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N2O EMISSIONS AND GROSS SOIL N TRANSFORMATIONS IN TWO AMAZONIAN DARK EARTH AND CORRESPONDING ADJACENT SOILS

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Amazonian Dark Earths (ADE) usually have higher nutrient contents, pH values, cation exchange capacities, water-holding capacity and microbial activity, correlated to higher soil organic carbon contents, including charcoal. They serve as archetypes; recent biochar research aims at understanding these soils and their functioning in order to copy them, and subsequently improve the fertility of degraded soils. However, high-SOC soils can have larger undesirable N2O emissions. We investigated the fluxes of CO2, N2O and CH4 in soils from two ADE, locally known as Terra Preta de Índio, sites located near Manaus, Brazil, and their corresponding adjacent soils. One site was covered by secondary forest the other under agriculture (cassava plantation). Subsequently, 15N-NH4+ and -NO3- were added, and N2O emissions and gross-N transformations of the different N species were closely followed over two weeks (15N signal, N concentrations; work on-going), using the methodology of Müller et al. (2004; 2007). While significantly larger CO2 effluxes from ADE at three temperatures indicated significantly larger biological activity of TP than adjacent soils, and secondary-forest than agricultural soils, N2O fluxes from all soils (including ADE) were very low without mineral-N additions. While the secondary-forest soils showed CH4 uptake this was not the case in the agricultural soils. The results of the gross N transformations and N2O emissions after mineral-N addition will be reported. Müller et al. (2004) Soil Biology & Biochemistry 36:619-632. Müller et al. (2007) Soil Biology & Biochemistry 39:715-726.

KAMMAN, C.; LIMA, A. B.; FINKE, C.; TEIXEIRA, W. G.; TSAI, S. M.; MUNIZ, A. W.; BRAKER, G.; MÜLLER, C. N_20 Emission and gross soil N transformations in two Amazonian Dark Earth and corresponding adjacent soils. Eurosoil, 2012. Bari. 4th: European Confederation of soil science societies. p.1465.