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Volume 46, 2025 - [Issue 9](#)

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

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Pages 3446-3465 | Received 16 Sep 2024, Accepted 03 Mar 2025, Published online: 12 Mar 2025

 Cite this article  <https://doi.org/10.1080/01431161.2025.2476776>



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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](#)

Acknowledgments

The authors thank the National Institute for Amazonian Research (INPA), the residents of the Bela Vista and Santa Helena do Abacate communities in the SCU who helped with the fieldwork and the project Amazon Tall Tower Observatory (ATTO) for their support in the development of the research, as well as the ATTO-Campina Site of the University of São Paulo for the concession of the meteorological data used in this

Disclosure statement

No potential conflict of interest was reported by the author(s).

Additional information

Funding

This research was supported by the Fundação de Amparo à Pesquisa do Estado do Amazonas [FAPEAM] and the Conselho Nacional de Desenvolvimento Científico e Tecnológico [CNPq] via grants from the research projects BIODIVERSA [01.02.016301.03236/2021-74; FAPEAM], PELD [01.02.016301.02630/2022-76; FAPEAM and 441811/2020-5; CNPq], INCT-ADAPTA II [465540/2014-7]; CNPq], Fundação Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] [PDPG-Amazonia Legal – Process No.[88887.839244/2023-00] and the Geoprocessing and Modeling Laboratory of the Ecology, Monitoring and Sustainable Use of Wetlands [MAUA/INPA] research group. We further acknowledge support of the scientific-technological cooperation between the Max-Planck Society [Germany] and INPA in studies of Amazonian wetlands.

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