Major Soil Groups Of The World

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Definitions of Soil:

- The unconsolidated mineral or organic material on the immediate surface of the Earth that serves as a natural medium for the growth of land plants.
- The unconsolidated mineral or organic matter on the surface of the Earth that has been subjected to and shows effects of genetic and environmental factors of: climate (including water and temperature effects), and macro- and microorganisms, conditioned by relief, acting on parent material over a period of time. A product-soil differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics.

Soil Science Society of America

Soil is a natural body comprised of solids (minerals and organic matter), liquid, and gases that occurs on the land surface, occupies space, and is characterized by one or both of the following: horizons, or layers, that are distinguishable from the initial material as a result of additions, losses, transfers, and transformations of energy and matter or the ability to support rooted plants in a natural environment.

Soil Taxonomy

In short, soil is a mixture of minerals, dead and living organisms (organic materials), air, and water. These four ingredients react with one another in amazing ways, making soil one of our planet's most dynamic and important natural resources.

According to Food and Agricultural Organization (FAO)

Soil is a 3-dimensional body with properties that reflect the impact of (1) *climate*, (2) *vegetation, fauna, Man* and (3) *topography* on the soil's (4) *parent material* over a variable (5) *time* span. The nature and relative importance of each of these five *`soil forming factors'* vary in time and in space. With few exceptions, soils are still in a process of change; they show in their *`soil profile'* signs of differentiation or alteration of the soil material incurred in a process of soil formation or *`pedogenesis'*.

Soil Classification

Soil Classification Systems have been developed to provide scientists and resource managers with generalized information about the nature of a soil found in a particular location. In general, environments that share comparable soil forming factors produce similar types of soils. This phenomenon makes classification possible. Numerous classification systems are in use worldwide.

Soil Classification concerns the grouping of soils with a similar range of properties (chemical, physical and biological) into units that can be geo-referenced and mapped. Soils are a very complex natural resource, much more so than air and water.

The Major Soil Groups and its Distribution

The many soil classification schemes developed over the years reflect different views held on concepts of soil formation and mirror differences of opinion about the criteria to be used for classification. In the 1950's, international communications intensified while the number of soil surveys increased sharply both in temperate regions and in the tropics. The experience gained in those years and the exchange of data between scientists rekindled interest in (the dynamics of) the world's soil cover. Classification systems were developed, which aimed at embracing the full spectrum of the soil continuum. In addition, emphasis shifted away from the genetic approach, which often contained an element of conjecture, to the use of soil *properties* as differentiating criteria. By and large, consensus evolved as to the major soil bodies which needed to be distinguished in broad level soil classification although differences in definitions and terminology remained.

The FAO-UNESCO Soil Classification System

In 1974, the Food and Agriculture Organization of the United Nations (FAO) published its Soil Map of the World (SMW). Compilation of the SMW was a formidable task involving collection and correlation of soil information from all over the world. Initially, the Legend to the SMW consisted of 26 (`first level') "Major Soil Groupings" comprising a total of 106 (`second level') `Soil Units'.

In 1990, a `Revised Legend' was published and a third hierarchical level of `Soil Subunits' was introduced to support soil inventory at larger scales. Soil Subunits were not defined as such but guidelines for their identification and naming were given. De facto this converted the SMW map legend, with a finite number of entries, into an open-ended, globally applicable `FAO-UNESCO Soil Classification System'.

The World Reference Base for soil resources

In 1998, the International Union of Soil Sciences (IUSS) officially adopted the *World Reference Base for Soil Resources* (WRB) as the Union's system for soil *correlation*. The structure, concepts and definitions of the WRB are strongly influenced by (the philosophy behind and experience gained with) the FAO-Unesco Soil Classification System. At the time of its inception, the WRB proposed 30 `*Soil Reference Groups*' accommodating more than 200 (`second level') *Soil Units*.

In the present text, the 30 Reference Soil Groups are aggregated in 10 `sets' composed as follows:

1.First, a separation is made between *organic soils* and *mineral soils*; all organic soils are grouped in Set #1.

2.The remaining (mineral) Major Soil Groups are each allocated to one of nine sets on the basis of `*dominant identifiers*', i.e. those soil forming factor(s) which most clearly conditioned soil formation.

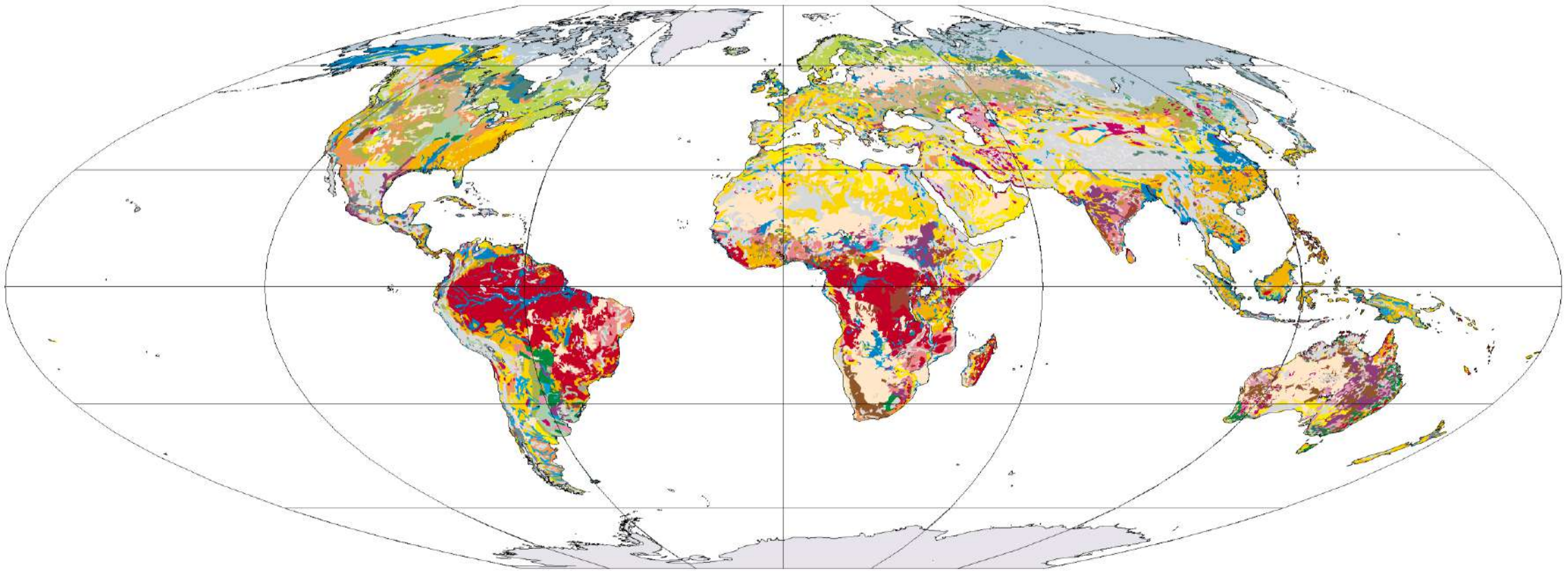
SOIL SETS	PREDOMINANT CHARACTERISTICS	NAME	ABBREVIATION	DISTRIBUTION
SET #1	Organic soils	HISTOSOLS	HS	Histosols occupy less than 2 percent of the nonpolar continental land area on Earth, mostly in Canada, Russia, and Scandinavia.
SET #2	Mineral soils whose formation was conditioned by human influences (not confined to any particular region)	ANTHROSOLS	AT	
SET #3	***Mineral soils whose formation was conditioned by their parent material***			
	- Soils developed in volcanic material	Andosols	AN	They are found from Iceland to Indonesia, but they typically occur in wooded highland areas of the continental lands bordering the Pacific Ocean.
	- Soils developed in residual and shifting sands	ARENOSOLS	AR	They occupy about 7 percent of the continental surface area of the Earth, and they are found in arid regions such as the Sahel of western Africa and the deserts of western Australia, as well as in the tropical regions of Brazil.
	- Soils developed in expanding clays	VERTISOLS	VR	Although broadly distributed on every nonpolar continent, they occupy just over 2 percent of the land area on Earth, primarily in subtropical or tropical zones of Australia, India, and Africa and in parts of the western United States (California and Texas) and Europe (Austria and the Balkans).

SET #4	**Mineral soils whose formation was conditioned by the topography/ physiography of the terrain** **- Soils in lowlands (wetlands) with level topography**			
		FLUVISOLS	**FL**	Great river basins and deltas of the world, nile delta, congo delta.
		GLEYSOLS	**GL**	These soils occupy about 5.7 percent of the continental land area on Earth, including the Mississippi valley, north-central Argentina, central Africa, the Yangtze River valley, and Bangladesh.
	- Soils in elevated regions with non-level topography	**LEPTOSOLS**	**LP**	They are the most extensive soil group worldwide, occupying about 13 percent of the total continental land area on Earth, principally in South America, Canada, the Sahara, the Middle East, central China, Europe, and Asia.
		REGOSOLS	**RG**	Regosols occur mainly in polar and desert regions, occupying about 2 percent of the continental land area on Earth, principally in northern China, Greenland, Antarctica, north-central Africa, the Middle East, and northwest Australia.
SET #5	**Mineral soils whose formation is conditioned by their limited age (not confined to any particular region)**	**CAMBISOLS**	**CM**	Cambisols are the second most extensive soil group on Earth, occupying 12 percent of the total continental land area—mainly in boreal polar regions, in landscapes with high rates of erosion, and in regions of parent material resistant to clay movement. They are not common in humid tropical climates.

SET #6	**Mineral soils whose formation was conditioned by climate: (sub-)humid tropics**	**PLINTHOSOLS**	**PT**	Plinthosols occupy about 0.5 percent of the total continental land area on Earth, mainly in Brazil and West Africa.
		FERRALSOLS	**FR**	Occupying just below 6 percent of the continental land surface on Earth, Ferralsols are found mainly in Brazil, the Congo River basin, Guinea, and Madagascar.
		NITISOLS	**NT**	Occupying 1.6 percent of the total land surface on Earth, Nitisols are found mainly in eastern Africa at higher altitudes, coastal India, Central America, and tropical islands (Cuba, Java, and the Philippines). They are perhaps the most inherently fertile of the tropical soils because of their high nutrient content and deep, permeable structure. They are exploited widely for plantation agriculture.
		ACRISOLS	**AC**	They occupy just under 8 percent of the continental land surface on Earth, covering areas throughout central and northern Latin America, Southeast Asia, and West Africa.
		ALISOLS	**AL**	predominately in the southeastern United States and Malaysia.
		LIXISOLS	**LX**	They occupy just under 3.5 percent of the continental land area on Earth, mainly in east-central Brazil, India, and West Africa.
SET #7	**Mineral soils whose formation was conditioned by climate: arid and semi-arid regions**	**SOLONCHAKS**	**SC**	Occupying about 2.6 percent of the continental land surface on Earth, they are found principally in Chad, Namibia, Australia, Paraguay, and Uruguay.
		SOLONETZ	**SN**	Occupying about 1 percent of the continental land area on Earth (northeastern Argentina, Chile, and the coastal edges of every continent), Solonetz soils occur in dry climatic zones and on parent materials either naturally enriched in sodium-bearing minerals or influenced by saline waters.
		GYPSISOLS	**GY**	Occupying about 0.7 percent of the continental land area on Earth, Gypsisols occur in the very arid regions of the world (North Africa, the Middle East), sometimes in association with Calcisols, as in Australia and the United States.
		DURISOLS	**DU**	Durisols are found in the southwestern United States, Chile, South Africa, and especially Australia, where rainfall is low. They usually occur in association with Arenosols, Calcisols, Cambisols, Gypsisols, or Vertisols.
		CALCISOLS	**CL**	these soils are typically encountered in arid or Mediterranean climatic zones (southwestern United States, central and southern Argentina, central China, northern Africa, and the Arabian Peninsula).

SET #8	**Mineral soils whose formation was conditioned by climate: steppes and steppic regions**	**KASTANOZEMS**	**KS**	They are found in relatively dry climatic zones (200–400 mm [8–16 inches] of rainfall per year), usually bordering arid regions such as southern and central Asia, northern Argentina, the western United States, and Mexico.
		CHERNOZEMS	**CH**	They are found in the middle latitudes of both hemispheres, in zones commonly termed prairie in North America, pampa in Argentina, and steppe in Asia or in eastern Europe. Chernozems account for 1.8 percent of the total continental land area on Earth.
		PHAEOZEMS	**PH**	Occupying about 1.5 percent of the continental land area on Earth, Phaeozems are found principally in the North American prairies, the South American pampas, and the subtropical steppes of Asia.
SET #9	**Mineral soils whose formation was conditioned by climate: (sub-)humid temperate regions**	**PODZOLS**	**PZ**	they range from Scandinavia to Russia and Canada in the Northern Hemisphere, to The Guianas near the Equator, to Australia and Indonesia in the Southern Hemisphere.
		PLANOSOLS	**PL**	Occupying about 1 percent of the total continental land area on Earth, they are found mainly in Brazil, northern Argentina, South Africa, eastern Australia, and Tasmania.
		ALBELUVISOLS	**AB**	Occupying 2.5 percent of the total land area on Earth, Albeluvisols are concentrated in a belt from Poland to Siberia in Eurasia and from Baffin Bay westward in Canada. As their subsurface layer structure implies, they tend to be associated with the FAO soil groups of Podzols to the north and Luvisols to the south.
		LUVISOLS	**LV**	they are found typically in west-central Russia, the United States, central Europe, the Mediterranean basin, and southern Australia.
		UMBRISOLS	**UM**	They are found under forest cover in high-rainfall regions of western Europe, the Pacific Coast of North America north of California, the southwestern coast of South America, and the Himalayas.
SET #10	**Mineral soils whose formation was conditioned by climate: permafrost regions**	**CRYOSOLS**	**CR**	Occupying about 17.7 million square km (6.83 million square miles) in the Arctic regions and in Antarctica, Cryosols are found principally in the wilds of Alaska, Canada, China, and Russia in the Northern Hemisphere. They are associated frequently with Gleysols, Histosols, and Podzols.

DOMINANT SOILS OF THE WORLD



Albiluvisols
Acrisols
Andosols
Arenosols
Chernozems
Calcisols
Cambisols
Cryosols
Durisols
Fluvisols
Ferralsols
Gleysols
Gypsisols
Histosols
Kastanozems
Leptosols
Luvisols
Lixisols
Nitosols
Podzols
Phaeozems
Planosols
Plinthosols
Regosols
Solonchaks
Solonetz
Umbrisols
Vertisols
Glaciers
No data
Water b.

Polar Quartic Projection

FAO-GIS, August 1999