Observatório Nacional

Laboratório de PALEOMAGNETISMO & Mineralogia Magnética

Presentation of candidacy for the Latinmag 2023

The National Observatory (ON/MCTI)

https://www.gov.br/observatorio/pt-br

Founded in Rio de Janeiro on October 15, 1827 (just five years after the Brazilian Independence), the National Observatory (Observatório Nacional - ON) is the second oldest federal research institution.

Currently linked to the Ministry of Science, Technology and Innovations - MCTI, operates in three major areas of knowledge: Astronomy, Geophysics and Metrology in Time and Frequency, in which it conducts research, technological development and innovation, with national recognition and international projection.

Its activities include the training of researchers in its graduate courses, the training of professionals, the coordination of projects and national activities in its areas of expertise and the generation, maintenance and dissemination of the Brazilian Legal Time.

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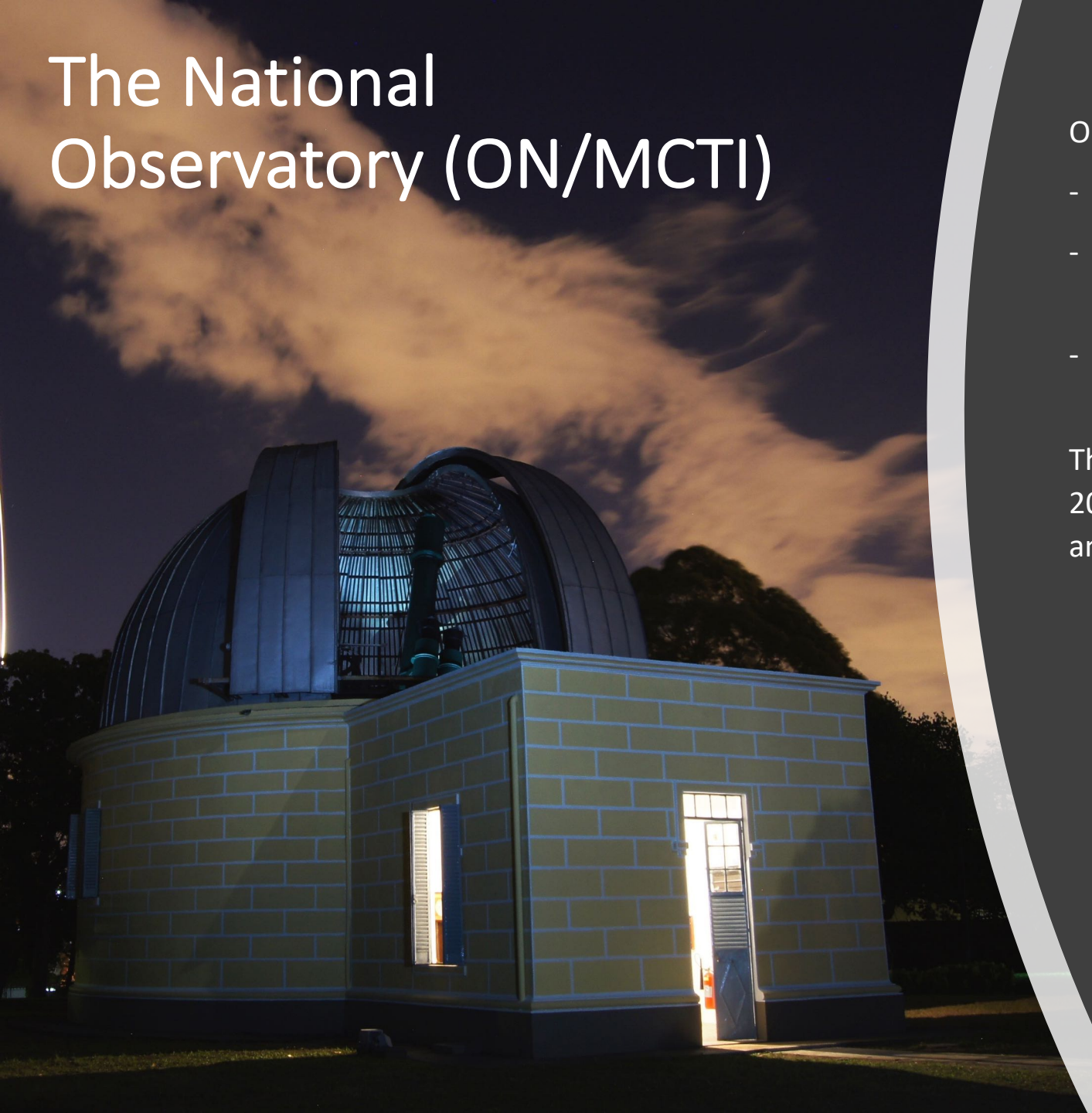


ON comprises three campii:

- Main campus (or São Cristóvão campus, Rio de Janeiro);
- Vassouras campus (geomagnetic observatory – in continuous operation since 1915), placed in city of Vassouras (state of RJ);
- Tatuoca campus (geomagnetic observatory – in operation since 1957), placed in the Tatuoca island (state of PA);

The physical infrastructure of the main campus – where Latinmag 2023 is planned – includes laboratories and rooms for research and teaching, distributed in an area of 42,650 m².

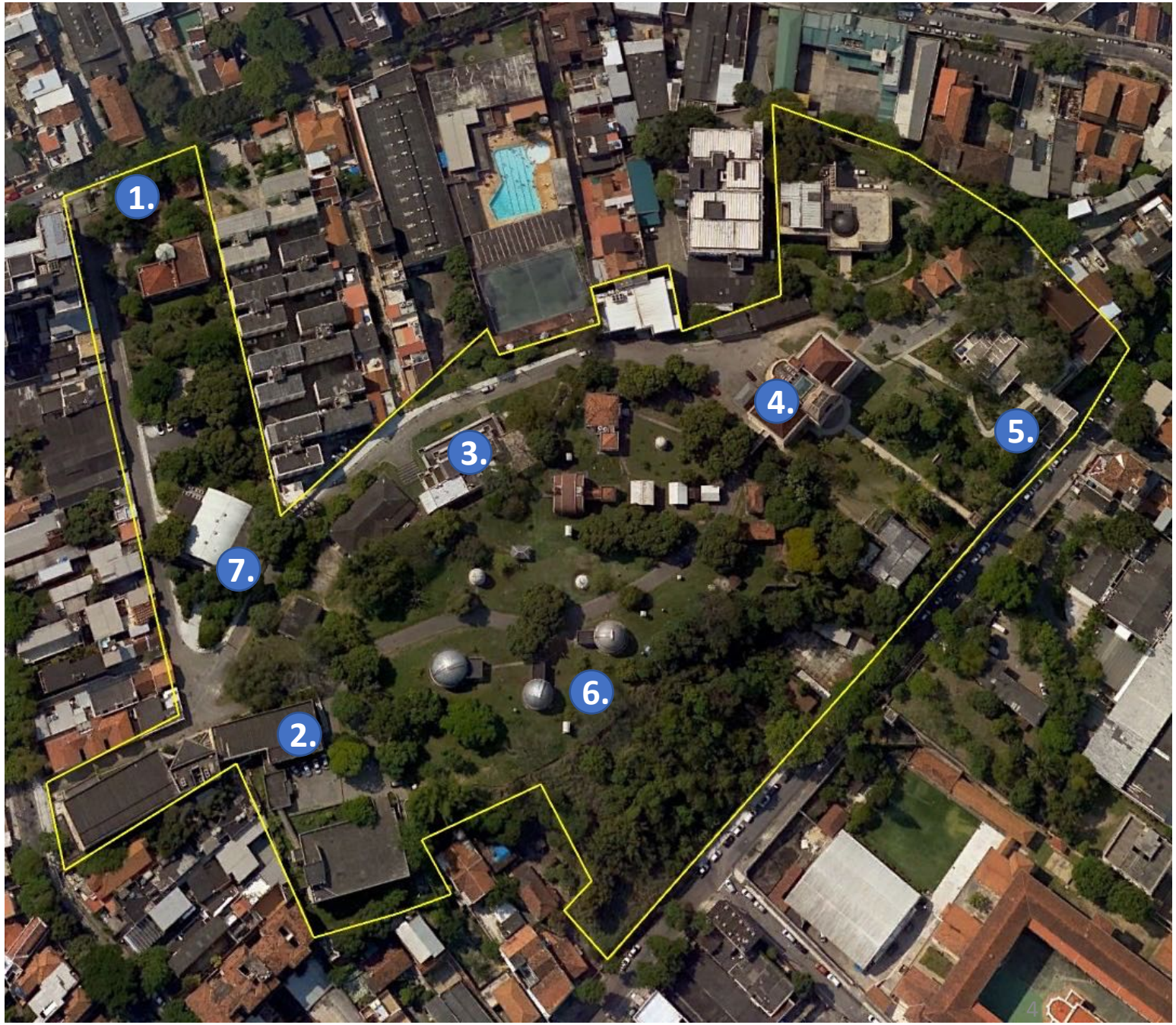
The main campus is protected by the Artistic and Cultural Heritage Institute - IPHAN and by the State Institute of Cultural Heritage - INEPAC. By the creation of the Museum of Astronomy and Sciences – MAST (1985), part of the historical buildings were attributed to the newer institution, which is also part of the MCTI structure. Currently, the ON's buildings within the campus represent a total constructed area of 11,800 m², with four main buildings intended for the institution's final activities and other smaller constructions intended for intermediate activities and support services.

Main (São Cristóvão) campus

The ON main campus is located at the neighborhood of São Cristóvão (northern part of the city of Rio de Janeiro). It is near the Galeão International Airport (11 km, 21 min by car), the Santos Dumont Airport (10 km, 25 min), and the Novo Rio Bus Station (4 km, 9 min). It is also about 7 km (13 min) from downtown Rio de Janeiro.

Some of the buildings and entrances shown on the map:

1. ON entrance (R. General José Cristino, 77);
2. Emmanuel Liais building;
3. Time Service Division (DSHO);
4. Museum of Astronomy and Related Sciences (MAST);
5. MAST entrance (R. General Bruce, 586);
6. Historic telescopes;
7. Restaurant – to be reopened on the first semester of 2023.



Highlight for the 46 cm telescope, the largest in Brazil.

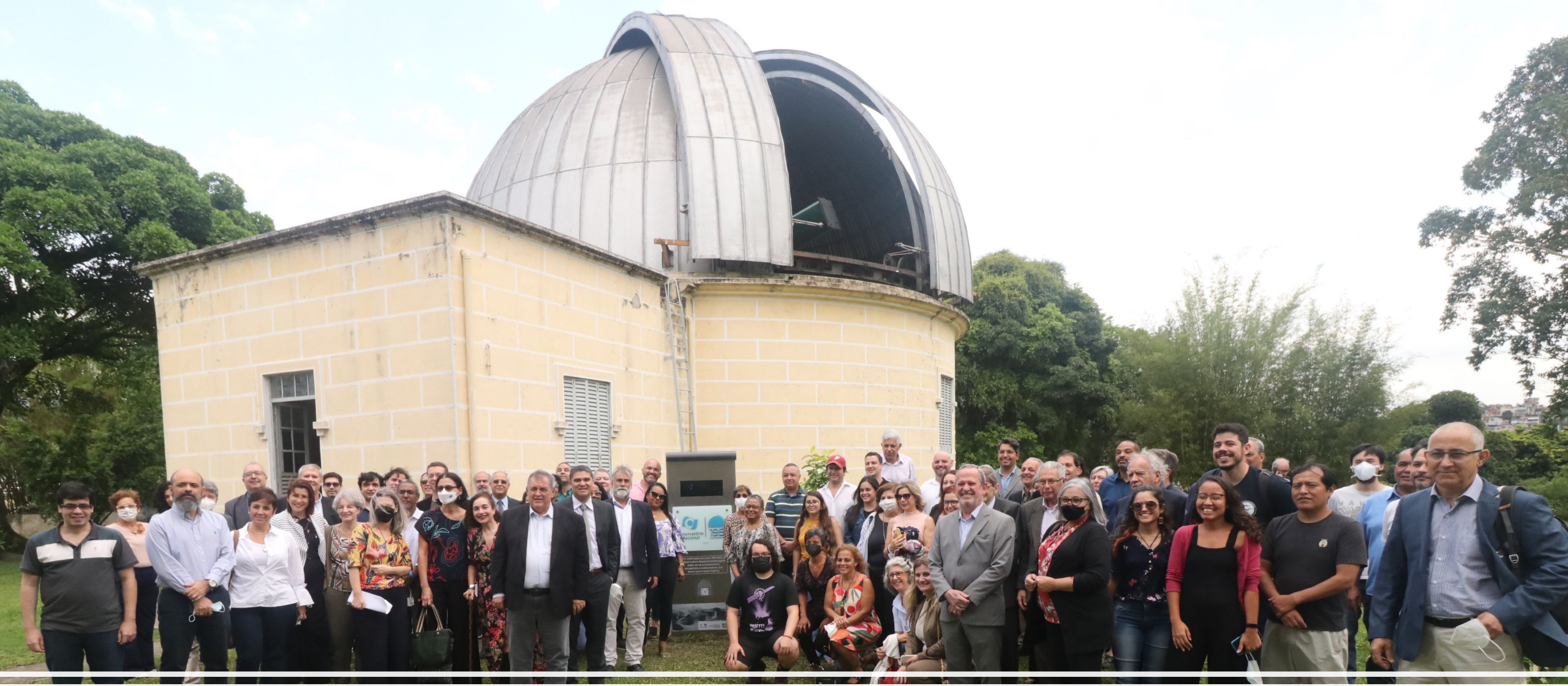
Photos of the astronomical cupolas located in the ON.

Emmanuel Liais building auditorium

- 122 seats;
- Live streaming.

Time Service Division auditorium

- 48 seats.



Celebration of the 195th anniversary

Department of Geophysics (COGEO)

The Department of Geophysics of the National Observatory (COGEO) has a large laboratory structure capable to provide all the necessary technical support to the development of research in Geophysics. This infrastructure includes facilities and equipment for both in-situ measurements and field experiments, such as:

- Laboratory of Petrophysics;
- Laboratory of Numerical Modeling in Geophysics;
- Laboratory of Gravimetry;
- Laboratory for Development of Magnetic Sensors;
- Laboratory of Applied Geophysics;
- Laboratory of Geomagnetism;
- Laboratory of Geothermy;
- Laboratory of Paleomagnetism and Magnetic Mineralogy.

The ON also maintains two national networks (the Brazilian Fundamental Gravimetric Network and the Geomagnetic Network), operates the Rio de Janeiro Seismological Station (RDJ), continuously monitors the variations of the Earth's magnetic field at the Magnetic Observatories of Vassouras (State of Rio de Janeiro), of Tatuoca (State of Pará) and at the stations of the Brazilian Magnetic Network.

The ON also performs technical services for geophysical prospection companies such as instrument calibration, the supply of records of the temporal variation of the Earth's magnetic field (magnetograms) and the certification of geophysical studies provided by them for governmental bodies and state companies.

Laboratory of Paleomagnetism and Magnetic Mineralogy of the National Observatory (LP2M-ON)

https://www.lp2m-on.com.br/

The Laboratory of Paleomagnetism and Magnetic Mineralogy (LP2M-ON), currently in the final stage of installation, corresponds to a historical demand from Brazilian Earth Science researchers.

After its inauguration (first quarter of 2023), it will promote the feasibility of studies linked to the magnetism of geomaterials and its diverse applications related to geological and environmental processes, and investigations concerning the geomagnetic field behavior.

These studies can also be carried out in cooperation with the industry due to its potential in mineral and hydrocarbon exploration. The LP2M-ON will be the the third related laboratory with a magnetically shielded room in South America.

Resources already employed: ~R$ 3.5 million (~US$ 660.000,00).

Laboratório de
PALEOMAGNETISMO
& Mineralogia Magnética

LP2M-ON Equipment:

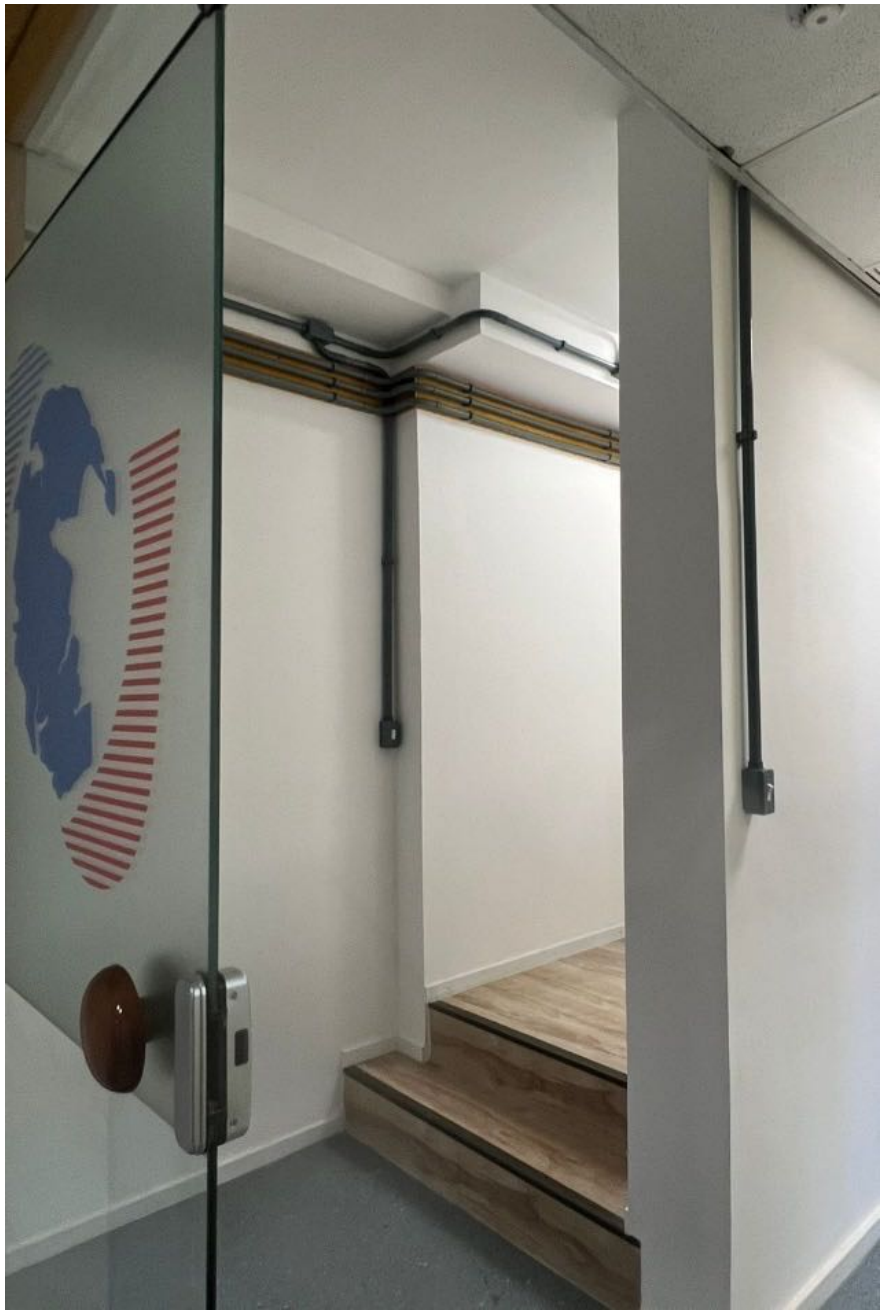
- MFK2-FA Kappabridge
- CS4 furnace apparatus
- CSL cryostat apparatus
- JR-6A sppiner Magnetometer
- ASC IM-10-30 Impulse magnetizer;
- MMTD80A Thermal demagnetizer;
- LDA-5 AF demagnetizer;
- PAM1 module (for ARM and IRM);
- Aerosol sampling station;
- S-6 Mu-metal magnetic shielding tube;
- Brunton 5006LM compass (3 un.);
- Pomeroy orienting fixture OR-2 (2 un.);
- Pomeroy EZ Core D261-C Drill (2 un.);
- 1” diamond core drill (4 un.);
- Pump can for drill water cooling line;
- Hard shell case for pump and drills (2 un.);
- S1-000 rock plug saw;
- Steel blades for plugs saw (2 un.);
- Bronze blades for plugs saw;
- Magnetic shielded room (internal field < 0.5 µT);
- UA 420 semi-analitycal balance;
- Argon gas line;

LP2M-ON Equipment:

- 755-4K SRM (2G Enterprises, USA) - "long-core“
- CHAMADA PÚBLICA MCTI/FINEP/FNDCT/CT-INFRA– INFRAESTRUTURA DE PESQUISA EM ÁREAS PRIORITÁRIAS – PROINFRA 2021
- Project: Aquisição de magnetômetro supercondutor triaxial para laboratório multiusuário de Paleomagnetismo e Mineralogia Magnética.
- R$ 4,774,359.50 (US$ 905,950.57);

LP2M-ON

- Total area (LP2M-ON): 67.1 m^2;
- Magnetically shielded room (internal area): 17.5 m^2;
- Magnetic Mineralogy Division (area): 21.1 m^2.



Paleomagnetism Division (magnetically shielded room)

Magnetic Mineralogy Division

Our candidacy

- **Estimates (Latinmag 2023): 100-150 participants;**
- **National Observatory: appropriate infrastructure for such an event, historical scientific institution in Brazil;**
- **Rio de Janeiro: main tourist destination in Brazil, with a very extensive hotel and restaurant network, for all budget levels;**
- **Several possibilities of parallel activities to the event, or post-event (e.g., field trips, etc.);**
- **Reinforcement of Paleomagnetism in Brazil and Latin America, with the establishment of the third similar laboratory in the country;**
- **Funding for the event (to date): FAPERJ (RJ state research funding agency): ~ R$ 27k (approved); ON/MCTI support: resources (daily expenses and airfare for two foreign speakers); Petrobras, CAPES, FAPESP: to be contacted**