

RELATIONSHIP BETWEEN VEGETATIONAL FIRE, CLIMATE EVOLUTION AND VEGETATION PATTERNS IN THE QUATERNARY OF THE COASTAL PLAIN OF RIO GRANDE DO SUL, BRAZIL

Ribeiro, V.¹; Kuhn, L. A.²; Guerra-Sommer, M.³; Simões, J. C.⁴; Menegat, R.⁵

^{1,2,3,4,5} Federal University of Rio Grande do Sul

ABSTRACT: The goal of the study was to establish correlations between the occurrence of fire peaks in the Late Pleistocene-Holocene interval and potential changes in the pattern of vegetation in the Águas Claras locality, municipality of Viamão, in the Coastal Plain of Rio Grande do Sul State, Brazil. Charcoal fragments were recovered from a 1.17 cm drill core at intervals of 10 cm and submitted to statistical analyses and documented under stereomicroscope and scanning electron microscopy (SEM). For palynological analyzes samples of 1 cm³ were recovered at different intervals of deposition at the basal Pleistocene lagoon interval and in the overlaying Holocene peat layer. The palynomorphs were quantified for statistical analysis and grouped taxonomically as well as for their ecological affinities, under optical microscopy (400x magnification). Palynological and charcoal analyzes indicated that in the basal (sandy matrix) Pleistocene lagoon facies, small charcoal fragments showing evidences of remobilization were commonly associated with dominant herbaceous forms (Poaceae besides, Asteraceae and Apiaceae), arboreal plants (Myrtaceae) are complementary forms. Pteridophytes are rare represented by *Blechnum* and Polypodiaceae, and Bryophytes are absent. The data indicate restricted conditions probably related to mixohaline environment caused by rapid sea level rise. Wildfires were distant events from the lagoon. At the charcoal peak identified at the deposition of the lagoon environment (approximately 25400 years BP) wood charred fragments are small but well preserved, showing incomplete burning (partially homogenized cell walls). Palynological data indicate that herbaceous forms from previous interval increase their dominance, decreasing the influence of arboreal and pteridophyte and bryophyte (*Sphagnum*, *Phaeoceros*) becoming more frequent. Integration of data suggest that mixohaline evolved to an environment where freshwater conditions were progressively been installed during sea level falling. Surface fires with low intensity and rapid propagation reached the area of the lagoon. At the boundary with peat generation facies the size, preservation and concentration of the charcoal fragments increases abruptly. Palynological analyses in the peat level underlying a paleosurface represented by a thin carbonate lamina (1 cm) which represent the maximum flood of the transgression phase in Coastal Plain of Rio Grande do Sul (~5.100 years BP) show an increase in arboreal forms and expansion of Bryophyta (*Sphagnum*) which is indicative of humidity, low mineral nutrient rate and paleoenvironmental acidity. After the inferred maximum transgression, arboreal plants become more important. Pteridophytes (dominated by *Blechnum*) and bryophytes, represented mainly by *Sphagnum* continue to expand. In the charcoal peak identified in the peat layer in the late Holocene (1590-1515 cal years BP) charcoals reached the maximum concentration and dimensions indicating the proximity of fires from the peat deposition area. Nevertheless, the incomplete homogenization of cell walls suggests low temperature of surface fires. The dominance of herbaceous angiosperms associated to the significant impoverishment of arboreal plants, pteridophytes and bryophytes reflected a dry environment probably correlated to the occurrence of regional climatic fluctuations. At the top of peat deposition, before the uppermost soil layer, charcoal concentration and dimensions abruptly decrease indicating a decrease in fire events. However, palynological composition remains stable. (Sponsored by INCT da Criosfera/FAPERGS processo n: 17/2551-0000518-0).

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