cm)	Bulk Density (kg/dm ³)	pF 0 (%) (w/v)	pF 1.0 (% w/v)	pF 1.5 (% w/v)	pF 2.0 (% w/v)	pF 2.3 (% w/v)	pF 2.7 (% w/v)	pF 3.4 (% w/v)	pF 4.2 (% w/v)	pF 2.5 (%)
70-80 :	1.673	32.8	31.4	28.0	23.5	21.3	19.8	22.1	19.9	-
110-120 :	1.609	41.2	40.5	37.3	32.9	30.8	28.8	26.9	23.9	-

Other physical data

Depth (cm)	Bulk Density (kg/dm³)	Spec. Surf. Area (m²/g)	COLE (cm/cm)	Water Disp. Clay (%)	Clay (%)
0-15	-	21	-	-	6.4
15-38	-	18	-	-	6.8
38-58	-	36	-	-	10.8
58-105	-	90	-	-	25.4
105-135	-	102	-	-	26.7
135-	-	118	-	-	30.9
0-20	-	-	-	-	-

Chemical characteristics:

[illegible]

Depth (cm)	CEC Soil (cmol/kg)	CEC Clay (cmol/kg)	CEC Org (cmol/kg)	ECEC (cmol/kg)	Base sat. (%)	Al sat. (%)	ESP (%)
0-15	3.9	61	1.5	-	33	-	0
15-38	3.1	46	0.8	-	39	-	0
38-58	4.9	45	0.7	-	43	-	0
58-105	12.6	50	0.7	-	66	-	4
105-135	16.4	61	0.6	-	84	-	17
135-	18.4	60	0.4	-	92	-	22
0-20	-	-	-	-	-	-	-

[illegible]

Clay mineralogy:

Depth (cm)	Kaolinite	Mica / illite	Vermiculite	Chlorite	Smectite	Halloysite	Mixed layer	Quartz	Feldspar	Gibbsite	Goethite	Hematite
0-15	: weak to medium	weak to medium	-	-	weak to medium	-	weak	weak to medium	very weak to weak	-	-	-
15-38	: weak to medium	weak to medium	-	-	weak to medium	-	weak	weak to medium	very weak to weak	-	-	-
38-58	: weak to medium	weak to medium	-	-	weak to medium	-	weak	medium to strong	very weak to weak	-	-	-
58-105	: weak to medium	weak to medium	-	-	medium to strong	-	weak	weak	very weak to weak	-	-	-
105-135	: weak to medium	weak to medium	-	-	strong	-	weak	weak to medium	very weak to weak	-	-	-
135-	: weak to medium	weak	-	-	strong	-	weak	weak to medium	very weak to weak	-	-	-
0-20	: -	-	-	-	-	-	-	-	-	-	-	-

Source of analyzing procedures:

Laboratory Attribute	Description	Proc. ref
ISRIC Al d	Al; Atomic Absorption Spectrometry	12.1-1.2
ISRIC Al o	Al; Atomic Absorption Spectrometry	12-2
ISRIC Al p	Al; Atomic Absorption Spectrometry	12-3
ISRIC Base sat.	Calculation; Sum of Exchangeable Cations (Na, K, Ca, Mg) / CEC soil	labmanual
ISRIC Bulk Density	Soil density excluding mass liquid, including interparticle space	18-3
ISRIC C / N	Calculation; Organic Carbon / Organic Nitrogen	labmanual
ISRIC Ca	Exchangeable bases with 1 M ammonium acetate at pH 7; Ca by atomic absorption spectrometry	9-4 and 9-5.3
ISRIC CaCO ₃ eq.	Carbonates are dissolved with dilute HCl. Residual acid is titrated. Carbonates expressed as CaCO ₃	7
ISRIC CEC Clay	Calculation; ((CEC soil - CEC org.m.)/ clay %)*100	9-6.3
ISRIC CEC Org	CEC organic matter; expert estimate for charge per unit C	9-6.3
ISRIC CEC Soil	CEC; with index cation in buffered solution pH7	9-4 and 9-5.3.3
ISRIC Clay; < 0.002 mm	Fraction by Pipette analysis; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC EC 1 : 2.5	Electro Conductivity of a soil / water (1:2.5) suspension	4-1.4 and 13-4
ISRIC ESP	Calculation; (Exchangeable Na / CEC soil) * 100	9-6.3
ISRIC Fe d	Fe; Atomic Absorption Spectrometry	12-1.2
ISRIC Fe o	Fe; Atomic Absorption Spectrometry	12-2
ISRIC Fe p	Fe; Atomic Absorption Spectrometry	12-3
ISRIC Feldspar	Feldspar; relative abundance scale 0 - 7	16-1
ISRIC K	Exchangeable bases with 1 M ammonium acetate at pH 7; K by flame atomic emission spectrometry	9-6.1
ISRIC Kaolinite	Kaolinite; relative abundance scale 0 - 7	16-1
ISRIC Mg	Exchangeable bases with 1 M ammonium acetate at pH 7; Mg by atomic absorption spectrometry	9-4 and 9-5.3
ISRIC Mica / Illite	Mica / ilite; relative abundance scale 0 - 7	16-1
ISRIC Mixed-layer	Mixed layer minerals; relative abundance scale 0 - 7	16-1
ISRIC Na	Exchangeable bases with 1 M ammonium acetate at pH 7; Na by flame atomic emission spectrometry	9-4 and 9-5.3
ISRIC Organic Carbon	Wet combustion of organic matter by potassium dichromate and sulphuric acid at about 125 degrees Celcius. Residual dichromate is back titrated against ferrous sulphate. To compensate for incomplete destruction an emprical correction factor of 1.3 is applied	5
ISRIC Organic Nitrogen	Organic Matter is digested in sulphuric acid (and hydrogen peroxide) with selenium as catalyst. Nitrogen is converted to ammonium sulphate. The solution is made alkaline and ammonia is distilled off. The evolved ammonia is trapped in boric acid and titrated with standardized acid solution	6
ISRIC pF 0	Moisture content of soil in a ring sample at tension of 0.1 kPa head of water	18-3
ISRIC pF 1.0	Moisture content of soil in a ring sample at tension of 1 kPa head of water	18-3
ISRIC pF 1.5	Moisture content of soil in a ring sample at tension of 3.2 kPa head of water	18-3
ISRIC pF 2.0	Moisture content of soil in a ring sample at tension of 10 kPa head of water	18-3
ISRIC pF 2.3	Moisture content of soil in a ring sample at tension of 20 kPa head of water	18-3
ISRIC pF 2.7	Moisture content of soil in a ring sample at tension of 50 kPa head of water	18-3
ISRIC pF 3.4	Moisture content of soil in a ring sample at tension of 250 kPa head of water	18-3
ISRIC pF 4.2	Moisture content of soil in a ring sample at tension of 1.5 MPa head of water	18-3
ISRIC pH H ₂ O	pH electrode; in supernatant suspension	4-1

ISRIC	pH KCl	In supernatant suspension; potentiometrically	4-1
ISRIC	Quartz	Quartz; relative abundance scale 0 -7	16-1
ISRIC	Sand; 0.10 - 0.05 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 0.25 - 0.10 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 0.5 - 0.25 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 1.0 - 0.5 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Sand; 2.0 - 0.05 mm	Total sand fractions by sieving; after removal CaCO ₃ and organic matter	3-5
ISRIC	Sand; 2.0 - 1.0 mm	Fraction by sieving; after removal CaCO ₃ and organic matter	3-4.6
ISRIC	Si o	Si; Atomic Absorption Spectrometry	12-2
ISRIC	Silt; 0.02 - 0.002 mm	Fraction by Pipette analysis ; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC	Silt; 0.05 - 0.002 mm	Calculation; Sum fractions Silt 0.05 - 0.02 mm	3-4.7
ISRIC	Silt; 0.05 - 0.02 mm	Fraction by Pipette analysis ; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC	Smectite	Smectite; relative abundance scale 0 - 7	16-1
ISRIC	Specific Surface Area	fine earth coated with monomolecular layer of Ethylene Glycol Monoethyl Ether	17-1
ISRIC	Sum cations	Sum of Exchangeable Cations (Ca, Mg, Na, K) with 1 M ammonium acetate at pH 7	9-

*ref: no labmanual available, link to presumable used analytical methode