

## M

### macronutrient (makrovoedingstof)

A chemical element necessary in relatively large amounts (usually more than 500 mg kg<sup>-1</sup> in the plant) for the growth of plants. These elements are C, H, O, Ca, Mg, K, S, N and P.

### macroorganism (makroörganisme)

Those organisms retained on a U.S. standard sieve no. 30 (openings of 0,589 mm); those organisms visible to the unaided eye. See microorganisms.

### macropore flow (makroporievloei)

The flow of water and chemicals through the macropores of a soil, as distinguished from the total and micropore flow. Cf. preferential flow.

### made land (opgevlude land)

Areas filled with earth; or with earth and trash mixed, usually by or under the control of man. Syn. fill.

### mafic (mafies)

Pertaining to or composed dominantly of magnesian rock-forming silicates. Contrast with felsic. In general, synonymous with "dark minerals".

### maghemite (maghemiet)

A strongly magnetic mineral of the magnetite series in the spinel group:  $\gamma\text{-Fe}_2\text{O}_3$ . It is dimorphous with hematite. Syn. oxymagnetite.

### magma (magma)

The hot material, partly or wholly liquid, from which igneous rocks form. Where magma erupts to the surface, it is commonly known as lava. At the surface cooling is rapid and fine-grained rocks are formed (extrusive rocks). Where magma is unable to reach the surface, it cools more slowly and a coarse-textured (intrusive) rock results. Most magmas are silicate melts with associated crystals and gas. Cf. lava; intrusive rock; extrusive rock; igneous rock.

### magnesite (magnesiet)

A white to greyish, yellow or brown mineral,  $\text{MgCO}_3$ . It is isomorphous with siderite. Magnesite is generally found as earthy masses of irregular veins resulting from the alteration of limestones and dolomite rocks by magmatic solutions or of rocks rich in magnesium silicates (such as olivines). It is an ore of magnesium and is used chiefly in making refractories and magnesia.

### magnetite (magnetiet)

A black, isometric, strongly magnetic, opaque mineral of the spinel group:  $(\text{Fe,Mg})\text{Fe}_2\text{O}_4$ . It often contains variable amounts of titanium oxide, and it constitutes an important ore of iron. Magnetite commonly occurs in octahedrons and is also granular or massive; it is a very common and widely distributed accessory mineral in rocks of all kinds, in orebodies as a magmatic segregation, in lenses enclosed in schists and gneisses, in igneous rocks as a primary mineral or as a secondary alteration product, in placer deposits, and as a constituent or heavy mineral in sands. Syn. magnetic iron ore; octahedral iron ore.

**mangan (mangaan)**

See micromorphology.

**man-made soil deposit (mensgemaakte grondafsetting)**

See diagnostic horizon.

**mantle (mantel)**

The zone lying between the Earth's crust and core, approximately 2300 km thick. Cf. crust (earth).

**manure (mis)**

- (1) The excreta of animals, with or without the admixture of bedding or litter, in varying stages of decomposition, e.g. stable manure, barnyard manure, kraal manure, etc.
- (2) Any fertilizer; to apply fertilizing materials to soil. Cf. fertilizer.

**map, soil (grondkaart)**

See soil map.

**map unit (of a soil map) (kaartenheid (van 'n grondkaart))**

See soil map unit; soil association; soil complex; soil consociation.

**marble (marmer)**

A metamorphosed form of limestone or dolomite in which the grains are recrystallized.

**margalitic (margalities)**

Refers to A horizons with strongly developed structure that are dark coloured with a high base status, Ca and Mg being the predominant exchangeable cations.

**marl (mergel)**

A general term for calcareous clay or calcareous loam. A calcareous clay or intimate mixture of clay and particles of calcite or dolomite, usually fragments of shells. In the USA the term marl is chiefly applied to incoherent calcareous sands, but elsewhere compact impure limestones are also called marls.

**marsh (moeras)**

A periodically wet or continually flooded area where the surface is not deeply submerged; covered dominantly with sedges, cattails, rushes, or other hydrophytic plants. Subclasses included are freshwater and saltwater marshes. A tidal marsh is a low, flat area traversed by interlacing channels and tidal sloughs and periodically inundated by high tides; vegetation usually consists of salt-tolerant plants. Cf. swamp.

**mass flow (ions) (massavloei (ione))**

- (1) The process by which ions are transported in the soil with flowing water as a result of water potential differences (gradients).
- (2) The process through which soluble plant nutrients are transported into and within the conducting tissues of a plant as a result of liquid pressure gradients.

**massive (massief)**

See soil structure.

**matching (land evaluation) (passing (landevaluering))**

Comparison of the requirements and tolerances of a land utilization type with the characteristics and qualities of each type of land in order to determine the suitability of each type of land for each envisaged kind of land use; the most crucial process in land evaluation.

**mathematical model (wiskundige model)**

A mathematical model is a formal expression of the relationships between defined variables that enables predictive statements to be derived from the relationships. It may be as simple as a single equation relating one variable to another, or it may involve the interaction of many equations having several mutually dependent variables. Cf. simulation model. Several types of mathematical models are distinguished (not necessarily mutually exclusive):

*analytic models* - Those for which explicit formulae are derived, or are based on equations that are derived primarily from theoretical considerations. They include those for which analytic solutions of differential equations may be obtained, and regression models.

*deterministic models* - Models for which the predicted values may be computed exactly; the output(s) is (are) determined completely in terms of the input(s).

*mechanistic models* - A subclass of deterministic models (sometimes used synonymously therewith). They are integrative and more concerned with mechanism; they contribute to understanding and are sometimes called explanatory.

*empirical models* - Obtained by using statistical methods to fit one of several possible equation types to experimental data. Regression equations are typical. Such models do not depend upon a theoretical understanding of the system being described.

*stochastic models* - In these models statistics play a part; some of the processes vary according to some probability distribution and correspondingly, the predicted values will vary.

*dynamic models* - They predict how a system unfolds with the passage of time; the time course of events.

**matric potential (matrikspotensiaal)**

See soil water : matric potential.

**matric pressure (matriksdruk)**

See soil water : matric pressure.

**matric pressure head (matriksdrukhoogte)**

See soil water : matric pressure head.

**matric suction (matrikssuiging)**

See soil water : matric suction.

**matrix (matriks)**

- (1) The soil framework consisting of the spatially arranged solid particles which enclose the soil air, soil water and biological component.
- (2) Natural material in which larger particles are embedded.

**mature soil (volwasse grond)**

A soil which has had sufficient time to develop fully in its present environment.

**mean diameter (gemiddelde diameter)**

See geometric mean diameter; mean weight diameter.

**meander (meander)**

One of a series of loop-like bends in the course of a stream, developed when the stream is flowing at grade, through lateral shifting of its course toward the convex sides of the original curves.

**meander land (meanderland)**

Unsurveyed land along a lake shore or stream border that has developed by the receding of the shore line or of the stream since the last cadastral survey of the area. A miscellaneous land type.

**mean weight diameter (MWD) (gemiddelde-massa diameter (GMD))**

A parameter used to quantify aggregate size distribution, usually based on a wet-sieving analysis. It is defined as

$$\text{MWD} = \frac{\sum_{i=1}^n \bar{x}_i w_i}{n}$$

where  $\bar{x}_i$  = mean diameter of aggregate size class  $i$ .  
 $w_i$  = fraction of total sample mass occurring in size class  $i$ .  
 $n$  = number of size classes used

Cf. geometric mean diameter.

**mechanical analysis (obsolete) (meganiese ontleding (verouderd))**

See particle-size analysis; particle-size distribution.

**mechanistic model (meganistiese model)**

See mathematical model.

**medium sand (mediumsand)**

See soil separates; soil texture.

**medium sand class (mediumsandklas)**

See soil texture.

**medium texture (mediumtekstuur)**

Intermediate between fine- and coarse-textured soils, containing moderate amounts of sand, silt, and clay. Includes the following textural classes: very fine sandy loam, loam, silt loam and silt. See soil texture. Cf. coarse texture; fine texture.

**meerschaum (meerskuim)**

Massive sepiolite. Etymol. German *meerschaum*, sea froth. Cf. sepiolite.

**melanic A horizon (melaniese A-horison)**

See diagnostic horizon.

**melanic epipedon (melaniese epipedon)**

See diagnostic horizon.

**melanisation (melanisering)**

Darkening of the soil horizons by the incorporation of humus into the mineral soil.

**mellow consistence (murfkonsistensie)**

See soil consistence.

**mellow soil (murfgrond)**

A very soft, very friable, porous soil without any tendency toward hardness or harshness. See soil consistence.

**mesa (tafelkop)**

A rather flat-topped, steep-sided hill or mountain that is usually composed of nearly horizontal strata of bedrock.

**mesh (maas)**

One of the openings or spaces in a screen. The value of the mesh is usually given as the number of openings per linear inch. This gives no recognition to the diameter of the wire, so that the mesh number does not always have a definite relation to the size of the hole.

**mesic (mesies)**

See soil temperature.

**mesofauna (mesofauna)**

The mesofauna include all soil animals with body size from 0,2 mm to 4 mm. In numbers they are the major group of the soil fauna and include the Enchytraeidae, larger nematodes and micro-arthropods like mites, false scorpions, springtails and small spiders.

**mesophyte (mesofiet)**

A plant that grows under medium or normal conditions of atmospheric water supply as distinguished from one which grows under dry or desert conditions (xerophytes) or very wet conditions (hydrophytes).

**mesotrophic (mesotrofies)**

Refers to soil that has suffered moderate leaching, such that the sum of the exchangeable Ca, Mg, K and Na, is 5-15 cmol/kg clay. This figure is calculated from the S-value and the clay content. Such soil is said to have a medium base status. Etymol. Greek *trophe*, nourishment; *mesos*, middle. Cf. base saturation percentage.

**Mesozoic (Mesosoïkum)**

See geological time scale.

**metahalloysite (metahalloysiet)**

A name used in Europe for the less hydrous form of halloysite. It is synonymous with halloysite of U.S. authors. The term has also been used to designate the nonhydrated form of halloysite. Cf. endellite; halloysite.

**metamorphic rock (metamorfe gesteente)**

A rock derived from pre-existing rocks but that differ from them in physical, chemical, and mineralogical properties as a result of natural geological processes, principally heat and pressure, originating within the earth. The pre-existing rocks may have been igneous, sedimentary or another form of metamorphic rock. For example, quartzite originating from sandstone.

**mho (obsolete) (mho (verouderd))**

A unit of electrical conductance; the reciprocal of ohm. See conductance; electrical conductivity.

**mica group (mikagroep)**

Phyllosilicate minerals, generally monoclinic, with perfect basal cleavage. Dioctahedral muscovite  $K_2A_{14}(Si_6Al_2)O_{20}(OH)_4$  and trioctahedral biotite  $K_2(Mg,Fe^{2+})_6[(Al,Fe^{3+})_2Si_6]O_{20}(OH)_4$  are pedologically the most important members. Other members of the group are paragonite, glauconite, margarite, phlogopite, sinnwaldite, lepidolite, clintonite and xanthophyllite. Cf. vermiculite; interstratified clay mineral; smectite.

**micelle (misel)**

- (1) The orderly arrangement of molecules, as in cellulose microfibrils in plant cell walls, or phospholipids in aqueous solution.
- (2) A spherical structure with polar groups on the inside and hydrophilic groups on the outside. Clay particles were sometimes referred to as micelles.

**microclimate (mikroklimaat)**

- (1) The climatic conditions of a small area resulting from the modification of the general climatic conditions by local differences in elevation or exposure.
- (2) The sequence of atmospheric changes within a very small region.

**microcline (mikroklien)**

See feldspar group of minerals.

**microfauna (mikrofauna)**

All animals smaller than 0,1 mm, including Protozoa, small unsegmented worms (Turbellaria, Rotifera, Nematoda) and Tardigrada. Most of them are hydrobionts living in the soil water.

**microflora (mikroflora)**

That part of the plant population which consists of individuals too small to be clearly distinguished without the use of a microscope. Includes actinomycetes, algae, bacteria and fungi.

**micro-irrigation (mikrobesproeiing)**

See irrigation methods.

**micromorphology (mikromorfologie)**

The study of soil microstructure, especially with the petrographic microscope. Many features have been recognized and described using this technique; some of the most important are listed below:

*apedal* - Applied to soil materials without peds.

*argillan* - A cutan composed dominantly of clay minerals.

*calcan* - A cutan composed of carbonates.

*chambers* - Vesicles or vughs connected by a channel or channels.

*channel* - A tubular-shaped void.

*cutan* - A modification of the texture, structure, or fabric at natural surfaces in soil materials due to concentration of particular soil constituents or in situ modification of the plasma.

*ferran* - A cutan composed of a concentration of iron oxides.

*glæbule* - A three-dimensional pedogenic feature within the s-matrix of soil material that is approximately prolate to equant in shape.

*gypsan* - A cutan composed of gypsum.

*mangan* - A cutan containing enough manganese (Mn) to effervesce upon application of H<sub>2</sub>O<sub>2</sub>.

*nodules* - Glaebules with an undifferentiated fabric; in this context undifferentiated fabric includes recognizable rock and soil fabrics.

*organan* - A cutan composed of a concentration of organic matter.

*pedal* - Applied to soil materials, most of which consist of peds.

*plasma* - That part of the soil material that is capable of being or has been moved, reorganized, and/or concentrated by the processes of soil formation. It includes all the material, mineral or organic, of colloidal size and relatively soluble material that is not contained in the skeleton grains.

*sesquan* - A cutan composed of a concentration of sesquioxides.

*skeleton grains* - Individual grains that are relatively stable and not readily translocated, concentrated or reorganized by soil-forming processes; they include mineral grains and resistant siliceous and organic bodies larger than colloidal size.

*vugh* - A relatively large void, usually irregular and not normally interconnected with other voids of comparable size.

**micronutrient (mikrovoedingstof)**

A chemical element necessary in small amounts for the growth of plants: B, Cl, Cu, Fe, Mn, Mo and Zn are normally regarded as micronutrients. Cf. essential element.

**microorganism (mikroorganisme)**

A member of a heterogeneous assemblage of simple organisms, consisting of the protozoa, algae, fungi, slime molds, and bacteria. They are either unicellular or, if multicellular, their tissues are relatively undifferentiated.

**microrelief (mikroreliëf)**

Small-scale, local differences in topography, including mounds, hollows, or pits a few metres or less in diameter and with elevation differences of up to 2 m. Cf. gilgai.

**midden (puinhoop)**

Accumulation of refuse around a dwelling place.

**migmatite (migmatiet)**

A composite rock produced by injection of granitic magma into schist.

**milli-equivalent per cent (milliëkwivalente-persent)**

See cation exchange capacity; conversion factors.

**millipedes (duisendpote)**

A group of the macrofauna characterized by elongated bodies and a large number of feet. They feed mainly on decomposing organic matter and fungal hyphae. They occur mainly in forest soils and do not damage crops significantly. Syn. diplopoda.

**mineral (mineraal)**

- (1) An inorganic substance with specific chemical composition; mixtures of mineral particles comprise rocks. Nearly all minerals are crystalline. Some are simple in composition, consisting of a single element (e.g. diamond, carbon) most of two (e.g. pyrites of iron and sulphur, FeS<sub>2</sub>). Minerals have various properties: a characteristic crystal form, hardness, specific gravity, colour, lustre and transparency, streak, cleavage, fracture, striations. Over 2 000 minerals are known, though only a few are important as rock constituents. Cf. soil mineral.
- (2) In general terms a substance obtained by mining: coal, oil, or a metallic ore.

**mineral fertilizer (anorganiese misstof)**

See fertilizer (inorganic).

**mineralization (mineralisasie)**

- (1) The transformation of an element from an organic to an inorganic state as a result of microbial action. Examples are the mineralization of N, P and S.

- (2) Sometimes refers to the enrichment of water by inorganic salts, although the term salinization is preferred. Cf. eutrophication; salinization.

**mineralogical analysis (mineralogiese ontleding)**

The identification and measurement of the kinds or amounts of minerals present in a sample.

**mineral soil (mineraalgrond)**

A soil consisting predominantly of inorganic particles which mainly determines its properties. It usually contains less than 20% organic matter but may sometimes have an organic surface layer up to 30 cm thick. Cf. organic soil.

**minimum tillage (minimumbewerking)**

A collective term for soil cultivation systems in which the number of tillage operations during the preplant period is reduced to a minimum. Syn. reduced tillage. Cf. tillage systems.

**Miocene (Mioseen)**

See geological time scale.

**miscellaneous land type (diverse landtype)**

A map unit for areas of land that either have little or no natural soil, or in respect of which soil identification has not been made. It can include badland, made land, meander land, mine dumps, mine wash, oil wasteland, river wash, rough broken land, rubble land, scoria land, slickens, stony land, swamp, tidal flats, urban land, volcanic-ash land and waste land.

**miscible displacement (mengbare verplasing)**

A process whereby one solution displaces another from a porous body, the two solutions being miscible and mixing occurring freely in the zone of contact between the two solutions.

**mite (myt)**

The mites or Acari constitute one of the eleven orders of the class Arachnida. Generally known as mites, it includes the ticks. They vary in size from 0,1 mm to 15 mm. The body has no clear division between the cephalothorax and abdomen, with little or no segmentation. The adult has four pairs of legs. They occur in large numbers and can numerically constitute up to 80% of the soil fauna population.

**mixed fertilizer (gemengde misstof)**

See fertilizer.

**mixed layer mineral (menglaagmineraal)**

See interstratified clay mineral.

**modal soil profile (modale grondprofiel)**

The most representative example of a specific soil type.

**model (model)**

See mathematical model.

**modulus of elasticity (elastisiteitsmodulus)**

The ratio of stress to strain for a material under given loading conditions; numerically equal to the slope of the tangent or the secant of a stress-strain curve. The use of the term modulus of elasticity is recommended for materials that deform in accordance with Hooke's Law; the term modulus of deformation for materials that deform otherwise.

**modulus of rupture (breukmodulus)**

A measure of the maximum tensile stress that the matrix of a standard soil sample can withstand before failure occurs; measured in kPa. It is a soil property often determined by way of a standardized procedure in studying soil crusting strength.

**Mohs' scale (Mohs se skaal)**

See hardness scale.

**moisture content (waterinhoud)**

See soil water . (Note : All terms with the prefix "moisture" and relating to soil water are dealt with under the entry "soil water").

**moisture equivalent (obsolete) (vogekwivalent (verouderd))**

See soil water: moisture equivalent.

**moisture-holding capacity (waterhouvermoë)**

See soil water : field capacity; saturation water content.

**moisture percentage (obsolete) (vogpersentasie (verouderd); waterinhoud)**

See soil water : water content.

**moisture potential (obsolete) (vogpotensiaal (verouderd); waterpotensiaal)**

See soil water : water potential; total potential.

**moisture profile (waterinhoud profiel)**

See soil water : water content profile.

**moisture-retention curve (grondwaterkenkromme; grondwaterretensie kromme)**

See soil water : water retentivity curve.

**moisture stress (obsolete) (vogspanning (verouderd); matriksdruk)**

See soil water : matric pressure.

**mole drain (moldrein)**

An uncased cylindrical channel created with a torpedo-like implement at a suitable depth below the soil surface and sloping sufficiently to provide for an adequate flow of drainage water.

**mole plough (molploeg)**

A special plough equipped with a sharp blade to which is attached a pointed torpedo-like metal cylindrical plug, used for establishing mole drains.

**mollic A horizon (obsolete) (molliese A-horison (verouderd))**

See diagnostic horizon.

**mollic epipedon (molliese epipedon)**

See diagnostic horizon.

**mollic horizon (molliese horison)**

See diagnostic horizon.

**Mollisol (Mollisol)**

See soil classification.

**molybdenite (molibdeniet)**

MoS<sub>2</sub>, hexagonal; a greenish-gray mineral.

**monoammonium phosphate (MAP) (monoammoniumfosfaat (MAP))**

A fertilizer consisting mainly of NH<sub>4</sub>H<sub>2</sub>PO<sub>4</sub>. It contains approximately 22% P and 11% N.

**monoculture (monokultuur)**

The continuous cultivation of a single crop, usually on a large area of land.

**monodentate (monodentaat)**

A ligand in which only one atom is bonded to the central atom of a complex. Cf. bidentate; complex.

**monolith (monoliet)**

See soil monolith.

**montmorillonite (montmorilloniet)**

See smectite.

**montmorillonite-saponite group (montmorilloniet-saponiet groep)**

See smectite.

**monzonite (monzoniet)**

A granular plutonic rock containing roughly equal amounts of orthoclase and plagioclase and thus intermediate between syenite and diorite. Hornblende and/or diopside, quartz and biotite are common constituents. Apatite, sphene, zircon and opaque oxides are accessories.

**mor (mor)**

A type of forest humus in which the H layer is present and in which there is practically no mixing of surface or organic matter with mineral soil; that is, the transition from the H layer to the A1 horizon is abrupt.

**moraine (moreen; gletserpuinhoop)**

An accumulation of drift with an initial topographic expression of its own, built within a glaciated region chiefly by the direct action of glacial ice. Examples are ground, lateral, recessional and terminal moraines.

**morphology (morfologie)**

Pertaining to the form and structure of things such as the soil.

**mosaic (photo) (mosaïek; fotomosaïek)**

An assemblage of overlapping aerial photographs whose edges have been matched to form a continuous photographic representation of an area. Cf. mosaic, controlled.

**mosaic, controlled (mosaïek, gekontroleerde)**

An aerial mosaic in which the photographs have been adjusted, oriented, and scaled to horizontal ground control in order to improve the accuracy of representation with respect to distances and distortions. It is usually assembled from rectified photographs that have been corrected for tilt and for variations in flight altitude. An uncontrolled mosaic has not undergone any rectification.

**mosaic, uncontrolled (mosaïek, ongekontroleerde)**

See mosaic, controlled.

**mottle (vlek)**

A spot or blotch of different colour or shades of colour interspersed with the dominant colour of the soil matrix. Cf. mottled soil; soil colour.

**mottled soil (gevlekte grond)**

Soil irregularly marked with spots of colour. A common cause of mottling is impeded drainage, although there are other causes, such as soil development from an uneven weathered rock. The weathering of different kinds of minerals may cause mottling (geogenic mottles). Cf. mottle; soil colour.

**mottling (vlekking)**

See mottle; mottled soil; soil colour.

**muck (meermolm)**

Highly decomposed organic material in which the original plant parts are not recognizable. Contains more mineral matter and is usually darker than peat.

**muck soil (meermolmgrond)**

- (1) An organic soil in which the organic matter is decomposed beyond recognition.
- (2) A soil containing 20 to 50% organic matter.

**mudstone (moddersteen)**

- (1) An indurated mud having the texture and composition, but lacking the fine lamination or fissility, of shale; a blocky or massive, finegrained sedimentary rock in which the proportions of clay and silt are approximately the same; a non-fissile mud shale.
- (2) A general term that includes clay, silt, claystone, siltstone, shale, and argillite, and that should be used only when the amounts of clay and silt are known or specified or cannot be precisely identified or when a deposit consists of an indefinite mixture of clay, silt, and sand particles, the proportions varying from place to place, so that a more precise term is not possible, or when it is desirable to characterize the whole family of finer-grained sedimentary rocks (as distinguished from sandstones, conglomerates, and limestones). Syn. mud rock.

**mulch (deklaag; grondkombers)**

Any material such as straw, sawdust, leaves, plastic film, or loose soil that is spread on the surface of the soil to protect the soil and the plant roots from the effects of raindrops, soil crusting, evaporation and freezing.

**mulching material (dekmateriaal)**

Any material used to establish a mulch, such as straw, leaves, plastic, etc.

**mulch tillage (deklaagbewerking)**

See tillage systems.

**mull (mild humus) (mull (milde humus))**

A type of humus, usually developed in forests, that is incorporated with underlying mineral matter. Cf. mor.

**Munsell colour system (Munsell kleursysteem)**

See soil colour.

**muriate of potash (muraat van potas)**

See potassium chloride fertilizer.

**muscovite (muskoviet)**

See mica.

**mycelium (miselium)**

A mass of thread-like filaments, branched or composing a network, that constitutes the vegetative structure of a fungus. Cf. hypha.

**mycorrhiza (mikorisa)**

A symbiotic association of root and/or rhizome with a fungus.

## N

### **nacrite (nakriet)**

A well-crystallized clay mineral of the kaolin group :  $Al_2Si_2O_5(OH)_2$ . It is polymorphous with kaolinite and dickite. Nacrite is structurally distinct from other members of the kaolin group, being the most closely stacked in the c-axis direction.

### **natric horizon (natriese horison)**

See diagnostic horizon.

### **natric B horizon (obsolete) (natriese B-horison (verouderd))**

See diagnostic horizon.

### **natric soil (natriese grond)**

See sodic soil.

### **natural classification (natuurlike klassifikasie)**

A type of classification in which observed properties or objects are classified; Cf. soil classification; numerical classification; technical classification.

### **natural erosion (natuurlike erosie)**

See erosion.

### **natural resource (natuurlike hulpbron)**

See resource.

### **necrosis (nekrose)**

Death associated with discolouration and dehydration of plant organs such as leaves.

### **negative adsorption (negatiewe adsorpsie)**

The increase in the concentration of anions in the equilibrium solution following the addition of a dilute, neutral salt solution to clay with little or no adsorbing capacity for anions at the prevailing pH.

### **negative pressure (negatiewe druk)**

See soil water : matric potential.

### **nematode (nematode)**

A term applied to members of the phylum Nematoda, being a group of unsegmented worms commonly parasitic on plants and animals, and occurring widely in soils.

### **neocarbonate B horizon (neokarbonaat B-horison)**

See diagnostic horizon.

### **neocutanic B horizon (neokutaniese B-horison)**

See diagnostic horizon.

### **nepheline (nefelien)**

$(Na,K)AlSiO_4$ , hexagonal. See feldspathoids.

**nepheline syenite (nefeliensiëniet)**

A medium grained plutonic rock composed essentially of alkali feldspar, nepheline, and sometimes an alkalic ferro-magnesian constituent.

**nesosilicate (nesosilikaat)**

A class or structural type of silicate characterized by the linkage of the  $\text{SiO}_4$  tetrahedra by ionic bonding only, rather than by sharing of oxygens. An example of a nesosilicate is olivine,  $(\text{Mg,Fe})_2\text{SiO}_4$ . Cf. sorosilicate; cyclosilicate; inosilicate; phyllosilicate; tectosilicate.

**neutral soil (neutrale grond)**

See soil pH.

**neutral stress (neutrale spanning)**

See pore water pressure.

**neutron moderation (neutronvertraging)**

Loss of energy of neutrons through collision with atomic nuclei. Neutron moderation constitutes the basis for the determination of soil water content with a neutron water meter.

**neutron water meter (neutronwatermeter)**

An instrument utilizing the principle of neutron moderation for the non-destructive, *in situ* measurement of the water content of soil. A suitable calibration procedure is usually required.

**ngubane (ngubane)**

See hardpan.

**nitic horizon (nitiese horison)**

See diagnostic horizon.

**Nitisol (Nitisol)**

See soil classification.

**Nitosol (obsolete) (Nitosol (verouderd))**

See soil classification.

**nitrification (nitrifikasie)**

The biological oxidation of ammonium nitrogen to nitrite and nitrate nitrogen, or a biologically induced increase in the oxidation state of nitrogen.

**nitrogen assimilation (stikstofassimilasie)**

The incorporation of nitrogen compounds into cell substances by living organisms.

**nitrogen cycle (stikstofsiklus)**

The sequence of biochemical changes undergone by nitrogen, wherein it is utilized by a living organism, liberated upon the death and decomposition of the organism and converted to inorganic forms.

**nitrogen fixation (stikstofbinding)**

The conversion of elemental nitrogen ( $N_2$ ) to organic combinations or to forms readily usable in biological processes.

**nitrogenous fertilizer (stikstofmisstof)**

Any inorganic fertilizer utilized for its nitrogen content. Cf. fertilizer.

**nitrogen loss (stikstofverlies)**

- (1) Losses, particularly of nitrate, by leaching from sandy soil with a low exchange capacity.
- (2) Non-biological volatilization of gaseous ammonia ( $NH_3$ ).
- (3) Biological volatilization of  $N_2$ ,  $N_2O$  and  $NO$  as a result of denitrification.

**nodule (nodule)**

Bodies of various shapes, sizes and colour that have been hardened to a greater or lesser extent by chemical compounds such as lime, sesquioxides, animal excreta and silica. These may be described in terms of:

*kind* - durinodes, gypsum, insect casts, ortstein, iron-manganese, lime, lime-silica, plinthite, salts;

*abundance* - few: less than 20% by volume percentage; common: 20-50%; many: more than 50%;

*hardness* - soft; hard (meaning barely crushable between thumb and forefinger); indurated and

*size* - threadlike; fine; medium (2-5 mm); coarse. Cf. micromorphology

**nodule bacteria (knoppiesbakterieë)**

See rhizobia.

**non-renewable resource (nie-hernubare hulpbron)**

See resource.

**nontronite (nontroniet)**

See smectite.

**norite (noriet)**

A coarse-grained plutonic rock containing basic plagioclase (labradorite) as the chief component and differing from gabbro by the presence of orthopyroxene (and hypersthene) as the dominant mafic mineral.

**normal erosion (normale erosie)**

See erosion.

**no-tillage (geenbewerking)**

See tillage systems.

**numerical classification (numeriese klassifikasie)**

The use of statistical techniques in order to classify soils. Cf. soil classification, natural classification; technical classification.

**nutrient (voedingstof; nutriënt)**

**An element which is absorbed and is necessary for the completion of the life cycle of organisms. Cf. plant nutrient.**

**nutrient balance (voedingstofbalans)**

**See plant nutrient balance.**

**nutrient cycle (voedingstofsiklus)**

**The cycle whereby plant nutrients are taken up from the soil and incorporated into plants, returned to the soil with dead plant matter and through mineralization is again converted to inorganic forms or released.**

## O

### **O horizon (O-horison)**

See soil horizon.

### **oblique air photo (skuinslugfoto)**

An aerial photograph taken with the camera axis intentionally inclined between the horizontal and the vertical (camera pointing down at an angle). It combines the ground view with the pattern obtained from a height. Cf. vertical air photo. Syn. oblique photograph.

### **occlude (insluit)**

The entrapment of an element or ion within the matrix of a crystallized or precipitated compound, e.g. the occlusion of phosphate (occluded P) in amorphous soil components. Cf. amorphous compound.

### **ochric A horizon (obsolete) (okriese A-horison (verouderd))**

See diagnostic horizon.

### **ochric epipedon (okriese epipedon)**

See diagnostic horizon.

### **ochric horizon (okriese horison)**

See diagnostic horizon.

### **octahedral sheet (oktahedrale plaat)**

One of the sheets of layer-lattice minerals. In this sheet Al or Mg atoms are co-ordinated with six oxygen atoms or OH groups, which are located around the Al or Mg atom with their centres on the six corners of a regular octahedron. The oxygen atoms and hydroxyl groups lie in two parallel planes with Al or Mg atoms between these planes. Syn. alumina sheet; magnesia sheet; gibbsite sheet; brucite sheet.

### **ohm (ohm)**

The unit of electrical resistance, equal to the resistance of a circuit in which an electrical potential difference of one volt maintains a current of one ampere.

### **Oligocene (Oligoseen)**

See geological time scale.

### **oligoclase (oligoblaas)**

See feldspar group of minerals.

### **olivine (olivien)**

(1) An olive-green, greyish-green or brown orthorhombic mineral:  $(\text{Mg,Fe})_2\text{SiO}_4$ . It comprises the isomorphous solid-solution series forsterite-fayalite. Olivine is a common rock-forming mineral of basic, ultrabasic and low-silica igneous rocks (gabbro, basalt, peridotite, dunite); it crystallizes early from a magma, weathers readily at the earth's surface, and metamorphoses to serpentine.

- (2) A name applied to a group of minerals forming the isomorphous system  $(\text{Mg,Fe,Mn,Ca})_2\text{SiO}_4$  including forsterite, fayalite, tephroite and a hypothetical calcium orthosilicate. Also, any member of this system.

**oolite (oöliet)**

A rock, usually a limestone, composed mainly of ooliths.

**oolith (oölietkorrels)**

A spherical to ellipsoidal body, usually 0,25 to 2,00 mm in diameter, with concentric or radial structure or both. It is usually calcareous but may be siliceous, haematitic or of other composition.

**opal (opaal)**

A mineral (or mineral gel) :  $\text{SiO}_2 \cdot n\text{H}_2\text{O}$ . It is an amorphous (colloidal) form of silica containing a varying proportion of water (as much as 20% but usually 3-9%) and occurring in nearly all colours. Opal is transparent to nearly opaque, and typically exhibits a definite and often marked iridescent play of colour. It differs from quartz in being isotropic, having a lower refractive index and being softer and less dense. Opal usually occurs massive and frequently pseudomorphous after other minerals and is deposited at low temperatures from silica-bearing water. Syn. opaline. Cf. phytolith.

**order, soil (orde, grond-)**

A category in soil classification schemes. See soil classification.

**Ordovician (Ordovisium)**

See geological time scale.

**organan (organaan)**

See micromorphology.

**organic O horizon (organiese O-horison)**

See soil horizon.

**organic fertilizer (organiese misstof)**

See fertilizer.

**organic matter, soil (organiese materiaal, grond-)**

The organic fraction of soil ranging from undecayed plant and animal tissues through ephemeral products of decomposition to fairly stable amorphous brown to black material, known as humus, which bears no trace of the anatomical structure from which it was derived. Usually determined on soils which have been sieved through a 2,0 mm sieve.

**organic soil (organiese grond)**

A soil which forms under hydromorphic conditions and contains more than 15% organic matter throughout the solum. In general, organic soils are very compressible and have poor load-sustaining properties.

**orthic A horizon (ortiese A-horison)**

See diagnostic horizon.

**orthoclase (ortoklaas)**

One of the most common minerals occurring in rocks,  $KAlSi_3O_8$ . Found especially in granites and syenites, in arkose and certain sandstones and conglomerates, and in gneisses. It has two prominent cleavages at right angles to each other and is grey, white or flesh-red. Also referred to as a potash feldspar.

**orthoquartzite (ortokwartsiet)**

A clastic sedimentary rock composed of silica-cemented quartz sand.

**ortstein (ortstein)**

See hardpan; nodule.

**osmosis (osmose)**

The transport of solvent through a semipermeable membrane separating solutions in which the chemical potentials of the solvent are unequal; the solvent moves to the solution with the higher solute concentration.

**osmotic head (osmotiese hoogte)**

See soil water : osmotic head.

**osmotic potential (osmotiese potensiaal)**

See soil water : osmotic potential.

**osmotic pressure (osmotiese druk)**

See soil water : osmotic pressure.

**osmotic suction (osmotiese suiging)**

See soil water : osmotic stress.

**ouklip (ouklip)**

See hardpan.

**outcrop (dagsoom)**

That part of a geologic formation or structure that appears at the surface of the earth.

**outer-sphere complex (buitesfeerkompleks)**

A complex in which one or more water molecules is interposed between the central group and a ligand. Cf. complex; inner-sphere complex.

**outwash (fluvioglasiale puin)**

Material deposited by glacial meltwater issuing from ice.

**oven-dry soil (oonddroë grond)**

Soil which has been dried at 105°C until it reaches constant mass.

**overburden (bolaag)**

- (1) Material recently deposited by a transportation mode, that occurs immediately superjacent to the surface horizon of a contemporaneous soil.
- (2) A term used to designate disturbed or undisturbed material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials, ores, lignites, or coals, especially those deposits mined from the surface by open cuts.

**overburden potential (bolaagpotensiaal)**

See soil water : envelope-pressure potential.

**overliming injury (oorbekalkingskade)**

The addition of lime until the pH of the soil is above the range required for optimum growth of a particular plant species on the soil in question. Under such conditions many crops that ordinarily respond to lime are adversely affected, especially during the first season following the application.

**oxbow lake (hoefystermeer)**

A crescent-shaped lake formed in an abandoned river bend by a meander cut-off.

**oxic B horizon (obsolete) (oksiese B-horison (verouderd))**

See diagnostic horizon.

**oxic horizon (oksiese horison)**

See diagnostic horizon.

**oxidation (oksidasie)**

- (1) A chemical reaction that increases the oxygen content of a compound.
- (2) A chemical reaction in which a compound or radical loses electrons, that is in which the positive valence is increased, for example  $\text{Fe}^{2+} \text{-----} \rightarrow \text{Fe}^{3+} + \text{e}^-$ .

**Oxisol (Oksisol)**

See soil classification.

## P

### paleocene (Paleoseen)

See geological time scale.

### paleontology (paleontologie)

The study of life in past geological time, based on fossil remains, both animal and vegetable.

### paleosol (paleosol)

A soil formed during the geological past and subsequently buried. When the overlying, younger material is removed by erosive stripping, it becomes exposed on the landscape surface. Age may be determined by carbon dating and pollen grain analysis. Syn. buried soil; fossil soil.

### Paleozoic (Paleosoikum)

See geological time scale.

### pallid A horizon (obsolete) (pallidiese A-horison (verouderd))

See diagnostic horizon: ochric epipedon.

### palygorskite (paligorskiet)

A chain-lattice clay mineral:  $(\text{Mg,Al})_2\text{Si}_4\text{O}_{10}(\text{OH})\cdot 4\text{H}_2\text{O}$ . The term has also been used as a group name for lightweight, tough, matted, fibrous clay minerals showing a considerable amount of substitution of magnesium for aluminium and characterized by distinctive rod-like shapes under the electron microscope. Syn. attapulgite.

### palynology (stuifmeelstudie)

The study of living and fossil pollen grains and plant spores, including their dispersal and applications in stratigraphy and paleoecology.

### pan (pan)

A closed depression that can occur in great profusion in arid and semi-arid areas such as in the Karoo or Kalahari. Pans may result from such processes as solution and animal activity (buffalo or hog wallows), but the prime cause of their development is deflational activity on surfaces composed of susceptible materials (e.g. shales, fine sandstones and sands, lake beds, etc.). A pan may contain fresh or saline water.

### pan, soil (bank, grond-)

A layer, crust or horizon within the solum with a high bulk density or very high in clay content and usually impeding the movement of water and air and the growth of plant roots. Cf. hardpan.

### parent material (moedermateriaal)

The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of soils is developed by pedogenic processes. One may speak of the parent material of a horizon, or of a number of horizons which constitute a profile, or even of stratified alluvium which, although almost identical to its parent material, has often undergone changes in organic matter content and base status.

**parent rock (moedergesteente)**

The rock mass from which a soil's parent material is derived.

**particle, soil (deeltjie, grond-)**

See soil particle.

**particle density (deeltjiedigtheid)**

The mass per unit volume of the soil particles. Usually expressed as kg/m<sup>3</sup>.

**particle size (deeltjiegrootte)**

The general dimensions (such as average diameter or volume) of soil particles, based on the premise that the particles are spheres or that the measurements made can be expressed as diameters of equivalent spheres. It is commonly measured by sieving, by sedimentation analysis or by micrometric methods. Syn. grain size.

**particle size analysis (deeltjiegrootte-ontleding)**

Determination of the various amounts of the different separates in a soil sample, usually by sedimentation, sieving, micrometry or a combination of these methods.

**particle size distribution (deeltjiegrootteverspreiding (-verdeling))**

The percentage, usually by mass and sometimes by number of particles in each size fraction into which a dispersed sample of a soil, sediment or rock has been separated, such as the percentage of sand retained on each sieve in a given size range. It is the result of a particle size analysis. Syn. size distribution; size-frequency distribution.

**parts per million (ppm) (dele per miljoen (dpm))**

Mass units of any given component per 1 million mass units of material; or in the case of solutions, the mass units of solute per million volume units of solution. Obsolete, now replaced by mg kg<sup>-1</sup>, mg dm<sup>-3</sup> or g m<sup>-3</sup>.

**patina (patina)**

- (1) The smooth weathered surface of prehistoric artifacts, or similar surfaces on early Holocene and older rocks.
- (2) An incrustation, usually green, on the surface of bronze objects, old coins, etc.; also, the artificial copying thereof.

**pavement crust (plaveiselkors)**

See soil crust.

**peat (veen; moerasturf)**

A dark brown or black residuum produced by the partial decomposition and disintegration of mosses, sedges, trees and other plants that grow in wet places.

**pebble (rolsteen)**

A rock or mineral fragment in the soil, somewhat rounded, having a diameter in the range of 2 to 75 mm. Cf. gravel.

**ped (ped)**

A unit of coherent soil particles such as an aggregate, crumb, prism, block or granule formed by natural processes (in contrast with a clod, which is formed artificially).

**pedal (pedaal)**

Refers to soil materials most of which consists of peds. Cf. soil structure. Cf. micromorphology.

**pedalfer (obsolete) (pedalfer (verouderd))**

An old, general term for a leached soil in which there is a concentration of sesquioxides. It is the characteristic type of soil in a humid region. Cf. pedocal.

**pediment (pediment)**

The footslope component of an erosional slope; geomorphologically an erosional surface that lies at the foot of a receded slope, with underlying rocks or sediments that also underlie the upland, which is barren of, or mantled with sediment, and which normally has a concave upward profile.

**pediplain (pedivlakte)**

A plain formed by the coalescing of pediments. Cf. pediment.

**pedisediment (pedisediment)**

A colluvial deposit on plains of low relief (pediments) of soil material from upslope as a result of surface wash or rapid forms of mass movement such as slumpage or flowage.

**pedocal (obsolete) (pedokal (verouderd))**

An old, general term for a soil in which there is an accumulation or concentration of carbonates, usually calcium carbonate. It is the characteristic type of soil in an arid or semiarid region. Cf. pedalfer.

**pedocutanic B horizon (pedokutaniese B-horison)**

See diagnostic horizon.

**pedofabric (pedomaaksel)**

See fabric. Cf. micromorphology.

**pedogenesis (pedogenese)**

See soil genesis.

**pedogenic material (pedogenetiese materiaal)**

A product of soil genesis. Cf. soil genesis.

**pedogeomorphology (pedogeomorfologie)**

The field of study which emphasizes the spatial coincidence of soils and landforms and which reflects the interaction between pedological and geomorphological processes.

**pedology (pedologie)**

That branch of soil science dealing with soils as a natural phenomenon, including their morphological, physical, chemical, mineralogical and biological constitution, genesis, classification and geographical distribution.

**pedon (pedon)**

The smallest three-dimensional portion of the soil mantle needed to describe and sample soil in order to represent the nature and arrangement of its horizons. Rock or material that is too deep to be of interest to agricultural soil users mark the lower limit of the pedon. Depending on the variability within the soil, the area of a pedon ranges

from about 1 to 10 m<sup>2</sup>. In a way it resembles the unit cell of a crystal because it repeats itself laterally. The term "a soil" refers to those contiguous similar pedons that are bounded on all sides by "not soil" or by pedons of unlike character. This group of contiguous, similar pedons is called a polypedon and is the soil individual for the purpose of classification (Soil Survey Staff, 1994).

**pedorelic (pedorelik)**

A soil feature that is derived from a pre-existing soil horizon.

**pedosphere (pedosfeer)**

That shell or layer of the earth in which soil-forming processes occur.

**pedoturbation (pedoturbasie)**

Biological and physical (freeze-thaw and wet-dry cycles) churning and cycling of soil materials, thereby homogenizing the solum in varying degrees. Several kinds are recognized: floral, faunal, congelli-, argilli-, aero-, aqua-, crystal- and seismido-turbation.

**pegmatite (pegmatiet)**

An exceptionally coarse-grained (most grains 10 mm or more in diameter) igneous rock, with interlocking crystals, usually found as irregular dikes, lenses or veins, esp. at the margins of batholiths. Although pegmatites having gross compositions similar to other rock types are known, their composition is generally that of granite; the composition may be simple or complex and may include rare minerals rich in such elements as lithium, boron, fluorine, niobium, tantalum, uranium, and rare earths. Pegmatites represent the last and most hydrous portion of a magma to crystallize and hence contain high concentrations of minerals present only in trace amounts in granitic rocks. Syn. giant granite.

**peneplain (skiervlakte)**

- (1) A relatively flat, featureless plain which has resulted from the erosion of former overlying formations first by streams cutting a series of channels and then the ridges which lay between such channels eroding until the resulting surface is almost flat.
- (2) A once high, rugged area which has been reduced by erosion to a low, gently rolling surface resembling a plain.

**penetrability (penetreerbaarheid)**

The ease with which a probe can be pushed into the soil. May be expressed as a penetration value in units of distance, speed, force, or work depending on the type of penetrometer used.

**penetrometer resistance (penetrometerweerstand)**

The resistance offered by a soil against the penetration of a standard probe; usually measured in kPa.

**percentage base saturation (persentasie basisversadiging)**

The ratio of S-value to cation exchange capacity, expressed as a percentage. The S-value is the sum of exchangeable Ca, Mg, Na and K, usually expressed in cmol/kg.

**perched water table (verhewe watervlak)**

The surface of a local zone of saturation held above the main body of groundwater by an impermeable layer or stratum, usually clay, and separated from the main body of groundwater by an unsaturated zone.

**percolation (perkolasie)**

A qualitative term applicable to the downward movement of water through soil. Especially, the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of one or less. Cf. soil water: hydraulic conductivity.

**pergelic (vriesend)**

See soil temperature.

**peridot (peridoot)**

A gem variety of olivine.

**peridotite (peridotiet)**

A general term for a coarse-grained plutonic rock consisting chiefly of olivine, with or without other mafic minerals such as amphiboles and pyroxenes, and little or no feldspars.

**periglacial (periglasiaal)**

Indicative of all cold-climate processes, whether or not they occur in the immediate vicinity of glaciers.

**period (periode)**

In geology, a unit of geological time during which a system of rocks is formed, e.g. the Jurassic period. Cf. geological time scale.

**permafrost (ysgrond)**

- (1) Permanently frozen material underlying the solum.
- (2) A perennially frozen soil horizon.

**permanent negative charge (permanente negatiewe lading)**

The negative charges of clay particles inherent in the crystal lattice of the particle due to isomorphous substitution and thus not affected by changes in pH or by ion exchange reactions.

**permanent wilting percentage (permanente verwelkpersentasie)**

The gravimetric water content of a soil at a point where indicator plants growing in that soil wilt and fail to recover turgidity when placed in a humid chamber. Syn. permanent wilting point. Cf. wilting point.

**permeability (deurlatendheid; permeabiliteit)**

A qualitative term that refers to the ease with which gases, plant roots or, more usually, liquids penetrate or pass through soil. See soil water: hydraulic conductivity; infiltration; intrinsic permeability.

**Permian (Perm)**

See geological time scale.

**petrocalcic horizon (petrokalsiese horison)**

See diagnostic horizon.

**petrography (petrografie)**

The systematic description and interpretation of rock textures and mineralogy in thin section and as hand specimens.

**petrogypsic horizon (petrogipsiese horison)**

See diagnostic horizon.

**petrology (petrologie)**

The study of rocks in general, including their occurrence, field relations, structure, origins and history (petrogenesis), and their mineralogy and textures (petrography).

**petroplinthic horizon (petroplintiese horison)**

See diagnostic horizon.

**pF (obsolete) (pF (verouderd))**

The logarithm of the soil matric potential expressed in units of cm water. Originally defined by R.K. Schofield as the logarithm of Buckingham's potential expressed as the height, in cm, of an equivalent water column.

**pH (pH)**

The pH of a solution is the negative logarithm to the base ten of the hydrogen ion activity in the solution:

$$\text{pH} = -\log_{10}a_{\text{H}}$$

where  $a_{\text{H}}$  = hydrogen ion activity. Cf. soil pH.

**pH, soil (pH, grond-)**

See soil pH.

**pH-dependent charge (pH-afhanklike lading)**

That portion of the total charge of soil particles which is affected by, and varies with, changes in pH.

**Phaeozem (Phaeozem)**

See soil classification.

**Phanerozoic (Fanerosoïkum)**

Paleozoic, Mesozoic and Cenozoic. Eon of evident life. Cf. geological time scale.

**phase (soil) (fase (grond))**

A subdivision of a unit of classification (e.g. a series or family) made in order to distinguish properties (e.g. depth) important to the use and management of land.

**phenocryst (fenokrist)**

A porphyritic crystal.

**phlogopite (flogopiet)**

See mica group of minerals.

**phonolite (fonoliet)**

The fine-grained extrusive equivalent of nepheline syenite.

**phosphorite (fosforiet)**

A sedimentary rock composed principally of phosphate minerals.

**phosphate fertilizer (fosfaatmisstof)**

Any fertilizer capable of supplying phosphorus when applied to the soil, e.g. superphosphate; double superphosphate (triple superphosphate, in USA usage); ammoniated superphosphate; mono-ammonium phosphate (MAP); calmafos. Cf. fertilizer.

**phosphate fixation (fosfaatvaslegging)**

See fixation.

**photomap (fotokaart)**

A mosaic map made from aerial photographs with physical and cultural features shown as on a planimetric map.

**phreatic line (freatiese lyn)**

The upper boundary of the water table in soils or of seepage water in earth dams, levees, and dikes. It is the line at which soil water pressure is equal to atmospheric pressure and lies between the capillary zone and the saturation zone. Hence phreatic surface. Cf. line of seepage.

**phyllite (filliet)**

An argillaceous rock formed by regional metamorphism and intermediate in metamorphic grade between slate and mica schist.

**phyllosilicate (fillosilikaat)**

A class or structural type of silicate characterized by the sharing of three of the four oxygens in each tetrahedron with neighbouring tetrahedra, to form sheets; the Si:O ratio is 2:5. An example is the micas. Cf. nesosilicate.

**physical properties of soil (fisiese grondeienskappe)**

Characteristics of soil which can be measured by physical means and expressed in physical terms, such as colour, density, porosity, hydraulic conductivity, structure, texture and depth.

**physical weathering (fisiese verwering)**

The breakdown of rock and mineral particles into smaller particles by physical forces such as frost action. Cf. weathering.

**phytolith (fitoliet)**

Rock formed by plant activity or composed chiefly of plant remains, e.g. coal, lignite and some reef limestones. The stony part of a living plant that secretes mineral matter, for example silica.

**piedmont (piedmont)**

Lying or formed at the base of a mountain.

**piezometer (piësometer)**

A standpipe or tube connected to a point in a liquid system at which the fluid pressure is to be measured.

**piezometric surface (piësmetriese vlak)**

The surface to which the water in a given aquifer will rise.

**pigeonite (pigeoniet)**

See pyroxene group of minerals.

**pile (heipaal)**

A long, relatively slender structural foundation element (plate, post, plank, beam board, etc.), usually made of timber, steel, or reinforced or prestressed concrete, that is driven or jettted into the ground or cast in place and that is used to support vertical or lateral loads, to form a wall to exclude water or soft material or to resist their pressure, to compact the surrounding ground, or rarely to restrain the structure from uplift forces.

**pipng (pyperosie; tonnelerosie)**

See erosion. Syn. tunnel erosion.

**piston flow (suiervloei)**

An idealized type of liquid transport in a porous medium such that all elements of the liquid flow in the same direction and with the same velocity. Cf. hydrodynamic dispersion.

**placic horizon (plaksiese horison)**

See diagnostic horizon.

**placic pan (plaksiese horison)**

See diagnostic horizon.

**plain (vlakke)**

An extensive area characterized by a local relief of less than 60 m and slopes of generally less than 5%.

**plaggen epipedon (plaggiiese epipedon)**

See diagnostic horizon.

**plagioclase (plagioklaas)**

See feldspar group.

**Planosol (Planosol)**

See soil classification.

**plant nutrient (plantvoedingstof)**

The elements or groups of elements taken in by a plant which are essential to its growth and used in elaboration of its food and tissues. Cf. essential element; macronutrient; micronutrient.

**plant nutrient balance (plantvoedingstofbalans)**

A ratio among concentrations of nutrients essential for plant growth which permits maximum growth rate and yield. An imbalance results when one or more nutrients are present in either deficient or excessive amounts.

**plant nutrient stress (plantvoedingstofstremming)**

A condition when an inadequate nutrient supply restricts plant growth.

**plant nutrient uptake (plantvoedingstofopname)**

See absorption, active; absorption, passive.

**plant nutrition (plantvoeding)**

That branch of science dealing with the uptake and translocation of nutrients by plants from soil and other media, and the interactions, interrelationships and transformations of nutrients and other substances as related to growth and yield of plants.

**plasma (plasma)**

See micromorphology.

**plastic flow (plastiese vloeï)**

- (1) In structural geology, synonymous with plastic deformation.
- (2) Non-Newtonian fluid flow, i.e. the flow of fluid which does not have a constant viscosity in accordance with Newton's law.

**plasticity (plastisiteit)**

The property of a soil which allows it to be deformed rapidly without cracking or crumbling and then maintain that deformed shape after the deforming force has been released.

**plasticity constants (plastisiteitskonstantes)**

A set of values indicative of soil plasticity. See Atterberg limits.

**plasticity index (plastisiteitsindeks)**

See Atterberg limits.

**plasticity number (plastisiteitsgetal)**

See Atterberg limits.

**plastic limit (plastisiteitsgrens)**

See Atterberg limits.

**plastic soil (plastiese grond)**

A soil capable of being molded or deformed continuously and permanently by relatively moderate pressure. Cf. soil consistence.

**plateau (plato)**

A broad plain that drops to lower elevations on at least three sides.

**platy structure (plaatstruktuur)**

See soil structure.

**playa (playa)**

A shallow basin in a desert region, intermittently filled with water which evaporates in a short time.

**Pleistocene (Pleistoseen)**

See geological time scale.

**plinthic horizon (plintiese horison)**

See diagnostic horizon.

**plinthite (plintiet)**

In a soil, a material consisting of a mixture of clay and quartz with other diluents, that is rich in sesquioxides and poor in humus and is highly weathered. It occurs as red mottles in a platy, polygonal, or reticulate pattern. Repeated wetting and drying changes plinthite to ironstone hardpan or irregular aggregates. See diagnostic horizon.

**Pliocene (Plioseen)**

See geological time scale.

**plough layer (ploeglaag)**

The layer ordinarily disturbed by tillage. Syn. Ap horizon.

**ploughsole (ploegblad (-bank; -sool))**

A subsurface soil layer having a higher bulk density and a lower total porosity than the soil directly above or below it, as a result of pressure that has been applied by normal tillage operations. Syn. ploughpan; traffic pan; pressure pan; induced pan.

**plutonic (plutonies)**

A general term applied to that class of igneous rocks which have crystallised at great depth and have therefore assumed, as a rule, granitoid (coarse) texture. Syn. intrusive rock.

**pluvial period (pluviale tydperk)**

A period of hundreds or thousands of years of heavy rainfall.

**pneumatic potential (gasdrukpotensiaal)**

See soil water : pneumatic potential.

**Podzol (Podzol)**

A great soil group of the zonal order consisting of soils formed in cool-temperate to temperate, humid climates, under coniferous or mixed coniferous and deciduous forest, and characterized particularly by a highly-leached, whitish-grey (Podzol) A2 horizon.

**podzol B horizon (podzol B-horison)**

See diagnostic horizon.

**podzolization (podzolisasie)**

The mobilization in and removal from an A and/or E horizon of organic matter and/or sesquioxides. That part of the eluvial horizon which is darkened by organic matter has bleached sand-size grains. The illuvial horizon has increased amounts of sesquioxides and/or organic matter as a result of removal from the upper soil. The process takes place typically in quartzose parent materials under a coniferous, coniferous-deciduous, macchia or heath vegetal cover.

**Podzoluvisol (obsolete) (Podzoluvisol (verouderd))**

See soil classification.

**point source (pollution) (puntbron (besoedeling))**

**Pollution originating in a small area, e.g. from a waste dump, an industrial site, a contaminated well, a spillage of chemicals, etc. Cf. diffuse source.**

**polder (polder; drooggelegde land)**

**An area of low-lying land which has been reclaimed from the sea, and is surrounded by earth banks (dykes) in order to keep out sea and river water, as in the Netherlands.**

**polyelectrolyte (poliëlektroliet)**

**A polymer containing dissociable ions. Cf. polymer.**

**polymer (polimeer)**

**A high molecular weight substance of either synthetic or natural origin; it is formed by linkage of smaller units (monomers) through the process of polymerization.**

**polymorphic (polimorf)**

**See allotropic.**

**polypedon (polipedon)**

**See pedon.**

**poorly drained soil (swak gedreineerde grond)**

**A soil that remains wet or waterlogged for long periods and as a result develops a mottled pattern of grey and brown/yellow colours; it usually has a gley horizon.**

**poorly graded soil (swak gegradeerde grond)**

**A soil material consisting mainly of particles nearly the same size; well sorted, usually by wind. Because there is little difference in size of the particles in poorly graded soil material, density usually can be increased only slightly by compaction.**

**pore pressure (poriedruk)**

**See pore water pressure.**

**pore size (poriegrootte)**

**The equivalent diameter of a soil pore determined by micrometry or indirect methods such as mercury injection or water retention.**

**pore space (porieruimte)**

**The total space not occupied by soil particles in a bulk volume of soil, expressed as a fraction or percentage of the bulk volume. The interconnected part of the pore system through which fluids can move freely is called the effective pore space. Cf. air-filled porosity.**

**pore water (poriewater)**

**Water occurring within the pore space of soil or rock.**

**pore water pressure (poriewaterdruk)**

**That part of the total stress in a mass of soil or rock that acts in the liquid contained within the pores. Cf. effective stress. Syn. neutral stress.**

**porosity (soil) (poreusheid (grond); porositeit)**

**The percentage volume of the soil occupied by pores and pore space.**

**porphyritic (porfirities)**

A textural term for those igneous rocks in which larger crystals (phenocrysts) are set in a finer groundmass.

**potash (obsolete) (potas (verouderd))**

- (1) A term used to refer to potassium or potassium fertilizers and usually designated as  $K_2O$ .
- (2) Potash is actually  $K_2CO_3$ ; the name derives from a manufacturing process thereof.

**potassium chloride fertilizer (kaliumchloriedkunsmiss)**

A potassium fertilizer containing 50% K (KCl). Syn. muriate of potash.

**potassium feldspar (kaliumveldspaat)**

See feldspar group of minerals.

**potassium fertilizer (kaliummisstof)**

Any fertilizer that is used to supply a soil with plant available K. Cf. fertilizer.

**potassium fixation (kaliumvaslegging)**

See fixation.

**potassium nitrate fertilizer (kaliumnitraatkunsmiss)**

A fertilizer, little used at present, containing 38% K and 13% N ( $KNO_3$ ).

**potassium sulphate fertilizer (kaliumsulfaatkunsmiss (-misstof))**

A potassium fertilizer, containing 40-42% K ( $K_2SO_4$ ).

**pot clay (potter's clay) (potklei)**

A dense, impermeable, sticky clay usually occurring in the subsoil of low-lying areas. Often used for making clay objects.

**potential evapotranspiration (potensiële evapotranspirasie)**

Water loss from soil supporting an actively growing low level crop of large extent, completely covering the ground and not suffering water stress, through evaporation and transpiration. Very largely controlled by physical meteorological factors.

**potential (soil water) (potensiaal (grondwater))**

See soil water : total potential.

**potential gradient (potensiaalgradiënt)**

See soil water : hydraulic gradient.

**Prairie Soil (Prairiegrond)**

A zonal great soil group consisting of soils formed under temperate to cool-temperate, humid regions under tall grass vegetation.

**Precambrian (Voor-Kambrium)**

See geological time scale.

**precipitation (neerslag)**

In hydrology, the discharge of water in liquid or solid state, out of the atmosphere, upon land or water.

**preferential flow (voorkeurvloei)**

The process whereby water and chemical movement through a porous medium follow favoured routes, thus bypassing other parts of the medium. The favoured routes are cracks, channels and macropores. Syn. bypass flow.

**pressure head (drukhoogte)**

See soil water : pressure head.

**pressure membrane (apparatus) (drukmembraan (-toestel))**

A membrane, permeable to water and only very slightly permeable to gas when wet, through which water can escape from a soil sample in response to a pressure gradient. Used in a pressure membrane apparatus to determine soil water retention values.

**pressure plate (apparatus) (drukplaat (-toestel))**

A porous ceramic plate, permeable to water and permeable to air only when some critical air-entry pressure value is exceeded, through which water can escape from a soil sample in response to a pressure gradient. Used in a pressure plate apparatus to determine soil water retention values.

**pressure potential (drukpotensiaal)**

See soil water : pressure potential.

**primary mineral (primêre mineraal)**

A mineral that has not been altered chemically since deposition and crystallization from molten lava. Cf. secondary mineral.

**primary mineral (primêre mineraal)**

A mineral that has remained unchanged from the time it was formed out of molten rock.

**prismacutanic B horizon (prismakutaniese B-horison)**

See diagnostic horizon.

**prismatic soil structure (prismatiese grondstruktuur)**

See soil structure.

**prismlike (prismavormig)**

See soil structure.

**probe (peiler)**

A device that can be inserted into a material in order to measure some property thereof, e.g. temperature probe, hardness probe, neutron (water) probe, etc.

**producer (produseerder)**

In ecology, an organism that can use radiant energy, carbon dioxide and inorganic nutrients to synthesize organic substances. Cf. consumer.

**productivity, soil (produktiwiteit, grond-)**

The capacity of a soil, in its normal environment, for producing a specified plant or sequence of plants under a specified system of management.

**profile available water capacity (PAWC) (profiel-beskikbare waterkapasiteit (PBWK))**

For a specified cultivar and growth stage, soil, and evaporative demand, PAWC is the amount of water held in the effective root zone between field capacity and the water content at which water should be applied if optimum yield is to be attained. Cf. available water capacity; soil capacity.

**profile, soil (profiel, grond-)**

See soil profile.

**Proterozoic (Proterosoikum)**

See geological time scale.

**psammite (psammiet)**

A metamorphosed sandstone, arkose, or quartzite, extremely rich in quartz. Etymol. Greek *psammos*, sand.

**psammophyte (psammofiet)**

Plants which prefer or tolerate sand, particularly fine to medium sand, as a habitat.

**pseudomorph (pseudomorf)**

A mineral that has an uncharacteristic crystalline form as a result of assuming the shape of another mineral that it has replaced.

**psychrometer (psigrometer)**

A hygrometer consisting of a similar pair of thermometers, the bulb of one of which is kept wet, and therefore cooled by evaporation. The difference in temperature between the two thermometers is a measure of the relative humidity of the air. Cf. hygrometer.

**puddle (slemp)**

To work a soil in the plastic condition until its pore space is much reduced. Cf. puddled soil.

**puddled soil (toegeslane grond)**

A dense, massive soil artificially compacted when wet and having no regular structure. The condition commonly results from the tillage of a clayey soil when it is wet.

**pure sand (suiwersand)**

A texture class. See soil texture.

**pyrite (piriet)**

An iron sulphide:  $\text{FeS}_2$ . A yellow mineral with metallic lustre, mined chiefly for its sulphur content. Sometimes called "fool's gold".

**pyroclastic (piroklasties)**

A term applied to clastic rock material formed by volcanic explosion or aerial expulsion from a volcanic vent.

**pyrolusite (pirolusiet)**

Manganese dioxide,  $\text{MnO}_2$ . Usually occurs in radiating fibers or columns with metallic lustre.

**pyrophyllite (pirofilliet)**

**An aluminosilicate mineral:  $\text{Al}_4(\text{Si}_8\text{O}_{20})(\text{OH})_4$ . Like the micas it has a layered structure in which a sheet of octahedrally co-ordinated Al ions is sandwiched between two sheets of linked  $\text{SiO}_4$  -tetrahedra.**

**pyroxene (pirokseen)**

**A mineral group in which members are closely analogous chemically to the members of the amphibole group. Augite ( $\text{Ca}(\text{Mg,Fe,Al})(\text{Al,Si})_2\text{O}_6$ ) is the most common pyroxene and an important rock-forming mineral. It is dark-coloured and found mainly in dark-coloured igneous rocks.**

## Q

### quartz (kwarts)

Crystalline silica ( $\text{SiO}_2$ ). It is an important rock-forming mineral and next to feldspar the commonest mineral, occurring either in colourless and transparent hexagonal crystals (sometimes coloured yellow, brown, purple, red, green, blue or black by impurities) or in crystalline or cryptocrystalline masses. Commonly the dominant constituent in the sand fraction of soils, often with red or yellow coatings of iron oxides.

### quartzite (kwartsiet)

- (1) As its name indicates, a quartzite is a rock composed essentially of quartz. It has been derived from a sandstone by intense metamorphism. It is a common and widely distributed rock in which solution and redeposition of silica have yielded a compact rock of interlocking quartz grains; it is hard, resistant to weathering and impermeable. It is distinguished from a sandstone by noting the fracture, which in a quartzite passes through the grains but in a sandstone passes around them.
- (2) A quartzose sandstone cemented by silica which has grown in optical continuity around each fragment.

### quartz diorite (tonalite) (kwartsdioriet; tonaliet)

Plutonic rock with the composition of diorite but with appreciable quartz. A small amount of orthoclase may be present; as this increases, the rock passes to granodiorite.

### quartz porphyry (kwartsporfier)

An extrusive or hypabyssal rock containing phenocrysts of quartz and alkali feldspar, usually orthoclase, with or without mica, in a microcrystalline or cryptocrystalline groundmass. If the phenocrysts are abundant, the rock becomes a granite porphyry.

### Quaternary (Kwaternêr)

See geological time scale.

### quaternary exchange (kwaternêre uitruiling)

Refers to an exchange reaction in which four ions are involved. Cf. binary exchange; ternary exchange.

### quick (condition) (weltoestand)

A condition (e.g. in some sands and clays) in which the bearing capacity of the material is markedly reduced by upward flowing water. Cf. quicksand.

### quicksand (welsand)

Sand that is unstable because of an upward pressure gradient of water in the sand. Usually a thick mass of loose sand and mud saturated with water, which may swallow a heavy object such as an animal. Cf. quick (condition).

## R

### **R horizon (R-horizon)**

See soil horizon.

### **radiocarbon dating (radiokoolstofdatering)**

The determination of the age of a material by measuring the proportion of the isotope  $C^{14}$  (radiocarbon) in the carbon it contains. The method is suitable for the determination of ages up to about 50 000 years.

### **rain shadow (reënskaduwee)**

The area on the leeward side of a mountain range where the precipitation is less than on the rain - bearing, windward side.

### **Ranker (obsolete) (Ranker (verouderd))**

See soil classification.

### **reaction, soil (reaksie, grond-)**

See soil reaction.

### **Recent (Resent)**

See geological time scale.

### **recession (terugtrekking)**

The retreat of the sea, thereby exposing formerly submerged areas. Syn. regression.

### **reclamation (herwinning)**

The process of recovering disturbed and/or deteriorated land to its former uses or other productive uses.

### **reconnaissance survey (verkenningsoopname)**

A reconnaissance inspection or survey of an area to gain general information useful for future planning and management. Cf. soil survey.

### **recycling (hersirkulering)**

A resource recovery method involving the collection and treatment of a waste product for use as a raw material for other purposes, e.g. composting of household wastes.

### **red apedal B horizon (rooi apedale B-horison)**

See diagnostic horizon.

### **Red Desert Soil (Rooi Woestynggrond)**

A zonal great soil group consisting of soil formed under warm-temperate to hot, dry regions under desert type vegetation, mostly shrubs.

### **red earth (rooi aarde)**

Highly leached, red clayey soil of the humid tropics, usually with very deep profiles that are low in silica and high in sesquioxides. Syn. Krasnozem.

### **redox potential (redokspotensiaal)**

Reactions involving the transfer of electrons from donor to acceptor, i.e. oxidation-reduction reactions. Aqueous solutions contain only minute amounts of free electrons, but it is nevertheless possible to define a relative electron activity  $pe = -\log(e^-)$ . The quantity  $pe^0$  indicates the relative electron activity when reacting species other than the electrons are at unit activity. The redox potential ( $E_h$ ) is defined as:

$$E_h = E_h^0 + (RT/nF) \ln[(Ox)/(Red)], \text{ with } E_h^0 - pe^0 \times 60 \text{ mV.}$$

**red structured B horizon (rooi gestruktuurde B-horison)**

See diagnostic horizon.

**reduced tillage (verminderde bewerking)**

See tillage systems.

**reduction (reduksie)**

- (1) The reaction of hydrogen with another substance.
- (2) A chemical reaction in which an element gains an electron, that is the positive valence is reduced, e.g.  $Fe^{3+} + e^- \longrightarrow Fe^{2+}$ .
- (3) In geomorphology : the lowering of a land surface by erosion.

**Red-yellow Podzolic Soil (Rooi-geel Podzoliese Grond)**

A combination of the zonal great soil groups, Red Podzolic and Yellow Podzolic, consisting of soils formed under warm-temperate to tropical, humid climates, under deciduous or coniferous forest vegetation and usually, except for a few members of the Yellow Podzolic group, under conditions of good drainage.

**reflection coefficient (weerkaatsingskoeffisiënt)**

- (1) The average reflectivity over a specific waveband.
- (2) The fraction of radiation intensity reflected by a surface.

**reflectivity (weerkaatsingsvermoë)**

The reflectivity of a surface is the fraction of incident solar radiation reflected at a specific wavelength.

**regic sand (regiese sand)**

See diagnostic horizon.

**regolith (regoliet)**

The unconsolidated mantle of weathered rock and soil material on the earth's surface; loose earth materials above solid rock. (Approximately equivalent to the term "soil" as used by many engineers.)

**Regosol (Regosol)**

Any soil of the azonal order without definite genetic horizons and developing from or on deep, unconsolidated, soft mineral deposits such as sands, loess, or glacial drift. See soil classification.

**regression (regressie)**

See recession.

**Regur (Regur)**

An intrazonal group of dark calcareous soils high in clay, which is mainly montmorillonitic, and formed mainly from rocks low in quartz, occurring extensively

on the Deccan Plateau of India. The South African equivalent is the black turf soils or soils of the Arcadia and Rensburg forms (Vertisols).

**relative humidity (relatiewe humiditeit)**

See humidity.

**relief (reliëf)**

The variation in or physical outline of a landscape, shown on maps by the use of contours, spot heights, hypsometric tinting and hillshading. Relief is also used synonymously with relative relief. Positive relief indicates land rising above the general level, i.e. hills. Relief should not be confused with topography. Cf. topography.

**remote sensing (afstandwaarneming)**

Identifying and observing objects from a distance, commonly from aircraft or satellites.

**Rendzina (obsolete) (Rendzina (verouderd))**

A great soil group of the intrazonal order and calcimorphic suborder, consisting of soils with brown or black friable surface horizons underlain by light grey to pale yellow calcareous material; developed from soft, highly calcareous parent material under grass vegetation or mixed grasses and forest in humid and semi-arid climates. See soil classification.

**renewable resource (hernubare hulpbron)**

See resource.

**replenishment efficiency (aanvullingsdoeltreffendheid)**

The replenishment efficiency of irrigation is the ratio of the amount of water which enters the root zone to the amount of water required to enter the root zone, expressed as a percentage. Cf. application efficiency; distribution efficiency; irrigation efficiency; transmission efficiency.

**residual effect (fertilizer) (nawerking (kunsmis))**

When the effect of a fertilizer application is evident over more than one season, e.g. on crop yield.

**residual material (residuele materiaal)**

Unconsolidated and partly weathered mineral material accumulated by the *in situ* disintegration of consolidated rock.

**residual soil (residuele grond)**

A soil formed from, or resting on, consolidated rock of the same kind as that from which it was formed, and in the same location. Cf. residual material; sedentary soil.

**resilience (herstelvermoë)**

See soil resilience.

**resistance, electrical (weerstand, elektriëse)**

(1) That property of any electrically conductive material that causes a portion of the energy of an electric current flowing in a circuit to be converted into heat. This rate of energy conversion is also  $VI$  where  $V$  is the electrical potential difference and  $I$  the current. By Ohm's law  $R = V/I$ , for a metal conductor.

- (2) Soil electrical resistance is measured (and expressed in ohms) on a saturated paste in a US Bureau of Soils resistance cell (cell constant  $0,25 \text{ cm}^{-1}$ ). It is a rough but easily measured guide to the quantity of soluble salts in the soil.

**resource (hulpbron)**

Anything in the environment that is of use to man.

*natural resources* - Part of the environment that can be used commercially (e.g. soil, forests, coal deposits).

*non-renewable resources* - Substances or materials which have been built up or evolved in a geological time-span and cannot be replaced except over a similar time-scale. Examples are copper, coal, oil, etc. We also consider soil to be a non-renewable resource.

*renewable resources* - Resources that derive from solar energy such as rain, wind, trees, grass, fish, wild-life.

**retentivity profile (retensieprofiel)**

A graph showing the retaining capacity of a soil as a function of depth. The retaining capacity may be for water, for water at any given potential, for cations, or for any other substances held by the soil.

**rhizobia (risobia)**

The bacteria capable of living in symbiotic relationship with higher plants, usually legumes, in nodules on the roots. They receive energy from the plant and are capable of using atmospheric nitrogen; hence the term symbiotic nitrogen-fixing bacteria. From the genus name *Rhizobium*.

**rhizosphere (risosfeer)**

The zone of soil immediately adjacent to plant roots in which the kinds, numbers, or activities of microorganisms differ from that of the bulk soil.

**rhyolite (rioliet)**

The extrusive equivalent of granite with quartz and alkali feldspar in a glassy groundmass.

**rill (groef)**

A small, intermittent water course with steep sides; usually only a few centimetres deep and, hence, no obstacle to tillage operations. See erosion.

**rill erosion (groeferosie)**

See erosion.

**riparian (oewer-)**

Pertaining to the banks of a river; as in riparian rights.

**Riss (Riss)**

The third Pleistocene glaciation.

**riverwash (rivierpuin)**

Alluvial material, usually coarse-textured, exposed in streambeds at low water and subject to shifting during normal high water. A miscellaneous land type.

**roaring sand (brulsand)**

Sand, found on a desert dune, that during movement, sets up a low roaring sound that sometimes can be heard for a considerable distance.

**rockland (rotsland)**

Areas containing frequent rock outcrops and shallow soils. Rock outcrops usually occupy 25 to 90% of the area. A miscellaneous land type.

**rock phosphate (rotsfosfaat)**

A finely ground phosphate-containing rock which may be used as a phosphate fertilizer. Also referred to as raw rock phosphate, its chemical formula is conventionally given as  $\text{Ca}_3(\text{PO}_4)_2$ , although it is more likely to approach fluorapatite or hydroxyapatite, with the formula  $[\text{Ca}_3(\text{PO}_4)_2]_3 \cdot \text{Ca}(\text{F},\text{OH})_2$ . Due to its insolubility it is usually used only on acid soils or with organic matter.

**rock salt (rotssout)**

Crystalline, fibrous or even granular aggregates of NaCl (halite).

**root zone (wortelsone)**

The part of the soil that is penetrated or can be penetrated by plant roots.

**rubble land (klipperige land)**

Land areas with 90% or more of the surface covered with stones and boulders. A miscellaneous land type.

**rubification (rubifikasie)**

A process in which iron is released from primary minerals by means of weathering and in the oxidized state the iron causes a reddening of the soil mass. This process is sometimes visible in soils that have been irrigated for some time.

**runoff (afloop)**

That portion of the precipitation on an area which is discharged from the area through stream channels. That which is lost without entering the soil is called *surface runoff* and that which enters the soil before reaching the stream is called *ground water runoff* or *seepage flow* from ground water. (In soil science "runoff" usually refers to the water lost by surface flow; in geology and hydrology "runoff" usually includes both surface and subsurface flow.)

**rutile (rutiel)**

A black, yellowish, or reddish-brown mineral, found in igneous rocks, metamorphosed limestones, and quartz veins. It is a source of titanium; its composition is  $\text{TiO}_2$  and it has a tetragonal crystal structure.