GLOBE VSS Research Proposal Template 2026

Project Title: Assessment for the care and preservation of historic and native trees.

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Research Question(s) and Hypothesis

The theme of this season of IVSS 2026 deals with the impact of climate change on the urban and local/regional environment. With this in mind, hypotheses were raised regarding the care and preservation of historical trees in the urban perimeter, present in parks, environmental reserves, and native forests.

This work seeks to compare data and scientific research on the preservation of these areas, trees, and forests to combat and mitigate the effects of climate change, especially in the urban perimeter, where the concept of heat islands is discussed and defined.

This work addresses the location of these preserved areas and the identification of certain centennial trees and species. With the help of the GLOBE OBSERVER, the conditions of these trees were monitored.

To avoid water movement, it is necessary to regularly monitor the soil condition around the trees, carry out adequate drainage to avoid excess water in the roots, and maintain root health by avoiding pruning.

Buritis Park in Lucas do Rio Verde, Mato Grosso, focuses on native species of the Cerrado and Amazon biomes. It's common to find Ipê trees (yellow and purple), Açoita-Cavalo, Canela-doce, Canjerana, Jacarandá, Ingá, Canafístula, and fruit-bearing species like guava. The park aims for reforestation and urban afforestation with trees such as Jequitibá, Peroba, and Copaíba, reflecting the local flora, although exact lists require a visit or contact with the local municipality. It mitigates the urban heat island effect, improves air quality, reduces noise by muffling traffic noise, and creates more pleasant environments. It also controls flooding by absorbing rainwater, promoting health and quality of life for residents.

Description of Study Site

• Lucas do Rio Verde/MT, Uberlândia/MG, Campo Novo do Parecis/MT, Rosario da Limeira/MG

• Urban and Rural

Geographic Coordinates (Lucas do Rio Verde - MT):

- **Latitude:** 13° 01' 59" S ou -13.09
- **Longitude:** 55° 56' 38" W ou -55.92
- **Altitude:** 398 meters
- **Type:** Tropical climate, characteristic of the Brazilian Midwest.
- **Stations:** It has two well-defined seasons: a rainy season (generally November to April) and a dry season (May to October).
- **Características:** Warm temperatures for most of the year, with cloud cover and showers, especially in the afternoon.

Geographic Coordinates (Campo Novo do Parecis/MT): Latitude 13°40'31" S, Longitude 57°53'31" W. Campo Novo do Parecis City Hall – MT.

Altitude: 572 meters. City Hall of Campo Novo do Parecis - MT.

• **Climate**: Tropical, typical of the Cerrado biome, with high temperatures and two well-defined seasons: a rainy summer and a dry winter (Infosanbas).

Location: Central-West region of Brazil, state of Mato Grosso

Geographic Coordinates (Uberlândia/MG):

Climate: The climate in Uberlândia is classified as **Tropical Altitude** (Aw/Cwa according to Köppen). This means that the city has dry and mild winters and hot and rainy summers [64]. Temperatures vary with well-defined seasons, with the rainy season generally occurring between October and March**.**

Geographic Coordinates

- **Latitude:** 18° 55′ 08″ south (18.9189° S) [65].
- **Longitude:** 48° 16′ 37″ west (48.2769° W) [65].

Geographic Coordinates (Rosário da Limeira/MG):

Rosário da Limeira, located in Minas Gerais, It has a mild climate characteristic of the mountainous region, with preserved Atlantic Forest, waterfalls, and temperatures that can vary (with daily forecasts indicating between 14°C and 21°C on winter days, with increasing cloud cover and showers). The city is located near Muriaé.

Climate (General Trend)

- •**Type**: Mild, influenced by the Atlantic Forest.
- **Variation:** There may be days with increasing cloud cover and showers in the afternoon/evening.
- **Temperature:** Records indicate variations with mild minimum temperatures and moderate maximum temperatures.

- **Geographic Coordinates and Location**
- **Localition:** Minas Gerais, southeast, approximately 36 km from Muriaé.
- **Coordinates:** Approximate latitude

  20◦51′00″20 raised to the composed with power 51 prime 00 double prime

  20◦51′00″

  S and longitude

  42◦27′36″42 raised to the composed with power 27 prime 36 double prime

  42◦27′36″
- **Features:** Mountainous area and environmental preservation zone

Geographic Coordinates (Santa Maria/RS):

Santa Maria, located in the center of Rio Grande do Sul, has a subtropical climate (Cfa), characterized by hot summers and well-distributed rainfall. Its main geographic coordinates are approximately 29° 41′ 02″ S latitude and 53° 48′ 25″ W longitude. The city stands out as a regional and educational center in the state.**Coordenadas:** 29° 41′ 02″ Sul, 53° 48′ 25″ Oeste.

- **Climate:** Subtropical (hot in summer, temperate/cold in winter) with constant rainfall..

- **Localition:** Central region of Rio Grande do Sul

Data Collection Plan

For the collection of data that support this work, in addition to reliable Brazilian websites that endorsed studies on the importance of environmental preservation, concepts about climate change, deforestation, heat islands, and atmospheric data were used. With regard to GLOBE, the biosphere (trees) and atmosphere (clouds) protocols were used. Data on precipitation and water volume, temperature, humidity, tree height, leaves, trunk, and the like were collected. For these measurements, both the field data collection in the cities of Uberlândia/MG, Rosário da Limeira/MG, Lucas do Rio Verde/MT, and Campo Novo do Parecis/MT were used. In addition to comparisons with other measurements carried out in other locations with similar climates at other times. Also giving the ability to compare item by item periodically.

Thermal data collection is carried out in different types of environments, with the aim of comparing temperature variations and analyzing the formation of heat islands.

Data is collected in urban neighborhoods with little vegetation and a high presence of concrete, such as paved streets, areas with many buildings, residences, and low tree cover—places more prone to heat accumulation.

Information is also collected in areas with extensive vegetation cover, such as parks, farms, rural areas, and locations with a large presence of trees and natural vegetation. These areas generally have lower temperatures due to the presence of shade and the evapotranspiration process of plants.

The data collection is carried out using the GLOBE Observer application, which records local temperatures, environmental characteristics, and photographs of the observed areas. The information is entered at different points in the city and in rural areas, allowing for thermal comparison between the different locations studied.

The collected data is organized and analyzed to understand the influence

of vegetation and impermeable surfaces on temperature.

The results obtained contribute to the study of urban heat islands and can assist in urban planning, highlighting the importance of green areas in reducing temperatures and improving the quality of life of the population..

Background and Supporting Information

The work also included a meeting with one of the employees of the municipal environmental department of the city of Assis/SP, where valuable and specific data and information were collected about the region and local biodiversity, environmental problems, and methods for preserving the ecosystem and historical trees, as well as how to locate and verify some important and essential information about the trees, the park, and the environment.

The team is from an online club where students are from different and quite distant states/regions, in which there are significant changes in climate, environment, and biodiversity, both urban and rural.

The main difference of this project lies in the collaborative and multi-regional approach, involving participants from different Brazilian states, which allowed for a comparative analysis between various climatic, environmental, and urban contexts. The use of GLOBE Observer as a scientific tool confers greater credibility and standardization to the collected data, allowing them to be used as a reference in future studies. Another innovative aspect is the appreciation of historical trees not only as natural elements but also as environmental, cultural, and historical heritage of the cities. The project combines science, environmental education, and citizenship, encouraging the formation of a network for continuous monitoring and preservation, with the potential to inspire other similar initiatives in different regions.

Expected Outcomes or Goals

We hope that the work continues to serve as a reference, arousing public interest in the dissemination of these practices, serving as an example and inspiration for other people, children and adults, to learn how to collect and monitor data, also learning the technical and scientific concepts and creating a chain of ecological and human preservation, and also raising awareness of environmental education.

We also want our data to serve as comparisons with other diverse or similar regions, regarding the ecological system as a whole. Temperature, humidity, rainfall, drought, biodiversity, agricultural and pest control, as well as carbon and pollution levels from fires, waste and environmental crimes.

GLOBE Data Use Plan (Optional)

Image 1 – Measurement – Coordinates Lucas do Rio Verde/MT. January 2026.

Image 2 – Measurement – Coordinates Lucas do Rio Verde/MT. January 2026.

Image 3 – Measurement – Coordinates Lucas do Rio Verde/MT. January 2026.

Image 4 – Measurement – Coordinates Uberlândia/MG. January 2026.

Image 5 – Measurement – Coordinates Uberlândia/MG. January 2026.

Image 6 – Measurement – Coordinates Uberlândia/MG. January 2026.

Image 7 – Measurement – Coordinates Rosário da Limeira/MG. January 2026.

Image 8 – Measurement – Coordinates Rosário da Limeira/MG. January 2026.

Image 9 – Measurement – Coordinates Rosário da Limeira/MG. January 2026.

Challenges and Considerations (Optional)

With this work, it was possible to carry out critical thinking, reflecting and researching on the topic and thus finding local, urban and rural problems, in addition to paying attention to the preservation of the ecosystem and biodiversity, also learning how to preserve, measure, monitor and locate trees. It was also possible to learn about the history and urban environmental background of the regions, how it was in the past, how it is in the present and the importance of how it should be in the future. In addition to going into the field, connecting, collecting data, learning about data collection and measurements, identifying heat islands, interpreting maps and the like. Finally, a presentation of the entire study was also made, in order to present and record for other people the importance of this ecosystem, its preservation and also contributing to local authorities, serving as a

reference for the data collected for environmental preservation and ecological balance.

It is concluded that the preservation of historical trees and urban green areas plays a fundamental role in mitigating the impacts of climate change, especially in controlling heat islands, improving environmental quality and promoting the health and quality of life of the population. The study demonstrated that systematic environmental monitoring, combined with scientific education, is an effective tool for understanding and addressing current environmental challenges. The work reinforces the importance of integration between science, society, and public authorities, showing that locally collected data can serve as a basis for environmental policies, preservation actions, and sustainable urban planning. Furthermore, it highlights that community awareness and involvement are essential to ensure the protection of natural heritage over time.

References

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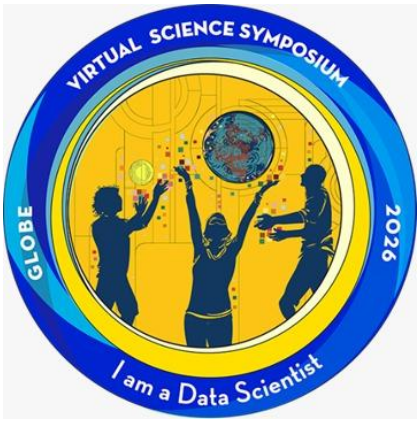
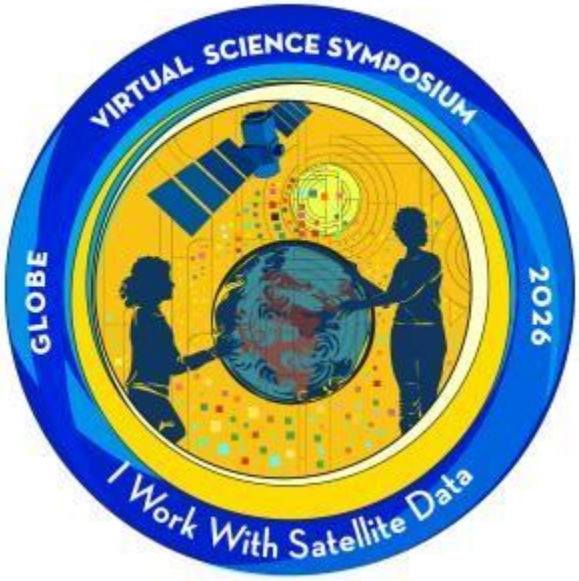
Badges



This study involves the participation of students as citizen scientists, responsible for collecting, systematizing, and analyzing environmental data through the GLOBE Observer platform, linked to the international GLOBE program (Global Learning and Observations to Benefit the Environment). In parallel, ethnographic oral records obtained from older individuals who inhabited the ecosystem in previous decades were integrated. This methodological triangulation—combining contemporary scientific data with qualitative historical narratives—enables the construction of a robust timeline, broadening the understanding of the environmental and sociocultural transformations that occurred in the investigated territory.

The "I am a global researcher" label was chosen for our project because the team is spread across various points in the country, in different states. This allows us to gather information about different locations, with diverse climates, vegetation, and forests. Furthermore, we conduct numerous data collections using different protocols.



This project makes direct use of satellite data to investigate the formation of urban heat islands and the relationship between vegetation cover and surface temperature. Images and information from NASA satellite missions allow for the identification of largescale thermal variations, as well as mapping areas with greater vegetation and highly urbanized regions.

Remote sensing data were fundamental for the analysis of Earth's surface temperature and for the application of indices such as NDVI, enabling the identification of spatial and temporal patterns of heat islands. This information was integrated with data collected in the field using the GLOBE Observer application,

allowing for comparison between local observations and orbital data.

In this way, the use of satellite data contributed to a broader and more scientific understanding of the phenomenon studied, strengthening the analyses, validating the results obtained, and assisting in answering research questions related to the impact of urban vegetation on the microclimate of cities.