

MS were used. In the ADFE samples, the highest low frequency MS (MS<sub>lf</sub>) value was observed in ADEs, while the lowest MS<sub>lf</sub> values were observed in non-anthropogenic soils and ME 02. In the ADEs and ME 01, the highest MS<sub>lf</sub> values are observed in the surface horizons, decreasing in depth ( $9,20 - 0,52 \cdot 10^{-6} \text{ m}^3 \text{ kg}^{-1}$ ), these results are probably due to the anthropogenic actions, such as the use of fire, which favor the formation of magnetic minerals, as maghemite, in the anthropogenic A horizons, by the process of burning organic matter. The MS<sub>lf</sub> of the clay fraction showed the same tendency from the values found in the ADFE, with the higher values being observed in ADEs. The relatively close values of the MS<sub>lf</sub> in the ADFE and clay fraction, indicate that the MS is mainly resulting from the maghemite. The  $\chi_{df}$  in the ADFE samples from ADEs surface horizons showed values from 7,53 to 9,69%, thus indicating a mixture of multi-domain and single-domain (SD) minerals, or probably, a predominance of superparamagnetic minerals (SP). The close to 10%  $\chi_{df}$  values observed in ADEs and ME 01 indicate the predominance of particles smaller than  $0,03\mu\text{m}$ , with a SP behavior, common in the clay fraction (maghemite), to the detriment of SD and multiple (magnetite), common in sand and silt's coarse fractions. The higher MS in ADEs and ME 01 is due to the use of fire by pre-Columbian populations, consequently promoting maghemite formation in these soils.

**Keywords:** Anthropogenic horizons; soil magnetism; Amazonian soils; magnetic susceptibility.

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**(6879 - 1563) Magnetic susceptibility and its relation to human modification of soils in archaeological sites in Brazilian central plateau.**

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The study of magnetic properties in archaeological soils has been very useful in detecting activities related to the use of fire. The warming produces a reorganization of the molecules and a neof ormation of magnetic minerals. The present study aims to evaluate the variation of magnetic susceptibility in soils archaeological sites in San Francisco's depression. Ten archaeological sites and three control sites were studied. Volumetric magnetic susceptibility (VMS) were determined in  $10 \text{ cm}^3$  aliquots of TFSA using a Bartington MS2 system and an MS2B sensor, Carbon-14 dating was also done. The control sites results show values of VMS in order of  $40$  to  $62 \times 10^{-3} \text{ m}^3 \text{ kg}^{-1}$ . Samples related to human burning features the VMS ranged from  $2518$  to  $145 \times 10^{-3} \text{ m}^3 \text{ kg}^{-1}$ . The site called Lapa Pintada seems to have the more intense anthropic fire activities, followed by Lapa do Boquete. Dating showed that an intense occupation was between 1000 and 8000 yrs BP but with indications of an occupation older than 12000 years BP. The Anthrosol of Santana do Riacho had a value of  $VMS 1293 \times 10^{-3} \text{ m}^3 \text{ kg}^{-1}$  in the burials layer. Dating show an age between  $8230 \pm 150$  to  $9460 \pm 110$  years BP, we have also found an indication of throwing ashes and coals inside the graves, as well as make campfires above them. The oldest level dated was  $11960 \pm 250$  yrs BP, and shows high MS values, although lower than the previous ones,  $877 \times 1010^{-3} \text{ m}^3 \text{ kg}^{-1}$ . The Bibocas II archaeological site, in its oldest level,  $10470 \pm 80$  BP, show intense fire activities. The VMS data suggest that the Lapa Grande, Lapa do Malhador, Cave da Passagem and Lapa do Sol, had incipient human activities. The Lapa Grande had its highest value in recent level. The Lapa of the Malhador, had high VMS value ( $2199 \times 10^{-3} \text{ m}^3 \text{ kg}^{-1}$ ) in its oldest level. The cave da Passagem, had its highest value in a representative level of bonfire.

The Lapa do Sol, is an open-air site, had high VSM at the same level where many lithic artifacts were found. Our results indicated that VSM is a very useful parameter as diagnostic characteristic for anthropic soils horizons, or horizons were activities using fire were conducted. These activities that heat the soil and change the magnetic characteristics and may also change the mineralogical assemblage are related to fire to food and pigment preparation, thermal flaking, ceramic burning, lighting, or ritual bonfires.

**Keywords:** Termoremanence, Anthrosols, Magnetite, Maghemite, Anthropic

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**(3849 - 3129) Micromorphology study of the soil of the archaeological site Sol de Campinas do Acre**

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The southwest region of the Brazilian Amazon has gained visibility in the last decades due to the mapping of many earthworks build, currently counted in 450 sites and this number only increases. Two types of distinct structures are observed, geoglyphs are formed by ditches or embankments and appear in great quantity, whereas mound constructions normally are in elliptic shape, are scarce and are associated spatially with the geoglyphs. One of the main issues nowadays is the indigenous interference in the Amazonian landscape and these earth structures are inserted in this debate due to the movement of the necessary pedological material during their constructions. Recent research in the region conceives earth engineering as a dynamic and enduring cultural practice that has transformed the landscape and established regional communication networks. This research has a geoarchaeological approach and studies archaeosedimentary material from the archaeological site Sol de Campinas do Acre. The site consists of 15 mounds with an average height of 3 meters, which are arranged elliptically around a central square covering approximately  $15.000 \text{ m}^2$ . The dating radiocarbon on mound 11 revealed a succession of occupancy events between the 11th and 17th centuries, placing the period of its construction later than the geoglyphs of the region. Preliminary results of the micromorphological study of Mound 11 in SCA indicated an intentionality in the choice of building material. The lower layers of Mound 11 were designed using the A horizon of the surrounding soil, adding allochthonous material such as iron oxide and / or manganese nodules, possibly to provide more strength to the structure. Micromorphology has the potential to reveal hidden aspects in the formation of earthworks and to offer complementary data for the interpretation of the use and function of the site. To complement the micromorphological data particle size and X-ray Fluorescence analyzes are being performed.

**Keywords:** micromorphology of soils; geoarchaeology; earthen mounds; Amazon

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**(3357 - 2483) Spatial variability of soil erodibility in areas of Indian dark earth under different uses in the south of the Amazon**

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The erodibility represents the susceptibility of the soil when exposed to erosive agents, disintegration and transport of particles, and can