

A white DJI Phantom drone is shown in flight, centered in the frame. The drone has four propellers, two of which are blurred due to motion. It has a camera mounted underneath and red lights on its arms. The background is a dense canopy of green trees.

Name: Paulo Guilherme de Alencar
E-mail: paulo.g_alencar@hotmail.com

INCBAC UNIGOU PROGRAM

Project: Habitat mapping with unmanned aerial systems (UAS)

Personal Informations

- Name: Paulo Guilherme de Alencar
- Undergraduate Student of Environmental Engineering in Brazil
- State University of São Paulo (UNESP)

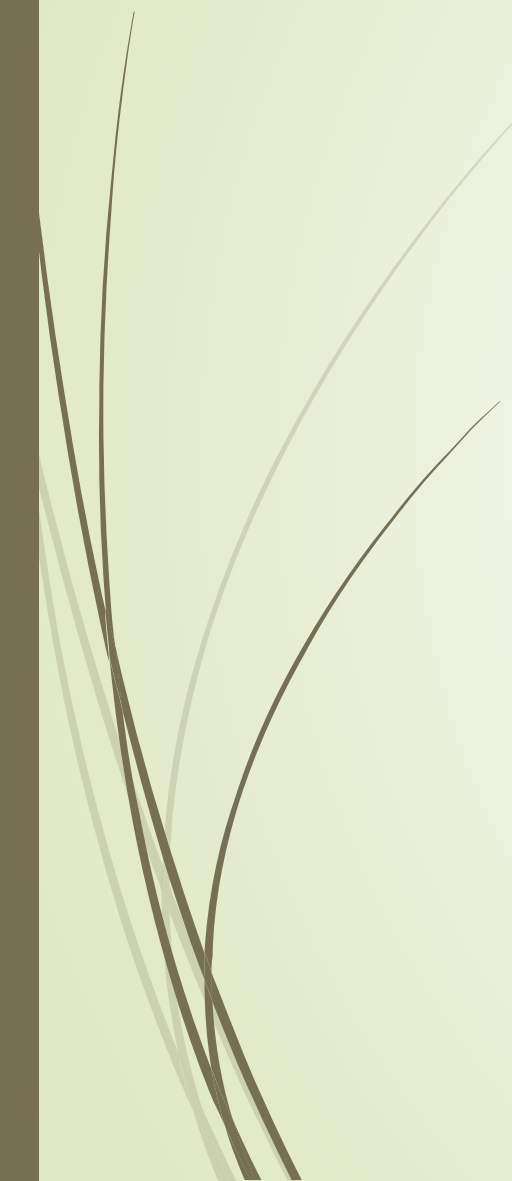


INCBAC/UNIGOU

- INCBAC - Institute of Czech-Brazilian Academic Cooperation
- UNIGOU - Program of Academic Internships for Brazilian university students to join scientific departments at Czech universities for a period of 2 months.
- Project: Habitat mapping with unmanned aerial systems (UAS)
- *Task: Use UAS equipped with multispectral and thermal cameras and remote sensing tools for a detail-scale detection and mapping of habitat types.*



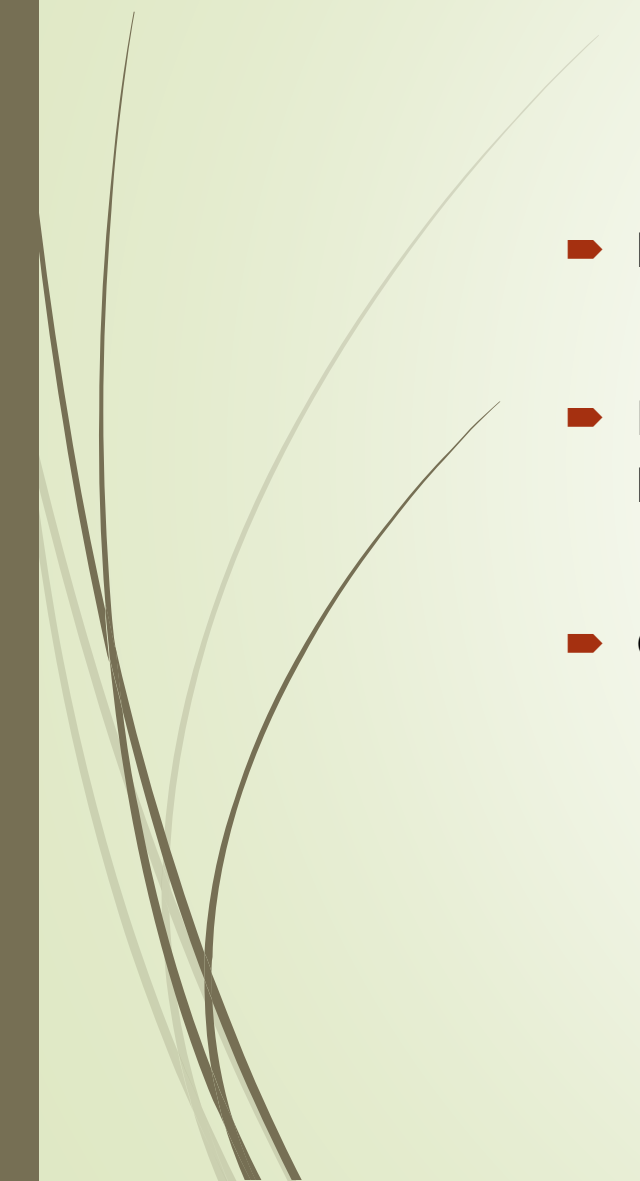
Goals



- Supervisor for the project for 2 months.
- 2 Months – Short time to develop a big or complex research.
- Great opportunity for learning and sharing knowledge.
- Main goal of UNIGOU program is to create connections and strengthen links between the 2 countries regarding scientific research.



Background



- Image processing with Agisoft Photoscan/Metashape software.
- Basic analyses in R software. Correlation between growth of herbaceous plants and hydrological levels in Amazonian Wetlands.
- Geoprocessing classes in my University (Qgis and ArcGis).

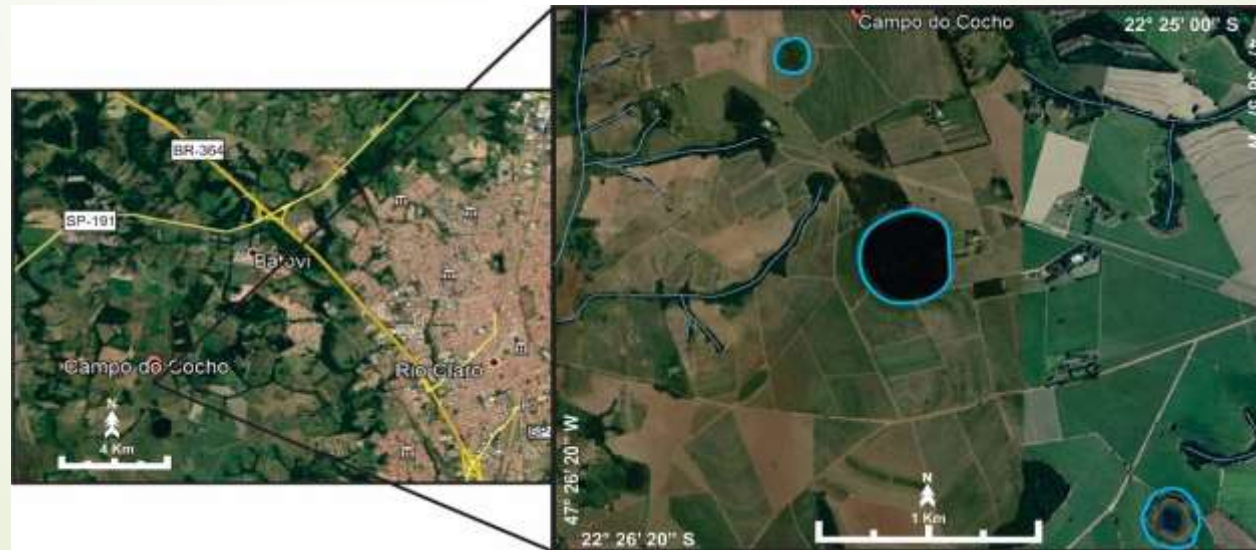
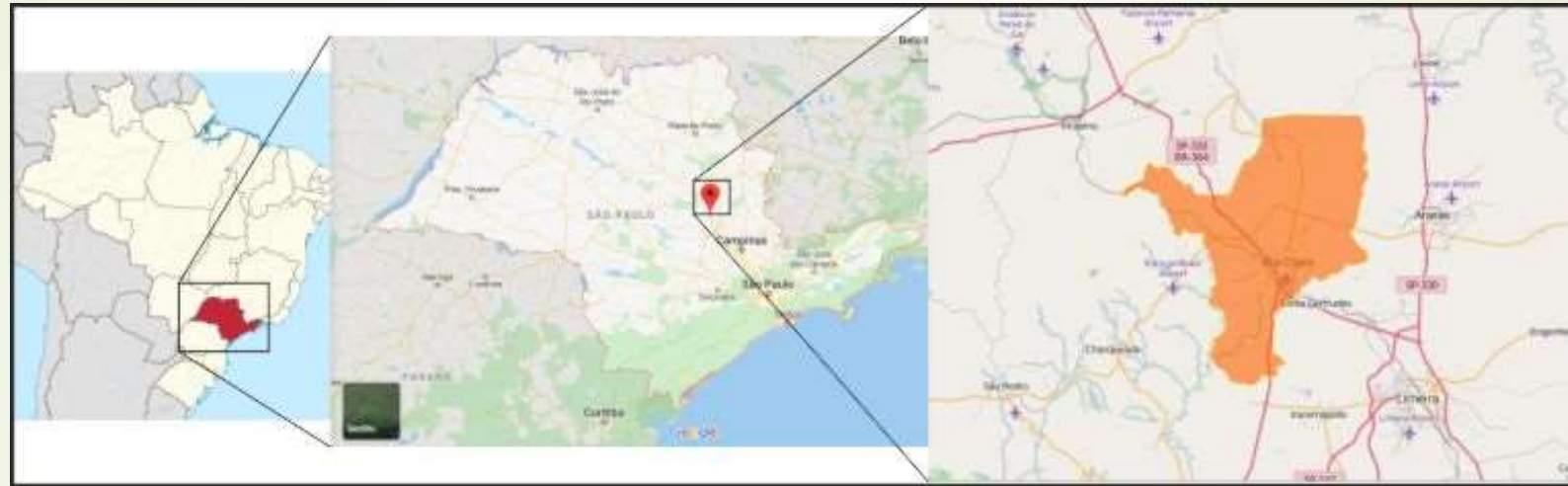


Background

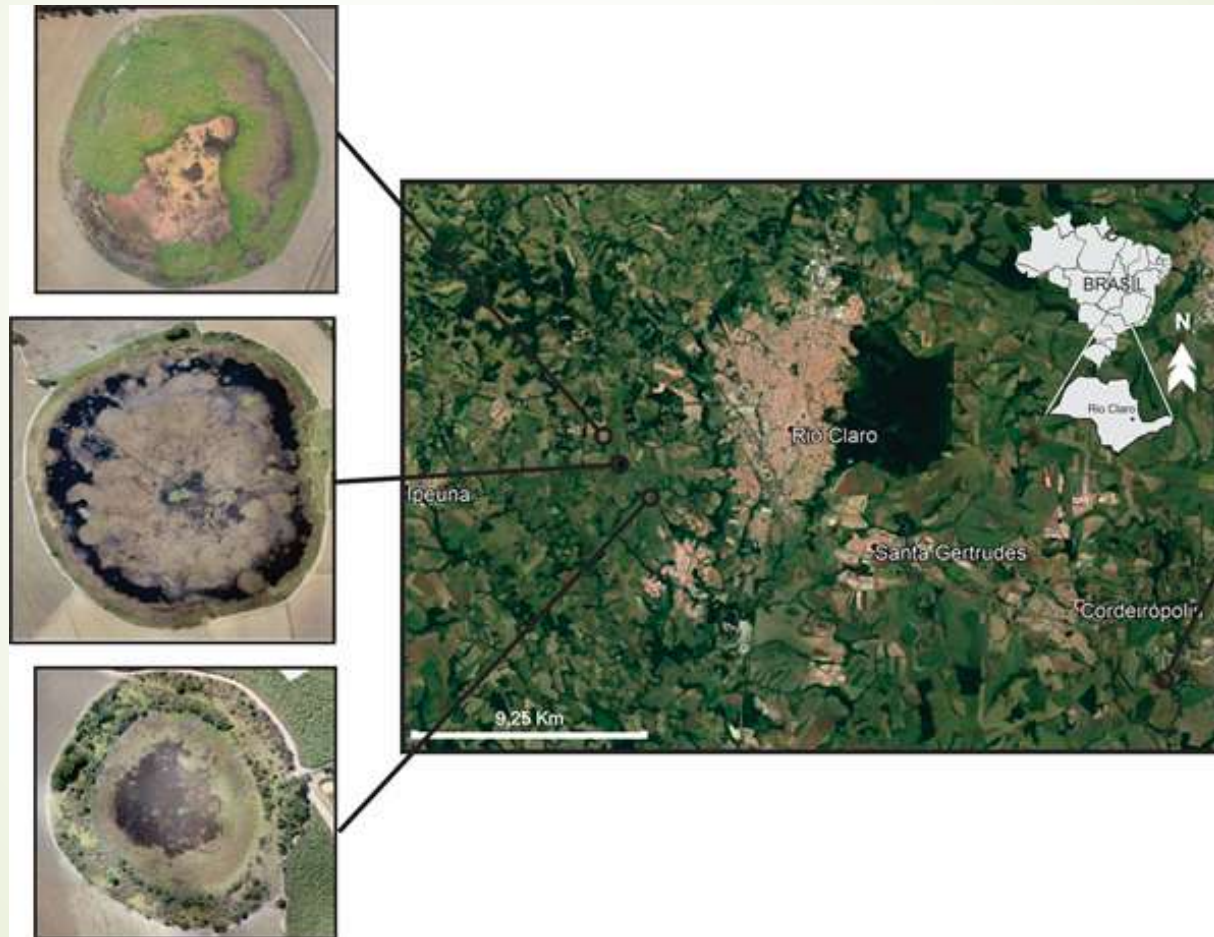
- Goals of my scientific work and Bachelor's Thesis:
 - Creating a database of UAV images of three wetlands throughout 12 months.
 - Period of study: August 2019 until July 2020
 - Analyses:
 - Are these wetlands providing recharge of underground water?
 - Variation of water and vegetation
 - Importance of these wetlands and services provided by them.

Location

Rio Claro City, State of São Paulo, Brazil



Location



Materials and methods

- ▶ Phantom 4Pro - DJI enterprise



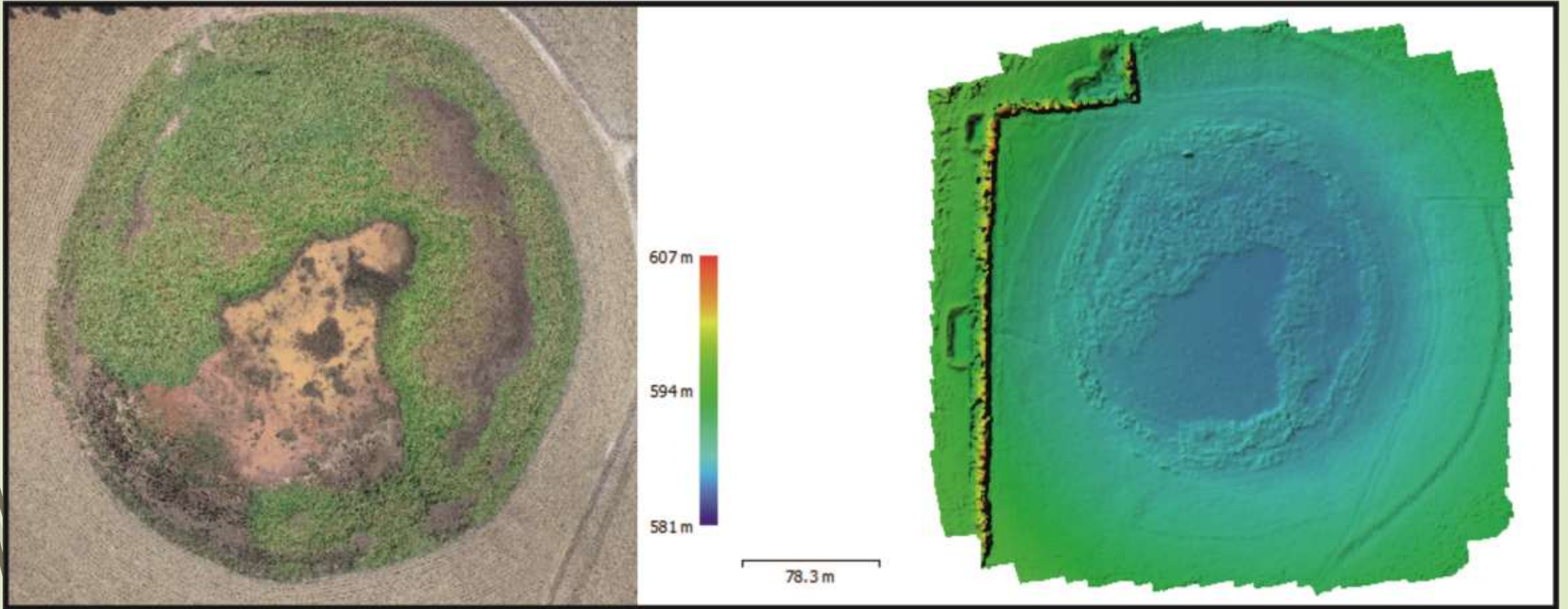
Image processing software : Agisoft
Photoscan/Metashape

Basic Steps:

- Automatic Calibration
- Align photos
- Build dense cloud
- Build mesh
- Build texture
- Build Orthomosaics and DEMs

Monthly Average Rainfall Data acquired
from the nearest weather station.

Site 1 - August

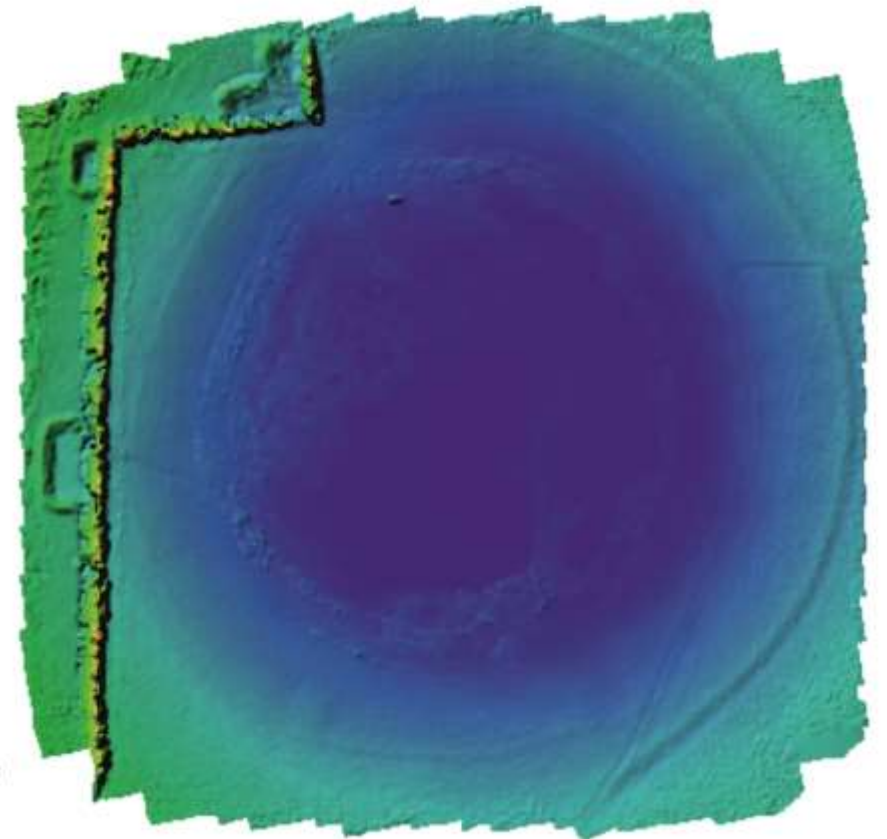


Site 1 - September



607 m
596 m
585 m

79 m

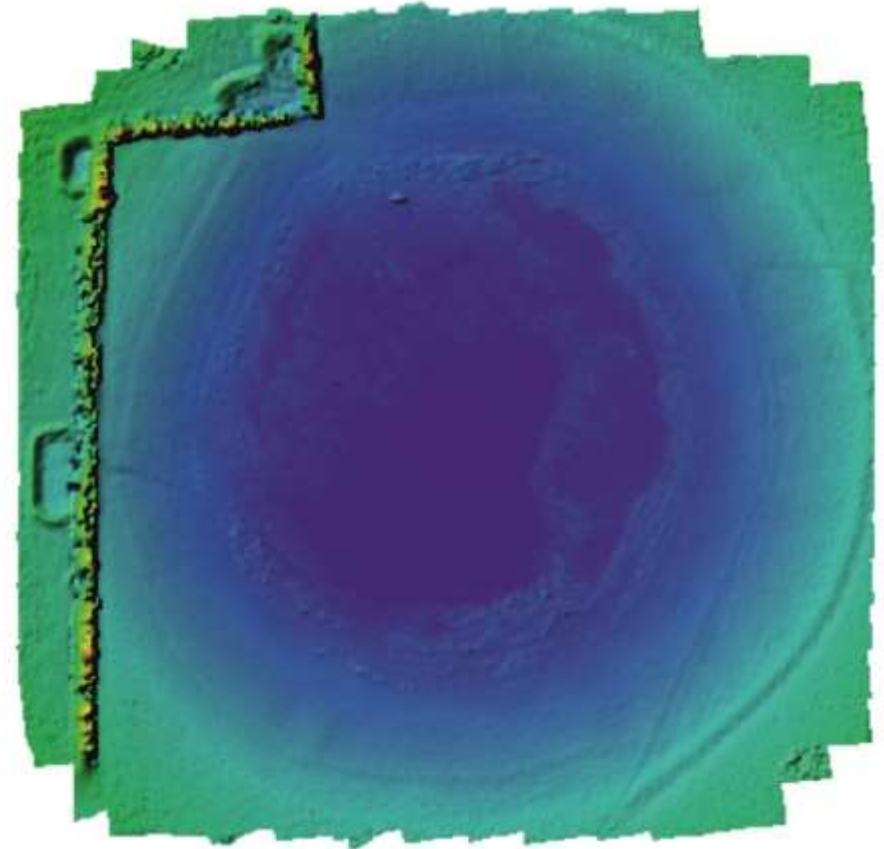


Site 1 - October

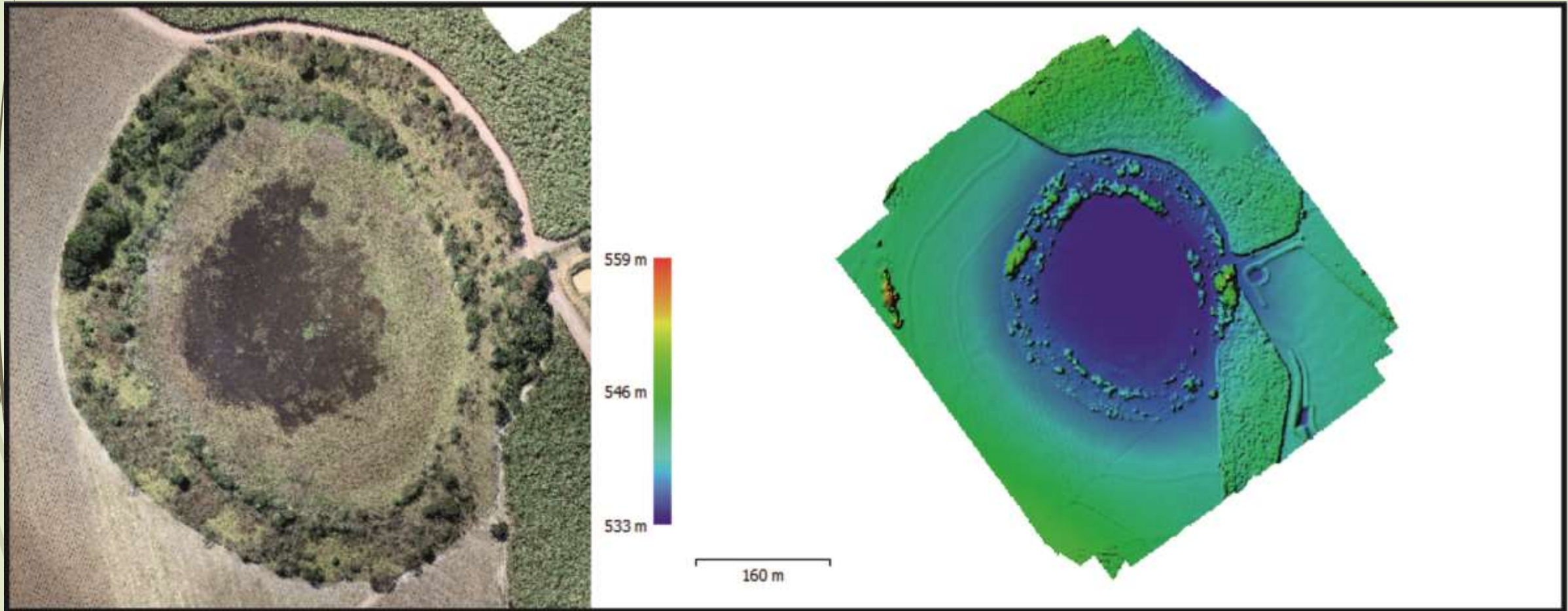


578 m
567 m
556 m

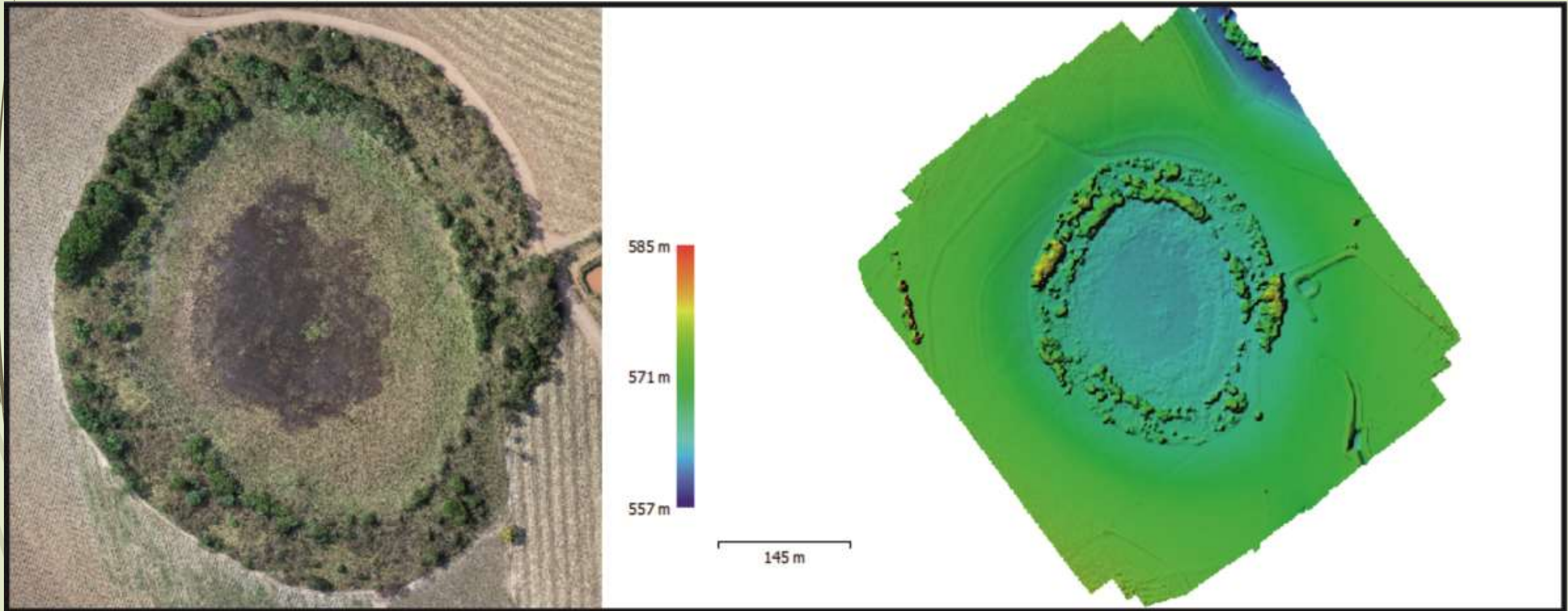
76.2 m



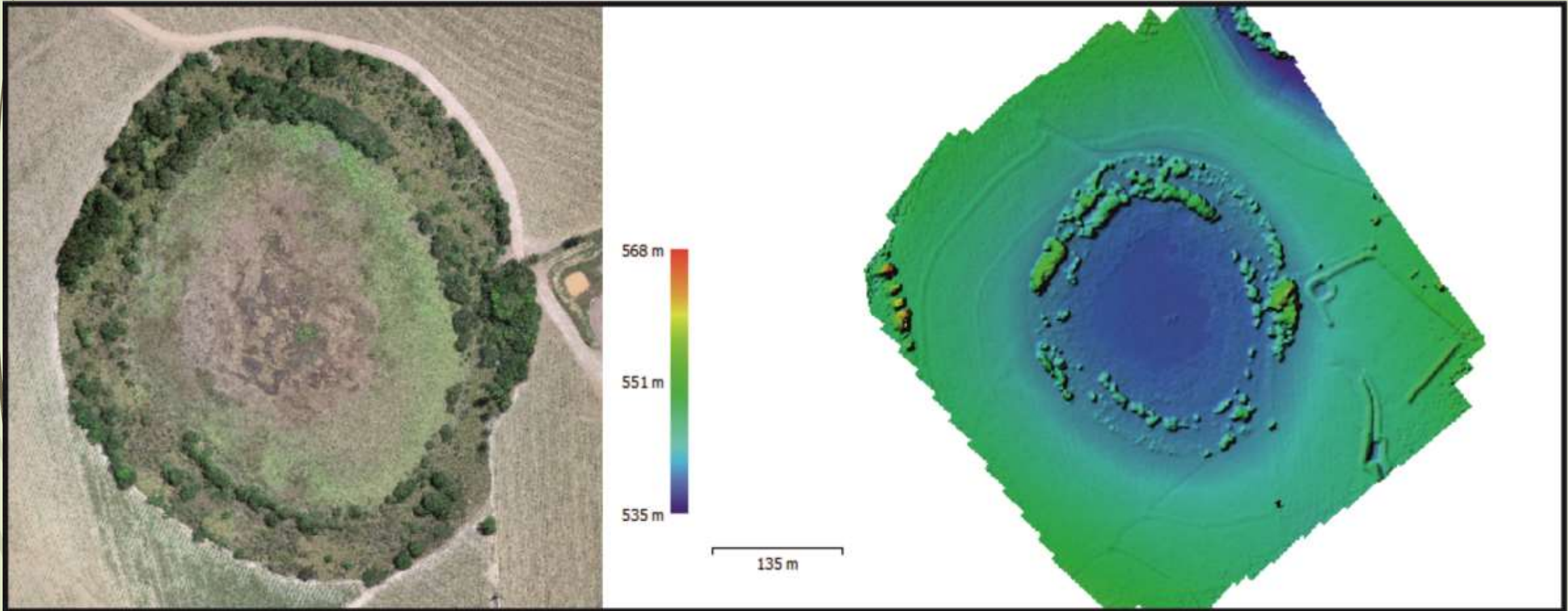
Site 2 - August



Site 2 - September



Site 2 - October



Site 3 - August

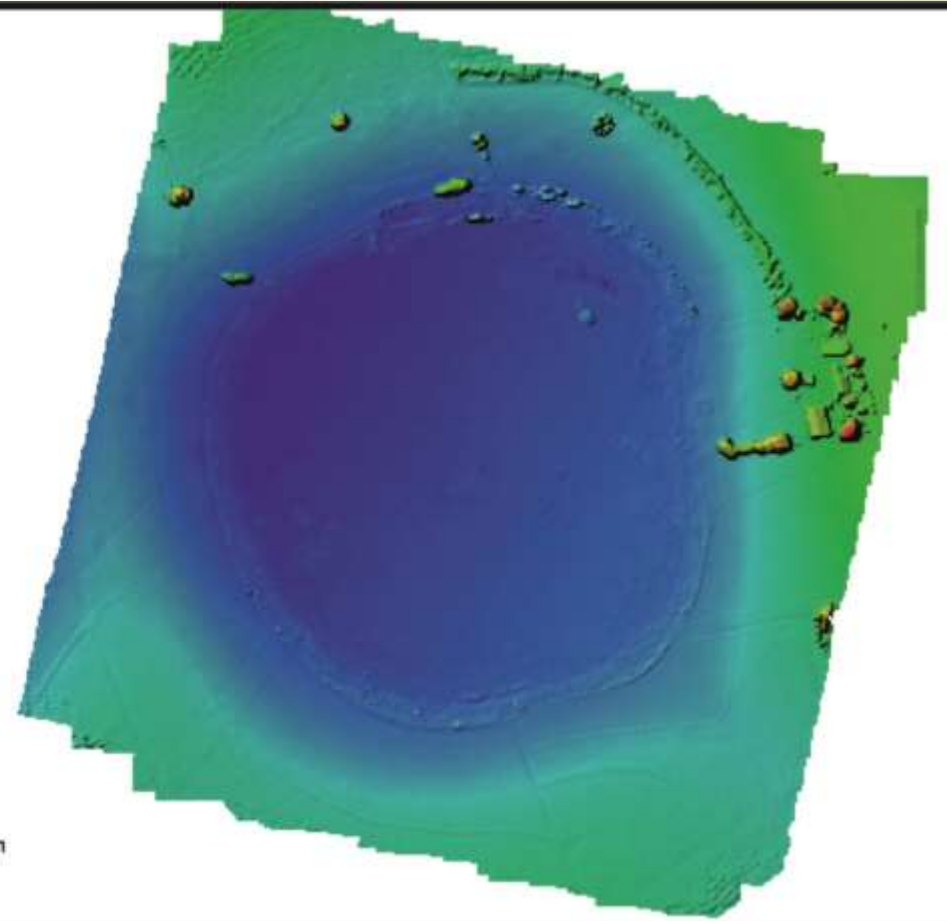


602 m

587 m

572 m

180 m

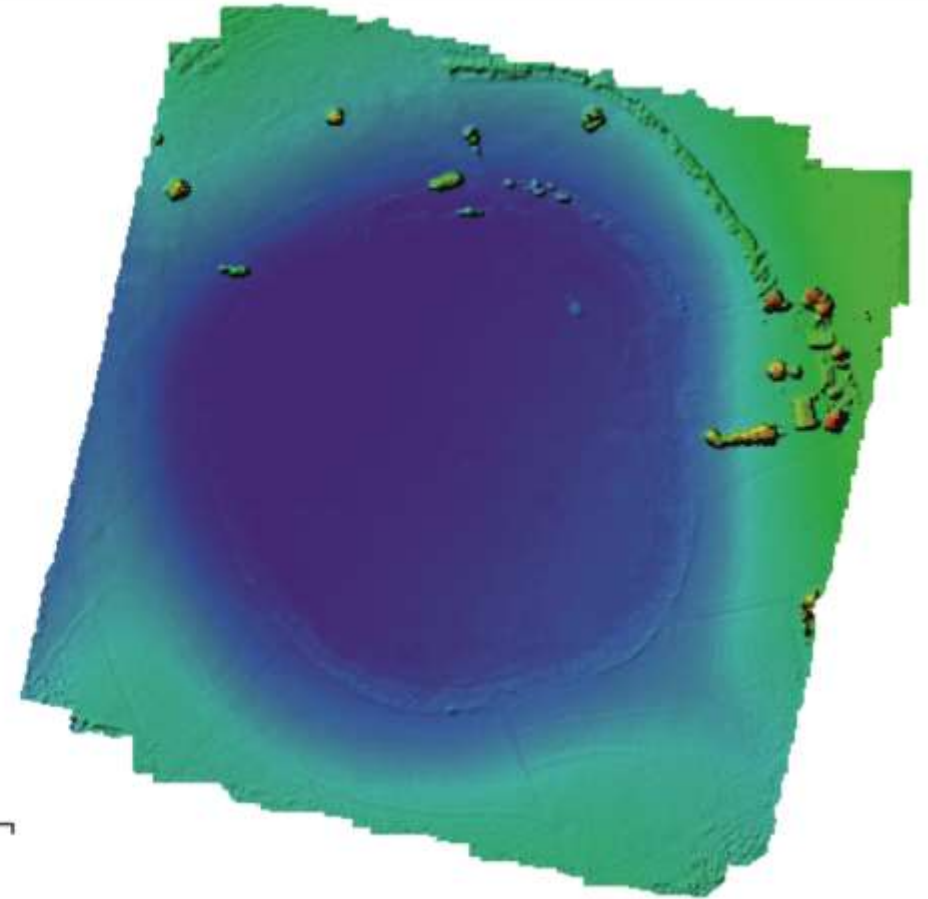


Site 3 - September



602 m
587 m
573 m

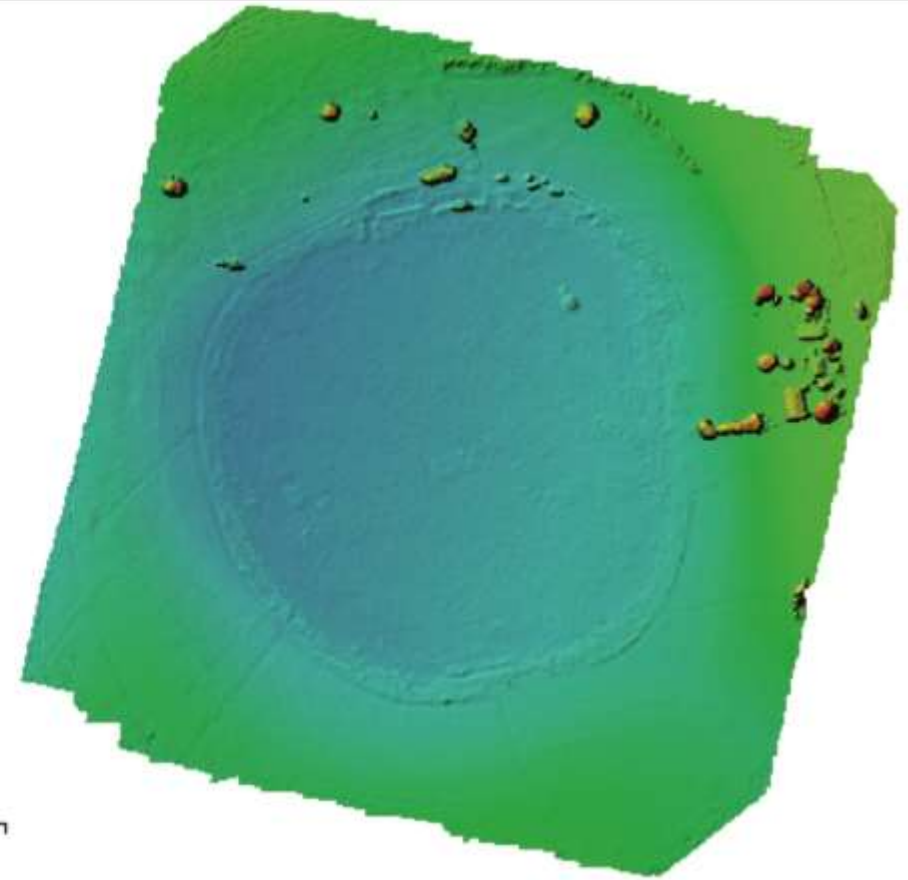
185 m



Site 3 - October



185 m





Important

- Difference from the project and my Bachelor's Thesis:
 - Focus on mapping habit types
- Supervisor

Supervisor in Brazil

➤ **Supervisor:** PhD. Vania Silvia Rosolen

Email: vania.rosolen@unesp.br

➤ Experience in Geosciences, acting on the following subjects: multi-element analysis, xrf-spectroscopy, geographic distribution, monitoring and environmental risk.

Some articles:

- On the link between soil hydromorphy and geomorphological development in the Cerrado (Brazil) wetlands (2019)
- Soil hydromorphy and soil carbon: A global data analysis (2018)
- The application of U-isotopes to assess weathering in contrasted soil-water regime in Brazil (2019)
- Evolution of iron crust and clayey Ferralsol in deeply weathered sandstones of Marília Formation (Western Minas Gerais State, Brazil) (2017)

Co-supervisor in Brazil

- **Co-supervisor:** Mgr. Lucas Moreira Furlan
- **Email:** lucasmfurlan@gmail.com
- Experience in Geosciences, focusing on Applied Geophysics and Remote Sensing, acting on the following subjects: electrical resistivity tomography (ERT), photogrammetry and erosive processes.
- He worked using UAV for his Master's Thesis.
- Main researcher working on the mentioned wetlands.





Thank you!

- Contacts

- Paulo Guilherme Alencar

e-mail: paulo.g_alencar@hotmail.com

- Supervisor in Brazil – Ph.D Vania Silvia Rosolen

e-mail: vania.rosolen@unesp.br

- Co-supervisor in Brazil – Mgr. Lucas Moreira Furlan

e-mail: lucasmfurlan@gmail.com

