

Climate controlled peat accumulation at Colônia (São Paulo, SE / Brazil) since the last interglacial

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The Colônia site is situated 40 km south of the mega city São Paulo, within a geomorphological structure probably formed by a meteor impact. The regional yearly rainfall pattern is under the domain of the South American Summer Monsoon, with increased summer rainfall accompanied by increasing temperatures. During the austral winter, southern frontal systems act as moisture source and relate to colder temperatures. The vegetation history from the peatland sediments had already shown noticeable changes since 125 ka (Ledru et al, 2009). The previous reconstruction is herewith complemented by investigations of the inorganic portions of the sediments. The age model of the present study bases on radiocarbon ages, luminescence ages and paleomagnetism. The detrital input (e.g. K, Ti, Si [XRF counts]) allowed the identification of phases deposited under increased water table depth, containing older carbon with respect to the stratigraphic counterparts deposited under lower water table conditions. The degree of crystallinity, as obtained from X-ray diffraction data, clearly outlines alternations between ombrotrophic peat accumulation and minerotrophic accumulation. These two deposition environments present distinct geochemical signature (from K, Rb, Si, Ti, Zr, Fe, Ca, S [high resolution XRF counts]), as supported by compositional data analysis. Inserted in the context of South American paleoclimate, the change of the peatland deposition environment towards minerotrophic conditions correlates well to time periods in which the overall region received increased moisture. Such conditions relate to changes in precipitation and seasonality regulated by the South American Summer Monsoon variability, as also observed in supra-regional paleoclimate records, e.g. speleothem records, the Cariaco Basin and concomitant increased detrital input to the continental margin at SE-Brazil as shown by marine sediments. These conditions partly overlap with time periods of colder temperatures and enhanced frequency of southern frontal systems, as shown by several phases of Araucaria pollen occurrence in the Colônia peatland.