IMPACTS OF SEA-LEVEL AND CLIMATE CHANGES ON MANGROVES FROM SOUTHERN BAHIA DURING THE HOLOCENE: A COMBINATION OF POLLEN, ISOTOPE AND DIGITAL ELEVATION MODEL ANALYZES

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ABSTRACT: The recent relative sea level (RSL) rise and climate changes will cause significant alterations in geomorphology and coastal wetlands. The robustness of projections of these driving forces impacts on mangroves depending on data volume about the wetlands dynamics in response to sea level and climate changes during the last millenniums. In order to contribute to the mangrove dynamics analysis during the Holocene, this work presents an integration of drainage basins analyzes, based on satellite images from southern Bahia-Northeastern Brazil, with a digital elevation model, based on drone images, sedimentary features, pollen, geochemical (isotope/elemental) (δ13C, δ15N, C/N) and chronological (^{14}C) analyzes obtained from cores sampled along 37 km of the Jucuruçu River. The data indicate that tidal flats along the fluvial valleys from southern Bahia was dominated by mangroves at least ~37 km upriver during the Mid-Holocene. This greater reach to the interior of the mangrove compared to nowadays can be attributed to a combination of RSL and climate behavior. During the early and middle Holocene, the climate was relatively dryer compared with the predominant humid late Holocene, and the post-glacial sea level rise caused flooding along the studied fluvial valleys. The RSL at about 7400 cal yr BP was between -1 and +1 m, and at about 5350 cal yr BP was recorded a maximal RSL of ~+3.3 m. During this phase the marine incursion was favored by the lower fluvial discharge, promoting an expansion of estuarine influence and the replacement of freshwater vegetation by mangroves on tidal flats. During the middle and late Holocene occurred a RSL fall and the climate becomes wetter. The combination of these forces drove to an increase of fluvial discharge and a reduction of tidal water salinity along the fluvial valleys. The estuarine influence migrated downstream, and mangroves were replaced by freshwater vegetation on flood plain. Today, mangroves occur as fringes along tidal channels on the mouth of the Jucuruçu River estuary. The combination of satellite, drone images supported by interpolated dense points cloud and theodolite data, with inter-proxy data obtained from stratigraphic sequences proved to be an efficient and innovative process for evaluating the impacts of sea level and climate changes on mangroves during the Holocene.

KEYWORDS: MANGROVE; PHOTOGRAMETRY; TOPOGRAPHY.