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Abstracts

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Distribution, Formation, Degradation, and Properties

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Ancient manuring of Amazonian Dark Earths as assessed by molecular markers

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Anthrosols often exhibit high nutrient levels. Whereas the nutrient sources in some Anthrosols are well known, e.g. manure as nutrient source for plaggic Anthrosols, often their origin was not investigated up to now. Within a landscape of infertile soils (Ferralsols, Acrisols, Lixisols, and Arenosols) in central Amazonia, small islands of highly fertile black-earth-like anthropogenic soils (Amazonian Dark Earths) occur. Radiocarbon dating indicates that these soils were formed between 7000 - 500 cal. yr BP and are of pre-Columbian origin. Their fertility is caused by stable soil organic matter and high levels of nutrients, specially phosphorus.

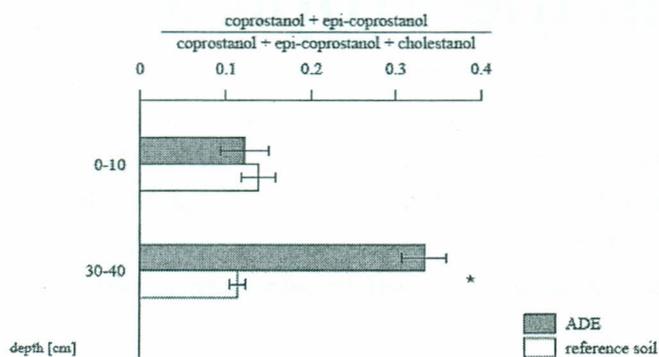


Figure: Sum of the amounts of coprostanol and epi-coprostanol divided by the amounts of cholesterol, coprostanol and epicoprostanol in Amazonian Dark Earth (ADE) and Ferralsols. The elevated value of ADE in 30 - 40 cm soil depth indicates application of faecal material.

In the shallowest 10 cm recent land use could effect a dilution of the

ancient stanol signal (* indicates significant differences ($P < 0.05$) between ADE and reference soils; error bars show standart errors; N = 5)

The nutrient stocks and nutrients forms of Amazonian Dark Earths were investigated in the last decades. However, only few studies about the origin of nutrients were carried out. Up to now, bones have been identified as one source of nutrients in Amazonian Dark Earths but other sources like e.g. plant biomass and feacal material are still a matter of speculation. We are investigating the nutrient sources of these soils using biomarker- and compound-specific stable isotope analyses. We will present first data from analyses of stanols, bile acids and nitrogen isotope ratios in amino acids. Our data show that excrements contribute to the fertility of Amazonian Dark Earths (e.g. Figure). Analytical procedures and the applicability of this methods to detect ancient human manuring in those soils, which were as far as we know, not used before in the humid tropics, will be discussed.