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The genesis of foothill landforms is attributed to the Neogene age with correlative deposits and in situ alterations. This paper presents the preliminary results of an analysis of the geomorphopedological genesis of the foothills at the São Pedro Cuesta, located between the Peripheral Depression and the Western Plateau in the State of São Paulo, southeastern tropical Brazil. Geomorphopedological genesis is approached through a multiscale analysis, from the regional to the soil scale. A regional survey of forms, structures, and neotectonic features is followed by a structural analysis of the pedological cover. Macro- and micro-morphological, physical, chemical, and mineralogical properties of toposequence materials were analyzed in addition to dating by optically stimulated luminescence. The foothills are elongated hills in a sandstone area covered by shallow Quaternary materials. The soil toposequence is located at the gentle interfluvial slopes of the foothills. The results show a pedological system with a sandy clay loam texture with less than 20% clay and minor variation in depth, except for the hillslope in the inferior sector where the texture changes suddenly. The pedological system is reddish at the top, with more clay, and becomes progressively yellowish, and coarser with more sand in the inferior sector. A weak acid pH, prevailing negative charges, low basic cation concentration, and Ki and Kr indexes greater than 0.75 suggest high degrees of weathering and leaching in these materials, with a predominance of kaolinite in the clay fraction. Although the materials show a high pedologic development, their ages are relatively young, between 22.5 ± 2.6 ka (at the top) and 27.45 ± 4.35 ka (in the inferior sector). Rock fragments (basalt, sandstone, silex, and ferruginous crust) are found at depth in the inferior sector. Magnetite and maghemite soil minerals are present in the upper sector. The preliminary results suggest the presence of allochthonous materials on the glacial surface, which would have been derived from Late Quaternary morphogenesis linked to the escarpment retreat. The current sculpture of the interfluvial is a result of pronounced mechanical morphogenesis in the Upper Pleistocene, and more intense weathering and pedogenesis in subsequent wetter periods in the Holocene.

Keywords: Geomorphopedological genesis; Soil toposequence; Soil analysis; Late Quaternary morphogenesis.

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(5447 - 1703) Five decades in research on Vertisols: A bibliometric analysis

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The Vertisols present a wide world-wide occurrence, high productive potential, besides particular and dynamic features, which requires different management. Through the bibliometric analysis of publications, the objective was to analyze the dynamics and evolution of research on Vertisols between 1966 and 2015. The data were taken from the database (Scopus), using the words "vertisols" or "vertisol" in the search. "Vertisol" in the field of article title, abstract and keywords. The evaluated items of the documents were category, type of document, affiliation, language, country of publication, as well as frequency distribution of the words in the title, keywords and author keywords. The countries that published the most on Vertisols (1966-2015) were India, Australia, the United States, France and Ethiopia, which have extensive areas occupied by this soil except France. Thus, at the global level, they contributed the most scientifically to the progress of researches on Vertisols, as well as presenting the main publishing institutions on this subject, and Spain, Belgium and Mexico. The first publications indexed in the database come from the 60s, and reached the peak of production in 2014. This behavior expresses the scientometric model that followed a second-order polynomial growth pattern. A fifth of the publications came from 11 authors, although these were not responsible for the most cited articles. Articles are the

main type of document and English is the predominant language of publications. Vertisols, Vertisol and Soil were the most used words. The country, elements and most frequent cultures were India; nitrogen, phosphorus, potassium, carbon, zinc; and sorghum, wheat, soybeans, rice, cotton, chickpeas. The studies focused mainly on effects, differences, productivity, growth and uses, aiming at the optimization of natural resources, their better use, as well as increased productivity. Subjects related to pedogenesis and microbiology were poorly explored.

Keywords: Vertisols, Vertisol, Vertosol, Bibliometric analysis, Scopus

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(8778 - 2858) Influence of relief on mineralogical development in soil in the semi-arid region of Pernambuco, Brazil

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Semi-arid environments occupy a large part of the terrestrial territory, are characterized by quite characteristic climatic conditions, with low rainfall and high temperatures. The soils existing in this landscape are categorically characterized as little weathered, and predominantly rich in bivalent minerals, showing the climate as a preponderant formation factor, forgetting the importance of the others. From these theories, this study was carried out with the purpose of proving the fundamental influence of the relief and drainage condition on the formation of minerals in the semi-arid environment and consequent evolution of soils. Physical, chemical, mineralogical and petrographic analyzes were carried out, being proved the predominance of processes of monovalentization and bivalentization in the region. The studied soils are formed from materials of very similar composition, being of great importance for the mineralogical development of the same. All the chemical, physical and mineralogical characteristics are reflections of the materials of origin of the studied profiles. It is clear after all studies that the formation of minerals is directly linked to the position of the soil in the landscape, being the soils with greater drainage propitious to the formation of minerals 1: 1 (kaolinite), and the soils with less drainage conducive to the formation of minerals 2: 1 (smectite).

Keywords: kaolinite, smectite, hydrolysis, landscape, drainage.

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(4954 - 2543) Legacy soil maps from Brazil: organizing and providing layers in an interactive WebGIS

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Digital soil maps at appropriate scales are essential information for land use planning. Nevertheless, Brazilian soil information is scattered in several institutions and stored in several formats. In addition to that, this information have faced an interruption of its systematic soil

survey program, providing difficult access to decision makers. In order to organize and safeguard the spatial data produced at the Brazilian Agricultural Research Corporation (Embrapa), a spatial data infrastructure was developed (IDE-Embrapa) where thematic collections related to soil have been gathered and published in a web environment. The objective of this work is to present the initiative of organizing the spatial data of Embrapa related to soil information through the development of the IDE-Embrapa. In order to achieve this goal, the spatial data that were stored in a previous geoinformation infrastructure developed by Embrapa Soils were shifted to the IDE-Embrapa infrastructure. The implementation of the IDE-Embrapa was performed using open source software, based on the Open Geospatial Consortium standards. The IDE-Embrapa infrastructure uses GeoNode platform, which integrates a geospatial database (PostGis) with a map server (GeoServer) and a metadata catalog (PyCSW), and is controlled by a Content Management System in the Web environment. Currently, 100 information layers and 60 documents were catalogued in the IDE-Embrapa Soils (geoinfo.cnps.embrapa.br). These data and metadata are already available for download. Maps represented by various territorial boundaries and scales were registered. The main maps of Embrapa Soils are already catalogued and are available to the user with their own color pattern (styling) for each type of thematic map, allowed by incorporation of a file with the styled layer descriptor (SLD) format to each map. Soil maps, for example, are presented with the colors established according to the Brazilian Soil Classification System, which facilitates users to visualize the spatial distribution of soils in a given region. Currently, the IDE-Embrapa infrastructure is making available the Brazilian soil information available to any external user. This work is under construction and we hope soon to have all maps prepared by Embrapa Soils catalogued and available, in order to safeguard data and metadata, for ready use of these by society.

Keywords: Geoinformation, Geoservices, Geodata

Financial support: Embrapa

(8245 - 598) Pedo-ecotone as a specific soil-geographic unit

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At the present stage of the development of geographic science, there has emerged a need to improve the conception of geographical ecotones as transitional bands between various natural systems. Within such territories, one type of landscape (soil) is changed by another, for example, the steppe – by the dry steppe (chernozems – by kastanozems). In the northwest of the Black Sea region, a distinct transitional stripe is the transition stripe from the middle to the dry Steppe, which at the same time is a peculiar transition from calcic chernozems to the gypsic kastanozems. At the present stage, the soils of this ecotone are affined to the gypsic kastanozems in the brownish color of the humus accumulative horizon, with clear signs of lessivage, very low sodic resistance, low buffer capacity and chemical signs of soil sodicity. A well-defined humus accumulative horizon, humus indexes, a broad ratio of carbon content in humic acids to the one in fulvic acids and indicators of the optical properties of humic acids characterize the soils of this ecotone as calcic chernozems. A characteristic feature of ecotones (and hence of pedo-ecotones) is the pronounced spatial streamlining of their internal structure. Accordingly, in the pattern of the soil cover of the researched area, three groups of soils, which form the local catenas, can be distinguished: the background soils of the plakors and narrow watersheds (sodic and residual-sodic calcic chernozems); the soils of the lower parts of the slopes and the soils of the reclined thalwegs of the hollows – are characterized by chernozem parameters; slightly xeromorphic and slightly eroded soils of the upper parts of the slopes – closer to gypsic kastanozems. It also confirms the transitional (ecotonal) status of the researched area. Thus, the transition stripe from the gypsic kastanozems to the calcic chernozems in the northwest of the Black Sea region should be defined as a medium-dry

steppe pedo-ecotone – a peculiar soil-geographic unit. Actually, the pedo-ecotone should be defined as a dynamic spatio-temporal soil-geographic system, which is formed in the contact zone of certain types (subtypes) of soils and is characterized by relatively high gradients of properties and parameters, internal inhomogeneity and functional interconnection of the structural elements, among which both the objects of adjacent pedo-ecotone-forming bodies and specific for the given pedo-ecotone formations are found.

Keywords: Pedo-ecotone; chernozems; kastanozems; steppe.

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(5260 - 2739) Relation of pedoenvironments with forms of nitrogen and phosphorus in semiarid soils.

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There are few studies related to the influence of the climatic gradient, mainly rainfall, on N and P dynamics in soils of the semiarid region of Brazil, being this information primordial for the planning of the soil management, since these nutrients are considered limiting for the production of biomass of the region. Eight sample areas were selected considering two climatic gradients (hot and semihumid, and hot and semiarid), which contained the three main orders of representative soils of the Brazilian semiarid region Planossolos, Luvisolos e Neossolos Regolíticos (Typic Albaqualf, Aridic Haplustalf and Typic Ustertent). In these places trenches were opened, horizons were identified and samples were collected for analysis in all present horizons. The values of the fraction of P (P-Al, P-Fe and P-Ca) and mineral N (NH_4^+ and NO_3^-) were evaluated. The highest levels of P fractions were found in the Luvisolos (Aridic Haplustalf) region of the hot and semiarid climate, with predominance of P-Al and P-Fe fractions, which may be related to the reduced Ca^{2+} contents in this soil and the soil pH, since P-Al and P-Fe are more frequent in more developed soils and acids, while the P-Ca predominates in alkaline soils. As for mineral N fractions (NH_4^+ and NO_3^-), the levels were considered low in all soils and horizons, only the Luvisolos (Aridic Haplustalf) of the hot and semiarid climate had higher levels of nitrate. It was possible to conclude that with increasing rainfall there was an increase in P and N fractions in all Planossolo (Typic Albaqualf) and Luvisolos (Aridic Haplustalf) profiles, however, the source material influenced more than rainfall.

Keywords: pedogenesis, fractionation of P, NH_4^+ and NO_3^-

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(3397 - 747) Soil fertility mapping: its transference to farmers by using GIS online tools

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The GIS helps to study the spatial variability of different characteristics on landscape and becomes an important tool for the adequate management under precision agriculture concept. The goal of this study was to use available *Online* tools in order to display the spatial variability of some soil chemical properties on field. In the project participated 235 farmers of CoopeTarrazú R.L. and CoopeLlanobonito R.L. cooperatives located at "Zona los Santos", Costa Rica and dedicated to coffee production. Cooperative Foment Institute (INFOCOOP) and University of Costa Rica (UCR) sponsored this study