

## D

### **dacite (dasiet)**

A fine-grained extrusive rock with the same general composition as andesite, but having less calcic plagioclase and more quartz. It is sometimes regarded as the extrusive equivalent of granodiorite. Syn. quartz andesite.

### **darcy (darcy)**

See soil water : darcy.

### **Darcy's Law (Darcy se wet)**

See soil water : Darcy's Law.

### **debris (puin)**

The loose material arising from the disintegration of rocks and vegetative material; transportable by streams, ice, or floods.

### **decomposer (ontbinder)**

An organism, usually a bacterium or a fungus, that breaks down dead plants and animals into simple compounds.

### **decomposition (ontbinding)**

The process of resolving into simpler or constituent parts. Inorganic ions are generally among the terminal products. The decomposition of organic materials results from the action of especially micro-organisms; the processes may be aerobic or anaerobic.

### **deep tillage (diepbewerking)**

A soil cultivation operation in which the soil is disturbed to a depth greater than the 180 to 200 mm normally encountered with conventional ploughing. Cf. tillage systems.

### **deficiency disease (gebreksiekte)**

A characteristic plant growth abnormality associated with the deficiency of an essential nutrient. Cf. essential element; plant nutrient.

### **deflation (deflasie)**

The removal of fine particles from soil by wind. Hence, deflation basin.

### **deflocculation (deflokkulasie)**

- (1) Separation of the individual components of compound particles (e.g. soil aggregates) by chemical and/or physical means. Syn. dispersion.
- (2) To disperse the particles of a colloidal system thus producing a stable suspension.
- (3) A high soluble salt content (a high electrolyte concentration) promotes flocculation in soils, whereas a low soluble salt content combined with a high sodium adsorption ratio favours deflocculation. Cf. dispersion; flocculation; sodic soil.

### **deforestation (ontbossing)**

The removal of trees from a forested area without adequate replanting.

### **degradation (degradasie)**

- (1) See soil degradation.

- (2) The process whereby a compound is transformed into simpler compounds, although products more complex than the starting material may be formed.
- (3) The general lowering of the surface of the land by weathering and erosive processes.

**degree of saturation (versadigingsgraad)**

See soil water : degree of saturation.

**dehydration (dehidrasie)**

- (1) Removal or loss of water from a compound.
- (2) Dewatering of fruit, vegetables, etc.
- (3) Withdrawal or removal of water from gels, sediments, rocks, etc.
- (4) Loss of water from animal and human bodies.

**delineation (afbakening)**

The process of drawing or plotting features on a map with lines and symbols.

**delta (delta)**

A buildup deposit of river-borne sediments at the mouth of a river.

**demineralization (ontsouting)**

The removal of inorganic substances from water, organic media and substances, or organisms. Cf. desalination.

**dendrochronology (dendrochronologie)**

Study and matching of tree rings with the aim of dating events in the recent past.

**dendritic (dendrities)**

- (1) Said of a mineral that has crystallized in a branching pattern: pertaining to dendrite. Syn. arborescent.
- (2) The form of the drainage pattern of a stream and its tributaries when it follows a treelike shape, with the main trunk, branches, and twigs corresponding to the main stream, tributaries and subtributaries, respectively, of the stream.

**denitrification (denitrifikasie)**

The chemical or biochemical reduction of nitrate or nitrite to gaseous nitrogen, either as molecular nitrogen (N<sub>2</sub>) or as an oxide of nitrogen.

**density (digtheid)**

- (1) The ratio of the mass of an object to its volume at a specified temperature, in units kg m<sup>-3</sup>. Cf. bulk density.
- (2) In biology, the number of organisms per unit of volume or area at a given time.

**density probe (digtheidspeiler; digtheidsonde)**

A probe, usually used in conjunction with the neutron water meter, for the measurement of soil bulk density. Cf. neutron moderation.

**denudation (denudasie)**

- (1) The sum of the processes that results in the wearing away or the progressive lowering of the Earth's surface by various natural agencies that include weathering, erosion, mass wasting, and transportation.
- (2) The removal of vegetation from land by man or as a result of natural processes.

**deposit (afsetting)**

- (1) Material left in a new position by a natural transporting agent such as water, wind, ice or gravity, or by the activity of man. Hence : deposition.
- (2) Material accumulated in various ways, e.g. as surface layers, in cracks, in layers, etc., through chemical and physical processes such as leaching, precipitation, crystallization, etc.

**depositional crust (afsettingskors)**

See soil crust.

**depression (depressie)**

An area that is below or has sunk below its surroundings; a hollow.

**depth (diepte)**

See effective soil depth; soil depth.

**desalination (ontsouting)**

- (1) The removal of salts from saline or sea water.
- (2) The removal of salts from saline soils, usually by leaching.

**desert crust (woestynkors)**

A hard layer, containing calcium carbonate, gypsum, or other binding material, exposed at the surface in desert regions.

**desertification (verwoestyning)**

Conversion of rangeland, rainfed cropland, or irrigated cropland to desertlike land, with a drop in agricultural productivity of 10% or more. It is usually caused by a combination of overgrazing, soil erosion, prolonged drought, and climatic change.

**desert pavement (woestynvloer)**

Gravel accumulated at the soil surface after removal of the finer material by wind action.

**Desert Soil (obsolete) (Woestyngrond (verouderd))**

A zonal great soil group consisting of soil with a very thin, light-coloured surface horizon that may be vesicular and is ordinarily underlain by calcareous material; formed in arid regions under sparse shrub vegetation.

**desert varnish (woestynverniss)**

A glossy sheen or coating (mainly of Fe and Mn oxides) on stones and gravel in arid regions.

**deterministic model (deterministiese model)**

See mathematical model.

**detritus (detritus)**

Material produced by the disintegration and weathering of rocks and that has been moved from its site of origin.

**Devonian (Devoon)**

See geological time scale.

**diabase (diabaas)**

In South Africa this term is used for a dark, grey-green coloured hypabyssal coarse grained rock, usually consisting of plagioclase (mainly labradorite) and augite with pyroxene somewhat altered to greenish uralite, sometimes containing amphibole and small amounts of biotite, quartz and micropegmatite. Diabase is intrusive mainly in the Transvaal Supergroup and is therefore pre-Karoo as far as age is concerned. Cf. dolerite.

**diagenesis (diagenese)**

- (1) The changes which occur in sediments after their initial deposition and during and after lithification. These changes include compaction, replacement, cementation and recrystallization.
- (2) The rearrangement of a mineral to form a new mineral.

**diagnostic horizon (diagnostiese horison)**

A surface (epipedon) or subsurface horizon which is used for the taxonomic classification of soils.

- (1) In the revised edition of "Soil Classification - A Taxonomic System for South Africa" (Soil Classification Working Group, 1991) the diagnostic horizons are described in detail. In the following list a very abbreviated description of each horizon is given:

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

A very dark horizon with more than 10% organic carbon and saturated with water for long periods.

***humic A horizon* (humiese A-horison)**

A dark-coloured horizon with a moderate content of organic carbon, low base status and no signs of wetness.

***vertic A horizon* (vertiese A-horison)**

A dark coloured-horizon with a high clay content and with swell-shrink properties.

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

A dark-coloured horizon with a high base status.

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

A surface horizon that does not qualify as organic, humic, vertic or melanic topsoil horizons.

**Subsoil horizons and materials**

***E horizon (E-horison)***

A light-coloured, structureless horizon in which removal of colloidal matter has taken place.

***G horizon (G-horison)***

A horizon with greyish colours, which is saturated for long periods and has a firm consistence and has undergone no removal of colloidal matter.

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

A reddish, structureless and non-calcareous horizon.

***yellow-brown apedal B horizon (geelbruin apedale B-horison)***

A yellowish, structureless and non-calcareous horizon.

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

A reddish horizon with strong structure.

***soft plinthic B horizon (sagte plintiese B-horison)***

A mottled and concretionary (iron and manganese oxides) horizon that is non-indurated and non-calcareous.

***hard plinthic B horizon (harde plintiese B-horison)***

The indurated equivalent of the soft plinthic B horizon.

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

A horizon with an abrupt transition with an overlying A horizon with respect to texture, structure or consistence; the structure is strong prismatic or columnar.

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

A horizon with strong blocky structure and clearly expressed cutans.

***lithocutanic B horizon (litokutaniese B-horison)***

A horizon with distinct affinities with the underlying parent rock into which it merges. It has cutanic character expressed usually as tongues or prominent colour variegations.

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

A horizon that has developed in recent sediments and unconsolidated material (usually transported), showing little signs of pedogenesis and is non-calcareous.

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

The calcareous equivalent of the neocutanic B horizon.

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

A horizon developed from sandy parent materials in which the sand-size mineral grains present a bleached appearance, placic pans occur and an accumulation of amorphous oxides of Fe and Al and humus have taken place.

***regic sand (regiese sand)***

Recent, structureless, greyish, friable sands.

*stratified alluvium* (gestratifiseerde alluvium)

Unconsolidated alluvial or colluvial deposits with stratifications.

*placic pan* (plaksiese pan)

A thin (usually 2-10 mm thick) dark cemented layer associated with podzol B horizons. It is commonly cemented with iron oxides and is slowly permeable or impermeable to water and roots.

*dorbank* (dorbank)

A very hard, reddish, massive layer cemented by silica.

*saprolite* (saproliet)

A horizon of weathering bedrock which still has distinct affinities with the parent rock and underlying specific B horizons.

*soft carbonate horizon* (sagte karbonaathorison)

A horizon which is dominated by continuous, soft, powdery carbonate material.

*hardpan carbonate horizon* (hardebank karbonaathorison)

A horizon consisting of a continuous, very hard, massive layer cemented by carbonates.

*unconsolidated material without signs of wetness* (ongekonsolideerde materiaal sonder tekens van natheid)

Consists of unconsolidated material underlying specific diagnostic B horizons without signs of wetness.

*unconsolidated material with signs of wetness* (ongekonsolideerde materiaal met tekens van natheid)

Consists of greyish unconsolidated material underlying specific diagnostic B horizons with signs of wetness.

*unspecified material with signs of wetness* (ongespesifiseerde materiaal met tekens van natheid)

Consists of unconsolidated material to partly weathered rock underlying specific diagnostic B horizons with signs of wetness.

*hard rock* (harde rots)

A continuous hard layer of parent rock or silcrete.

*man-made soil deposit* (mensgemaakte grondafsetting)

A man-made deposit of soil material, with or without rock fragments.

(2) In Soil Taxonomy (USA), combinations of specific soil characteristics that are indicative of certain classes of soils define the diagnostic horizons. Those which occur at the soil surface are called epipedons, those below the surface, diagnostic subsurface horizons. (Soil Survey Staff, 1994.)

*agric horizon* (agriese horison)

A horizon formed by the accumulation of silt, clay, and humus moved from an overlying plough layer by percolating water.

*albic horizon* (albiese horison)

An eluviated surface or subsurface horizon, normally light, if not whitish, in colour. Typically, an A2 horizon.

*anthropic epipedon* (antropiese epipedon)

Similar to a mollic epipedon but with a high level of extractable phosphorus due to heavy fertilization.

*argillic horizon* (argilliese horison)

Essentially, a subsurface horizon formed by the illuviation of crystalline clay.

*calcic horizon* (kalsiese horison)

A lime-enriched horizon (not indurated).

*cambic horizon* (kambiese horison)

A subsurface horizon containing illuvial clay, humus, or amorphous sesquioxides, but not in sufficiency to be classed as spodic or argillic.

*duripan* (duribank)

A soil layer cemented by precipitated silica.

*fragipan* (brosbank)

A natural subsurface horizon with high bulk density relative to the solum above, seemingly cemented.

*glossic horizon* (glossiese horison)

A subsurface horizon that consists of eluvial and illuvial parts. It developed from the degradation of an argillic, a kandic or a natric horizon and contains remnants of these.

*gypsic horizon* (gipsiese horison)

A gypsum-enriched layer.

*histic epipedon* (histiese epipedon)

An organic surface horizon too thin to allow classification of the soil as a Histosol.

*kandic horizon* (kandiese horison)

A diagnostic argillic horizon having mostly low activity (1:1) clays, such as kaolinite.

*melanic epipedon* (melaniese epipedon)

A thick black epipedon which contains a high concentration of organic carbon, usually associated with short-range-order minerals or aluminium-humus complexes.

*mollic epipedon* (molliese epipedon)

A surface horizon of mineral soil that is dark-coloured and relatively thick, contains at least 1% organic matter, and has a base saturation (pH 7,0) in excess of 50%.

*natric horizon* (natriese horison)

A subsurface horizon having the characteristics of an argillic horizon, and in addition, a prismatic or columnar structure and an exchangeable sodium percentage greater than 15.

*ochric epipedon* (okriese epipedon)

A surface horizon of mineral soil that lacks one or more of the properties required for classification as a mollic, histic, anthropic, plaggen, or umbric epipedon.

*oxic horizon* (oksiese horison)

A mineral soil horizon characterized by a lack of weatherable minerals, a low cation-exchange capacity, and small amounts of exchangeable bases, but containing 1:1 layer clays or sesquioxides as dominant minerals, with or without quartz and other resistant minerals.

*petrocalcic horizon* (petrokalsiese horison)

A lime-cemented layer.

*petrogypsic horizon* (petrogipsiese horison)

A continuous, strongly cemented, massive gypsic horizon that is cemented by calcium sulphate. It can be chipped with a spade when dry. Dry fragments do not slake in water, and it is impenetrable to roots.

*placic horizon* (plaksiese horison)

An iron-cemented horizon that is slowly permeable or impermeable to water and roots.

*plaggen epipedon* (plaggiese epipedon)

A thick surface horizon of 50 cm or more formed by long-continued heavy manuring.

*salic horizon* (saliiese horison)

A mineral soil horizon of enrichment with secondary salts more soluble in cold water than gypsum. A salic horizon is 15 cm or more in thickness and contains at least 2% salt.

*sombric horizon* (sombriese horison)

A subsurface horizon high in illuvial humus and less than 50% saturated with bases. Restricted to well-drained, tropical and subtropical soils, often those of higher elevations.

*spodic horizon* (spodiiese horison)

A subsurface horizon containing illuvial humus and/or amorphous sesquioxides, and normally, a low degree of saturation with bases.

*sulfuric horizon* (sulfaathorison)

A strongly acidic layer (pH <3,5) produced by the oxidation of sulphur or sulphur compounds to sulphuric acid.

*umbric epipedon* (umbriese epipedon)

A surface horizon darkened by organic matter but either too low in bases or too thin to be classed as a mollic, plaggen, or anthropic epipedon.

(3) In the 1974 FAO-Unesco soil classification system the following diagnostic horizons were described (FAO UNESCO, 1974). They are now obsolete or have been renamed/redefined, but for the sake of convenience are listed below and very briefly described:

*albic E horizon* (albiese E-horison)

A horizon from which clay and free iron oxides have been removed, normally light in colour.

*argillic B horizon* (argilliese B-horison)

A horizon that contains illuviated layer-lattice clays.

*calcic horizon* (kalsiese horison)

A horizon wherein calcium carbonate has accumulated; it may occur in an A, B, or C horizon.

*cambic B horizon* (kambiese B-horison)

An altered horizon containing illuvial clay but lacking properties that meet the requirements of argillic, natric or spodic B horizons.

*gypsic horizon* (gipsiese horison)

A horizon of secondary calcium sulphate (gypsum) enrichment that is more than 15 cm thick.

*histic H horizon* (histiese H-horison)

An organic surface horizon which is more than 20 cm but less than 40 cm thick.

*mollic A horizon* (molliese A-horison)

A dark surface horizon of mineral soil containing at least 1% organic matter and with a base saturation of 50% or more (pH 7,0).

*natric B horizon* (natriese B-horison)

A subsurface horizon with more than 15% exchangeable sodium and a prismatic or columnar structure.

*ochric A horizon* (okriese A-horison)

A horizon that is too light in colour, has too high a chroma, too little organic matter, or is too thin to be mollic or umbric.

*oxic B horizon* (oksiese B-horison)

A subsurface horizon that is not argillic or natric and is characterized by a lack of weatherable minerals and a low cation exchange capacity of the clay fraction.

*spodic B horizon* (spodiese B-horison)

A subsurface horizon that has a coarse texture and/or that contains illuvial humus and/or amorphous sesquioxides.

*sulfuric horizon* (sulfaathorison)

A horizon with a low pH that forms due to the oxidation of substances rich in sulfides.

***umbric A horizon* (umbriese A-horison)**

A surface horizon darkened due to the presence of organic matter and with a base saturation of less than 50%, thus cannot be classed as mollic.

(4) Diagnostic horizons defined in the World Reference Base for Soil Resources (Spaargaren, 1994) are very briefly described below:

***albic horizon* (albiese horison)**

A light coloured horizon from which clay and free iron oxides have been removed. (Latin *albus*, white.)

***andic horizon* (andiese horison)**

A soil layer in which the mineralogy is dominated by short-range-order minerals. They may be dominated by volcanic glass, allophane or similar minerals, or aluminium-organic complexes. (Japanese *ando*, dark soil.)

***argic horizon* (argiese horison)**

A subsurface horizon with a distinctly higher clay content than the overlying horizon. (Latin *argilla*, white clay.)

***anthric horizon* (antriese horison)**

The anthric horizon comprises a variety of surface layers that result from long-continued cultivation. (Greek *anthropos*, human.)

***calcic horizon* (kalsiese horison)**

A horizon in which secondary calcium carbonate has accumulated. (Latin *calx*, lime.)

***cambic horizon* (kambiese horison)**

A subsurface horizon showing evidence of alteration relative to the underlying horizons, but lacking the properties to qualify as an argic, natric, spodic, histic, folic, mollic or umbric horizon. (Latin *cambiare*, to change.)

***duripan* (duribank)**

A subsurface horizon cemented by silica. (Latin *durum*, hard.)

***eluvic horizon* (eluviese horison)**

A horizon at or near the soil surface rich in sand and having lost clay, iron or aluminium or some combination of them. (Latin *eluere*, to wash out.)

***ferralic horizon* (ferraliese horison)**

A subsurface horizon resulting from long and intense weathering. (Latin *ferrum*, iron.)

***ferric horizon* (ferriese horison)**

A horizon with many coarse, red mottles or with discrete, iron-coated nodules. (Latin *ferrum*, iron.)

***folic horizon* (foliese horison)**

A surface horizon, or subsurface horizon occurring at shallow depth, with more than 20% organic carbon and which is saturated by water for less than one month in most years. (Latin *folium*, leaf.)

***fragipan* (brosbank)**

A natural, non-cemented subsurface horizon wherein roots and water can penetrate along interped faces and streaks. (Latin *fragilis*, *frangere*, to break.)

***gypsic horizon* (gipsiese horison)**

A non-cemented horizon containing secondary accumulations of gypsum in various forms. (Latin *gypsum*, gypsum.)

***histic horizon* (histiese horison)**

A surface horizon, or subsurface horizon occurring at shallow depth, consisting of organic soil material having more than 12% organic carbon. (Greek *histos*, tissue.)

***hydrargic horizon sequence* (hidrargiese horison-opeenvolging)**

A horizon sequence that consists of related surface and subsurface horizons resulting from wet-cultivation practices. It comprises a puddled layer, a plough pan and a subsurface illuvial horizon.

***hypercalcic horizon* (hiperkalsiese horison)**

A horizon that consists of continuous concentrations of calcium carbonate that may or may not be cemented.

***hypergypsic horizon* (hipergipsiese horison)**

A hypergypsic horizon is a horizon with 60% or more gypsum. It may be cemented or not and must be at least 10 cm thick to be diagnostic. If cemented, the dry fragments do not slake in water and it cannot be penetrated by roots.

***mollic horizon* (molliese horison)**

A mollic horizon is a well-structured, dark coloured surface layer with a high base saturation and a moderate to high organic matter content.

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

A natric horizon is a dense subsurface horizon with a higher clay content than the overlying horizon(s). The increase in clay content between the natric horizon and the overlying horizon must meet the same requirements as an argic horizon. Moreover, it has a high content of exchangeable sodium and/or magnesium.

***nitic horizon* (nitiese horison)**

The nitic horizon is a subsurface horizon with a moderately to strongly developed angular blocky structure with many shiny ped faces, which cannot or can only partially be attributed to clay illuviation. To be diagnostic it must have a minimum thickness of 30 cm.

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

An ochric horizon is a surface horizon lacking fine stratification and which is too light coloured or too thin, or that has an organic carbon content which is too low, to meet the requirements for a mollic or an umbric horizon.

***petroplinthic horizon* (petroplintiese horison)**

A petroplinthic horizon is a continuous layer of indurated material, at least 10 cm thick, in which iron is an important cement and in which organic matter is absent, or present only in traces.

***plinthic horizon*** (plintiese horison)

A plinthic horizon is a subsurface horizon that consists for 10% or more of an iron-rich, humus-poor mixture of kaolinitic clay with quartz and other diluents, which changes irreversibly to a hardpan or to irregular aggregates on exposure to repeated wetting and drying with free access to oxygen.

***salic horizon*** (saliiese horison)

A salic horizon is a surface or shallow subsurface horizon which contains a secondary enrichment of readily soluble salts, i.e. salts more soluble than gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ).

***spodic horizon*** (spodiese horison)

A spodic horizon is a dark-coloured subsurface horizon which contains illuvial amorphous substances composed of organic matter and aluminium, with or without iron.

***sulfidic horizon*** (sulfidiese horison)

A sulfidic horizon is a waterlogged subsurface horizon containing sulphur, mostly in the form of sulphides, and only moderate amounts of calcium carbonate.

***sulfuric horizon*** (sulfaathorison)

A sulfuric horizon is an extremely acid ( $\text{pH}(\text{H}_2\text{O}) < 3,5$ ) subsurface horizon generally containing yellow jarosite mottles with a hue 2.5 Y or more and a chroma of 6 or more.

***umbric horizon*** (umbriese horison)

An umbric horizon is a dark-coloured base-desaturated surface layer rich in organic matter.

***vertic horizon*** (vertiese horison)

A vertic horizon is a subsurface horizon that, as a result of shrinking and swelling, has either slickensides, or wedge-shaped or parallelepiped structural aggregates whose longitudinal axis is tilted between  $10^\circ$  and  $60^\circ$  from the horizontal. It contains 30% or more clay throughout.

**diaspore** (diaspoor)

$\alpha\text{-AlO.OH}$ , orthorombic.

**diastrophism** (diastrofisme)

Deformation of the earth's crust by tectonic processes.

**diatomaceous earth** (diatoomaarde)

A geologic deposit of fine, grayish siliceous material composed chiefly or wholly of the remains of diatoms. It may occur as a powder or as a porous, rigid material.

**dickite** (dickiet)

A well-crystallized clay mineral of the kaolin group :  $\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$ . It is polymorphous with kaolinite and nacrite. Dickite is structurally distinct from other members of the kaolin group, having a more complex order of stacking in the c-axis direction than kaolinite. It usually occurs in hydrothermal veins. Cf. kandite.

**differential erosion** (differensiële erosie)

Irregular erosion resulting from differences in resistance of surface materials.

**differential thermal analysis (differensieeltermiese analise)**

Thermal analysis carried out by uniformly heating or cooling a sample material which undergoes chemical and physical changes, while simultaneously heating or cooling in identical fashion a reference material which undergoes no changes. The temperature difference between the sample and the reference material is measured as a function of the temperature of the reference material. Syn. thermography.

**differential water capacity (differensiële waterkapasiteit)**

See soil water : differential water capacity.

**diffuse double layer (diffuse dubbellaag)**

A system, in the context of soils and clays, which consists of a charged (negative) particle surface and a balancing amount of counter ions (positive), of which the concentration is a function of distance in the liquid near the particle surface.

**diffuse source (diffuse bron)**

A source of environmental pollution originating from a large area, e.g. through rain. Cf. point source.

**diffusion (diffusie)**

The spreading or scattering of matter under the influence of an energy gradient, the energy being quantitatively expressed in terms of the chemical potential of the substance concerned, and approximated by concentration, vapour pressure or similar properties.

**diffusivity (diffusiwiteit)**

See soil water : diffusivity.

**dike (dyke) (gang; dyk)**

- (1) In geology, a tabular body of igneous rock that cuts across the structure of adjacent rocks or cuts massive rocks.
- (2) In engineering, an embankment to confine or control water, especially one built along the banks of a river to prevent overflow of lowlands; a levee.

**dilatancy (dilatansie)**

An increase in the bulk volume during deformation, caused by a change from close-packed structure to open-packed structure, accompanied by an increase in the pore volume. The latter is the result of rotation of grains, microfracturing, grain boundary slippage etc.

**dimorphous (dimorf)**

In mineralogy, having the same chemical composition but crystallizing in two crystal systems.

**dioctahedral (dioktaëdries)**

Refers to a layered-mineral structure in which only two of the three available octahedrally co-ordinated positions are occupied by trivalent cations.

**diopside (diopsied)**

See pyroxene group of minerals.

**diorite (dioriet)**

A diorite is a granular, intrusive rock characterized by plagioclase feldspar but lacking quartz and orthoclase in appreciable amounts. Normally dark minerals are present in sufficient amounts to give the rock a dark appearance. If the plagioclase is more calcic in composition than andesine (labradorite to anorthite) the rock is called a gabbro. The name norite is given to a gabbro in which the pyroxene is essentially hypersthene. The term diabase is sometimes used to indicate a fine-grained gabbro characterized by a certain texture. Cf. diabase; dolerite; gabbro; norite.

**direct count (direkte telling)**

In soil microbiology, any one of several methods of estimating the total number of micro-organisms in a given mass of soil by direct microscopic examination.

**discharge (afvoer)**

In hydraulics, the volume rate of flow; the volume of liquid passing a point per unit time, commonly expressed as cubic metres per second.

**discordant (diskordant)**

See conformable.

**disintegration (disintegrasie)**

See physical weathering; weathering.

**disperse (dispergeer)**

- (1) To break up compound particles, such as aggregates, into the individual component particles.
- (2) To distribute or suspend fine particles, such as clay, in or throughout a dispersion medium, such as water. In soils, ease of dispersion is related to soil erodibility.

**disperse(d) phase (gedispergeerde fase)**

See dispersion medium.

**disperse system (disperse sisteem)**

A system in which at least one of the phases is subdivided into small particles which together exhibit a very large surface area. Soil can be described as a disperse three-phase system, the phases being solid, liquid and gas. Cf. dispersion medium.

**dispersing agent (dispergeermiddel)**

A substance promoting dispersion or deflocculation.

**dispersion (dispersie)**

The act of dispersing; to disperse. Cf. disperse. Syn. deflocculation.

**dispersion medium (dispersiemedium)**

That material (solid, liquid, or gas) in which colloidal particles, known as the dispersed phase, is suspended.

**dispersion ratio (dispersieverhouding)**

The ratio (expressed as a percentage) of the total mass of particles less than a specific diameter (for example, 50  $\mu\text{m}$ ) that enter into suspension after shaking a soil sample in pure water, to the total mass of all particles smaller than that diameter (as determined

by complete dispersion). It is sometimes used as a measure of aggregate stability. Cf. disperse.

**dispersivity (dispersiwigteit)**

A characteristic property of a porous medium which influences the coefficient of hydrodynamic dispersion. Cf. hydrodynamic dispersion.

**dissect (verkerf)**

Cut by erosion into hills and valleys. Applicable especially to plains in the process of erosion after uplift.

**distribution coefficient (verdelingskoeffisiënt)**

A parameter used to describe the partitioning of a solute between the liquid and solid phases of a suspension or soil. It is usually defined as

$$K_D = \frac{\text{mass of solute on the solid phase per unit mass of solid phase}}{\text{concentration of solute in solution}}$$

and reported in units of ml/g.

**distribution efficiency (verspreidingsdoeltreffendheid)**

The efficiency with which irrigation water is distributed to the root zone over the irrigated field. Cf. application efficiency; irrigation efficiency; replenishment efficiency; transmission efficiency.

**divide (waterskeiding)**

See watershed.

**dolerite (doleriet)**

A hypabyssal rock consisting of plagioclase (labradorite) and augite, sometimes containing olivine. Texture varies from fine-grained and porphyritic to coarser grained and ophitic. Dolerite is intrusive mainly in the Karoo Supergroup and is therefore post-Karoo as far as age is concerned. Cf. diabase.

**dolomite (dolomiet)**

The mineral  $\text{CaMg}(\text{CO}_3)_2$ ; also the rock which consists mainly of this mineral.

**domain (domein)**

See clay domain.

**donga (donga)**

A term used in South Africa for a gully formed by water erosion. Etymol. Afrikaans *donga*, from Zulu. See erosion.

**donga erosion (donga-erosie)**

See erosion.

**dorbank (dorbank)**

- (1) A hard to extremely hard layer of soil (subsoil) in certain soils of arid regions. It may simply be massive or it may be laminated (coarse or fine), the latter parallel to the soil surface. Does not soften on immersion in water. It may or may not be calcareous, or salty. Its colour is related to the soil in which it occurs. It is related to the duripan of other classification systems. Cf. diagnostic horizon.
- (2) See diagnostic horizon.

**double layer (dubbellaag)**

See diffuse double layer.

**double superphosphate (dubbelsuperfosfaat)**

A phosphate fertilizer consisting of monocalcium orthophosphate and containing not less than 19% P.

**downslope (helling-af)**

Indicating a movement or direction from a higher to a lower hillslope position. Cf. upslope.

**drag (remming)**

The force retarding the flow of water or wind over the surface of an object, such as the land surface.

**drain (to -) (dreineer)**

- (1) To provide open ditches, perforated pipes or other highly permeable structures so that excess water can be removed by surface or internal flow.
- (2) To lose water (from the soil) by percolation.

**drainage (dreinerig)**

- (1) A general term applied to the removal of surface or ground water from a given area either by gravity or by pumping.
- (2) The removal of excess water from land by means of surface or subsurface drains (external drainage). Cf. drain (to-).
- (3) Internal drainage refers to natural drainage or percolation of water through the soil. Cf. drainage system; drainage water.

**drainage basin (opvanggebied)**

See watershed.

**drainage coefficient (dreineerkoëffisiënt)**

The amount of excess water (expressed in water depth or other units) removed or drained from an area in 24 hours.

**drainage requirement (dreineervereiste)**

The performance and capacity specifications for a drainage system, i.e. permissible fluctuations of water table depth with respect to the root zone or soil surface, and the volume of water that the drains must convey in a given time.

**drainage system (dreineerstelsel)**

- (1) A system of channels, conduits and structures for effecting drainage. Cf. drain (to-).

- (2) A network of streams, and bodies of surface water that are tributary to them, both large and small, which convey water to a specific point. Cf. watershed.
- (3) In plumbing, all piping within public or private premises which conveys sewerage, rain water, or other liquid wastes, to a legal point of disposal.

**drainage terrace (dreineerterras)**

See terrace.

**drainage water (dreineerwater)**

- (1) Water which has been collected by a drainage system and discharged into a natural watercourse.
- (2) Water flowing in a drain and which is derived from soil, surface, or storm water.

**drawdown (watersakking; watervlakverlaging)**

- (1) The magnitude of the change in surface elevation of a body of water as a result of the withdrawal of water therefrom.
- (2) The magnitude of the lowering of the water surface in a well, and of the water table or piezometric surface adjacent to the well, resulting from the withdrawal of water from the well by pumping.

**drift (vervoerde materiaal)**

Unconsolidated material deposited by geological processes in one place after having been removed from another.

**drilling mud (boormodder)**

A heavy suspension, usually in water but sometimes in oil, used in rotary drilling, consisting of various substances in a finely divided state (commonly smectite clays and chemical additives such as barite). Introduced continuously down the drill pipe under hydrostatic pressure and out through openings in the drill bit, and back up in the annular space between the pipe and the walls of the hole and to a surface pit where it is purified and reintroduced into the pipe. It is used to lubricate and cool the bit, to carry the cuttings up from the bottom, and to prevent blowouts and cave-ins by plastering and consolidating the walls with a clay lining, thereby making casing unnecessary during drilling and also offsetting pressure of fluid and gas that may exist in the formation. Syn. drilling fluid; drill mud; mud flush; circulation fluid.

**drip irrigation (drupbesproeiing)**

See irrigation methods.

**driving force (dryfkrag)**

See soil water : driving force.

**drop erosion (druppelerosie)**

See erosion: splash erosion.

**drying crust (drogingskors)**

See soil crust.

**dryland farming (droëland boerdery)**

The practice of crop production without irrigation (rain-fed agriculture).

**dry-mass percentage (droëmassa persentasie)**

The ratio of the mass of any constituent (of a soil) to the oven-dry mass of the soil, expressed as a percentage. Cf. oven-dry soil.

**DTA (DTA)**

See differential thermal analysis.

**dune (duin)**

A mound or ridge of sand piled up by wind.

**dune sand (duinsand)**

See aeolian.

**duplex soil (dupleksgrond)**

A soil with a relatively permeable topsoil abruptly overlying a very slowly permeable diagnostic horizon which is not a hardpan.

**duricrust (durikors)**

A hard crust formed at or near the land surface during the processes of weathering of rocks and soil formation, usually in tropical or arid regions. The main types include alcrete, calcrete, ferricrete (laterite) and silcrete.

**duripan (duribank)**

A mineral soil horizon that is cemented by silica, usually opal or microcrystalline forms of silica, to the point that air-dry fragments will not slake in water or HCl. A duripan may also have accessory cement such as iron oxide or calcium carbonate. See diagnostic horizon.

**dust (stof)**

Finely powdered particles ( $>1,0 \mu\text{m}$ ) lying on surfaces or carried about by wind.

**dust mulch (stofdeklaag)**

A loose, finely granular, or powdery condition of the surface of the soil, usually produced by shallow cultivation when the soil is dry.

**dwarfing (verdwerging)**

An abnormal plant growth condition resulting from a plant nutrient deficiency, disease or physical impediment.

**dynamic model (dinamiese model)**

See mathematical model.

**dynamometer (dinamometer)**

An instrument for measuring draught of tillage implements and for measuring resistance of soil to penetration by tillage implements.

**dystrophic (distrofies)**

Refers to soil that has suffered marked leaching, such that the sum of the exchangeable (as opposed to soluble) Ca, Mg, K and Na, expressed in  $\text{cmol/kg}$  clay, is less than 5.

**The figure is calculated from the S-value and the clay content. Such soil is said to have a low base status.**

## **E**

### **E horizon (E-horison)**

See diagnostic horizon.

### **earth (aarde)**

A term for the loose, softer, or fragmental material of the earth's surface, as distinguished from firm or solid rock (bedrock) or a natural soil. Not synonymous with the term soil. Much of it has been transported by wind, ice, water or man. Cf. regolith; soil; solum.

### **earthslide (grondverskuiwing)**

See landslide.

### **ecology (ekologie)**

The science that deals with the interrelations between organisms and between organisms and their environment.

### **ecosphere (ekosfeer)**

The mantle of earth and troposphere inhabited by living organisms.

### **ecosystem (ekosisteem)**

A community of organisms and the environment in which they live, forming an interacting system.

### **ecotone (ekotoon)**

The transition zone separating different biologic communities.

### **ecotope (ekotoop)**

A particular habitat within a region. Used in South Africa for a class of land within which the variation of natural resources is insufficient to influence significantly the agricultural products that can be produced on it, their potential yield (both quantity and quality) and the required production techniques.

### **ecotype (ekotipe)**

- (1) An ecologic variant of a species that has adapted to local environmental conditions.
- (2) A unit, within an ecospecies, that contains individuals capable of interbreeding both with other members of that ecotype and with members of other ecotypes in the same ecospecies but that remains distinctive through selection and isolation. If it is morphologically distinct, it is more or less equivalent to the taxonomic unit subspecies.
- (3) A locally adapted population of a species which has a distinctive limit of tolerance to environmental factors. Cf. biotype.

### **ectotrophic mycorrhiza (ektotrofe mikorriza)**

A mycorrhizal association in which the fungal hyphae form a compact mantle on the surface of the roots. Mycelial strands extend inward between cortical cells and outward from the mantle to the surrounding soil. Cf. endotrophic.

### **edaphic (edafies)**

- (1) Pertaining to the influence of soil on organisms.
- (2) Resulting from or influenced by factors inherent in the soil rather than by climatic factors. Cf. edaphology.

**edaphic factor (edafiese faktor)**

A condition or characteristic of the soil (chemical, physical, or biological) which influences organisms.

**edaphology (edafologie)**

The science that deals with the influence of soil on living organisms, particularly plants, including man's use of land for plant growth.

**effective pore space (effektiewe porieruimte)**

See pore space.

**effective precipitation (effektiewe neerslag)**

That portion of the total precipitation which becomes available for plant growth. It does not include precipitation lost to deep percolation below the root zone or to surface runoff or to interception loss.

**effective soil depth (effektiewe gronddiepte)**

The depth of soil material that plant roots can penetrate readily to obtain water and plant nutrients. The depth to a layer that differs sufficiently from the overlying material in physical or chemical properties to prevent or seriously retard the growth of roots.

**effective stress (effektiewe spanning)**

The stress transmitted through a soil by intergranular pressures. It is the stress that is effective in mobilizing internal friction. In a saturated soil in equilibrium, the effective stress is the difference between the total stress and the neutral stress of the water in the voids; it attains a maximum value at complete consolidation of the soil. Syn. effective pressure; intergranular pressure. Cf. pore water pressure.

**effervescence (bruising)**

The production of gas bubbles, e.g. when hydrochloric acid is added to lime.

**efflorescence (effloressensie)**

A fluffy, crystalline powder on a surface, produced by evaporation.

**effluent (uitvloeisel)**

- (1) Solid, liquid, or gaseous wastes which enter the environment as man-made by-products.
- (2) The discharge or outflow of water from ground or sub-surface storage.

**electrical conductivity (elektriese geleivermoë; konduktiwiteit)**

- (1) A measure of the ability of a material to conduct electric current. It is the reciprocal of resistivity (specific resistance) and is measured in siemens per metre. Also termed specific conductance. Cf. conductance; conductivity.
- (2) In soil studies it is measured in millisiemens/m (1 mmho/cm = 100 mS/m), and is a measure of the concentration of salts in solution. Low salinity irrigation waters have values less than 25 mS/m and high salinity irrigation waters have values greater than 75 mS/m. Water with an electrical conductivity of 1 mS/m contains

about 0,1 mmol/dm<sup>3</sup> cations and 0,1 mmol/dm<sup>3</sup> anions or about 6,4 mg/dm<sup>3</sup> dissolved salts.

**electrical resistance (elektriese weerstand)**

See resistance, electrical.

**electrical resistance block (elektriese weerstandsblokkie)**

A small porous block (size in the order of 30 mm x 30 mm x 10 mm) made of gypsum, nylon, fibreglass or some similar material, containing electrodes and lead wires for the measurement of the electrical resistance of the block which is a function of its water content, and hence the water content of the soil with which it is in equilibrium.

**electrokinetic (zeta) potential (elektrokinetiese (zeta-) potensiaal)**

- (1) The difference in electrical potential between the immobile liquid layer attached to the surface of a charged particle and the bulk liquid phase.
- (2) The work done in bringing a unit charge from infinite distance (bulk solution) to the plane of shear in the diffuse double layer.

**electrolysis (elektrolise)**

Chemical decomposition of certain substances by electric current passing through a substance.

**electro-ultra filtration (elektro-ultrafiltrasie)**

A technique for the analysis of soils for plant-available nutrients.

**elutriation (elutriësie)**

- (1) A method of particle size analysis of a soil or sediment, in which the finer, light particles are separated from the coarser, heavy particles by means of a slowly rising current of air or water of known and controlled velocity, carrying the lighter particles upward and allowing the heavier ones to settle.
- (2) Purification, or removal of material from a mixture or a suspension in water, by washing and decanting, leaving the heavier particles behind.

**eluviation (eluviasie)**

The removal of soil material in suspension or solution from a part of or from the whole of the soil profile. The term leaching is preferred for removal in solution. Cf. illuviation.

**eluvic horizon (eluviese horison)**

See diagnostic horizon.

**empirical model (empiriese model)**

See mathematical model.

**endellite (endelliet)**

A clay mineral :  $\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4 \cdot 4\text{H}_2\text{O}$ . It is the more hydrous form of halloysite. Syn. hydrated halloysite; hydrohalloysite; hydrokaolinite.

**endogenous (endogeen)**

Produced from within, e.g. originating from within an organism, or within the soil or earth.

**endotrophic (endotroof)**

Nourished or receiving nourishment from within, as fungi or their hyphae receiving nourishment from plant roots in a mycorrhizal association.

**enstatite (enstatiet)**

See pyroxene group of minerals.

**Entisol (Entisol)**

See soil classification.

**envelope-pressure (onhulsedruk)**

See soil water : envelope-pressure.

**envelope-pressure potential (omhulsedrukpotensiaal)**

See soil water : envelope-pressure potential.

**environmental degradation (omgewingsdegradasie)**

The depletion or destruction of soil or of a potentially renewable resource such as grassland, forest, or wildlife by using it at a faster rate than it is naturally replenished. Cf. soil degradation.

**environmental soil science (omgewingsgrondkunde)**

Essentially soil science but with prominence given to soil as a component of the environment, thus with particular attention to physical, chemical and biological soil degradation, soil reclamation and study of soil pollution and soil remediation. Cf. soil science.

**Eocene (Eoseen)**

See geological time scale.

**eolian (eolies)**

See aeolian.

**eolian soil material (eoliese grondmateriaal)**

See aeolian soil material.

**ephemeral stream (kortstondige stroom (efemeer))**

A stream or portion of a stream that flows only in direct response to precipitation, and receives little or no water from springs or no long continued supply from snow or other sources, and its channel is at all times above the water table.

**epidiorite (epidioriet)**

A metamorphosed gabbro or diabase in which the augite has been altered to fibrous amphibole. Commonly massive, but may have some schistosity.

**epidote (epidoot)**

$\text{Ca}_2(\text{Al,Fe}^{3+})_3(\text{SiO}_4)_3(\text{OH})$ , monoclinic. A common mineral in metamorphic rocks.

**epipedon (epipedon)**

**A diagnostic horizon formed at the surface. It may include all or part of a B horizon. Cf. diagnostic horizon.**

**epiphyte (epifiet)**

**A plant, e.g. a moss, that grows on another plant without being parasitic.**

**epoch (epog)**

**In geology, a unit of geological time within a period during which a series of rocks is formed, e.g. the Pleistocene epoch. Cf. geological time scale.**

**equilibrium (ewewig)**

**A state of balance, when various forces have created a state or form which will not be altered with passage of time unless controlling factors change.**

**equivalent (chemistry) (obsolete) (ekwivalent (chemie) (verouderd))**

**In chemistry, the quantity of a substance equivalent to one mole of charge (mol<sub>c</sub>), or capable of yielding one mole of charge or electrons. For example, one mole of Ca<sup>2+</sup> ions is equal to two equivalents of Ca. The milliequivalent (m.e.) has been a widely-used measure of charge in the soils literature.**

**equivalent diameter (ekwivalente deursnee)**

**The diameter of a hypothetical sphere composed of material having the same density as that of the actual soil particle and of such size that it will settle in a given liquid at the same terminal velocity as the actual soil particle. Hence also : equivalent radius.**

**era (era)**

**In geology, a major division of geological time, divided into several periods, e.g. the Mesozoic era. Cf. geological time scale.**

**erodibility (erodeerbaarheid)**

- (1) The degree or capability of being eroded; susceptibility to erosion.**
- (2) The tendency of soil to be detached and carried away; a characteristic influencing the rate of soil erosion.**

**erosion (erosie)**

- (1) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. Syn. denudation.**
- (2) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of water erosion:**

***accelerated erosion* - Erosion much more rapid than normal, natural or geological erosion, primarily as a result of the influence of the activities of man or, in some cases, of animals or natural catastrophies that expose bare surfaces, for example, fires.**

***donga erosion* - See gully erosion (below).**

***geological erosion* - The normal or natural erosion caused by geological processes acting over long geologic periods and resulting in the wearing away of mountains, the building up of floodplains, coastal plains, etc. Syn. natural erosion.**

***gully erosion*** - The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 300 mm to 600 mm to more than 20 m.

***natural erosion*** - Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc., undisturbed by man. Syn. geological erosion.

***normal erosion*** - The gradual erosion of land used by man which does not greatly exceed natural erosion.

***rill erosion*** - An erosion process in which numerous small channels a few centimetres deep are formed; occurs mainly on recently cultivated soils. See rill.

***sheet erosion*** - The removal of a fairly uniform layer of soil from the land surface by runoff water. Syn. surface erosion.

***splash erosion*** - The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not be subsequently removed by surface runoff.

***raindrop erosion*** - See splash erosion (above).

***tunnel erosion*** (tunnelling) - The removal of soil material through subsurface flow channels or "pipes" developed by seepage water. Also referred to as piping.

#### **erosion class (erosieklas)**

A grouping of erosion conditions based on the degree of erosion or on characteristic patterns (e.g. slight sheet erosion, severe gully erosion, etc.); not applied to normal, natural, or geological erosion.

#### **erosion crust (erosiekors)**

See soil crust.

#### **erosion cycle (erosiesiklus)**

A sequence of stages in the erosion of a land surface (following an initial change in state) to the ultimate stage of stability or equilibrium. Usually the initial change implies uplift, but it might also involve a change in climate.

#### **erosion pavement (erosieplaveisel)**

A surface covering of stone, gravel or coarse soil particles accumulated as the residue left after erosion has removed the finer soil.

#### **escarpment (eskarp)**

A steep face of a ridge of high land; the escarpment of a mountain range is generally on the side nearest the sea.

#### **esker (esker (smeltwaterrug))**

A narrow ridge of gravelly or sandy drift deposited by a stream in association with glacier ice.

#### **ESP (UNP)**

See exchangeable sodium percentage.

**essential element (essensiële element)**

A chemical element required for the normal growth of plants, and without which a plant cannot complete its life cycle.

**eustasy (eustasie)**

World-wide simultaneous change in sea level.

**eutrophication (eutrofikasie)**

The artificial or natural enrichment of a river, dam or lake by an excessive influx of nutrients normally required for the growth of aquatic plants (such as algae).

**eutrophic (eutrofies)**

Refers to soil that has suffered little or no leaching, such that the sum of the exchangeable Ca, Mg, K and Na, expressed in cmol<sub>c</sub>/kg clay, is more than 15. The figure is calculated from the S-value and the clay content. Such a soil is said to have a high base status. The term is normally confined to non-calcareous soils. Cf. base saturation percentage. Etymol. Greek *trophe*, nourishment; *eu*, good.

**evaporation (verdamping)**

The process by which a liquid is changed to a vapour or gas without change in temperature.

**evaporite (evaporiet)**

A nonclastic sedimentary rock composed primarily of minerals produced from a saline solution that became concentrated by evaporation of the solvent; especially a deposit of salt precipitated from a restricted or enclosed body of seawater or from the water of a salt lake. Examples include gypsum, anhydrite, rock salt, chemically precipitated limestone, primary dolomite, and various rare nitrates and borates. The term sometimes includes rocks developed by metamorphism of other evaporites. Syn. evaporate; saline deposit; saline residue.

**evapotranspiration (evapotranspirasie)**

The combined loss of water from a given area and during a specific period of time, by evaporation from the soil surface and by transpiration from plants. Cf. transpiration.

**exchangeable acidity (uitruilbare suurheid)**

See acidity, exchangeable.

**exchangeable cation percentage (uitruilbare kationpersentasie)**

The extent to which the adsorption complex of soil is occupied by a particular cation. It is calculated as follows:

$$\frac{\text{Amount of exchangeable cations in cmol/kg soil}}{\text{Cation exchange capacity in cmol/kg soil}} \times 100$$

**exchangeable sodium percentage (ESP) (uitruilbare natriumpersentasie (UNP))**

The percentage of the cation exchange capacity of the soil (expressed in cmol/kg soil) that is occupied by sodium (expressed in cmol/kg soil). ESP is calculated as follows:

$$\frac{\text{Amount of exchangeable sodium in cmol/kg soil}}{\text{Cation exchange capacity in cmol/kg soil}} \times 100$$

Cf. sodium adsorption ratio.

**exchange capacity (uitruilkapasiteit)**

See anion exchange capacity; cation exchange capacity.

**exchange complex (uitruilkompleks)**

The sum total of all contributors to the exchange properties of soil, e.g. clay mineral particles, amorphous compounds and colloidal organic substances.

**exchange constant (uitruilkonstante)**

The equilibrium constant for a reaction involving ionic exchange between solution and adsorbed phases; usually not a true constant. Cf. selectivity coefficient.

**exfoliation (eksfoliasie (afbladering))**

The breaking or peeling off of concentric rock sheets from bare rock surfaces. It is caused by the action of physical, thermal or chemical forces producing differential stresses within an expanding rock.

**exogenous (eksogeen)**

Having an external origin, e.g. developing or originating outside an organism, or the soil.

**expanding-lattice clay (swelklei)**

A clay mineral whose crystal lattice is expandable according to the amount of water it adsorbs. For example a layer silicate (such as a smectite) in which diffuse negative charges originating in the central octahedral sheets result in less tendency for successive layers to be tightly bound by interlayer cations. This results in the layers being readily pushed apart by water.

**expansive soil (swelgrond)**

See swelling soil.

**external gas pressure (eksterne gasdruk)**

See soil water: pneumatic pressure.

**external gas pressure potential (eksterne gasdrukpotensiaal)**

See soil water: pneumatic potential.

**extrusive rock (ekstrusiewe gesteente)**

**An igneous rock derived from magma ejected at the earth's surface. Cf. igneous rock.**

## F

### **F layer (F-laag)**

A layer of partially decomposed litter with portions of plant structures still recognizable. Occurs below the L layer (011 horizon) on the forest floor in forest soils. It is the fermentation layer or the 012 layer. See L layer; soil horizon.

### **fabric (soil) (maaksel (grond))**

The micromorphology of soil according to the spatial arrangement of its particles and voids. Cf. micromorphology.

### **facies (fasie)**

Part of a rock body as differentiated from other parts by appearance or composition.

### **faecal pellet (fekale korrel)**

The excreta of fauna in pellet form.

### **failure (swigting)**

Fracture or rupture of a rock or other material that has been stressed beyond its ultimate strength, e.g. rock failure.

### **fallow (braak)**

Allowing cultivated land to lie idle (either tilled or untilled) during the whole or greater portion of the growing season.

### **family, soil (grondfamilie)**

See soil family.

### **fan (waaier)**

- (1) A gently sloping, fan-shaped mass of detritus forming a section of a very low cone commonly at a place where there is a notable decrease in gradient; specifically an alluvial fan.
- (2) A fan-shaped mass of congealed lava that formed on a steep slope by the continually changing direction of effusions.

### **fault (verskuiwing)**

A fracture or fracture zone of the earth along which there has been displacement of one side with respect to the other.

### **fauna (fauna)**

The animal life of a region; members of the animal kingdom.

### **feldspar group (veldspaatgroep)**

Most feldspars can be classified as members of the ternary system  $\text{NaAlSi}_3\text{O}_8$  -  $\text{KAlSi}_3\text{O}_8$  -  $\text{CaAl}_2\text{Si}_2\text{O}_8$  (sodium, potassium and calcium feldspar). Members of the series between  $\text{NaAlSi}_3\text{O}_8$  and  $\text{KAlSi}_3\text{O}_8$  are called alkali feldspars. Most natural alkali feldspars contain a mixture of potassium and sodium feldspars. The most common of these are the low albite potassium feldspars microcline (triclinic) and orthoclase (monoclinic, dimorphous with microcline) which are common in granite and gneissic rocks. Sanidine is a variety of orthoclase. Anorthoclase is a triclinic alkali feldspar rich

in albite. Members of the triclinic feldspar series between  $\text{NaAlSi}_3\text{O}_8$  (albite) and  $\text{CaAl}_2\text{Si}_2\text{O}_8$  (anorthite) are called plagioclase feldspars, one of the most common groups of rock-forming minerals. The series can be designated in terms of the mole fraction of the albite component (abbrev. Ab) and anorthite component (abbrev. An) as follows (Ab + An=100): albite (Ab 100-90), oligoclase (Ab 90-70), andesine (Ab 70-50), labradorite (Ab 50-30), bytownite (Ab 30-10), anorthite (Ab 10-0).

**feldspathoid (veldspatoïed)**

The feldspathoids are those minerals that form in place of the feldspars in certain rocks rich in alkali and deficient in silica. Leucite, nepheline, sodalite, and lazurite are the feldspathoids of greatest importance.

**felsic minerals (felsiese minerale)**

Mainly feldspars, feldspathoids, quartz and muscovite.

**felsite (felsiet)**

An igneous rock in which either the whole or the groundmass consists of a cryptocrystalline aggregate of felsic minerals, quartz and potassium feldspar being the most common. When phenocrysts of quartz are present, the rock is termed a quartz porphyry or a quartz felsite.

**fen (ven)**

Low land overflowed, or covered wholly or partially with water, but producing reeds, sedges and other aquatic plants. Cf. marsh; swamp.

**fermentation (fermentasie)**

A set of metabolic processes by which anaerobic organisms obtain energy by converting sugars to alcohols or acids and  $\text{CO}_2$ .

**fermentation layer (fermentasielaag)**

See F-layer.

**ferralic horizon (ferraliese horison)**

See diagnostic horizon.

**ferrallitic (ferrallities)**

A term originating in Africa describing highly weathered soils characterised by a clay fraction  $\text{SiO}_2/\text{Al}_2\text{O}_3$  molecular ratio of less than 1,3, a friable consistence and a low cation exchange capacity of the clay separate which predominantly consists of kaolinite and/or sesquioxides. Amorphous compounds are often present, as is gibbsite. Primary weatherable minerals are generally absent. The main genetic processes are the loss of silica and bases and the relative accumulation of sesquioxides. See siallitic soil.

**Ferralsol (Ferralsol)**

A term originating in Africa for ferrallitic soils with more than 20% clay and with a low silt/clay ratio; it has apedal structure and less than 50% base saturation. See soil classification.

**ferran (ferraan)**

See micromorphology.

**ferric horizon (ferriese horison)**

See diagnostic horizon.

**ferricrete (ferrikreet)**

See hardpan.

**ferrihydrite (ferrihidriet)**

A poorly crystalline natural ferric oxide for which various formulae have been proposed, e.g.  $\text{Fe}_2\text{O}_3 \cdot 2\text{FeOOH} \cdot 2,6\text{H}_2\text{O}$  and  $5\text{Fe}_2\text{O}_3 \cdot 9\text{H}_2\text{O}$ . It appears as a reddish brown (rusty), voluminous precipitate, rich in absorbed water and often rich in adsorbed inorganic ions and organic matter.

**Ferrisol (Ferrisol)**

A term originating in Africa which refers to Latosols slightly less weathered than Ferralsols. Although, like Ferralsols, they have  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratios of less than 2, and less than 50% base saturation, Ferrisols have a structured B horizon, a higher silt/clay ratio and some primary weatherable minerals. The concept probably fits many mesotrophic members of the Shortlands form and certain members of the Hutton and Clovelly forms that exhibit some pedality.

**ferromagnesian (ferromagnesies)**

A term applied to silicate minerals containing iron and magnesium and to mafic and igneous rocks containing such minerals.

**ferruginous tropical soil (ysterryke tropiese grond)**

A class name originating in tropical pedology for soils generally similar to fersiallitic soils.

**fersiallitic (fersiallities)**

A term used in tropical pedology for soils less weathered than ferrallitic. The clay fraction  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio is higher than that for ferrallitic soils and ranges up to about 2,3. Consistence is firmer (in fine textured soils) and the CEC of the clay separate (which in addition to 1:1 layer clays, contains 2:1 layer clays) is higher than in ferrallitic soils. Some primary weatherable minerals are usually present.

**fertigation (sproeibemesting)**

Application of plant nutrients in irrigation water to accomplish fertilization.

**fertility, soil (grondvrugbaarheid)**

See soil fertility.

**fertilizer burn (misstofbrand)**

See foliar burn.

**fertilization (bemesting)**

The addition of any material, organic or inorganic, to a soil for the purpose of supplementing the soil's reserves of essential plant nutrients.

**fertilizer (misstof)**

Any organic or inorganic material of natural or synthetic origin which supplies one or more of the nutrient elements essential for the growth and reproduction of plants.

**Fertilizer terms:**

*acid-forming fertilizer* - One that is capable of increasing soil acidity.

*bulk fertilizer* - Commercial fertilizer delivered to the purchaser, either in the solid or the liquid state, in a nonpackaged form.

*complete fertilizer* - A fertilizer containing all three primary plant nutrient elements (N, P and K).

*fertilizer analysis* - As applied to fertilizers, designates the actual percentage composition of the product as determined by a laboratory analysis.

*fertilizer grade* - The minimum guarantee of its plant nutrient content expressed as whole numbers in terms of nitrogen (N), phosphorous (P), and potassium (K) and the sum of their respective percentages, e.g. 2:3:2 (22) fertilizer contains  $\frac{2}{7} \times 22\%$  N,  $\frac{3}{7} \times 22\%$  P and  $\frac{2}{7} \times 22\%$  K.

*fertilizer liquid* - Fertilizer wholly or partially in solution that can be handled as a liquid, including clear liquids and liquids containing solids in suspension.

*fertilizer sidedressed* - Application made to the side of crop rows after plant emergence.

*fertilizer suspension* - A fluid fertilizer containing dissolved and undissolved plant nutrients. The undissolved plant nutrients are kept in suspension with a suspending agent, usually a swelling type clay. The suspension must be flowable enough to be mixed, pumped, agitated, and applied to the soil in a homogeneous mixture.

*fertilizer top-dressed* - A surface application of fertilizer to a soil after the crop has been established.

*granular fertilizer* - A fertilizer in which all fine particles are bound into granules of approximately 2 mm diameter by a physical granulation process, sometimes with the aid of a binding agent.

*inorganic fertilizer* - A fertilizer material in which carbon is not an essential component of its basic chemical structure. Urea is often considered an inorganic fertilizer because of its rapid hydrolysis to form ammonium ions in soil.

*mixed fertilizer* - A fertilizer containing two or more of the primary plant nutrient elements. Also referred to as a fertilizer mixture. (Note: All complete fertilizers are mixed fertilizers, but not all mixed fertilizers are complete fertilizers.)

*pop-up fertilizer* - Fertilizer placed in small amounts in direct contact with the seed.

*single (or straight) fertilizer* - A fertilizer containing only one of the primary plant nutrient elements (N, P or K).

**starter fertilizer** - Liquid or solid fertilizer, placed near or in contact with the seed or roots of new transplants, constituting a small proportion of the total fertilizer requirement.

**fertilizer carrier (misstofdraer)**

The actual chemical substance or compound which contains one or more of the plant nutrient elements.

**fertilizer requirement (bemestingsbehoefte)**

The quantity of certain plant nutrient elements needed, in addition to the amount supplied by the soil, to increase plant growth or yield to a designated level.

**fiducial mark (fidusiële merk)**

An index or point used as a basis of reference, e.g. one of usually four index marks connected with a camera lens (as on the metal frame that encloses the negative) and that forms an image on the negative or print such that lines drawn between opposing points intersect at, and thereby define, the central point of the photograph. Syn. collimating mark.

**field capacity (veldkapasiteit)**

See soil water : field capacity.

**fill (vulling)**

Man-made deposits of geological, soil and/or diverse waste materials.

**filter (drainage) (filter (dreinerings))**

A filter or protective envelope of any porous material whose openings are small enough to prevent movement of soil particles into the drain, but which is sufficiently pervious to offer little resistance to seepage.

**fine earth (fyngrond)**

Soil material that contains only particles < 2 mm in equivalent diameter; soil material from which all solid particles > 2 mm in equivalent diameter have been excluded.

**fines (fynmateriaal; fynfraksie)**

- (1) Very small particles, esp. those smaller than the average in a mixture of particles of various sizes, e.g. the silt and clay fraction in glacial drift, or the fine-grained sediment that settles slowly to the bottom of a body of water.
- (2) An engineering term for the clay- and silt-sized soil particles (diameters < 0,074 mm) passing U.S. standard sieve no. 200.

**fine sand (fynsand)**

See soil separates; soil texture.

**fine sand class (fynsandklas)**

See soil texture.

**fine sandy loam (fynsandleem)**

See soil texture.

**fine texture (fyntekstuur)**

The texture exhibited by soils consisting predominantly of the finer, i.e. silt and clay, separates; includes all textural classes except sand, loamy sand and sandy loam. Cf. coarse texture; medium texture; soil texture.

**fingering (vingervorming)**

The irregular advance of wetting or tracer fronts in a porous medium caused by heterogeneities in pore characteristics.

**finite difference method (eindige-verskilmetode)**

A mathematical technique employed in the solution of differential and partial differential equations, for example those describing transient water, salt and heat flow in soil. Basically the method involves replacement of the derivative at any point by the change in the appropriate variable over a small, finite interval. Consequently the solution is reduced to a set of algebraic equations describing a finite number of points.

**fireclay (vuurklei (vuurvaste klei))**

A siliceous clay rich in hydrous aluminium silicates, capable of withstanding high temperatures without deforming (either disintegrating or becoming soft and pasty), and useful for the manufacture of refractory ceramic products (such as crucibles, or firebrick for lining furnaces). It is deficient in iron, calcium, and alkalis, and approaches kaolin in composition, the better grades containing at least 35% alumina when fired. Syn. firestone; refractory clay; saggar.

**firm (consistence) (ferm (konsistensie))**

See soil consistence.

**fixation (vaslegging; fiksering)**

The process or processes in soil in which certain chemical elements essential for plant growth are converted from an available to an unavailable form, for example, phosphate fixation; potassium fixation.

**flaggy (plaveisteenhoudend)**

See coarse fragments.

**flagstone (plaveisteen)**

A relatively thin fragment, 15 to 40 cm long, of sandstone, limestone, slate, shale or rarely, of schist. Cf. coarse fragments.

**flint (vuursteen)**

A dense, black or dark-grey rock with conchoidal fracture composed of chalcedony and opal. Flint was the chief raw material of tools and weapons of the stone ages. Cf. chert.

**flocculation (flokkulasie)**

See deflocculation.

**flooding (vloedbesproeiing)**

See irrigation methods.

**flood irrigation (vloedbesproeiing)**

See irrigation methods.

**flood plain (vloedvlakte)**

The strip of relatively smooth land adjacent to a river channel, which is built of sediments during the present regime of the stream and which is covered with water when the river overflows its banks at flood stages.

**flora (flora)**

The sum total of the kinds of plants in an area at one time; the plant life of a region. Members of the plant kingdom.

**flownet (vloeinet)**

A graphical representation of stream lines and equipotential lines used in the study of water flow phenomena.

**flow, unsaturated (vloei, onversadigde)**

See soil water : unsaturated flow.

**flow velocity (vloeisnelheid)**

See soil water : flow velocity.

**fluorapatite (fluorapatiet)**

(1) A very common mineral of the apatite group:  $[\text{Ca}_3(\text{PO}_4)_2]_3 \cdot \text{CaF}_2$ . It is a common accessory mineral in igneous rocks. Syn. apatite.

(2) An apatite mineral in which fluorine predominates over chlorine and hydroxyl. Cf. apatite.

**fluorite (fluoriet)**

A transparent to translucent mineral:  $\text{CaF}_2$ . It is found in many different colours (often blue or purple) and has a hardness of 4 on Mohs' scale. Fluorite occurs in veins usually as a gangue mineral associated with lead, tin, and zinc ores.

**fluvial (fluviaal)**

Of or pertaining to rivers; growing or living in streams or ponds; produced by river action, as a fluvial plain. Hence: fluvial deposit.

**fluvioglacial (fluvioglasiaal)**

Pertaining to streams flowing from glaciers or to the deposits made by such streams. Cf. glaciofluvial deposit.

**Fluvisol (Fluvisol)**

See soil classification.

**flux (vloed)**

See soil water : flux.

**flux density (vloeddigheid)**

See soil water : flux density.

**foliar analysis (blaarontleding)**

The analysis of certain selected leaves or plant organs to indicate the nutrient status of plants; it is of use in the diagnosis of plant nutrient deficiencies of soils.

**foliar application (blaartoediening)**

Application of soluble fertilizer in the form of spray on the foliage of plants.

**foliar burn (blaarbrand)**

Injury to shoot tissue caused by dehydration due to contact with high concentrations of chemicals, e.g. certain fertilizers and pesticides.

**foliar diagnosis (blaardiagnose)**

A method of diagnosis of plant nutrient deficiencies or excesses by examining selected plant tissue, either by chemical analysis or visual symptoms such as colour and growth characteristics.

**folic horizon (foliese horison)**

See diagnostic horizon.

**food chain (voedselketting)**

A series of plant or animal species in a community, each of which is related to the others as a source of food.

**food cycle (voedselweb)**

All the interconnecting food chains in a community, also called food web.

**foraminifera (foraminifera)**

Unicellular animals mostly of microscopic size that secrete casts composed of calcium carbonate or build them by cementing together sedimentary grains with calcium carbonate.

**form, soil (grondvorm)**

See soil classification.

**fraction, soil (grondfraksie)**

See soil texture; soil separate.

**fragipan (brosbank)**

A loamy or (uncommonly) sandy subsurface horizon, very low in organic matter, with a high bulk density relative to the horizons above it, and slowly permeable to water. It is seemingly cemented when dry and, when moist, peds tend to rupture suddenly under pressure. Dry fragments slake or fracture when placed in water. See diagnostic horizon.

**fragment (brokstuk)**

See coarse fragments; Cf. clastic.

**friable (brokkelrig)**

The ease of crumbling of soils. Cf. soil consistence.

**frost heaving (vrieswellig)**

The uneven lifting or upward movement, and general distortion, of surface soils, rocks, vegetation, and other structures, such as pavements, due to internal frost action resulting from subsurface freezing of water and growth of ice masses (esp. ice lenses), and usually producing a frost mound. Syn. frost heave.

**fuller's earth (vollersaarde)**

A very fine-grained, naturally occurring earthy substance (such as clay or clay-like material) possessing a high adsorptive capacity, consisting largely of hydrated aluminium silicates (chiefly the clay minerals montmorillonite and palygorskite). Used to clean and thicken (full) cloth.

**fulvic acid (fulviensuur)**

Organic substances of indefinite composition which remain in solution when an aqueous alkaline extract of soil is acidified.

**fungi (fungi)**

Nucleated, usually filamentous, spore-bearing organisms devoid of chlorophyll; typically reproductive both sexually and asexually; living as parasites on plants, animals or other fungi, or as saprophytes on plant or animal remains, in aquatic, marine, terrestrial or subaerial habitats. Yeasts, mildews, rusts, mushrooms, and truffles are examples of fungi.

**furrow irrigation (voorbeproeing)**

See irrigation methods.

## G

### G horizon (G-horison)

See diagnostic horizon.

### gabbro (gabbro)

A group of dark-coloured, basic intrusive igneous rocks composed principally of basic plagioclase (commonly labradorite) and clinopyroxene (augite), with or without olivine and orthopyroxene; also, any member of that group. It is the approximate intrusive equivalent of basalt. Apatite and magnetite or ilmenite are common accessory minerals. Gabbro grades into monzonite with increasing alkali-feldspar content.

### gamma-ray attenuation (gammastraalafduuning)

A procedure, based on the fact that scattering and absorption of gamma rays are related to the density of matter in their path, whereby soil bulk density and water content may be determined.

### garnet (granaat)

A mineral group, formula  $A_3B_2(SiO_4)_3$  where  $A = Ca, Mg, Fe^{2+}, Mn^{2+}$  and  $B = Al, Fe^{3+}, Mn^{3+}, Cr$ . Common in metamorphic rocks and found in some granites, acid volcanic rocks and detrital sediments. Fairly resistant to weathering. Cf. accessory mineral.

### gas pressure potential (gasdrukpotensiaal)

See soil water : pneumatic potential.

### gel (jel)

An amorphous, colloidal mass that has not yet hardened.

### genesis (genese)

See soil genesis.

### genetic (geneties)

- (1) Resulting from, or produced by, soil-forming processes, for example, a genetic profile or a genetic horizon.
- (2) Pertaining to the study of genetics.

### geochemical cycle (geochemiese siklus)

The sequence of stages in the migration of elements during geologic changes such as weathering and soil formation. A major cycle, proceeding from magma to igneous rocks to sediment to sedimentary rocks to metamorphic rocks, and possibly through migmatites and back to magma, and a minor or exogenic cycle proceeding from sediment to sedimentary rocks to weathered material and back to sediments again, are distinguished.

### geochemistry (geochemie)

All aspects of geology that involve chemical changes. It includes the study of (i) the relative and absolute abundances of the elements and the atomic species (isotopes) in the earth, and (ii) the distribution and migration of the individual elements in the

various parts of the earth (the atmosphere, hydrosphere, lithosphere, pedosphere, etc.) and in minerals and rocks.

geogenic mottle (geogeniese vlek)

See mottled soil.

geological erosion (geologiese erosie)

See erosion. Cf. denudation.

geological time scale (geologiese tydskaal)

A scale used for dating past events in the earth's history, as indicated in the record of the rocks. The order of occurrence or formation of rocks, radioactive decay of certain elements and several other methods are used to establish chronology. The eras, periods and epochs and their ages are shown in the following diagram.

#### THE GEOLOGICAL TIME SCALE

ERA	PERIOD	EPOCH	TIME SCALE Million Years
CAINOZOIC OR CENOZOIC	QUATERNARY	Holocene or Recent	0,00
			0,01
			1,64
			5,20
			23,30
			35,40
			58,50
			65,00
			145,60
			208,00
			245,00
			290,00
		362,50	
	408,50		
	439,00		
	510,00		
	570,00		
		Pleistocene	
	TERTIARY	Pliocene	
		Miocene	

		<b>Oligocene</b>
		<b>Eocene</b>
		<b>Paleocene</b>
<b>MESOZOIC</b>	<b>CRETACEOUS</b>	
	<b>JURASSIC</b>	
	<b>TRIASSIC</b>	
<b>PALEOZOIC</b>	<b>PERMIAN</b>	
	<b>CARBONIFEROUS</b>	
	<b>DEVONIAN</b>	
	<b>SILURIAN</b>	
	<b>ORDOVICIAN</b>	
	<b>CAMBRIAN</b>	
<b>PRE-CAMBRIAN (including PROTEROZOIC and ARCHAEOAN)</b>		

**geometric mean diameter (GMD) (geometrische gemiddelde diameter (GGD))**

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

$$\text{GMD} = \exp \left[ \frac{\sum_{i=1}^n w_i \ln \bar{x}_i}{\sum_{i=1}^n w_i} \right]$$

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

C.f. mean weight diameter.

#### geomorphology (geomorfologie)

The science which deals with the form of the earth, the general configuration of its surface and the changes that take place in the evolution of land forms.

#### gibbsite (gibbsiet)

A mineral with a platy habit that occurs in highly weathered soils and in laterite:  $\text{Al}(\text{OH})_3$ .

#### gilgai (gilgai)

The microrelief of soils sometimes produced by swelling clays during prolonged expansion and contraction due to changes in water content; usually a succession of microbasins and microknolls in nearly level areas, or of microvalleys and microridges parallel to the direction of the slope. A feature common in Vertisols.

#### glacial drift (gletserpuin)

- (1) A general term for drift transported by glaciers or icebars, and deposited directly on land or in the sea. Cf. fluvioglacial. Syn. glacial deposit; glacial debris.
- (2) Rock debris transported by glaciers and deposited directly from the ice or from the melt water. The debris may or may not be heterogeneous.

#### glacial soil (obsolete) (gletsergrond (verouderd))

A soil derived from glacial drift.

#### glacial till (gletserkeileem)

See till.

#### glaciofluvial deposit (fluvioglasiale afsetting)

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames, eskers and kame terraces. Cf. glacial drift; till.

#### glebule (glebule)

See micromorphology.

**glaucanite (gloukoniet)**

- (1) A dull-green, amorphous, and earthy or granular mineral of the mica group:  $K,Na(Al,Fe^{3+},Mg)_2(Al,Si)_4O_{10}(OH)_2$ . It has often been regarded as the iron-rich analogue of illite. Glaucanite occurs abundantly in greensand, and seems to be forming in the marine environment at the present time; it is the most common sedimentary (diagenetic) iron silicate and is found in marine sedimentary rocks from the Cambrian to the present. Glaucanite is an indicator of very slow sedimentation.
- (2) A name applied to a group of green minerals consisting of hydrous silicates of potassium and iron.

**gley (gley)**

A material that has been or is subject to intense reduction as a result of prolonged saturation with water. Grey, blue and green colours predominate, but stains of ferric and manganese oxides and hydrates (yellow, brown, red and black) may be present and indicate localized areas of better aeration. Grey colours are due to a depletion of iron compounds; blue and green are due to the presence of ferrous compounds. Gleyed sands are friable and clays firm when moist and usually hard to very hard when dry. Cf. hydromorphy.

**gleyic horizon (gleyiese horison)**

See diagnostic horizon: G horizon.

**gleying (vergleying)**

Soil mottling, caused by partial oxidation and reduction of its constituent ferric iron compounds, due to conditions of intermittent water saturation. The process is also called gleization. Also spelled : glei.

**gley soil (gleygrond)**

A soil developed under conditions of poor drainage resulting in reduction of iron and other elements and in grey colours and mottles.

**Gleysol (Gleysol)**

See soil classification.

**glossic horizon (glossiese horison)**

See diagnostic horizon.

**Glossisol (Glossisol)**

See soil classification.

**gneiss (gneis)**

A foliated rock formed by regional metamorphism in which bands or lenticles of granular minerals alternate with bands and lenticles in which minerals having flaky or elongated prismatic habits predominate.

**goethite (goethiet)**

A yellowish, reddish, or brownish-black mineral,  $\gamma\text{-FeO(OH)}$ . It is dimorphous with lepidocrocite,  $\alpha\text{-FeO(OH)}$ . Goethite is one of the most common minerals and is typically formed under oxidized conditions as a weathering product of iron-bearing

minerals. It also forms as a direct inorganic or biogenic precipitate from solutions. Syn. gothite; xanthosiderite.

**Gondwanaland (Gondwanaland)**

The southern continent that preceded the rupture and drifting apart of South America, Africa, peninsular India, Australia and Antarctica during the late Mesozoic.

**gradation (gradasie; vereffening)**

In geology, the bringing of a surface or a stream bed to grade through erosion, transportation and deposition by running water. Cf. aggradation; degradation.

**graded sediment (gradeerde (= vereffende) sediment)**

In geology, a sediment consisting chiefly of grains of the same size range. In engineering, a sediment having an even distribution of particles from coarse to fine.

**grain (korrel)**

A small, hard particle, usually larger than silt or clay size.

**granite (graniet)**

A coarse-grained, light-coloured plutonic rock consisting essentially of quartz and alkali feldspar. Sodic plagioclase is commonly present in small amounts and muscovite, biotite, hornblende and, rarely, pyroxene may be mafic constituents. Etymol. Latin *granum*, grain.

**granite gneiss (granietgneis)**

A coarsely crystalline, banded gneiss derived from a sedimentary or igneous rock with the mineral composition of granite.

**granodiorite (granodioriet)**

A coarse-grained plutonic rock consisting of quartz, oligoclase or andesine, and orthoclase with biotite, hornblende or pyroxene as mafic constituents. It is intermediate between quartz monzonite and quartz diorite and contains at least twice as much plagioclase as orthoclase.

**granophyric (granofiries)**

The texture of a porphyritic igneous rock in which the phenocrysts and groundmass penetrate each other, having crystallized simultaneously.

**grain-size analysis (deeltjegrootte-ontleding)**

See particle size analysis.

**granular fertilizer (korrelkunsmis)**

See fertilizer.

**granular soil (korrelrige grond (granulêre grond))**

See soil structure.

**granular structure (korrelstruktuur; granulêre struktuur)**

See soil structure; soil structure types.

**granule (korrel)**

A natural soil aggregate or ped that is relatively non-porous; consists of an accumulation of primary particles. Cf. soil structure.

**granulometric analysis (korrelgrootte-ontleding)**

Determination of the relative amounts of granules falling in various size classes, usually by wet-sieving and sedimentation analysis of a soil sample which has not been dispersed physically or chemically. Syn. aggregate-size analysis. Cf. aggregate stability.

**grassland (grasland)**

Land covered by herbaceous vegetation dominated by grasses (Graminae).

**grass waterway (graswaterbaan)**

A natural or constructed waterway covered with erosion-resistant grasses and used to carry water and reduce erosion.

**gravel (gruis)**

Consists of rock fragments between 2 mm and about 75 mm in diameter. Cf. soil separate.

**gravelly (gruiserig)**

A term used to describe a soil which contains appreciable or significant amounts of gravel. Cf. coarse fragments.

**gravimetric water content (gravimetrische waterinhoud)**

See soil water : water content.

**gravitational constant (gravitasiekonstante)**

The force ( $F$ ) exerted by the earth on a small mass ( $m$ ) near the earth's surface is given by  $F = GEm/R^2$ , where  $E$  is the mass of the earth,  $G$  the gravitational constant and  $R$  the radius of the earth. The acceleration due to gravity at the earth's surface ( $g$ ) is given by  $g = GE/R^2$ . It can be seen that  $g$  is not an absolute constant, whereas  $G$  is. It is, however, difficult to measure  $G$ ; its value is  $6,672 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$ . Cf. acceleration due to gravity.

**gravitational head (gravitasiehoogte)**

See soil water : gravitational head.

**gravitational potential (gravitasiepotensiaal)**

See soil water : gravitational potential.

**gravitational water (obsolete) (gravitasiewater (verouderd))**

Water which moves into, through, or out of the soil under the influence of gravity.

**gravity (gravitational) acceleration (gravitasieversnelling)**

See acceleration due to gravity.

**grazing capacity (drakrag; weidingspotensiaal)**

The maximum number of stock utilizing a unit land area without inducing damage to vegetation or related resources. Syn. carrying capacity; grazing potential.

**great soil group (hoofgrondgroep; grootgrondgroep)**

One of the categories in the system of soil classification that has been used in the United States for many years. See soil classification.

**green manure (groenbemesting)**

Green plant material, usually a legume, incorporated into the soil for the purpose of providing nutrients to the following crop; or to orchards and vineyards.

**Grey-brown Podzolic Soil (Grysbrown Podzolie Grond)**

A zonal great soil group consisting of soils with a thin, moderately dark A1 horizon and with a greyish-brown A2 horizon underlain by a B horizon containing a high percentage of bases and an appreciable quantity of illuviated silicate clay; formed on relatively young land surfaces, mostly glacial deposits, from material relatively rich in calcium, under deciduous forests in humid temperate regions.

**Grey Desert Soil (Gryswoestynggrond)**

See Sierozem. Cf. Desert soil.

**greywacke (grouwak)**

Any dark sandstone or grit having a matrix of clay minerals. Cf. grit.

**Greyzem (obsolete) (Greyzem (verouderd))**

See soil classification.

**grit (grint)**

- (1) Small hard particles of sand, earth, stone, etc.
- (2) A gritstone is any coarse sandstone that can be used as a grindstone or millstone.

**gritstone (grintsteen)**

See grit.

**ground (grond)**

- (1) The surface or upper part of the Earth.
- (2) Land, particularly a region or area.
- (3) The Afrikaans term also has the meaning of "soil".

**groundwater (ondergrondwater)**

That part of the subsurface water in the zone in which permeable rocks are saturated with water under pressure equal to or greater than atmospheric. This water may extend into overlying soil. Phreatic water. Cf. soil water: water table; phreatic line.

**Ground-water Laterite Soil (Grondwaterlaterietgrond)**

A great soil group of the intrazonal order and hydromorphic suborder, consisting of soils characterized by hardpans or concretionary horizons rich in iron and aluminium (and sometimes manganese) oxides that have formed immediately above the water table.

**groundwater level (ondergrondwatervlak)**

- (1) A synonym for groundwater table. See soil water : water table.
- (2) The surface at which the liquid pressure in the pores of soil or rock is equal to atmospheric pressure.

#### Ground-water Podzol Soil (Grondwaterpodzolgrond)

A great soil group of the intrazonal order and hydromorphic suborder, consisting of soils with an organic mat on the surface over a very thin layer of acid humus material underlain by a whitish-grey leached layer, up to 1 m in thickness, in turn underlain by a brown, or very darkbrown, cemented hardpan layer; formed under various types of forest vegetation in cool to tropical, humid climates under conditions of poor drainage.

#### guano (ghwano (guano))

A fertilizer consisting of dried sea bird faeces and feathers; it is gathered on coastal islands where penguins, cormorants and gannets nest; dried and sold as fertilizer. Guano is rich in N and P.

#### gully (donga) (donga)

See donga; erosion.

#### gully erosion (donga-erosie)

See erosion.

#### gypsan (gipsaan)

See micromorphology.

#### gypsic horizon (gipsiese horison)

See diagnostic horizon.

#### Gypsisol (Gipsisol)

See soil classification.

#### gypsum (gips)

A mineral consisting of hydrous calcium sulphate:  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . It is the commonest sulphate mineral, and is frequently associated with halite and anhydrite in evaporites. Etymol. Greek *gypsos*, chalk. Syn. gypsite; gyp; plaster stone; plaster of Paris.

#### gypsum requirement (gipsbehoefte)

The quantity of gypsum or its equivalent required to reduce the exchangeable sodium percentage of a given portion of soil to a desired level.