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Research Articles

# Detection of white sand patches in central Amazonia using remote sensing and meteorological data

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## ABSTRACT

Mapping the extent and different types of wetlands is essential in order to establish coherent policies for the sustainable management and protection of these important ecosystems. Few studies have been carried out on white-sand ecosystems (WSEs) in the Amazon based on the integration of meteorological data and remote sensing. In this study, the ability to identify the WSEs present in the Uatumã Sustainable

surface temperature (LST) and canopy height. Air temperature data was collected from a weather station at the USDR from January 2023 to September 2023. To indicate the WSEs areas present in the USDR, RGB images from Sentinel 2A and Planet/NICFI were used and to validate the areas of WSEs, high-resolution optical and thermal images were obtained using an unmanned aerial vehicle (UAV). In addition, satellite images from the TM and OLI/TIRS sensors on board the Landsat 5 and 8 satellites were used to obtain the LST variable. Additionally, canopy height data obtained by orbital lidar (NASA's Global Ecosystem Dynamics Investigation – GEDI) were applied. The meteorological station located in the open shrubby campinarana registered high temperatures during the analyzed period, with air temperatures over 30 °C in the afternoon, especially in the months with less rainfall. The LST and canopy height variables were efficient in mapping open shrubby habitats of the WSEs due to the fact that they present extremely high temperatures and relatively low canopies. Based on this method it was possible to calculate the WSEs coverage with a total area of 31.502 hectares, which is equivalent to around 7.4% of the USDR. The developed methodology in this study has huge potential to provide a reliable mapping and inventory of WSEs throughout the Amazon and the monitoring of the dynamics of these vulnerable ecosystems.

**KEYWORDS:**

WSEs central Amazonia forest canopy height land surface temperature

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# Additional information

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