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salic horizon (saliese horison)

See diagnostic horizon.

saline-sodic soil (sout-natriumgrond)

A soil containing both sufficient exchangeable sodium and soluble salts to adversely affect the growth of most crop plants. The exchangeable sodium percentage is >15 , the conductivity of the saturation extract >400 mS/m (at 25°C), and the pH is usually 8,5 or less in the water saturated soil. Cf. soluble salts; sodic soil; sodium adsorption ratio.

saline soil (soutgrond)

A soil containing sufficient soluble salts to adversely affect the growth of most crop plants. Specifically, a soil providing a saturation extract having an electrical conductivity >400 mS/m at 25°C and a sodium adsorption ratio <13 . Cf. salt-affected soil.

salinization (versouting; salinisasie)

The process whereby soluble salts accumulate in soil or water. Cf. mineralization.

salt-affected soil (soutgeaffekteerde grond)

A soil having an excess of soluble salts, or an excess of exchangeable sodium, or both, such that the growth of most crop plants are adversely affected. Cf. saline soil; sodic soil; saline-sodic soil.

saltation (saltasie)

A mode of sediment transport in which the particles are moved progressively forward in a series of short intermittent leaps, jumps, hops or bounces from a surface; e.g. sand particles skipping downwind by impact and rebound along a desert surface, or bounding downstream under the influence of eddy currents that are not turbulent enough to retain the particles in suspension and thereby return them to the stream bed at some distance downstream. Etymol. Latin *saltar*, to jump, leap.

salt balance (soutbalans)

The comparison between the quantity of dissolved salts carried to an area in irrigation water and the quantity of dissolved salts removed by drainage water.

salt tolerance (soutbestandheid)

- (1) The average soil salinity required to produce a specified decrease in plant yield.
- (2) The ability, expressed qualitatively or quantitatively, of a plant species to withstand high salt concentrations in soil.

salty soil (souterige grond)

A term not recommended for use in soil science. See saline soil.

sand (sand)

- (1) In the RSA, a soil separate consisting of particles 2,0 - 0,05 mm in diameter. See soil separate.
- (2) A soil textural class. See soil texture.

sand class chart (sandklasdiagram)

See soil texture.

sandstone (sandsteen)

A sedimentary rock, consisting mainly of grains of quartz, often with feldspar, mica and other minerals; consolidated, cemented and compacted. Sandstones can be classified according to the "cementing" material which binds the individual grains: (i) calcareous; (ii) siliceous; (iii) ferruginous; and (iv) dolomitic. Colour varies from dark brown or red through yellow to grey and white, mainly due to iron oxide content and its degree of oxidation or hydration; some sandstones have a greenish shade due to the presence of glauconite or reduced iron compounds. Sandstones may be deposited by water or wind action, and primary features (sedimentary structures and fossils) are common.

sandy (sanderig)

Containing a large amount of sand (applied to any one of the soil textural classes that contains a large percentage of sand). See soil texture.

sandy clay (sandklei)

See soil texture.

sandy clay loam (sandkleileem)

See soil texture.

sandy loam (sandleem)

See soil texture.

sandy soil (sanderige grond)

A qualitative term for a soil containing a large amount of sand. Cf. coarse texture; soil texture.

sanidine (sanidien)

See feldspar group of minerals.

saponite (saponiet)

See smectite.

saprolite (saproliet)

- (1) A soft, earthy, thoroughly decomposed rock formed *in situ* by chemical weathering. It often forms a thick (as much as 100 m) layer, esp. in a humid and tropical or subtropical climate; the colour is commonly some shade of red or brown. Cf. laterite. Syn. saprolith.
- (2) Weathering rock in various stages of decomposition. It has a general organization with respect to colour, structure or consistence which still has distinct affinities with the parent rock.
- (3) See diagnostic horizon.

saprophyte (saprofiet)

A plant (e.g. a fungus) that lives on decayed or decaying organic matter.

SAR (NAV)

See sodium adsorption ratio.

saturate (versadig)

- (1) To fill all the voids between soil particles with a liquid.
- (2) To form the most concentrated solution possible under a given set of physical conditions in the presence of an excess of the solute.
- (3) To fill to capacity, as the adsorption complex with a cation species, e.g. Ca-saturated.

saturated conductivity (versadigde geleivermoë)

See soil water : hydraulic conductivity.

saturated flow (versadigde vloeï)

See soil water : saturated flow.

saturated soil paste (versadigde grondpasta)

A mixture of soil and pure water such that all the voids between the soil particles are filled with water, while at the same time there is no accumulation of free water on the surface. At saturation the soil paste glistens as it reflects light, flows slightly when the container is tipped and the paste slides freely and cleanly off a spatula for all soils, except those with a high clay content.

saturation extract (versadigingsekstrak)

The soil solution obtained from a saturated soil paste.

saturation percentage (versadigingspersentasie)

The water content of a saturated soil paste expressed on a dry-mass basis. Cf. Soil water : saturation water content.

sauconite (soukoniet)

See smectite.

savanna (savanne; grasvlakte)

A tropical grassland, usually with scattered trees and shrubs.

scale (of maps) (skaal (van kaarte))

- (1) The scale of a map is the ratio of the straight-line distance between any two points on the map to the actual straight-line distance between the same two points on the earth's surface.
- (2) The scale of a map is the linear ratio or proportion between the map and the reality portrayed on the map.

scanning curve (skandeerkromme)

See soil water : scanning curve.

scarp (skarp)

A steep slope, especially one formed by erosion or faulting. Syn. escarpment. Cf. cuesta.

schist (skis)

A strongly foliated crystalline rock formed by dynamic metamorphism which can be readily split into thin flakes or slabs due to the well developed parallelism of more than 50% of the minerals present, particularly those of lamellar or elongate prismatic habit, e.g. mica and hornblende. The mineral composition is not an essential factor in its

definition (American usage) unless specifically included in the rock name, e.g. quartz-muscovite schist. Varieties may also be based on general composition, e.g. calc-silicate schist, amphibolite schist, or on texture, e.g. spotted schist.

scree (talus; glooiingspuin)

An accumulation of primary angular clasts which lies at an angle of around 36° beneath an exposed free face or cliff. The prime cause of deposition is rock fall, but other processes, such as debris flows, may contribute to their development. The largest clasts occur at the base of the scree. Syn. talus.

screen (sifplaat (-draad))

A perforated plate or meshed fabric used to separate coarser from finer parts, as of sand or other particulate materials. Types include:

rotary - An inclined, meshed cylinder that rotates on its axis and screens material placed in its upper end.

vibrating - An inclined screen that is vibrated mechanically and screens material placed on it. Cf. sieve.

sealing (verseëling)

See soil sealing; soil crust.

secondary mineral (sekondêre mineraal)

A mineral resulting from the decomposition of another mineral or from the reprecipitation of the products of decomposition of another mineral. Cf. primary mineral.

sedentary soil (obsolete) (sedentêre grond; residuele grond (verouderd))

A soil formed *in situ* from underlying parent rock, in contrast to one derived from transported parent material.

sediment (sediment)

- (1) Any material carried in suspension by water, which would settle to the bottom if the water lost velocity.
- (2) Fine water-borne matter deposited or accumulated in beds. Sediment is ordinarily transported as suspended sediment, by saltation or as bed load.

sedimentary rock (sedimentêre gesteente)

A rock formed from materials deposited from suspension or precipitated from solution and usually, but not necessarily, consolidated (i.e. cemented). The principal sedimentary rocks are sandstones, shales, limestones and conglomerates.

sedimentation (sedimentering)

The process of subsidence and deposition or settling of suspended matter carried by water or other liquids, by gravity.

sedimentation crust (sedimentasiekors)

See soil crust.

seed bed (saadbed)

The soil prepared by natural or artificial means to promote the germination of seed and the growth of seedlings.

seed inoculation (saadenting)

The process of adding microorganisms to seed, used frequently to designate the treatment of leguminous seed with symbiotic nitrogen-fixing bacteria (Rhizobia).

seepage (sypeling)

- (1) The loss of water by leakage and drainage from a canal, reservoir or other body of water or from a field. It is generally expressed as flow volume per unit time. Seepage into a body is referred to as influent seepage; that away from a body, as effluent seepage. Cf. soil water : infiltration; percolation.
- (2) Water escaping through or emerging from the soil along an extensive line or surface as contrasted with a spring where the water emerges from a localized spot.

seif dune (lengteduin)

A longitudinal dune oriented in the direction of the wind movement. It can be of considerable height and length.

selective uptake (selektiewe opname)

The uptake of ions by plants in ratios dissimilar to those occurring in the growth medium.

selectivity coefficient (selektiwiteitskoëffisiënt)

A value describing equilibrium conditions for an exchange reaction. It may be compared with the thermodynamic equilibrium constant, but differs from it in that assumptions are made regarding the activities of the ions participating in the exchange reaction.

self-mulching (selfkrummelend)

A process of swelling and shrinking due either to alternate wetting and drying or to freezing and thawing, which gives rise to a surface layer of well aggregated granules or fine blocky structure that do not form a crust.

separate, soil (grondfraksie)

See soil separate.

sepiolite (sepioliet)

A chain-lattice clay mineral: $Mg_4(Si_2O_5)_3(OH)_2 \cdot 6H_2O$. It is an extremely lightweight, absorbent, soft, compact to fibrous, and white to light-grey or light-yellow material found chiefly in Asia Minor and used for making tobacco pipes, pipe bowls, cigar and cigarette holders, and ornaments. It occurs in deposits formed from weathering of serpentine masses. Syn. meerschaum; sea-foam.

sequum (sekwum)

A vertical sequence of pedogenetically interrelated soil horizons.

sericite (serisiet)

A white, fine-grained potassium mica occurring in small scales and flakes as an alteration product of various aluminosilicate minerals, having a silky lustre and found in various metamorphic rocks, fault gangue and vein fillings of many deposits. It is a variety of muscovite, or very close to muscovite in composition, and may also include much illite.

series, soil (serie, grond-)

See soil series.

serpentine (serpentyn)

A group of common rock-forming minerals having the formula:

$(\text{Mg,Fe})_3\text{Si}_2\text{O}_5(\text{OH})_4$. Serpentine has a greasy or silky lustre, a slightly soapy feel and a tough, conchoidal fracture; they are usually compact but may be granular or fibrous and are commonly green, greenish yellow or greenish grey (sometimes brown, black or white) and often veined or spotted with red, green and white. Serpentine is always a secondary mineral, derived by alteration of magnesium-rich silicate minerals (esp. olivines) and are found in both igneous and metamorphic rocks.

sesquan (seskwaan)

See micromorphology.

sesquioxide (seskwioksied)

A binary compound of a metal and oxygen in the proportion of 3 to 2, as Al_2O_3 and Fe_2O_3 . The term sesquioxides is also used generally to describe free iron, aluminium and manganese oxides in the soil.

Sesquisol (Seskwisol)

See soil classification.

settlement (afsakking)

A gradual subsidence of material. Differential settlement is the non-uniform subsidence of material from a fixed horizontal reference plane.

sewage (riool)

The waste matter from industrial and domestic sources disposed of through sewers. It contains 95-99% water. Cf. sewage sludge.

sewage sludge (rioolslyk)

Solid material, mostly organic matter, produced by a sewage treatment plant through separation of the liquid and solids in sewage. It contains important plant nutrients such as N and P, but also varying amounts of potentially hazardous chemicals. Cf. sewage.

shale (skalie)

A fine-grained, indurated, detrital sedimentary rock formed by the consolidation (as by compression or cementation) of clay, silt or mud and characterized by finely stratified structure and/or fissility that is approximately parallel to the bedding (along which the rock breaks readily into thin layers) which is commonly most conspicuous on weathered surfaces. It has an appreciable content of clay minerals or derivatives from clay minerals and of detrital quartz. Cf. mudstone; slate.

shear (afskuiwing; skuifspanning)

- (1) A distortion, strain, or failure producing a change in form, usually without change in volume, in which parallel layers of a body are displaced in the direction of their line of contact.
- (2) A force, as with a tillage implement, acting at right angles to the direction of movement.

shear strain (skuifvervorming)

The angular skew, in radians, of an element undergoing change of shape by tangential (shearing) forces.

shear strength (skuifsterkte)

The maximum resistance to shearing stresses which a specimen or element of soil can withstand before failure occurs. The shearing strength is generally considered to be made up of (i) internal friction, or resistance due to interlocking of the particles and (ii) cohesion, or resistance due to the forces tending to hold the particles together in a solid mass. The law governing the shear failure of soils is generally known as Coulomb's law and given by:

$$S = C + \sigma \tan \Theta$$

where S = shearing resistance under conditions of normal stress

C = cohesion

σ = normal stress

Θ = angle of internal friction.

The cohesion and angle of internal friction are found from a shearing strength diagram in which normal stress is plotted against shearing strength.

shearing stress (skuifspanning)

See shear strength.

sheet (plaat)

The occurrence of groups of atoms such as silicon-oxygen tetrahedra or aluminium-oxygen (hydroxyl) octahedra in a plane. Two or more such sheets comprise a layer of the layer lattice minerals. Cf. layer; lattice.

sheet erosion (plaaterosie)

See erosion.

shrinkage index (krimpindeks)

See Atterberg limits.

shrinkage limit (krimpgrens)

See Atterberg limits.

shrinkage ratio (krimpverhouding)

The ratio of a given volume change, expressed as a percentage of the dry volume, to the corresponding change in water content above the shrinkage limit, expressed as a percentage of the mass of the oven-dried soil.

siallite (obsolete) (sialliet (verouderd))

Weathered rock material consisting largely of aluminosilicate clay minerals and being highly leached of the alkalis and alkaline earths.

siallitic soil (siallitiese grond)

Soil which, during its development, has not lost appreciable amounts of silica. Its clay fraction is dominated by 2:1 layer clays. Cf. ferrallitic, fersiallitic and allitic soil.

siderite (sideriet)

FeCO₃, trigonal.

siemens (siemens)

The SI unit for electrical conductance; the reciprocal of ohm. Cf. mho.

Sierozem (Grey Desert Soil) (Sierozem (Grys Woestynggrond))

A zonal great soil group consisting of soils with pale greyish A horizons grading into calcareous material at a depth of 300 mm or less, and formed in temperate to cool, arid climates under a vegetation of desert plants, short grass and scattered brush.

sieve (sif)

An apparatus containing a screen, used for separating particulate materials into different size fractions. Cf. screen.

silcrete (silcrete)

(1) A term for a conglomerate consisting of surficial sand and gravel cemented into a hard mass by silica.

(2) A siliceous duricrust. Syn. billy (Australia). Cf. duricrust; hardpan.

silica (silika)

The chemically resistant dioxide of silicon: SiO₂. It occurs naturally in five crystalline polymorphs (the minerals quartz, tridymite, cristobalite, coesite and stishovite); in cryptocrystalline form (as chalcedony); in amorphous and hydrated forms (as opal); in less pure forms (such as sand, diatomite, tripoli, chert and flint) and combined in silicates as an essential constituent of many minerals.

silica-alumina ratio (silika-alumina verhouding)

The molecular ratio of silicon dioxide (SiO₂) to aluminium oxide (Al₂O₃) in clay minerals or in soils.

silica-sesquioxide ratio (silika-seskwioksied verhouding)

The molecular ratio of silicon dioxide (SiO₂) to aluminium oxide (Al₂O₃) plus ferric oxide (Fe₂O₃) in clay minerals or in soils.

silicate (silikaat)

A compound whose crystal lattice contains SiO₄-tetrahedra, either isolated or joined through one or more of the oxygen atoms to form groups, chains, sheets, or three-dimensional structures with metallic elements. Silicates are classified according to crystal structure, i.e. nesosilicate, sorosilicate, cyclosilicate, inosilicate, phyllosilicate and tectosilicate.

siliceous (silikahoudend)

Relating to or containing silica, e.g. a siliceous clay; siliceous deposits.

silicon-oxygen tetrahedron (silikon-suurstof tetraëder)

A complex ion formed by four oxygen ions surrounding a silicon ion, with a negative charge of 4 units; the basic unit of the silicates. It is commonly written as SiO₄.

sill (intrusieplaat)

A tabular igneous intrusion, approximately uniform in thickness, and relatively thin compared with its lateral extent, that parallels the structure of the surrounding rock. Cf. dike.

silt (slik)

See soil texture.

siltstone (sliksteen)

A fine-grained, consolidated clastic rock composed predominantly of silt-size particles.

silty clay (slikklei)

See soil texture.

silty clay loam (slikkleileem)

See soil texture.

silty loam (slikleem)

See soil texture.

Silurian (Siluur)

See geological time scale.

single-grained structure (enkelkorrelstructuur)

A soil structure class in which the soil particles occur almost completely as individual or primary particles with essentially no secondary particles or aggregates being present. Usually found only in extremely coarse-textured soil. Cf. soil structure.

single superphosphate (enkel superfosfaat)

See superphosphate.

sink (put)

A term used to describe the removal of material or substances during a process occurring in soil, e.g. the precipitation of compounds during water flow through soil removes solutes from the water. Cf. source.

sinkhole (sinkgat)

A funnel-shaped depression in the land surface caused by solution of limestone or dolomite by underground water.

site (ligging)

- (1) In ecology, an area described or defined by its biotic, climatic and soil conditions as related to its capacity to produce vegetation.
- (2) An area sufficiently uniform in biotic, climatic and soil conditions to produce a particular climax vegetation.

site index (liggingsindeks)

- (1) A quantitative evaluation of the productivity of a soil for forest growth under the existing or specified environment.
- (2) The height of the dominant forest vegetation taken at or calculated to an index age, usually 50 or 100 years.

size limits (groottegrense)

The limiting sizes of the various soil separates. Cf. soil separates.

skeletal soil (skeletgrond (litosol))

See lithosol.

skeleton grain (skeletkorrel)

See micromorphology.

skewness (skeefheid)

A measure of the symmetry of a distribution about its mean. The skewness is zero when the distribution is symmetric about its mean. A distribution is roughly symmetric when $-0,5 < \text{skewness} < +0,5$. When the skewness exceeds +1 or is less than -1 the distribution is highly skewed.

slag (slak)

Non-metallic material obtained during the smelting of metallic ores; generally formed as a molten mass floating on top of the molten metal. Sometimes used as a fertilizer on the basis of its content of plant nutrient elements. Cf. basic slag.

slake (blus)

- (1) The crumbling and disintegration of earth materials upon exposure to air or water; specifically the breaking up of dried clay or indurated soil when saturated with or immersed in water, or the breaking up of clay-rich sedimentary rocks when exposed to air.
- (2) The disintegration of tunnel walls in swelling clay due to inward movement and circumferential compression.
- (3) The treating of lime (CaO) with water to give hydrated (slaked) lime.

slaked lime (gebluste kalk)

Calcium hydroxide, $\text{Ca}(\text{OH})_2$; used in agriculture as a liming material for the amendment of acid soils.

slate (lei)

A compact, fine-grained, metamorphic rock formed from such rocks as shale and volcanic ash, which possesses the property of fissility (cleavage) along planes independent of the original bedding (slating cleavage), whereby they can be parted into plates which are lithologically indistinguishable.

slaty (leihoudend)

Containing a considerable quantity of slate fragments.

slickens (mynslik)

Fine-textured materials separated in placer mining and in ore-mill operations; the materials may be detrimental to plant growth and so should be confined in specially constructed basins.

slickenside (wryfvlak)

Refers to a polished or grooved ped surface within the soil. It results from part of the soil mass sliding or moving against adjacent material along a plane, which defines the extent of the slickenside. They occur only in clayey materials with a relatively high smectite content.

slick spots (gladde kolle)

Barren areas having puddled or crusted, very smooth, nearly impervious surfaces, usually because of high salinity or alkalinity.

slip (glyding)

The downslope movement of a soil mass under wet or saturated conditions; a microlandslide that produces microrelief in soils.

slope (helling)

The degree of deviation of a surface from horizontal, measured in a numerical ratio, per cent, or degrees. Expressed as a ratio or percentage, the first number is the vertical distance (rise) and the second is the horizontal distance (run, as 2:1 or 200%). Expressed in degrees, it is the angle of the slope from the horizontal plane with a 90° slope being vertical (maximum) and 45° being a 1:1 slope.

slow-release fertilizer (stadig-vrystellende misstof)

A fertilizer usually containing nitrogen, modified to release a nutrient or nutrients slowly or in a controlled fashion, mainly to combat loss thereof through leaching. Sulphur-coated urea (SCU) and polymerized urea-formaldehyde are well-known examples. Also referred to as controlled-release fertilizer.

sludge (slyk)

See sewage sludge.

smectite (smektiet)

A group of swelling clay minerals made up of 2:1 unit layers, each layer consisting of two silicon-oxygen tetrahedral sheets enclosing one aluminium-oxygen (or hydroxyl) octahedral sheet (i.e. 2:1 unit layers). The layers are continuous in the a and b direction and are stacked one above the other in the c direction. Cations that are large on account of hydration (e.g. Ca²⁺) are situated between the 2:1 unit layers. Water and other polar molecules can enter between the unit layers causing the lattice to expand in the c direction. Members of the group include dioctahedral montmorillonite (Mg-rich), beidellite (Al-rich) and nontronite (Fe-rich) and trioctahedral hectorite (Mg, Li-rich), saponite (Mg-rich) and sauconite (Zn-rich). CEC ranges from 80-100 cmol_e/kg and surface area from 6x10⁵ to 8x10⁵ m²/kg. Cf. bentonite.

sod (sooi)

A surface layer of grassland soil matted with entwined roots.

sodic soil (natriumgrond)

Soil with a low soluble salt content but sufficient adsorbed sodium to have caused significant deflocculation. The exchangeable sodium percentage (ESP) is greater than 15. See soluble salts; sodium adsorption ratio; deflocculation; saline-sodic soil; alkali soil.

sodium adsorption ratio (SAR) (natriumadsorpsieverhouding (NAV))

A relation between soluble sodium and soluble divalent cations which can be used to predict the exchangeable-sodium percentage of soil in equilibrium with that solution. It is defined as follows:

$$[\text{Na}]$$

$$\text{SAR} = \frac{\text{[Na]}}{([\text{Ca}] + [\text{Mg}])^{1/2}}$$

where [] = concentration of ions in mmol/dm³. It is a measure of the quality of a solution (saturation extract, irrigation water, etc.) as regards the Na content. Cf. adjusted SAR.

sodium feldspar (natriumveldspaat)

See feldspar group of minerals.

soft (consistence) (sag (konsistensie))

See soil consistence.

soft carbonate horizon (sagte karbonaathorison)

See diagnostic horizon.

soft plinthic B horizon (sagte plintiese B-horison)

See diagnostic horizon.

soil (grond)

- (1) The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.
- (2) The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including precipitation and temperature effects), macro- and microorganisms, and topography, all acting over a period of time and producing a product - soil - that differs from the material from which it is derived in many physical, chemical, biological and morphological properties and characteristics.
- (3) A kind of soil is the collection of soils that are alike in specified combinations of characteristics. Kinds of soil are given names in a system of soil classification. The terms "the soil" and "soil" are collective terms used for all soil, equivalent to the word "vegetation" for all plants.

soil aeration (grondbelugting)

The process by which air in the soil is replaced by air from the atmosphere. In a well-aerated soil, the soil air is very similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen than the atmosphere above the soil. The rate of aeration depends largely on the volume and continuity of airfilled pores within the soil.

soil aggregation (grondaggregasie)

The cementing or building together of several soil particles into a secondary unit or ped, aggregate or granule. Water-stable aggregates, which will not disintegrate easily, are of special importance to soil structure.

soil air (grondlug)

The soil atmosphere; the gaseous phase of the soil, being that volume not occupied by solid or liquid.

soil amendment (grondverbeteringsmiddel)

A substance used to alter the properties of soil for the purpose of making it more suitable for a particular purpose. Examples are lime and gypsum. The term fertilizer is preferable for those amendments which provide elements essential for plant growth. Syn. ameliorating agent; ameliorant; soil conditioner.

soil analysis (grondontleding)

The chemical, physical and mineralogical analysis of soil samples, frequently for the purpose of determining the plant available nutrients; analyses are usually conducted in laboratories, but quick-test kits are also used. Syn. soil test.

soil association (grondassosiasie)

A number of defined and named taxonomic soil units, regularly geographically associated in a defined pattern. It is the principal soil mapping unit of small-scale maps. See map (soil); map unit; catena; complex.

soil capacity (grondkapasiteit)

The specific volume of the soil profile per unit land area available for the provision of water (and inorganic nutrient elements) to the growing plant. For water it is given by:

$$C = \frac{\sum d_{w(i)} \times \rho_{b(i)} \times P_{m(i)} \times d_{g(i)}}{\rho_w \times 100}$$

where i	=	horizon number (1 to n)
d_{w(i)}	=	soil capacity of horizon i
ρ_b	=	soil bulk density
P_m	=	available water percentage (mass basis)
d_g	=	horizon thickness
ρ_w	=	density of water.

This concept was defined by W.J. Fölscher in 1970. Cf. profile available water capacity.

soil category (grondkategorie)

One of the ranks or levels in a system of classification. Each such rank (e.g. form, family) contains one or more classes. The classes in one category are defined at roughly the same level of abstraction.

soil chemistry (grondchemie)

A division of soil science concerned with the chemical constitution, properties and reactions of soils.

soil classification (grondklassifikasie)

Soil classification is the ordering of soils into a hierarchy of classes. The product is an arrangement or system of classification designed to express interrelationships of soils and to serve as a filing system. Broad groupings are made on the basis of general characteristics; subdivisions on the basis of more detailed differences in specific properties. (See also: natural classification; numerical classification; technical classification.) Various soil classification systems exist. The taxonomic system for South Africa, Soil Taxonomy (USA) and the international World Reference Base for Soil Resources are outlined below.

(1) Soil Classification - A Taxonomic System for South Africa (Soil Classification Working Group, 1991)

In essence the system is a very simple one which employs two main categories or levels of classes - an upper or general level containing SOIL FORMS, and a lower, more specific one containing SOIL FAMILIES. Each soil form is a class at the upper level, defined by a unique vertical sequence of diagnostic horizons and/or materials. Although some forms contain only one family, most are divided into a number of families which have in common the properties of the form (that is, the prescribed sequence of horizons and/or materials), but are differentiated within the form on the basis of other defined properties. The range of variation at the family level is thus narrower than at the form level.

To date 73 soil forms and 400 soil families have been defined. Full details are given in the reference cited above.

(2) Soil Taxonomy (USDA, 1975; Soil Survey Staff, 1994)

In this system the category at the highest level of generalization is the soil order. The lower categories of classification are : suborder, great group, subgroup, family and series.

The properties selected to distinguish the orders are reflections of the degree of horizon development and the kinds of horizons present. The eleven orders are briefly defined below:

Alfisols - Soils of temperate-region forests showing moderate effects of weathering and leaching, but strong eluviation and illuviation; well-developed A2 and B horizons; base saturation usually above 35% in the B horizon.

Andisols - Soils, usually dark, with andic soil properties resulting mainly from the presence of significant amounts of allophane, imogolite, ferrihydrite or aluminium-humus complexes. Included are weakly weathered soils with much volcanic glass. From Japanese *ando*, dark soil.

Aridisols - Soils of arid regions; insufficient water to produce enough organic matter for a thick O or Al horizon; bases are not leached and accumulate in the A horizon because evaporation is greater than leaching.

Entisols - Recent soils that show little evidence of the factors of soil formation; common in alluvial areas and on steep slopes.

Histosols - Dark soils rich in organic matter (histic epipedon), usually wet, but without andic properties.

Inceptisols - Recent soils of humid regions that show beginning evidence of soil formation; clay and bases have not moved to any extent; B horizons may be red coloured and calcium carbonate may have leached.

Mollisols - Soils of the subhumid to semi-arid grasslands with deep, dark, friable surface horizons; base saturation above 35%.

Oxisols - Deep red soils of the tropics showing maximum effects of weathering and leaching; high in iron oxides.

Spodosols - Highly leached, strongly acid, coarse-textured soils of the humid forests; aluminium and iron oxides and humus have moved into the B horizon.

Ultisols - Soils of subtropical forests showing effects of strong weathering, leaching, eluviation and illuviation; very similar to Alfisols except base saturation is 35% or less.

Vertisols - Soils high in expanding clay that form large cracks on drying; self-mixing.

(3) World Reference Base for Soil Resources (Spaargaren, 1994)

The 1974 FAO-Unesco soil classification for the Soil Map of the World has been replaced by the one described in the World Reference Base for Soil Resources (Spaargaren, 1994). Basically it remains a mono-categorical classification of soils, with

30 major soil groups having been defined. A number of the 1974 major soil groups are now obsolete - they are indicated as such in the following list.

Acrisols - Acrisols are soils having a B horizon with illuvial accumulation of clay and low base saturation. (Latin *acris*, very acid).

Alisols - Alisols are soils in which, through weathering of 2:1 clay minerals, large amounts of aluminium and magnesium are released, giving rise to strongly acid conditions. (Latin *alumen*, alum).

Andosols - Andosols are soils formed from materials rich in volcanic glass and commonly having a dark surface horizon. These soils are dominated by amorphous material and have low bulk densities. (Japanese: *an*, dark, *do*, soil).

Anthrosols - Anthrosols are soils which have been influenced by man, e.g. through cultivation, irrigation, etc. Also described as anthropogenic soils.

Arenosols - Arenosols are weakly developed coarse-textured soils, usually deep. (Latin *arena*, sand).

Calcisols - Calcisols are characterized by an accumulation of CaCO_3 in the solum; this is or has been the most dominant soil-forming process.

Cambisols - Cambisols are soils showing some changes in colour, structure and consistence due to pedogenesis, but are still in early stages of development. (*Vide* Inceptisols in USDA Soil Taxonomy). (Latin *cambiare*, change).

Chernozems - Chernozems are soils with a black melanic A horizon and free lime in the subsoil. (Russian *chern*, black).

Cryosols - Cryosols are developed in very cold climates and are characterized by an ice-cemented permafrost table within the solum.

Ferralsols - Ferralsols are soils with a high content of sesquioxides.

Fluvisols - Fluvisols are soils developed from recent alluvial deposits and having no diagnostic subsurface horizons. (Latin *fluvius*, river).

Gleysols - Gleysols are soils with gley horizons, i.e. excessively wet soils.

Glossisols - Glossisols are soils with an ochric surface horizon and an argic horizon whose upper boundary is irregular because of tongue-like penetrations of a lighter and coarser eluvic horizon. (Greek *glossa*, tongue).

Greyzems (obsolete - 1974) - Greyzems are soils which have grey colours due to a blending of dark-coloured organic matter and white silica powder.

Gypsisols - Gypsisols contain a gypsic horizon (horizon containing secondary gypsum, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) at the soil surface or at some depth.

Histosols (obsolete - 1974) - Histosols are soils which are very high in fresh or decomposed organic matter, e.g. peat or muck soils. (Greek *histos*, tissues).

Kastanozems - Kastanozems have a dark brown or dark grey A horizon rich in organic matter and bases (melanic A) and free lime in the subsoil. (Latin *castaneo*, chestnut).

Leptosols - Leptosols are shallow, stony or very stony soils overlying rock, partially altered rock or strongly calcareous materials.

Lithosols (obsolete - 1974) - Lithosols are shallow stony soils, i.e. soils with hard rock at shallow depth.

Lixisols - Lixisols are characterized by a clay accumulation in the B horizon in combination with the occurrence of low activity clays and a moderate to high base saturation. (Latin *lix*, lye).

Luvisols - Luvisols are soils with a prominent illuvial accumulation of clay in the subsoil and moderate to high base status. It does not have a natric horizon and the subsoil is not saline.

Nitisols - Nitisols are red soils showing clay movement within the profile but with diffuse horizon boundaries. They have favourable physical properties and often high fertility. Usually developed from basic igneous rocks. (Compare with the rhodic concept in the USDA Soil Taxonomy).

Nitosols - Nitosols are characterized by the presence of a nitic horizon (see diagnostic horizon). Otherwise comparable with the earlier Nitosol.

Phaeozems - Phaeozems are soils with melanic A horizons (mollic epipedons but no free lime in the subsoil).

Planosols - Planosols are soils having a bleached horizon (E horizon) abruptly overlaying a B horizon having prominent clay illuviation and signs of wetness in the subsoil. They generally develop in level or depressed topography with poor drainage. (Latin *planus*, flat).

Podzols - Podzols are soils with a strongly bleached horizon over a red brown B horizon formed from illuviation of humus and iron oxides.

Podzoluvisols (obsolete - 1974) - Podzoluvisols are soils with a bleached horizon (E or albic horizon) overlying a B horizon showing prominent illuvial accumulation of clay.

Rankers (obsolete - 1974) - Rankers are shallow soils developed from siliceous material. (Austrian *rank*, steep slope).

Regosols - Regosols are soils with weak or no development, i.e. non-alluvial unconsolidated materials with no diagnostic sub-surface horizons. (Greek *rhegos*, blanket; connotative of loose material overlying the hard core of the earth).

Rendzinas (obsolete - 1974) - Rendzinas are soils with a thin mollic A horizon (melanic A) over calcareous material. (Polish *rzędzić*, noise; connotative of noise made by plough over shallow stony soil).

Sesquisols - Sesquisols are soils affected by groundwater and in which iron has been segregated to such an extent that a mottled layer which has been formed hardens irreversibly when exposed to the air and sunshine. Included are soils that have such a layer at shallow depth.

Solonchaks - Solonchaks are soils having high salinity and no well-developed subsurface horizons.

Solonetz - Solonetz are soils having natric B horizons, i.e. B horizons rich in sodium and/or magnesium and having prismatic structure.

Stagnosols - Stagnosols are soils with a perched water table showing features of oxidation and reduction caused by surface water. (Latin *stagnare*, to flood).

Termosols - Termosols are desert soils with a weakly developed A horizon and a moderately saline and/or alkaline subsoil.

Umbrisols - Umbrisols are relatively deep soils having a well-developed, dark-coloured, organic-rich, acid surface horizon. (Latin *umbra*, shade).

Vertisols - Vertisols have clayey topsoils, rich in swelling clays, which crack when dry.

Yermosols (obsolete - 1974) - Soils occurring under an aridic moisture regime.

Xerosols (obsolete - 1974) - Xerosols are semi-desert soils with a moderately saline and/or alkaline subsoil. (Greek *xeros*, dry).

soil colloid (grondkolloïed)

Soil organic and inorganic particles with very small particle size (10^{-6} to 10^{-9} m, or 1 to 10^{-3} μm) and a correspondingly large surface area per unit of mass. Clay (< 2 μm) is sometimes classed as a colloid, although this is not strictly correct. The upper size limit of a colloid is sometimes taken as 0,5 μm or even 0,1 μm . Most colloidal particles are too small to be seen with the ordinary compound microscope. Soil colloids do not go into true solution as sugar or salt do, but they may be dispersed into a relatively stable suspension and thus be carried in moving water. By treatment with salts and other chemicals, colloids may be flocculated, or aggregated, into small crumbs or granules that settle out of water. Many inorganic soil colloids are really tiny crystals and the minerals can be identified with X-rays and in other ways.

soil colour (grondkleur)

The description of soil colour has been standardized through the use of Munsell notations. Accordingly colour is given in terms of a verbal description (e.g. yellowish brown) and a notation (e.g. 10YR5/4), the latter being compounded from notations for hue (10YR) value (5) and chroma (4). Hue refers to the dominant spectral colour which is related to the dominant wavelength of the light. Value refers to the relative lightness of colour and is a function of the total amount of light. Chroma is the relative purity or strength of the spectral colour and increases with decreasing greyness. Colour usually varies with the water content of the soil. The water status (dry or moist) must always accompany colour description and the moist colour at least must always be given. A mottled or variegated pattern of colours is common in certain soil horizons due to, *inter alia* hydromorphy, illuviation, biological activity, and rock weathering in freely drained conditions (i.e. saprolite). It is described by noting (i) the colour of the matrix and

colour or colours of the principal mottles, and (ii) the pattern of the mottling. The latter is given in terms of abundance (few, common (2 to 20% of the exposed surface), or many), size (fine, medium (5 to 15 mm in diameter along the greatest dimension), or coarse), contrast (faint, distinct or prominent), form (circular, elongated-vesicular, or streaky) and the nature of the boundaries of the mottles (sharp, clear or diffuse); of these, abundance, size and contrast are most important.

soil compaction (grondverdigting)

The process of bringing soils to a dense state (increasing its bulk density) by blows, vehicle passage or some other type of loading.

soil complex (grondkompleks)

A map unit used in soil surveys for two or more defined taxonomic units which are so intimately mixed geographically that it is undesirable or impractical, because of the scale being used, to separate them. See association, soil.

soil conditioner (grondverbeteringsmiddel)

- (1) A soil amendment, particularly one that promotes aggregation. Usually refers to the synthetic polymers used for this purpose, e.g. Krilium, PVA, VAMA, HPAN, etc.
- (2) Any material added to a soil for the purpose of improving its physical condition. Syn. soil amendment.

soil conservation (grondbewaring)

- (1) The protection of the soil against physical loss by erosion or against chemical or physical deterioration; that is, excessive loss of soil fertility by either natural or artificial means.
- (2) A combination of all management and land use methods which safeguard the soil against depletion or deterioration by natural or by man-induced factors.

soil consistence (grondkonsistensie)

The degree of cohesion or adhesion within the soil mass or its resistance to deformation or rupture. The following soil consistence descriptions are used for the indicated soil wetness regimes:

<i>dry</i>	-	loose; soft; slightly hard; hard or very hard
<i>moist</i>	-	friable; slightly firm; firm or very firm
<i>wet</i>	-	(both in terms of stickiness and plasticity) non-sticky; slightly sticky; sticky or very sticky; non-plastic; slightly plastic; plastic or very plastic.

soil consociation (grondkonsosiasie)

A soil map unit indicating an area that is occupied by a single taxonomic unit only.

soil core (grondkern)

An undisturbed soil sample contained in or obtained by way of a cylindrical soil sampling tube, usually consisting of an outer tube encasing segmented, removable inner cylinders.

soil correlation (grondkorrelasie)

The process of defining, mapping, naming and classifying the kinds of soils in a specific soil survey area, the purpose being to insure that soils are adequately defined, accurately mapped and uniformly named in all soil surveys made in a particular country. It is also concerned with the standards and techniques for describing soils and with the application and development of soil classification.

soil creep (grondkruip)

The slow mass movement of soil and soil material down relatively steep slopes primarily under the influence of gravity, but facilitated by saturation with water and by alternate freezing and thawing.

soil crust (grondkors)

A thin surface layer on soil, ranging in thickness from less than one millimetre up to about 25 mm, which is hard and brittle when dry and much more compact than the material immediately beneath it. Cf. modulus of rupture; soil sealing. Various types of crusts may develop:

drying crust (drogingskors)

A desiccated surface layer in which particle sorting or the development of microhorizons has not occurred.

structural crust (struktuurkors)

A dense surface crust with identifiable microhorizons; a coarse sand layer is present above a washed-in layer of finer particles.

depositional crust (afsettingskors)

A crust developed by deposition in running water. It is often observed in furrows and is characterized by the sorting of particles into lamellae.

sedimentation crust (sedimentasiekors)

A crust formed by the sedimentation of particles in stationary water. It is characterized by a layer of fine particles on the surface and often curls up upon drying.

erosion crust (erosiekors)

A crust developed from a structural crust through the removal of the coarser surface layer by water or wind, thus exposing the washed-in layer on the surface.

pavement crust (plaveiselkors)

A crust formed through the continuous loss of finer particles by erosion, thus resulting in a surface layer of gravel and cobbles. Occurs mainly in arid and semi-arids region.

biological crust (biologiese kors)

A surface organic crust usually developed upon repeated (more or less daily) surface-applied irrigation. It consists of a dense mat of algae and fungi, sometimes mosses.

soil degradation (gronddegradasie; grondagteruitgang)

The physical, chemical or biological deterioration of soil. Soil erosion, soil salinization and loss of biological life, respectively, are examples.

soil depth (gronddiepte)

The thickness of the solum. Cf. effective soil depth.

soil dynamics (gronddinamika)

The study of the behaviour of soils subjected to dynamic loading conditions. It is related to the design of foundations, lateral earth pressure on structures, soil liquefaction and bearing capacity of shallow foundations.

soil erosion (gronderosie)

See erosion.

soil extract (grondekstrak)

The solution separated from a soil suspension or from a soil by filtration, centrifugation, suction or pressure.

soil family (grondfamilie)

An intermediate category in a soil classification system. See soil classification.

soil fertility (grondvrugbaarheid)

The condition of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants, when other growth factors, such as light, water, temperature and physical condition of soil, are favourable.

soil filtration (grondfiltrasie)

The removal of dissolved or suspended substances (e.g. chemicals, oils, etc.) from a liquid percolating through the soil.

soil form (grondvorm)

See soil classification.

soil-forming factors (grondvormingsfaktore)

The variables that are active in and responsible for the processes involved in the formation of soil. The factors are parent material, climate, the biotic factor, topography and time.

soil genesis (grondgenese)

- (1) The mode of origin of the soil with special reference to the processes and soil-forming factors responsible for the development of the solum or true soil from the unconsolidated parent material.
- (2) That branch of pedology concerned with the origin of soils.

soil geography (grondgeografie)

A subspecialization in physical geography concerned with the areal distribution of soil types.

soil horizon (grondhorison)

A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical and biological properties or characteristics such as colour, structure, texture, consistence, kinds and numbers of organisms present, degree of acidity or alkalinity, etc. Cf. diagnostic horizon.

The following generalized diagram and table lists the designations and properties of the major soil horizons. Very few if any soils have all of these horizons well developed, but every soil has some of them.

O1	Loose leaves and organic debris, largely undecomposed
O2	Organic debris, partially decomposed or matted
A1	Dark coloured due to admixture of humified organic matter with the mineral fraction
A2 or E	Light coloured mineral horizon
A3	Transitional to B but more like A than B
B1	Transitional to A but more like B than A
B2	Maximum expression of B horizon character
B3	Transitional to C
C	Unconsolidated material
R	Hard rock

**Horizon
designation**

Description

- O** Organic horizons of mineral soils. Horizons: (i) formed or forming in the upper part of mineral soils above the mineral part; (ii) dominated by fresh or partly decomposed organic material.
- O1** Organic horizons in which essentially the original form of most vegetative matter is visible to the naked eye. The O1 corresponds to the L (litter) and some F (fermentation) layers in forest soils designations and to the horizon formerly called A_{oo}.
- O2** Organic horizons in which the original form of most plant or animal matter cannot be recognized with the naked eye. The O2 corresponds to the H (humus) and some F (fermentation) layers in forest soils designations and to the horizon formerly called A_o.
- A** Mineral horizons consisting of : (i) horizons of organic-matter accumulation formed or forming at or adjacent to the surface; (ii) horizons that have lost clay, iron or aluminium with resultant concentration of quartz or other resistant minerals of sand or silt size; or (iii) horizons dominated by (i) or (ii) above but transitional to underlying B or C.
- A1** Mineral horizons, formed or forming at or adjacent to the surface, in which the feature emphasized is an accumulation of humified organic matter intimately associated with the mineral fraction.
- A2 or E** Mineral horizons in which the feature emphasized is loss of clay, iron or aluminium, with resultant concentration of quartz or other resistant minerals in sand and silt sizes.

- A3** A transitional horizon between A and B and dominated by properties characteristic of an overlying A1 or A2 but having some subordinate properties of an underlying B.
- AB** A horizon transitional between A and B having an upper part dominated by properties of A and a lower part dominated by properties of B, and the two parts cannot be conveniently separated into A3 and B1.
- A & B** Horizons that would qualify for A2 except for included parts constituting 50% of the volume that would qualify as B.
- AC** A horizon transitional between A and C, having subordinate properties of both A and C, but not dominated by properties characteristic of either A or C.
- B & A** Any horizon qualifying as B in more than 50% of its volume, including parts that qualify as A2.
- B** Horizons in which the dominant feature or features is one or more of the following: (i) an illuvial concentration of silicate clay, iron, aluminium or humus, alone or in combination; (ii) a residual concentration of sesquioxides or silicate clays, alone or mixed, that has formed by means other than solution and removal of carbonates or more soluble salts; (iii) coatings of sesquioxides adequate to give conspicuously darker, stronger or redder colours than overlying and underlying horizons in the same sequum but without apparent illuviation of iron and not genetically related to B horizons that meet requirements of (i) or (ii) in the same sequum; or (iv) an alteration of material from its original condition in sequums lacking conditions defined in (i), (ii), and (iii) that obliterates original rock structure, that forms silicate clays, liberates oxides, or both, and that forms granular, blocky, or prismatic structure if textures are such that volume changes accompany changes in water content.
- B1** A transitional horizon between B and A1 or between B and A2 in which the horizon is dominated by properties of an underlying B2 but has some subordinate properties of an overlying A1 or A2.
- B2** That part of the B horizon where the properties on which the B is based are clearly expressed, without subordinate characteristics indicating that the horizon is transitional to an adjacent overlying A or an adjacent underlying C or R.
- B3** A transitional horizon between B and C or R in which the properties diagnostic of an overlying B2 are clearly expressed but are associated with clearly expressed properties characteristic of C or R.
- C** A mineral horizon or layer, excluding bedrock, that is either like or unlike the material from which the solum is presumed to have formed, relatively little affected by pedogenic processes and lacking properties diagnostic of A or B but including materials modified by: (i) weathering outside the zone of

major biological activity; (ii) reversible cementation, development of brittleness, development of high bulk density and other properties characteristic of fragipans; (iii) gleying; (iv) accumulation of calcium or magnesium carbonate or more soluble salts; (v) cementation by accumulations such as calcium or magnesium carbonate or more soluble salts; or (vi) cementation by alkali-soluble siliceous material or by iron and silica.

R Underlying consolidated bedrock, such as granite, sandstone or limestone. If presumed to be like the parent rock from which the adjacent overlying layer or horizon was formed, the symbol R is used alone. If presumed to be unlike the overlying material, the R is preceded by a Roman numeral denoting lithologic discontinuity.

soil identification (grondidentifikasie)

It is the assigning of a soil profile to a particular class in a classification system.

soil individual (grondindiwidu)

See polypedon.

soil landscape (grondlandskap)

It is the soil component of the landscape. Cf. land.

soil management (grondbestuur)

The sum total of all tillage operations, cropping practices, fertilizer, lime and other treatments conducted on, or applied to, a soil for the production of plants.

soil management group (grondgebruiksgroep)

Groups of taxonomic soil units with similar adaptations or management requirements for one or more specific purposes, such as adapted crops or crop rotations, drainage practices, fertilization, forestry, highway engineering, etc.

soil map (grondkaart)

A map showing the geographic distribution of soil types or other soil mapping units in relation to the prominent physical and cultural features of the earth's surface. The following kinds of soil maps are recognized:

soil map, detailed - A soil map on which the boundaries are shown between all soil types that are significant to potential use as field-management systems. The scale of the map will depend upon the purpose to be served, the intensity of land use, the pattern of soils and the scale of the other cartographic materials available. Traverses are usually made at 400 m, or more frequent, intervals. Commonly a scale of 1:15 000 or larger is now used for field mapping in South Africa.

soil map, detailed reconnaissance - A reconnaissance map on which some areas or features are shown in greater detail than usual, or than others.

soil map, generalized - A small-scale map which shows the general distribution of soils within a large area and thus in less detail than on a detailed soil map. Generalized soil

maps may vary from soil association maps on a scale of 1:50 000 to maps of larger regions showing associations dominated by one or more soil types (forms).

soil map, reconnaissance - A map showing the distribution of soils over an area as determined by traversing the area at varying intervals. The units shown are soil associations. Such a map is usually made only for exploratory purposes to outline areas of soil suitable for more intensive development. The scale is usually much smaller than for detailed soil maps and may be 1:250 000 or smaller.

soil map, schematic - A soil map compiled from scant knowledge of the soils of new and undeveloped regions by the application of available information about the soil-forming factors of the area. Usually on a small scale (1:1 000 000 or smaller).

soil map unit (grondkaartenheid)

A description that defines the soil component of land, identified by a symbol and a boundary on a map. When a soil class (e.g. a family or a form) is used to make such a description, the procedure is soil mapping, not soil classification. Soil classification or identification is the placing of soils in soil classes. A soil class contains only soils of that class, whereas a soil map unit seldom, if ever, refers to land that contains soils belonging only in one soil class. See soil association; soil complex; soil consociation.

soil mapping (grondkartering)

It is the delineation of areas on a map, each described in terms of a soil class (or classes) of a classification system, for the purpose of showing the geographic distribution of soils in relation to other prominent physical and cultural features of the earth's surface.

soil material (grondmateriaal)

- (1) Soil or portions of soil that have been displaced or mixed by either natural or mechanical means.
- (2) Unconsolidated and more or less chemically weathered mineral matter from which soils are developed by pedogenic processes.

soil mechanics (grondmeganika)

The science concerned with the effect of forces on the soil and the application of engineering principles to problems involving the soil.

soil microbiology (grondmikrobiologie)

A subspecialization of soil science concerned with soil-inhabiting microorganisms and their functions and activities.

soil micromorphology (grondmikromorfologie)

The microscopic study of the morphology of soils; in thin sections it reveals the microstructure, shape of the voids, coating films, and distribution of the mineral and organic constituents. See micromorphology.

soil mineral (grondmineraal)

Any mineral that occurs as a part of or in the soil. A natural inorganic compound with definite physical, chemical and crystalline properties (within the limits of isomorphism), that occurs in the soil. Cf. clay mineral.

soil mineralogy (grondmineralogie)

The branch of soil science concerned with the minerals found in the earth's crust to the depth of weathering or of sedimentation.

soil moisture (obsolete) (grondwater (verouderd))

See soil water.

soil monolith (grondmonoliet)

A mounted vertical soil section, taken to illustrate a soil profile.

soil morphology (grondmorfologie)

- (1) The physical constitution, particularly the structural properties of a soil profile as exhibited by the kinds, thickness and arrangement of the horizons in the profile and by the texture, structure, colour, consistence and porosity of each horizon.
- (2) The structural characteristics of the soil or any of its parts.
- (3) That branch of soil science concerned with the soil properties mentioned in (1).

soil organic matter (grondorganiese materiaal)

See organic matter.

soil particle (gronddeeltjie)

A discrete portion of the soil less than 2 mm in effective diameter, which can only be broken into smaller units by application of severe mechanical force as in crushing or grinding; may be of primary origin (mineral or rock fragments) or of secondary origin (clay minerals, concretions, etc.). Syn. grain.

soil pH (grond-pH)

Soil pH is the degree of acidity of a soil as determined by means of a glass or other suitable electrode or indicator at a specified soil to suspension medium ratio or specified soil water content, expressed in terms of the pH scale. Suspension media commonly used are distilled water, 1 M KCl and 0,01 M CaCl₂. The suspension medium should be specified when reporting pH measurements. Descriptive terms commonly associated with certain ranges in soil pH measured in distilled water are:

extremely acid	:	< 4,5
very strongly acid	:	4,5 - 5,0
strongly acid	:	5,1 - 5,5
medium acid	:	5,6 - 6,0
slightly acid	:	6,1 - 6,5
neutral	:	6,6 - 7,3
mildly alkaline	:	7,4 - 7,8
moderately alkaline	:	7,9 - 8,4
strongly alkaline	:	8,5 - 9,0
very strongly alkaline	:	> 9,0

Syn. soil reaction. Cf. pH.

soil phase (grondfase)

A division of a soil series or other unit of classification having characteristics that affect the use or management of the soil but which do not vary sufficiently to differentiate it as a separate series. A variation in a property or characteristic such as textural class, degree of slope, degree of erosion, salt content, content of stones, etc.

soil physics (grondfisika)

The branch of soil science concerned with the state and movement of matter and with the fluxes and transformations of energy in the soil, i.e. it deals with the physical properties of soils, such as texture, structure, colour, temperature, soil water relationships, etc.

soil pollution (grondbesoedeling)

The addition of harmful or objectionable material to soil in concentrations or in sufficient quantities to adversely affect its usefulness or quality.

soil population (grondpopulasie (-bevolking))

- (1) All the organisms living in the soil, including plants and animals.
- (2) Members of the same taxa.
- (3) Delineations of the same map unit - a grouping of like things in a statistical sense.

soil pore (grondporie)

A particular volume, usually bounded by irregularly-shaped surfaces of particles, of the pore space of a soil. The pore space is that portion of the total soil volume occupied by air and water.

soil profile (grondprofiel)

A vertical section of the soil through all its horizons and extending to the underlying material. Cf. soil horizon.

soil reaction (grondreaksie)

See soil pH.

soil resilience (grondherstelvermoë)

The ability of a soil to approach its original state following utilization thereof and which resulted in loss of productivity due to chemical, physical and/or biological degradation.

soil respiration (grondrespirasie)

The consumption of oxygen and production of carbon dioxide by soil organisms, including plant roots.

soil salinity (soutinhoud van grond)

The amount of soluble salts in a soil, expressed in terms of conductivity of the saturation extract, percentage, mg/kg or other convenient units.

soilscape (grondlandskap)

- (1) See soil landscape.
- (2) The term "soilscape" is a contraction of the term "soil landscape", and analogous to "townscape" of architects.

soil science (grondkunde)

The science that deals with soils as natural phenomena, including their morphological, physical, chemical, mineralogical and biological properties, their genesis, their classification, their geographical distribution, their fertility and their management for the production of plants important to man.

soil sealing (grondverseëling)

The process whereby clods and aggregates (peds) on the soil surface are broken up by physical and chemical dispersive forces, particularly falling waterdrops. The detached material fills interaggregate pores thus forming a dense layer. Particle sorting occurs during the process sometimes resulting in a thin "skin" at the surface and a "washed-in" layer of finer particles immediately below the skin. Upon drying a soil crust is formed. Cf. soil crust.

soil separate (deeltjiegroottefraksie)

Mineral particles < 2,0 mm in diameter, ranging between specified limits. Syn. soil particle size class. Cf. soil texture.

The names and size limits used in South Africa are:

very coarse sand	-	2,0 to 1,0 mm
coarse sand	-	1,0 to 0,5 mm
medium sand	-	0,5 to 0,25 mm
fine sand	-	0,25 to 0,1 mm
very fine sand	-	0,1 to 0,05 mm
coarse silt	-	0,05 to 0,02 mm
fine silt	-	0,02 to 0,002 mm
clay	-	< 0,002 mm.

The USDA size limits differ only in that a single silt size class is defined, viz. 0,05 to 0,002 mm.

International Society of Soil Science equivalents are:

coarse sand	-	2,0 to 0,2 mm
fine sand	-	0,2 to 0,02 mm
silt	-	0,02 to 0,002 mm
clay	-	< 0,002 mm

British Standards (BS 1377:1967 for civil engineering) equivalents are:

coarse sand	-	2,0 to 0,6 mm
medium sand	-	0,6 to 0,2 mm
fine sand	-	0,2 to 0,06 mm
coarse silt	-	0,06 to 0,02 mm
medium silt	-	0,02 to 0,006 mm
fine silt	-	0,006 to 0,002 mm
clay	-	< 0,002 mm

soil series (grondserie)

The basic unit of soil classification, being a subdivision of a soil family and consisting of soils which are essentially alike in all major profile characteristics. It is the lowest category in a formal classification system.

soil solarisation (grondsolarisasie)

Exposing soil to the rays of the sun; covering the soil with a plastic sheet thereby heating it and thus killing certain micro-organisms, especially pathogens in the soil.

soil solution (grondoplossing)

The aqueous liquid phase of the soil and its solutes in equilibrium with the solid phase.

soil stabilization (grondstabilisering)

Chemical or mechanical treatment designed to increase or maintain the stability of a soil mass or otherwise to improve its engineering properties, such as by increasing its shear strength, reducing its compressibility or decreasing its tendency to absorb water. Stabilization methods include physical compaction and treatment with cement, lime or bitumen.

soil strength (grondsterkte)

A general term referring to the ability of a soil to resist deformation by applied forces, which could be any one of several types (e.g. shearing and compression) or combinations of these, as in penetrometer tests. This term should not be used when specific strength tests are implied as in the case of shear strength, modulus of rupture, penetrometer values, etc.

soil structure (grondstructuur)

The combination or arrangement of primary soil particles into secondary units or peds. These secondary units may be, but usually are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The secondary units are characterized and classified on the basis of size, shape and degree of distinctness into classes, types and grades, respectively. See table on the next page. Four terms, referred to as soil structure grades, describe distinctness or degree of aggregation. These are : (i) structureless, with no observable aggregation and no orderly arrangement of natural lines of weakness as in a sand (massive if coherent, single grain if non-coherent); (ii) weak, where peds are indistinct and poorly formed, being barely observable *in situ*; (iii) moderate, where peds are well formed and durable, but not distinctly separate from one another in undisturbed soil; (iv) strong, where peds are well formed and durable and distinctly separate from one another in undisturbed soil. The term apedal is often used in general to denote materials that are well aggregated in a microstructure so that well formed peds cannot be detected macroscopically. Cf. pedal.

soil structure classes (grondstructuurklasse)

A grouping of soil structural units or peds on the basis of size. See soil structure; soil structure types; table on the next page.

soil structure grades (grondstructuurgrade)

See soil structure.

soil structure types (grondstructuurtypes)

A classification of soil structure based on the shape of the aggregates or peds and their arrangement in the profile. Generally the shape of soil structure types is referred to as either platy, prismatic, columnar, blocky, granular or crumb. Cf. soil structure; table on the previous page.

soil subsidence (grondversakking)

A local mass movement that involves principally the gradual downward settling or sinking of the soil with little or no horizontal movement. Cf. subsidence.

soil suction (gronduiging)

See soil water : matric suction.

soil survey (grondopname)

The systematic examination, description, classification and mapping of soils in an area for a specific purpose. Soil surveys are classified according to the purpose of, kind and intensity of field examination. The soil survey consists of four parts:

- (a) The selection of sites for, and preparation of, soil pits;**
- (b) the description of the soil profile and identification of the soil form and/or series;**
- (c) the selection of samples for the determination of the physical and chemical properties of the profile; and**
- (d) the mapping of the soils. Cf. reconnaissance survey; soil classification; soil map.**

soil taxonomy (grondtaksonomie)

The theory and practice of classifying soils. The main taxonomic units in the RSA are, in order of increasing rank, series, family and form. Cf. soil classification.

soil temperature (grondtemperatuur)

The temperature of soil with indication of depth of measurement and type of measuring device used. Can be reported as a daily maximum, minimum, range, or mean; or as weekly, monthly or annual means; or as a continuous function of time.

Definitions of soil temperature regimes according to Soil Survey Staff (1994) are:

cryic (kriogenies)

A soil temperature regime that has mean annual soil temperatures of more than 0°C, but less than 8°C, more than 5°C difference between mean summer and mean winter soil temperatures at 50 cm, and cold summer temperatures.

hyperthermic (hipertermies)

A soil temperature regime that has mean annual soil temperatures of 22°C or more and more than 5°C difference between mean summer and mean winter soil temperatures at 50 cm. Isohyperthermic is the same, except that summer and winter temperatures differ by less than 5°C.

mesic (mesies)

A soil temperature regime that has mean annual soil temperatures of 8°C or more, but less than 15°C, and more than 5°C difference between mean summer and mean winter soil temperatures at 50 cm. Isomesic is the same, except the summer and winter temperatures differ by less than 5°C.

pergelic (vriesend)

A soil temperature regime that has mean annual soil temperatures of less than 0°C. Permafrost is present.

thermic (termies)

A soil temperature regime that has mean annual soil temperatures of 15°C or more, but less than 22°C, and more than 5°C difference between mean summer and mean winter soil temperatures at 50 cm. Isothermic is the same, except the summer and winter temperature differ by less than 5°C.

soil test (grondontleding; grondtoets)

See soil analysis.

soil texture (grondtekstuur)

The relative proportions of the various separates in the soil as described by the classes of soil texture shown in the soil texture and sand grade diagrams on the next page. Cf. soil separate.

soil tilth (grondgesteldheid)

The physical condition of soil as related to its ease of tillage, suitability as a seedbed, and its impedance to seedling emergence and root penetration.

soil tongues (grondtonge)

Penetrations of material of an overlying horizon into the horizon beneath it. The horizontal dimensions of a penetration (usually wider than 5 mm) are always smaller than the vertical.

soil type (grondtipe)

Formerly a subdivision of a soil series based on differences in the texture of the A horizon.

soil variant (grondvariant)

A kind of soil whose properties are believed to be sufficiently different from recognized series to justify a new series name, but of such limited extent that creation of a new series is not justified.

soil water (grondwater)

Water occurring in the solum.

INTRODUCTORY NOTES:

1. Where relevant the definitions approved by Commission I (Soil Physics) of the International Society of Soil Science are given (Bulletin of the ISSS, No 49, 25-36, 1976).
2. In most cases the term "soil", when used as a pronoun, has been omitted (e.g. "water content" instead of "soil water content").
3. The term "moisture" and all related terms in which it appears (e.g. "moisture content", "moisture potential", etc.) are regarded as obsolete. The term "water", referring to the chemical constituent H₂O, is preferred. Moisture refers to a liquid phase in general and would include aqueous solutions and liquids other than water. Thus the "water content" of a soil unambiguously refers to its content of H₂O, whereas "moisture content" could imply content of aqueous solution (including salts) and other liquid(s).
4. Water in soil is subject to several force fields originating from: the presence of the soil solid phase; the dissolved salts; the action of external gas pressure; and, the gravitational field. These effects may be quantitatively expressed by assigning an individual component potential to each. The sum of these potentials is designated the total potential of soil water and may be identified with the partial specific Gibbs free energy of the soil water relative to free pure water at the same temperature.
5. A number of terms relating to soil water are summarized in Tables A and B. The symbols given for the terms defined are those most commonly employed and which are preferred.

TABLE A: Summary of terms relating to the occurrence of water in soil

Term	Symbol	Unit(s)	Synonym(s) and derived terms
1. Water content (mass basis)	Θ_m	(kg/kg)	Gravimetric water content Wetness Dry mass fraction of water Water percentage ($\Theta_m \times 100$)
2. Water content (volume basis)	Θ_v	(m ³ /m ³)	Volumetric water content Volume fraction of water (or liquid) Volumetric water percentage ($\Theta_v \times 100$)
3. Water mass fraction	W_w	(kg/kg)	Water content on wet basis Water percentage on wet basis ($W_w \times 100$)
4. Saturation water content	Θ_{ms} or Θ_{vs}	(kg/kg) or (m ³ /m ³)	Water holding capacity Saturation percentage ($\Theta_{ms} \times 100$) or ($\Theta_{vs} \times 100$)
5. Degree of saturation	Θ_s	$\frac{\text{m}^3(\text{water})}{\text{m}^3(\text{pore space})}$	Relative saturation
6. Liquid ratio	γ	$\frac{\text{m}^3(\text{water})}{\text{m}^3(\text{solid space})}$	
7. Field capacity	FC	% or a ratio	Field water capacity
8. Differential water capacity	C_w or C_Θ	Pa ⁻¹ or J ⁻¹ kg or m ⁻¹	Specific water capacity

available water (beskikbare water)

The portion of water in a soil that can be absorbed by plant roots. Previously considered by many as the amount of water released by the soil when the equilibrium soil water matric potential is decreased from about -10 kPa or -33 kPa (field capacity) to about -1500 kPa (permanent wilting point). Cf. total available water capacity; profile available water capacity (PAWC); wilting point.

capillary conductivity (obsolete) (kapillêre geleivermoê (verouderd))

See hydraulic conductivity; unsaturated conductivity.

capillary potential (obsolete) (kapillêre potensiaal (verouderd))

See matric potential.

capillary pressure (obsolete) (kapillêre druk (verouderd))

See matric pressure.

characteristic curve (retensiekromme)

See retentivity curve.

TABLE B: Summary of terms relating to the state of water in soil

SPECIFIC WATER POTENTIAL (Energy/mass; J/kg)	SYM-BOL	ALTERNATIVE EXPRESSIONS OF POTENTIAL			
		Volumetric Water potential (Energy/volume; J/m ³ or Pa) (Pressure equiv.)	Sym-bol	Weight water potential (energy/weight; J/N or m) (Head equiv.)	Sym-bol
1. Total potential ($\psi_T = \psi_g + \psi_p + \psi_o$)	ψ_T	Total pressure (Obsolete: total stress/tension/suction)	P_T	Total head	H_T
2. Gravitational potential	ψ_g			Gravitational head	h_g
3. Pressure potential (Hydrostatic pressure potential Rigid matrix: $\psi_p = \psi_m + \psi_p^a$)	ψ_p	Pressure; hydrostatic pressure; tensiometer-pressure	p	Pressure head	h_p
4. Matric potential (Rigid matrix: $\psi_m = \psi_p^w$ Swelling soils: $\psi_m = \psi_p^w + \psi_p^s$)	ψ_m	Matric pressure (Obsolete: matric suction; capillary pressure; negative pressure; soil suction; soil water stress/tension/suction. Impermissible: soil water pressure)	P_m	Matric pressure head	h_m
5. Osmotic potential	ψ_o	Osmotic pressure	π	Osmotic pressure head	h_o
6. Pneumatic potential (Gas (phase) pressure potential)	ψ_p^a	Pneumatic pressure (Gas (phase) pressure)	P_a		
7. Envelope-pressure potential (overburden potential)	ψ_p^e	Envelope pressure (overburden pressure)	P_e		
8. Unloaded matric-potential (Wetness potential)	ψ_p^w	Unloaded matric pressure (Wetness pressure)	p^w		
9. Hydraulic potential ($\psi_w = \psi_p + \psi_g$)	ψ_H	Hydraulic pressure ($P_H = p + \rho_w g z$)	P_H	Hydraulic head ($H = h_p + h_g$)	H
10. Water potential (Chemical potential) ($\psi_w = \psi_p + \psi_o$)	ψ_w	Water stress/-tension/suction (In Plant Physiology: total suction; total water stress; diffusion pressure deficit)	P_w		

coefficient of permeability (obsolete) (permeabiliteitskoëffisiënt (verouderd))
See hydraulic conductivity; intrinsic permeability.

cumulative infiltration (kumulatiewe infiltrasie)

The time integral of the infiltration rate, or the total amount of water that has entered a soil in a given time under specified conditions. Also see infiltration; infiltration rate.

darcy (darcy)

An obsolete unit of intrinsic permeability (in metres squared) such that 1 darcy will lead to a specific discharge of 0,01 m/s for a fluid with a viscosity of 0,01 pascal-second (Pa s) under a hydraulic gradient of 1033 (pressure head of one atmosphere/cm). One darcy is approximately equal to 10^{-12} m². Cf. intrinsic permeability.

Darcy's law (Darcy se wet)

A law describing the rate of flow of water through porous media, named after Henry Darcy of France who formulated it in 1856 from extensive work on the flow of water through sand filter beds. In general terms it states that the rate of viscous flow of homogeneous fluids through isotropic porous media is proportional to, and in the direction of, the driving force. Specifically it may be formulated as follows:

(i) In one dimension: $q = V/At = -K\Delta H/L$ in which

q = water volume flux density

V = volume of water

A = cross-sectional area

t = time for volume V of water to flow through the soil

K = hydraulic conductivity

ΔH = hydraulic head difference over length L

$\Delta H/L$ = hydraulic gradient

(Note: The direction of flow is that of the driving force ($-\Delta H/L$))

(ii) In three dimensions: $q = -K\nabla H$.

degree of saturation (versadigingsgraad)

The volume of water present in a soil relative to the volume of pores. Sometimes simply termed "saturation", and may be expressed as a percentage.

differential water capacity (differensiële waterkapasiteit)

The rate of change of water content (Θ_m) or volumetric water content (Θ_v) with matric potential (ψ_m) or matric pressure (P_m). The unit of potential or pressure should be specified. Also termed specific water capacity.

diffusivity (diffusiwiteit)

The diffusivity (or soil water diffusivity) ($D(\Theta)$) in m²/s, is the quotient of the hydraulic conductivity ($K(\Theta)$) in m/s and the differential (specific) water capacity (c_Θ), in m⁻¹.

(Note: $D(\Theta) = K(\Theta)/c_\Theta = K(\Theta) \delta\psi_m/\delta\Theta$)

driving force (dryfkrag)

The driving force for water flow is equal in magnitude but opposite in direction to the potential gradient. See also hydraulic gradient.

envelope-pressure (P_e) (omhulsedruk)

The pressure equivalent, in Pa, of the envelope-pressure potential.

envelope-pressure potential (ψ_p^e) (omhulsedrukpotensiaal)

The increment of the pressure potential (ψ_p) following the application of an envelope pressure P_e to a soil sample with wetness Θ and originally under zero envelope pressure, when the pressure in the gas phase (P_a) is equal to atmospheric pressure (P_o), according to:

$$\psi_p^e = \int_0^{P_e} \frac{d\psi_p}{\Theta P_e} dP$$

Also termed overburden potential.

external gas pressure (eksterne gasdruk)

See pneumatic pressure.

external gas pressure potential ((eksterne) gasdrukpotensiaal)

Also termed gas pressure potential. See pneumatic potential.

field capacity (veldkapasiteit)

The percentage or fraction of water (mass or volume basis should be specified) remaining in a soil in the field 2 to 3 days after having been thoroughly wetted and after free drainage is negligible. The term is of limited value in exact work since it does not represent a unique value. Syn. field water capacity.

flow velocity (vloeisnelheid)

The rate of movement of material along its flow path. (Note: Because of soil tortuosity, flow velocity is not synonymous with flux density.) Since velocity is a vector, the direction of flow velocity should always be stated.

flux (vloed)

The quantity of material or energy transferred through a system or a portion of a system in unit time. The quantity can be expressed in units of mass, volume, heat energy, etc. (i.e. mass flux, volume flux, heat energy flux, etc.).

flux density (vloeddigheid)

The flux per unit area. Volume flux density, for example, is expressed in m/s. Sometimes flux density is incorrectly termed flux.

gravimetric water content (gravimetrisse waterinhoud)

See water content.

gravitational head (h_g) (gravitasiehoogte)

The elevation, in metres, of a point above a specified datum level.

gravitational potential (gravitasiepotensiaal)

The amount of useful work per unit mass of pure water, in J/kg, that must be done to transfer reversibly and isothermally an infinitesimal quantity of water from a pool of pure free water at height z_0 to a point at height z .

groundwater (ondergrondwater)

Water that occurs beneath the water table (at which $\psi_m = 0$) in soils, and in geologic formations that are fully saturated.

head (hoogte)

The equivalent of potential when expressed in units of length. Also termed weight potential (units J/N or m).

hydraulic conductivity (hidrouliese geleivermoë)

The proportionality factor (K) in Darcy's law as applied to the viscous flow of water in soil, i.e. the volume flux density of water per unit gradient of hydraulic head. If conditions require that the viscosity of the fluid be divorced from the conductivity of the medium, it is convenient to define an intrinsic permeability. To distinguish the conductivity in water-saturated soil from that in water-unsaturated soil, the terms saturated (hydraulic) conductivity and unsaturated (hydraulic) conductivity may be used in place of hydraulic conductivity. Cf. intrinsic permeability.

hydraulic gradient (hidrouliese gradiënt)

The term hydraulic gradient can imply a hydraulic potential gradient, hydraulic pressure gradient or hydraulic head gradient. In each case the gradient is the change in magnitude (of potential, pressure or head) per unit of distance in the direction of maximum rate of increase thereof. The hydraulic gradient generally determines the rate and direction of water flow in soil.

hydraulic head (hidrouliese hoogte)

The elevation with respect to a specified reference level at which water stands in a piezometer connected to the point in question in the soil. Its definition can be extended to soil above the water table if the piezometer is replaced by a tensiometer. The hydraulic head in systems under atmospheric pressure may be identified with a potential expressed in terms of the height of a water column. More specifically it is the sum of the gravitational and hydrostatic pressure (or matric) potentials, expressed as a head ($H = h_g + h_p$).

hydraulic potential (ψ_H) (hidrouliese potensiaal)

The sum of the gravitational and pressure (or hydrostatic pressure) potentials, expressed in J/kg. Hence $\psi_H = \psi_g + \psi_p$.

hydraulic resistance (hidrouliese weerstand)

The hydraulic resistance per unit area of a conducting system is the ratio of the thickness to the hydraulic conductivity.

hydraulic resistivity (hidrouliese resistiwiteit)

The reciprocal of the hydraulic conductivity.

hydrostatic pressure (hidrostatiese druk)

The pressure in a body of water due to the force of gravity and the weight of surrounding water. Hydrostatic pressure is related to the depth below the surface of pure, free water by $p = -\rho_w gz$ where ρ_w = density of water, g acceleration due to gravity, z height measured positively upwards from the free water surface. The absolute pressure in the body of water will in addition be determined by the atmospheric or external gas pressure acting on the water.

hydrostatic pressure head (hidrostatiese drukhoogte)

The head equivalent, in metres, of the hydrostatic pressure potential.

hydrostatic pressure potential (hidrostatiese drukpotensiaal)

The amount of useful work per unit mass of pure water, in J/kg, that must be done to transfer reversibly and isothermally an infinitesimal quantity of water from the surface of a pool of free water identical in composition and at the elevation of the point under consideration, to a point within the body of water.

hysteresis (histerese)

In the case of the water retentivity curve of a soil, in which matric potential is plotted against water content, hysteresis refers to the phenomenon that identical curves are not obtained for water uptake (wetting) and release (drying). Cf. scanning curve.

infiltrability (infiltreerbaarheid)

The flux (or rate) of water infiltration into soil when water at atmospheric pressure is maintained on the atmosphere-soil boundary, with the flow direction being one-dimensionally downward.

infiltration (infiltrasie)

The process of water entry into the soil, generally (but not necessarily) through the soil surface and vertically downward.

infiltration rate (infiltrasietempo)

The flux density of water passing through the (or a) soil surface and flowing into the soil.

intrinsic permeability (intrinsieke permeabiliteit)

The property of a porous material that relates to the ease with which fluids can pass through it; the hydraulic conductivity (K) from the Darcy equation divided by $\eta/\rho g$ (in which η is the viscosity of the fluid, ρ its density and g the acceleration due to gravity), which includes the contribution of fluid properties to the value of K . Intrinsic permeability has the dimensions of length squared.

liquid ratio (vloeistofverhouding)

The volume of the liquid phase per unit volume of the solid phase, expressed in m^3 liquid phase per m^3 of solid phase.

matric potential (ψ_m) (matrikspotensiaal)

The value of the pressure potential of a soil sample at a given water content and subject to a given envelope pressure, but with the soil gas phase pressure (P_a) equal to atmospheric pressure (P_o). Once referred to as capillary potential, and sometimes loosely but incorrectly equated to pressure potential or hydrostatic pressure potential.

matric pressure (P_m) (matriksdruk)

The gauge pressure, in pascal, to which a sample of the soil solution must be subjected isothermally in order to be in equilibrium via a membrane impermeable to the soil matrix with the soil water at the point under consideration, when the soil gas phase pressure (P_a) is equal to atmospheric pressure (P_o). It is also the pressure equivalent of the matric potential.

matric pressure head (matriksdrukhoogte)

The head equivalent, in metres, of the matric potential or matric pressure.

matric suction (matrikssuiging)

The negative of the matric pressure, in pascal.

moisture equivalent (obsolete) (vogekwivalent (verouderd))

An obsolete measure of soil water retention under standardized conditions, approximating water content at field capacity. It is the water content, as a percentage, of a previously saturated sample of soil 10 mm in thickness after it has been subjected to a centrifugal force of one thousand times gravity for 30 minutes.

negative pressure (of soil water) (obsolete) (negatiewe druk (van grondwater) (verouderd))

See matric pressure.

osmotic head (osmotiese hoogte)

The head equivalent, in metres, of the osmotic potential or osmotic pressure.

osmotic potential (ψ_o) (osmotiese potensiaal)

The osmotic potential (ψ_o) of the constituent water in soil at a specified temperature is the amount of useful work per unit mass of pure water, in J/kg, that must be done to transfer reversibly and isothermally an infinitesimal quantity of water from a pool of pure free water to a pool of free soil solution (identical in composition with the soil liquid phase at the point under consideration, and at the same height). The potential may be expressed in terms of the experimentally accessible osmotic pressure of the solution (π) according to

$$\psi_o = - \int_0^{\pi} \bar{v}_w dP$$

in which \bar{v}_w is the partial specific volume of the constituent water in the soil solution.

Note: \bar{v}_w is temperature dependent.

osmotic pressure (π) (osmotiese druk)

The osmotic pressure (π) is the gauge pressure, in pascal, to which a sample of the soil solution at atmospheric pressure and specified temperature must be subjected in order

to be in equilibrium via a membrane, impermeable to the solutes, with pure water at the same pressure and temperature.

(Note: By comparing the definitions of matric pressure and osmotic pressure, it will be seen that the negative osmotic pressure ($-\pi$) acts additively to the matric pressure.)

osmotic stress/tension/suction (osmotiese spanning/suiging)

Identical to osmotic pressure as defined above. It can be interpreted as the negative of the negative osmotic pressure, in pascal.

overburden potential (bolaagpotensiaal)

See envelope-pressure potential.

permeability (deurlatendheid; permeabiliteit)

A qualitative term describing the ability of a porous medium to conduct fluids. Cf. hydraulic conductivity.

pneumatic potential (ψ_p^a) (gasdrukpotensiaal)

The pneumatic potential (ψ_p^a) is the increment of the pressure potential (ψ_p) upon the introduction of an excess gas pressure $\bar{P}_a = P_a - P_o$ (in which P_a = pressure in the gas phase of the soil and P_o = atmospheric pressure) on a soil sample with given water content and subject to a given envelope pressure. In so far as the application of P_a does not influence the geometry of the liquid phase, this potential may be calculated according to

$$\psi_p^a = \int_0^{\bar{P}_a} \bar{v}_w' dP$$

in which \bar{v}_w' is the partial specific volume of water in the soil liquid phase *in situ* (in practice it is assumed to be equal to \bar{v}_w).

pneumatic pressure (gasdruk)

The pressure equivalent of the pneumatic potential.

potential gradient (potensiaalgradiënt)

See hydraulic gradient.

pressure head (h_p) (drukhoogte)

The head equivalent, in metres, of the pressure potential (ψ_p). Equivalent to the hydrostatic pressure head in saturated soil or liquid systems.

pressure potential (ψ_p) (drukpotensiaal)

The pressure potential (ψ_p) (also termed the tensiometer-pressure potential) of the constituent water (*in situ*), is the amount of useful work per unit mass of pure water, in J/kg, that must be done to transfer reversibly and isothermally an infinitesimal quantity of water from a pool of free soil solution (identical in composition with the soil liquid

phase at the point under consideration) at specified temperature and atmospheric pressure, to the soil liquid phase at the point under consideration. This potential may be expressed in terms of the experimentally accessible tensiometer pressure of the soil liquid phase (p) *in situ*, according to

$$\psi_p = \int_0^p \bar{v}_w dP$$

in which \bar{v}_w is the partial specific volume of the constituent water in the soil solution.

retentivity curve (retensiekromme)

The curve relating matric pressure (P_m) or matric potential (ψ_m) (for a specified envelope pressure in case of swelling soils) or wetness pressure (p_w) to the water content (Θ_m) or volumetric water content (Θ_v) of the soil. Because of hysteresis phenomena one may distinguish between uptake (wetting) and release (drying) boundary curves, if necessary supplemented by wetting and drying scanning curves corresponding to partial wetting and drying cycles. Also see hysteresis; scanning curve. Syn. soil water characteristic curve.

saturated conductivity (versadigde geleivermoë)

Also termed saturated hydraulic conductivity. See hydraulic conductivity.

saturated flow (versadigde vloeï)

Flow of water in soil completely saturated with water.

saturation percentage (versadigingspersentasie)

See saturation water content.

saturation water content (versadigingswaterinhoud)

The ratio of the mass of water to the dry mass of soil, for a soil completely saturated with water. Also termed the (maximum) water holding capacity. When expressed as a percentage it is termed the saturation percentage.

scanning curve (skandeerkromme)

The relationship between water content and matric potential when a water containing soil is subjected to water uptake (wetting) and release (drying) over a limited range of water contents; the scanning curve thus lies within the hysteresis loop. Cf. hysteresis.

soil solution (grondoplossing)

- (1) The *in situ* aqueous liquid phase of the soil and its solutes, in which case the term liquid phase is preferred.
- (2) A sample of the aqueous liquid phase and its solutes, obtained by some extraction procedure.

soil suction (grondsuijing)

See matric suction.

soil water characteristic (curve) (grondwaterkenkromme)

See retentivity curve.

soil water diffusivity (grondwaterdiffusiwiteit)

See diffusivity.

soil water retention curve (grondwaterkenkromme)

See retentivity curve.

soil water stress/tension/suction (grondwaterspanning)

See matric suction.

solute potential (osmotiese potensiaal)

See osmotic potential.

specific water capacity (spesifieke waterkapasiteit)

See differential water capacity.

steady state (bestendige toestand)

Refers to a transport process for which the net flux density remains constant and equal along the conducting system, i.e. the potential and gradient at each point remain constant with time (but can differ from one point to another).

submergence potential (hidrostatiese drukpotensiaal)

See hydrostatic pressure potential.

tensiometer-pressure potential (tensiometer-drukpotensiaal)

See pressure potential.

total available water capacity (totale beskikbare waterkapasiteit)

This is the capacity (expressed in mm water) of a soil to store water for plant use. TAWC (mm) = AW (mm/m) x effective rooting depth (m). AW differences of each horizon in anisotropic soils need to be taken into account. At best TAWC is a very rough approximation for a number of reasons, one of which is the difficulty of estimating effective rooting depth. Cf. soil capacity.

total head (totale hoogte)

The head equivalent, in metres, of the total potential.

total potential (ψ_T) (totale potensiaal)

The total potential (ψ_T) of the constituent water in soil at a specified temperature, is the amount of useful work per unit mass of pure water, in J/kg, that must be done by means of externally applied forces to transfer reversibly and isothermally an infinitesimal amount of water from a pool of pure, free water to the soil liquid phase at the point under consideration. Also termed total soil water potential. Cf. Table B.

total soil water stress/tension/suction (totale grondwaterspanning/suiging)

The pressure equivalent, in pascal, of the total potential.

transient flow (oorgangsvloei; onbestendige vloei)

Flow occurring under transient (state) conditions.

transient state (oorgangstoestand; onbestendige toestand)

Refers to a transport process for which the magnitude and possibly also the direction of the flux and potential gradient vary with time. Also termed unsteady state.

unloaded matric potential (ψ_p^w) (onbelaste matrikspotensiaal)

The unloaded matric potential (ψ_p^w) is the value of the pressure potential (ψ_p) in a soil sample at water content Θ_m , with the envelope pressure (P_e) equal to zero, and the soil gas phase pressure equal to atmospheric pressure (i.e. $\psi_p^a = 0$).

(Note: In a rigid matrix the envelope-pressure potential vanishes, so that $\psi_m = \psi_p^w$. In a swelling soil, however, $\psi_m = \psi_p^w + \psi_p^e$).

unsaturated conductivity (onversadigde geleivermoë)

Also termed unsaturated hydraulic conductivity. See hydraulic conductivity.

unsaturated flow (onversadigde vloei)

Flow of water in soil not completely saturated with water.

velocity (snelheid)

See flow velocity.

volumetric water content (volumetriese waterinhoud)

The volume of the liquid phase per unit bulk volume of soil, expressed in m^3 water per m^3 bulk volume. Also termed volume fraction of water (or liquid). When expressed as a percentage it is termed the volumetric water percentage.

volumetric water percentage (volumetriese waterpersentasie)

See volumetric water content.

water capacity (waterkapasiteit)

See soil capacity; total available water capacity.

water content (waterinhoud)

The amount of water lost from the soil upon drying at 105°C expressed in kg water per kg of solid phase after drying. Also termed wetness, mass wetness and gravimetric water content. When expressed as a percentage it is termed the water percentage.

water content on wet basis (waterinhoud op nat basis)

See water mass fraction.

water content profile (waterinhoud profiel)

A graphic representation of the water content - depth relationship in a soil. Water content is plotted on the abscissa and depth on a descending ordinate.

water holding capacity (waterhouvermoë)

See saturation water content.

water mass fraction (watermassafraksie)

The ratio of the mass of water to the sum of the mass of water and dry soil. Also termed the water content on wet basis. When expressed as a percentage, it is termed the water percentage on wet basis.

water percentage (waterpersentasie)

See water content.

water percentage on wet basis (waterpersentasie op nat basis)

See water mass fraction.

water potential (waterpotensiaal)

Water potential is the difference in the chemical potential of water in an equilibrium system and the chemical potential of pure, free water at the same temperature and elevation. It is the sum of the pressure, matric and osmotic potentials (note exclusion of the gravitational potential).

water ratio (obsolete) (waterverhouding (verouderd))

See volumetric water content.

water table (watervlak)

The upper surface of groundwater; the locus of points in soil water at which the hydraulic pressure is equal to atmospheric pressure.

wetness (waterinhoud)

See water content.

wetness potential (onbelaste matrikspotensiaal)

See unloaded matric potential.

soil water regime (grondwaterregime (-huishouding))

A qualitative term referring to the state and availability of water in soil, especially in relation to the growth of plants.

solarisation (solarisasie)

See soil solarisation.

solifluction (solifluksie)

The slow, viscous, downslope flow of water-saturated soil.

Solod (Solod)

A great group of soils in the Solonetzic order occurring most commonly in the grassland and parkland regions. The soils have a dark-coloured surface (A_h) horizon, a prominent eluvial (A_{he} or A_e horizon at least 5 cm thick, a prominent transitional (AB) horizon that breaks readily into blocky aggregates, and a darkly stained B horizon over a C horizon that is saline and usually calcareous.

solodized soil (gesolodiseerde grond)

A soil that has been subjected to the processes responsible for the development of a Solod and having at least some of the characteristics of a Solod. Cf. Solod.

Solonchak (Solonchak)

A term of Russian origin that refers to a friable, salty soil; usually with a thin salt crust on the surface. Cf. soil classification.

Solonetz (Solonetz)

A term of Russian origin that refers to a soil with a thin, porous topsoil underlain by a columnar horizon, usually natric. Cf. soil classification.

soluble salts (oplosbare soute)

Salts present in soil and which have solubility in water greater than calcium carbonate. Sodium salts, particularly NaCl, are the most common soluble salts in soils. The salt tolerance of crops varies, some being adversely affected when the electrical conductivity of the saturation extract is in the region of 200 mS/m; a large number of crops are adversely affected when the figure is 400 mS/m or higher. Cf. saline soil; saline-sodic soil; deflocculation; resistance; electrical conductivity.

solum (solum)

The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons. Usually the characteristics of the material in these horizons are quite unlike those of the underlying parent material. The living roots and other plant and animal characteristics of the soil are largely confined to the solum. Pl. sola.

solute (opgeloste stof)

A substance dissolved in water.

solute potential (osmotiese potensiaal)

See soil water : osmotic potential.

somblic horizon (sombriese horison)

See diagnostic horizon.

sorosilicate (sorosilikaat)

A class or structural type of silicate characterized by the linkage of two SiO₄ tetrahedra by the sharing of one oxygen, with a Si:O ratio of 2:7. An example of a sorosilicate is hemimorphite, Zn₄(Si₂O₇)(OH)₂·(H₂O). Cf. nesosilicate; cyclosilicate; inosilicate; phyllosilicate; tectosilicate.

sorption (sorpsie)

A general term for adsorption and absorption phenomena, particularly when the specific nature of the process is not known. Cf. absorption; adsorption.

sorptivity (sorptiwiteit)

An infiltration parameter defined by Philip's infiltration equation:

$$I = St^{1/2} A$$

where I = cumulative infiltration

S = sorptivity

A = an infiltration parameter

t = time.

sorting (sortering)

- (1) The separation and segregation of rock fragments according to size of particles, density and different shapes by natural processes, mainly the action of running water or wind. "Well sorted" refers to the presence of mainly one grade size; "poorly sorted" refers to the presence of many grade sizes in a sample of material.
- (2) Statistically, it is a measure of a spread of a distribution on either side of an average. "Poorly sorted" refers to a wide and "well-sorted" to a narrow spread. Cf. kurtosis.

source (bron)

A term used to describe the addition of material or substances during a process occurring in soil, e.g. the dissolution of minerals during water flow through soil adds solutes to the water. Cf. sink.

spatial variability (ruimtelike veranderlikheid)

Refers to the variability of soil properties over both small and large areas, and to the fact that soil properties tend to be correlated over space, both vertically and horizontally. The variability and correlations are quantified by using geostatistical techniques such as variograms and kriging.

speciation (spesiasie)

Identification of the various chemical species present in (usually) an aqueous solution. Cf. species.

species (spesie)

- (1) In taxonomy, one or more groups (populations) of individuals that can interbreed within the group but that cannot exchange genes with other groups.
- (2) In chemistry, a specific ion or molecule, e.g. Ca^{2+} , CaSO_4 , etc.

specific surface (soortlike oppervlakte)

The total surface area of a substance per unit mass.

specific yield (soortlike lewering)

The quantity of water that a unit volume of permeable rock or soil, after being saturated, will yield when drained by gravity. It may be expressed as a ratio or as a percentage by volume. The sum of specific retention and specific yield equals the porosity of the material drained.

spheroidal structure (sferoïdale struktuur)

See soil structure.

splash erosion (spaterosie)

See erosion.

spodic B horizon (obsolete) (spodiese B-horison (verouderd))

See diagnostic horizon.

spodic horizon (spodiese horison)

See diagnostic horizon.

Spodosol (Spodosol)

See soil classification.

spoil (uitskot)

Soil or rock material excavated from a canal, ditch, basin or similar construction.

springtail (veerstert)

See Collembola.

sprinkler irrigation (sprinkelbesproeiing)

See irrigation methods.

Stagnosol (Stagnosol)

See soil classification.

stalactite (stalaktiet)

A cylindrical or conical mineral deposit (usually calcite or aragonite), hanging from the roof of a cavern.

stalagmite (stalagmiet)

A cone or ridge of calcium carbonate rising from the floor of a cave, formed by evaporation of water dripping from above.

starter (fertilizer) (aanhitser (misstof))

See fertilizer.

steady flow (bestendige vloeï)

Flow in which the rate remains constant with time across a given cross-section. Cf. soil water : steady state.

steady state (bestendige toestand)

See soil water : steady state.

steppe (steppe)

A mid-latitude, short grass vegetation cover that mantles the ground with a fairly continuous sod.

stereo pair (stereopaar)

Two aerial photographs of the same object taken from slightly different positions, which when viewed together gives the viewer a three-dimensional image. Syn. stereoscopic pair.

stereoscopic pair (stereoskopiese paar)

See stereo pair.

sticky point (kleefpunt)

A condition of consistence at which the soil barely fails to stick to a foreign object. Specifically and numerically the moisture percentage by mass of well-mixed kneaded soil that barely fails to adhere to a polished nickel or stainless steel surface when the shearing speed is 50 mm/s. Cf. soil consistence.

stochastic model (stogastiese model)

See mathematical model.

Stokes' law (Stokes se wet)

An equation relating the terminal settling velocity of a smooth, rigid sphere in a viscous fluid of known density and viscosity to the diameter of the sphere when subjected to a known force field. Used in particle-size analysis of soils by the pipette, hydrometer, or centrifuge methods. The equation is

$$v = \frac{2gr^2(\rho_1 - \rho_2)}{9\eta}$$

where

- v = velocity of fall
- g = acceleration due to gravity
- r = equivalent radius of particle
- ρ_1 = density of particle
- ρ_2 = density of liquid medium
- η = viscosity of liquid medium.

stone (klip)

A rock fragment greater than 250 mm in diameter if rounded, and greater than 375 mm along the greater axis if flat. Cf. coarse fragments.

stoneline (kliplyn)

A concentration of stones, boulders, gravels or concretions (or mixtures of these) which occurs in the soil and appears in profile as a horizontally disposed line or layer.

stoniness (klipperigheid)

The relative proportion of stones in or on the soil, used in describing soils. It should be described in terms of:

- (i) abundance : few (< 20% by volume percentage)
common (20 - 50%)
many (> 50%)
- (ii) size : small (< 20 mm)
medium (20 - 100 mm)
large (> 100 mm)
- (iii) shape: flat; rounded; angular.

Cf. coarse fragments.

stony (klipperig)

Soil containing sufficient stones to interfere with or to prevent tillage. Used to modify soil class, e.g. stony clay loam or clay loam, stony phase. Cf. coarse fragments; stony land; stoniness.

stony land (klipperige land)

Areas containing sufficient stones to make the use of machinery impractical; usually 15 to 90% of the surface is covered with stones. A miscellaneous land type. See stoniness and rubble land.

strain (vervorming)

The relative change in dimensions or shape of a body which is subjected to stress. Associated with each type of stress is a corresponding strain, e.g. compressive strain, shearing strain, tensile strain, etc.

stratification (stratifikasie; gelaagdheid)

Arranged in or composed of strata or layers.

stratified alluvium (gestratifiseerde alluvium)

See diagnostic horizon.

stratigraphy (stratigrafie)

The branch of geology that deals with the definition and interpretation of stratified rocks; the conditions of their formation; their character, arrangement, sequence, age, and distribution; and especially their correlation by the use of fossils and other means.

strengite (strengiet)

An iron phosphate mineral, $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$, found in some well-drained acid soils. It belongs to the isomorphous variscite-barrandite-strengite group, variscite having the formula $\text{AlPO}_4 \cdot 2\text{H}_2\text{O}$.

stress (spanning)

In a solid, the force per unit area acting on any surface within it, and expressed as kilopascal; also by extension, the external pressure which creates the internal force. The stress at any point is mathematically defined by nine values; three to specify the normal component and six to specify the shear component, relative to three mutually perpendicular reference axes. Cf. strain; shear stress.

stria (striation) (skraap)

Minute, usually parallel groove(s) or channel(s) such as are produced by ice moving over rock. Pl. striae.

strip cropping (strookverbouing)

Growing crops in a systematic arrangement of strips or bands which serve as barriers to wind and water erosion. Related terms: alley cropping; buffer strip; contour strip cropping; sod strip; wind strip cropping.

strip mining (strookmynbou)

A process in which rock and topsoil strata overlying ore or coal deposits are scraped away by mechanical means. Also known as surface mining.

structural crust (struktuurkors)

See soil crust; soil sealing.

structure (struktuur)

See soil structure.

structureless (struktuurloos)

See soil structure.

stubble mulch (stoppeldeklaag)

The stubble of crops or crop residues left essentially in place on the land as a surface cover during fallow and the growing of a succeeding crop. Cf. tillage systems.

stubble tillage (stoppelbewerking)

See tillage systems.

stunted (verpot)

Reduced vegetative development of plants due to unfavourable environmental conditions, e.g. drought, infertile soil, poor soil physical conditions, etc.

subangular structure (subhoekige struktuur)

See soil structure.

subirrigation (ondergrondbesproeiing)

See irrigation methods.

submergence potential (onderwaterpotensiaal)

See soil water : hydrostatic pressure potential.

subsidence (versakking)

- (1) A local mass movement that involves principally the gradual downward settling or sinking of the solid earth's surface with little or no horizontal motion and that does not occur along a free surface (not the result of a landslide or failure of a slope). The movement is not restricted in rate, magnitude, or area involved. Subsidence may be due to natural geologic processes such as solution, erosion, oxidation, thawing, lateral flow, or compaction of subsurface materials; earthquakes, slow crustal warping, and volcanism (withdrawal of fluid lava beneath a solid crust); or man's activity such as removal of subsurface solids, liquid, or gases and wetting of some types of water-deficient loess or porous deposits. Syn. land subsidence; bottom subsidence. Cf. soil subsidence.
- (2) A sinking of a large part of the earth's crust relative to its surrounding parts, such as the formation of a rift valley or the lowering of a coast due to tectonic movements. Syn. sinking.

subsistence fertilization (onderhoudsbemesting)

When only those nutrients removed by the crop are replaced by fertilizer application.

subsoil (ondergrond)

That portion of the normal soil profile underlying the A horizon. In humid climates it is lower in organic matter content, is lighter in colour, usually of finer texture, of higher bulk density, and of lower fertility than the surface soil.

subsoiling (skeurploegbewing)

Breaking of compact subsoils, without inverting them, with a chisel plough which is pulled through the soil at depths of 30 to 60 cm and at spacings of 60 to 150 cm.

substratum (onderlaag; substratum)

Any layer lying beneath the solum, either conforming (C or R) or unconforming.

substrate (substraat)

- (1) In biology, the base or substance or nutrient on which an organism grows.
- (2) In chemistry, compounds or substances that are acted upon by enzymes or catalysts and changed to other compounds in a chemical reaction.

subsurface irrigation (ondergrondbesproeiing)

See irrigation methods.

subsurface tillage (suboppervlakkbewerking)

Tillage with a special sweeplike plough or blade which is drawn beneath the surface at sufficient depth so as to cut plant roots but does not invert the surface layer of soil.

succession (suksessie)

The progressive development of a vegetation towards its highest ecological expression, the climax; replacement of one plant community by another.

suction (suiging)

See soil water : matric suction.

sulfidic horizon (sulfidiese horison)

See diagnostic horizon.

sulfuric horizon (sulfaathorison)

See diagnostic horizon.

superphosphate (superfosfaat)

A phosphate fertilizer containing water soluble monocalcium orthophosphate $[\text{Ca}(\text{H}_2\text{PO}_4)_2]$ and calcium sulphate. It is prepared by first refining mined phosphate-containing ore to a phosphate concentrate, which is then treated with sulphuric acid. It contains between 8% and about 11% P.

surface-charge density (oppervlakladingsdigtheid)

The excess of negative or positive charge per unit of surface area of soil, clay or humic substances.

surface erosion (plaaterosie)

See erosion: sheet erosion.

surface runoff (oppervlakafloop)

See runoff.

surface sealing (oppervlakverseëling)

See soil crust; soil sealing.

surface soil (boggrond)

See topsoil.

surface tension (oppervlakspanning)

The force per unit length (N/m) required to increase the surface of a liquid, or the energy per unit area (J/m^2) expended in increasing the surface of a liquid.

suspended load (gesuspendeerde vrag)

- (1) The part of the total stream load that is carried for a considerable period of time in suspension, free from contact with the stream bed; it consists mainly of clay, silt and sand.
- (2) The material collected in, or computed from samples collected with, a suspended load sampler. Syn. suspension load; silt load; wash load.

suspension (suspensie)

A mixture of solid particles and liquid in which the solids are either settling under the force of gravity or are suspended by upward currents in eddies of turbulent flow, or by Brownian motion in the case of very small particles.

sustainable land use (volhoubare landgebruik)

The continuing utilization of land such that its productivity is maintained.

S-value (S-waarde)

The sum of exchangeable (as opposed to soluble) Ca, Mg, Na and K ions expressed in cmol_c/kg soil.

swamp (moeras)

An area saturated with water throughout much of the year but with the surface of the soil usually not deeply submerged; usually characterized by tree or shrub vegetation. A miscellaneous land type. Cf. marsh.

swelling (swelling)

The increase in bulk volume of a substance, usually upon addition of water.

swelling clay (swelklei)

See expanding-lattice clay.

swelling chlorite (swelchloriet)

A chlorite-like mineral, found in clays, that behaves like a chlorite on heating but has its basal spacing expanding on glycerol treatment. It contains incomplete hydroxide (brucite or gibbsite) layers and might be regarded as a special interlayering of chlorite with smectite or vermiculite. Syn. pseudochlorite.

swelling soil (swelgrond)

A soil containing expanding-lattice clay minerals which cause the soil to swell or heave upon wetting and shrink (with the formation of cracks) upon drying.

symbiosis (simbiose)

Two organisms of different species living in close association, one or both of which may benefit therefrom while neither is harmed. For example, nitrogen-fixing bacteria in the roots of legumes.

syenite (siëniet)

A group of plutonic igneous rocks consisting principally of alkali feldspar (orthoclase, microcline or perthite), usually with one or more mafic minerals such as hornblende or biotite. Small amounts of quartz (or nepheline) and plagioclase may be present. Spheue, apatite and opaque oxides are accessories.

synecology (sinekologie)

The study of groups of organisms that are associated together as a unit. Cf. autecology.

synergism (sinergisme)

The simultaneous actions of two or more agencies that together have a greater total effect than the sum of their individual effects, for example, the action of certain combinations of toxic substances. Cf. antagonism.

