Morphology

Morphology: It is Greek word: morph = means shape or form, logy = science.
So morphology is the study of form or forms. In biology morphology refers to the study of the form and structure of organisms, and in geology it refers to the study of the configuration and evolution of land forms.

Soil Morphology: a branch of soil science that studies the external characteristics of soils as a reflection of their internal genetic characteristics, regimes, present and past processes, and conditions of formation.
It deals with description using standard terminology of in situ special organization and physical properties of soil regardless of potential use.

Prior to utilization of standard terminology; soils were described as clayey, sandy, stony, sedimentary, saline, marshy, dry or moist, heavy or light, soft or compact, faty, friable or clean.

Useful terms in Pedology:

Pedon

The smallest unit or volume of soil that contains all the soil horizons of a particular soil type, usually having a surface area of 10.76 square feet (ft^2) or approximately 1 square meter (m^2) and extending from the ground surface down to bedrock.

Solum

The solum (plural, sola) in soil science consists of the surface and subsoil layers that have undergone the same soil forming conditions. The base of the solum is the relatively unweathered parent material.
In term of soil horizon; a soil consists of a set of horizons that are related through the

same cycle of pedogenic processes, it is consists of A, E, and B horizons and their transitional horizons and some O horizons. The solum of a soil presently at the surface, for example; includes all horizons now forming. It does not include a buried soil or a layer unless it has acquired some of its properties by currently active soil-forming processes. The solum of a soil is not necessarily confined to the zone of major biological activity. Its genetic horizons may be expressed faintly to prominently. A solum does not have a maximum or a minimum thickness.

Solum and soils are not synonymous. Some soils include layers that are not affected by soil formation. These layers are not part of the solum. The number of genetic horizons ranges from one to many. An A horizon that is 10 cm thick overlying bedrock is by itself the solum. A soil that consists only of recently deposited alluvium or recently exposed soft sediment does not have a solum.

The lower limit, in general sense, in many soils should be related to the depth of rooting to be expected for perennial plants assuming that water state and chemistry are not limiting. In some soils the lower limit of the solum can be set only arbitrarily and needs to be defined in relation to the particular soil. For example, horizons of carbonate accumulation are easily visualized as part of the solum in many soils in arid and semi-arid environments. To conceive of hardened carbonate accumulation extending for 5 meters or more below the B horizon as part of the solum is more difficult.

Gleyed soil material beings in some soils a few centimeters below the surface and continues practically unchanged to a depth of many meters. Gleying immediately below the A horizon is likely to be related to the processes of soil formation in the modern soil. At great depth; gleying is likely to be relict or related to processes that are more geological than pedological. Much the same kind of problem exists in material penetrated by roots is very similar to the weathered material at a much greater depth.
From some soil, digging deep enough to reveal all of the relationships between soils

and plants is not practical. Roots of plants, for example, may derive much of their moisture from fractured bedrock close to the surface. Descriptions should indicate the nature of the soil-rock contact and as much as can be determined about the upper part of the underlying rock.

Sequum

The Sequum (Ploral, sequa) is a B horizon together with any overlying eluvial horizons. A single sequum is considered to be the product of a specific combination of soil-forming processes.

Most soil has a single sequum but some have two or more. Soils in which two sequa have formed, one above the other in the same deposit, are said to be bisequal.

If two sequa formed in different deposits at different times, the soil is not bisequal. For example, a soil having an A – E – B horizon sequence may form in material that was deposited over another soil that already had an A – E – B horizon sequence. Each set of A – E – B horizons is a sequum but the combination is not a bisequum. The lower set is a buried soil. If the horizons of the upper sequum extend into the underlying sequum. For example; the A horizon of the lower soil may retain some of its original characteristics and also have some characteristics of the overlying soil. Here, too, the soils are not considered bisequal; the upper part of the lower soil is the parent material of the lower part of the currently forming soil. In many soils the distinction cannot be made with certainty. Neverless, the distinction is useful when it can be made. Where some of the C material of the upper sequum remains, the distinction is clear.

Soil Horizon:

Is a layer approximately parallel to the surface of the soil, distinguishable from adjacent layer by a distinctive set of properties produced by the soil-forming processes. The term layer, rather than horizon is used if all of the properties are believed to be inherited from the parent material, or no judgment is made as to whether the layer is genetic. The depth to and thickness of the horizon should be recorded as well the

horizon designation. Horizons are labeled according to diagnostic features and interpretations. A master horizon label is given which represents characteristic properties. As an example the system developed by the US department of agriculture (USDA) uses O, A, E, B, C, and R as master horizon labels.

Uppercase letters, O, A, E, B, C, and R are used to designate master horizons.

The symbol "**O**" represents an organic horizon. Most soils have no O horizon, they are however, common in forests and swamps and other places where organic production exceeds decomposition.

The symbol "**A**" means topsoil. Most soils have an A horizon, but it could have eroded off exposing a subsoil horizon. Some very young soils have not yet had time to form an A horizon.

The symbol "**B**" means region of accumulation. Salts and clays accumulate below the A horizon in a B horizon. Most soils have a B horizon.

The symbol "**E**" means eluvial or washed out. A small fraction of soils have an E horizon, usually between the A and B horizons.

The symbol "**C**" means parent material, i.e., unconsolidated mineral material that has not been affected appreciably by weathering, leaching, etc.

The symbol "**R**" means bedrock, i.e., mineral material that cannot be considered unconsolidated. It is too hard for roots to penetrate.

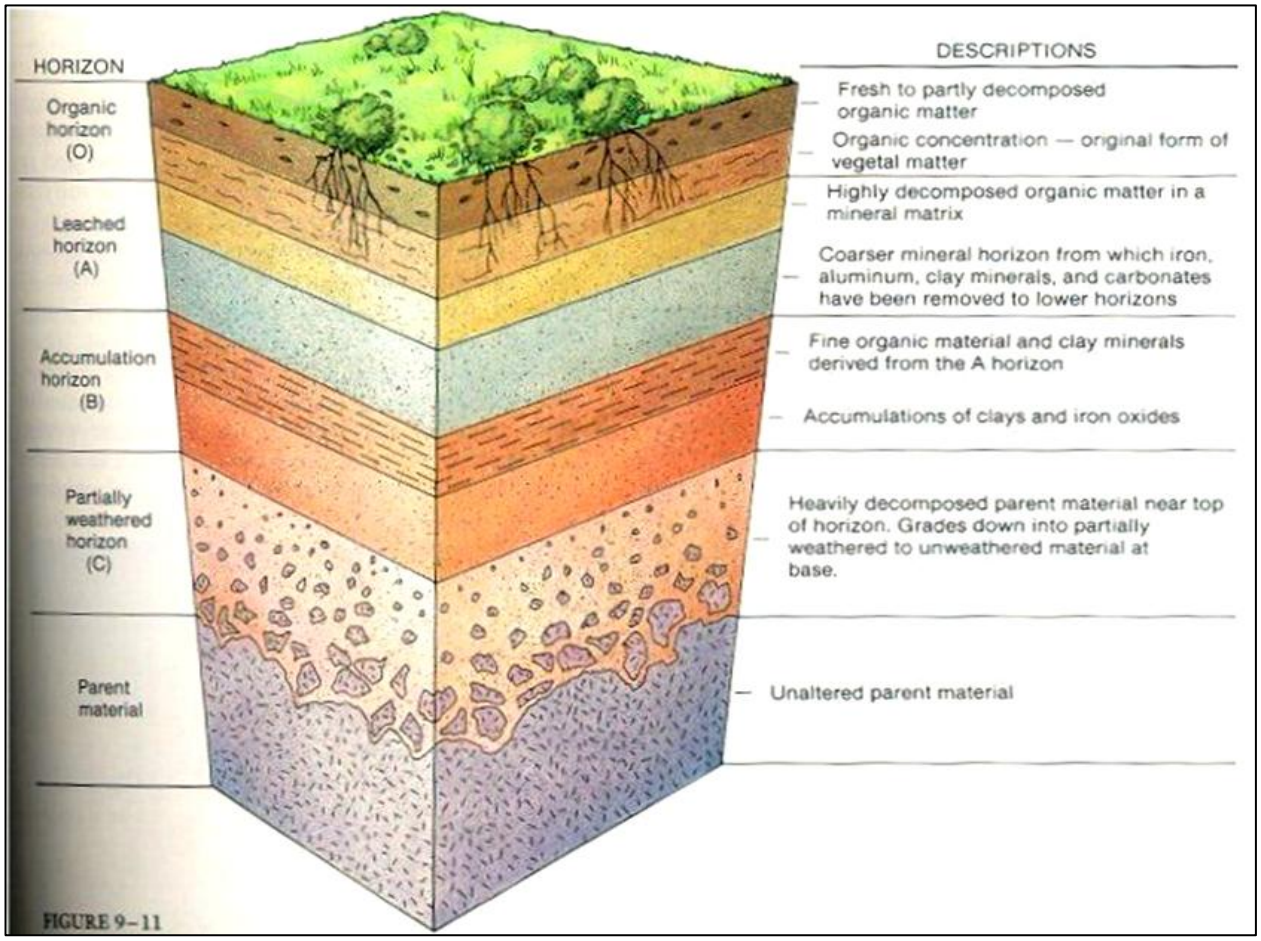

Figure 1: Soil profile shows the master horizons and layers.