SOIL MAP OF GREECE

SCALE 1:500.000

Project framework:
"Development of an integrated system for soil geographic data and delineation of agricultural zones in Greece"

The mapped area of agricultural soils reached a total of 385.023 ha. Soil mapping was conducted in the semi-detailed scale of 1:30.000, using the existing mapping system of the Greek National Soil Map, optimized and improved by incorporating additional soil characteristics. (IUSS Working Group WRB. 2006. World reference base for soil resources 2006. 2nd edition. A framework for international classification, correlation and communication. World Soil Resources Reports No. 103. FAO)

Delineation of Soil Mapping Units (SMUs) was performed by analyzing orthophoto-maps and digital topographic data. Verification or alteration of SMUs was achieved by field work that included detailed soil description and sampling (three soil depths) in 2.019 representative soil profiles. Additionally, soil sampling was performed (two soil depths) in 8.043 locations of Soil Mapping Units. In total, 22.000 soil samples were collected and analyzed for determining: texture, pH, organic matter, cation exchange capacity, carbonates, total nitrogen, available phosphorous, exchangeable potassium and salinity. Characterization and description of Soil Mapping Units was complemented by soil profile description and reconnaissance soil core description.

- **Soil profile:** excavation up to 150 cm & macroscopic profile description (FAO). Soil sampling from upper three soil horizons (commonly 0-30, 30-60 & 60-100 cm).
- **Soil core:** soil sampling from depths: 0-30 & 30-60 cm and reconnaissance soil core description.

Soil classification was based on FAO-WRB World Reference Base for soil resources framework for soil classification, containing definitions and diagnostic criteria to recognize soil horizons, properties and materials, providing rules and guidelines for classifying and subdividing reference soil groups. (IUSS Working Group WRB. 2006. World reference base for soil resources 2006. 2nd edition. A framework for international classification, correlation and communication. World Soil Resources Reports No. 103. FAO). Major Reference Soil Groups in Greece are: **Fluvisols, Cambisols, Gleysols, Luvisols, Calcisols, Regosols, Vertisols, Leptosols, & Histosols.**

SOIL MAP LEGEND

CL — **Calcisols:** Soils with significant accumulation of secondary calcium carbonates, generally developed in dry areas. Calcisols have substantial movement and accumulation of calcium-carbonate within the soil profile. The precipitation may occur as pseudomycelium (root channels filled with fine calcite), nodules or even in continuous layers of soft or hard lime (calcrete). Calcisols are common on calcareous parent material in regions with distinct dry seasons, as well as in dry areas where carbonate-rich groundwater comes near the surface. Typical Calcisols have a pale brown surface horizon; substantial secondary accumulation of lime occurs within 100 cm of the surface. Cartographic representation: **CL**

CM — **Cambisols:** Soils that are only moderately developed on account of limited age or rejuvenation of the soil material. Pedogenic processes are evident from color development and/or structure formation below the surface horizon. Cambisols occur in a wide variety of environments and under all many kinds of vegetation. Commonly referred to as brown soils, Cambisols combine soils with at least an incipient subsurface soil formation. Transformation of parent material is evident from structure formation and mostly brownish discoloration, increasing clay percentage, and/or carbonate removal. Cambisols are characterized by slight or moderate weathering of parent material and by absence of appreciable quantities of illuviated clay, organic matter, Al and/or Fe compounds. Cartographic representation: **CM**

FL — **Fluvisols:** Fluvisols accommodate genetically young, azonal soils in alluvial deposits (floodplain), lacustrine (lake) and marine deposits (from the Latin, fluvius, meaning river). Fluvisols are common in periodically flooded areas such as alluvial plains, river fans, valleys and tidal marshes. Fluvisols show layering of the sediments rather than pedogenic horizons. Their characteristics and fertility depend on the nature and sequence of the sediments and length of periods of soil formation after or between flood events. Soil profiles with evidence of stratification; weak horizon differentiation but a distinct topsoil horizon may be present. Redoximorphic features (*mottles*) are common, in particular in the lower part of the profile. Cartographic representation: **FL**

GL — **Gleysols:** Soils saturated by groundwater near the surface for long. Gleysols occur mainly in lowland areas where the groundwater comes close to the surface and the soil is saturated with groundwater for long periods of time. Conditioned by excessive wetness at shallow depth, this type of soil develops gleyic color patterns made up of reddish, brownish or yellowish colors on ped surfaces or in the upper soil layers, in combination with greyish/bluish colors inside the peds or deeper in the soil profile. Evidence of reduction processes in the soil profile with segregation of Fe compounds within 50 cm of the soil surface. Adequately drained Gleysols can be used for arable cropping, dairy farming and horticulture. Cartographic representation: **GL**

HS — **Histosols:** Histosols are composed mainly of organic soil material (> 18%). During development, the organic matter production exceeds the rate of decomposition. The decomposition is retarded mainly by low temperatures or anaerobic (low oxygen) conditions which result in high accumulations of partially decomposed organic matter. Parent material: Incompletely decomposed plant remains, with or without admixtures of sand, silt or clay. Histosols are also known as peat, muck, bog and organic soil. Cartographic representation: **HS**

LP — **Leptosols:** Leptosols are shallow over hard rock and comprise of very gravelly or highly calcareous material. They are found mainly in mountainous regions and in areas where the soil has been eroded to the extent that hard rock comes near to the surface. Because of limited pedogenic development, Leptosols do not have much structure; soil profile with continuous rock at or very close to the surface, extremely gravelly. Parent material: various kinds of continuous rock or of unconsolidated materials with less than 20% (vol.) fine earth. Cartographic representation: **LP**

LV — **Luvisols:** Soils with a subsurface horizon of high activity clay accumulation and high base saturation. Luvisols show marked textural differences within the profile. The surface horizon is depleted in clay while the subsurface *argic* horizon has accumulated clay. Luvisols have high-activity clays throughout the *argic* horizon and a high base saturation at certain depths. A wide range of parent materials and environmental conditions lead to great soil diversity. Luvisols are common in colluvial deposits of limestone weathering, mostly fertile soils and suitable for a wide range of agricultural uses. Cartographic representation: **LV**

RG — **Regosols:** Soils with limited development; a Regosol is a very weakly developed mineral soil in unconsolidated materials with only a limited surface horizon having formed. Limiting factors for soil development range from low soil temperatures and prolonged dryness to parent material or erosion type. Parent material: unconsolidated, finely grained material. Soil profile with no diagnostic horizons and minimal development as a consequence of young age and/or slow soil formation. Regosols are extensive in eroding lands, particularly in arid and semi-arid areas and in mountainous terrain. Cartographic representation: **RG**

VR — **Vertisols:** Vertisols are rich in swelling clay minerals and occur primarily in level landscapes under climates with pronounced dry and wet seasons. Vertisols shrink and swell upon drying and wetting. Deep *(>50cm)* wide *(>1cm)* cracks form when the soil dries out and swelling in the wet season and creates polished and grooved ped surfaces (slickensides) or wedge-shaped or parallel-sided aggregates in the subsurface vertic horizon. The name Vertisols (from Latin vertere, to turn) refers to the constant internal turnover of soil material. Landscapes of Vertisols may have a complex micro-topography of micro-knolls and mircro-basins called *gilgai*. Parent material: sediments that contain a high proportion of swelling clays, or products of rock weathering that have the characteristics of swelling clays. Cartographic representation: **VR**

- The dominant Reference Soil Group is **Cambisols** reaching up to 38,7% of total mapped area.
- The Reference Soil Group of **Fluvisols** cover up to 24,0% of total mapped area.
- The Reference Soil Group of **Calcisols** cover up to 11,1% of total mapped area.
- The Reference Soil Group of **Leptosols** cover up to 8,4% of total mapped area.
- The Reference Soil Group of **Luvisols**, cover up to 9,0% of total mapped area.
- The Reference Soil Group of **Vertisols** cover up to 4,0% of total mapped area.
- The Reference Soil Group of **Regosols**, cover up to 4,3% of total mapped area.
- The Reference Soil Groups of **Histosols** & **Gleysols** cover up to 0,1% & 0,7% of total mapped area, accordingly.

PAYMENT AND CONTROL AGENCY FOR GUIDANCE AND GUARANTEE COMMUNITY AID
(O.P.E.K.E.P.E.)

"Development of an integrated system for soil geographic data and delineation of agricultural zones in Greece"

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Contractor:
Aristotle University of Thessaloniki (AUTh)/Research Committee/Special Account for Research Funds – Consortium of companies "Greek Photogrammetric Ltd"

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CARTESIAN COORDINATE SYSTEM:
GREEK GEODETIC REFERENCE SYSTEM 1987 (EGSA87)
REFERENCE ELLIPSOID GRS80 (a=6378137 m, 1/f=298.257222101)
PROJECTION REFERENCE SYSTEM: TRANSVERSE MERCATOR
CENTRAL MERIDIAN l=24° 00' 00' SCALE FACTOR K=0,999600
FALSE EASTING +500000 m, FALSE NORTHING 0 m
REFERENCE LATITUDE 00° 00' 00'
MAP PRODUCTION: KARAPETSAS N.

SCALE 1:500.000

Digital data sources

Digital Elevation Model: Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM). Land Processes Distributed Active Archive Center (LP DAAC). 2001, ASTER GDEM V2. Registered Radiance at the Sensor, dataset: NASA EOSDIS Land Processes DAAC, USGS Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota (https://lpdaac.usgs.gov), accessed March 2014 at http://dx.doi.org/

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Soil Database: Phase 5 – Deliverable 1: "Soil mapping unit integrated geodatabase" sub-project 7 of the action "High added value Agricultural Digital Services (e-Yπ.A.A.T.) under the title: "Development of an integrated system for soil geographic data and delineation of agricultural zones in Greece". Contracting authority was the "Payment and Control Agency for Guidance and Guarantee Community Aid" (OPEKEPE) of Ministry of Agricultural Development and Food

Classification framework: IUSS Working Group WRB. 2006. World reference base for soil resources 2006. 2nd edition. World Soil Resources Reports No. 103. FAO. A framework for international soil classification; definitions and diagnostic criteria to recognize soil horizons, properties and materials; rules and guidelines for classifying and subdividing soil reference groups.

Cartographic representation: Soil Atlas of Europe, European Soil Bureau Network, European Commission, 2005, 128 pp, Office for Official Publications of the European Communities, L-2995 Luxembourg