

ANUAL REPORT

GLOBE BRAZIL

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INTRODUCTION

The 2020-2021 cycle was a time of many challenges and breakthroughs for the GLOBE Program in Brazil. The COVID-19 pandemic had an impact on the project due to the measures of social isolation established by different spheres of the government, that included the closure of schools and their regular activities and the new social distancing protocols, which made it impossible for the normal face-to-face actions with schools.

Due to this new reality, there was a need to remodel the actions in order to meet the main objectives of the project. Thus, many of the activities planned to take place in person, such as teacher training, had to be adapted to the virtual environment. Some schools were able to maintain research projects with students, carrying out activities to be completed at home. Schools that had their face-to-face activities suspended, and in which remote communication with students was not possible, were the most affected during this period.

In 2020, two online training sessions were held on Zoom and YouTube. Some educational material was sent to the teachers through e-mails and cloud storage drives, and communication was supported by e-mail and WhatsApp messages. Although these platforms are agile and efficient in their communication proposals, information about the program and communication to users has become somewhat diffuse.

However, in order to overcome this obstacle, the Brazilian Space Agency (AEB) developed a Virtual Learning Environment (AEB Escola Virtual) with the aim of structuring and organizing all AEB educational activities, including the GLOBE Program. The platform was launched in September 2021 with the online teacher training “Workshop GLOBE Brasil 2021”.

Today, Brazil has a total of 50,243 data were collected, 471 teachers distributed among 326 schools in Brazil and more de 3,000 Citizen Scientists registered on GLOBE.

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EDUCATION

Despite the challenges imposed by the pandemic, the project had relevant results in this biennium. Online training, initially seen as an alternative to face-to-face activities, made it possible to reach and connect with more people from different places than when the training was carried out locally.

In 2020, two training sessions were held and Learning and Teaching Support Materials were made available online to participants with the respective topics for each training.

GLOBE Brazil's 1st Virtual Workshop was held on September 16th to 18th, 2020. The training included a 12-hour certification distributed among lectures, active learning exercises, presentations and challenges the participants had to complete, such as the construction of a mosquito trap and a rain gauge, in addition to carrying out a research project using the GLOBE Mosquito, Precipitation and Air Temperature Protocols. During this edition, 111 participants were registered and certified through participation, interaction and issued works via Zoom. Of the total, 14 participants asked the training coordination to extend the final project's deadline until the return of face-to-face classes at schools. The training obtained more than 480 views in the live broadcasts during the event, via AEB's YouTube channel – that is open to the public.



Picture 1: GLOBE Brazil's 1st Virtual Workshop

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The **GLOBE Brazil's 2nd Virtual Workshop** was held between November 18th and 20th, 2020. The training included a 12-hour certification distributed among lectures, active learning exercises, presentations and challenges for participants in Atmosphere protocols. In this edition, there were 100 enrolled and certified through participation, interaction and issued works via Zoom.



Picture 2: GLOBE Brazil's 2nd Virtual Workshop

In 2021, to provide a better virtual learning experience, the Brazilian Space Agency developed *AEB Escola Virtual* (<https://aebescolavirtual.aeb.gov.br/>), a non-profit virtual learning environment (VLE), where courses and training activities are made available to students, teachers and space enthusiasts, following the mission of the AEB Escola Program. *AEB Escola Virtual* was created aiming to structure and organize AEB's educational activities, including the GLOBE Program in Brazil.



Picture 3: AEB Escola Virtual

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THE GLOBE PROGRAM

In addition, since September 27th, *Workshop GLOBE Brasil 2021* has been held on *AEB Escola Virtual* and will end on November 5th, 2021. This workshop is training teachers, citizen scientists, undergraduate and graduate students on the GLOBE Observer protocols (Cloud, Mosquito Habitat Mapper, Trees and Land Cover). The workshop was conducted by Mentor/Master Trainers Dr. Aline Veloso and Mrs. Inês Mauad, from Brazil, and Dr. Russane Low from the USA. Besides the protocols training, some researchers were invited to lecture about Meteorology, Deforestation in Brazil, the National Institute for Space Research Satellite Images Catalog, the Zika disease and CubeSats applications in environmental monitoring.



Picture 4: Introduction on the 2021 GLOBE workshop in the AEB Escola Virtual

For this workshop, many educational materials were produced or translated to Portuguese, from GLOBE's original ones. The teachers had access to protocols instructions, lesson plans, hands-on activities and others materials by *AEB Escola Virtual*. To be certified in the workshop, they had to collect at least one data from each of the four protocols and work in groups to develop a project to be executed in their schools in between November and March

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2022. Thus, teachers and students can use these projects to apply for the 2022 International Virtual Science Symposium (IVSS).

In the *Workshop GLOBE Brasil 2021*, 32 teachers, 11 undergraduate and 21 graduate students, from 17 states from north to south of Brazil, were registered.

SCIENCE

In 2020, GLOBE Brazil got a grant from the Ministry of Science, Technology and Innovations (MCTI) to introduce GLOBE in a national program called “Science in Schools”. The Agency granted six teachers and young academics that partnered up with schools in four regions of Brazil, conducting research and contributing to the qualification of new citizen scientists. The scholarship holders helped by coordinating and teaching at the virtual workshops in 2020 and developed several activities at their local communities, respecting the COVID-19 protocols. Those scholarships were only available until April, 2021.

In the state of Paraná, researches were developed on Mosquito, Cloud and Precipitation protocols in two schools, attending about 200 students. In addition, in partnership with the Mobile Laboratory for Scientific Dissemination (LabMóvel) of the Federal University of Paraná Litoral, the ZikaBus - LabMóvel project was developed.



Picture 5: ZikaBus Project

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The ZikaBus proposal is to be a traveling exhibition installed in an adapted minibus that runs through public schools on the coast of Paraná. The initiative makes use of the ZikaBus, the GLOBE Observer App and the environmental monitoring methodologies of the GLOBE Program with students from public schools. It focuses on disseminate Science and awareness about the *Aedes aegypti* mosquito and related diseases such as Dengue, Zika and Chikungunya Fever. A lecture is given on the life cycle concepts of *Aedes aegypti*, showing the difference between them and other mosquito species in the region; it also presents the types of diseases caused by the mosquito, its symptoms and associated risks; development of a joint effort, in each school visited, involving the school community to detect outbreaks of egg deposition and the development of mosquito larvae.

In March 2020, we started our activities by raising awareness about Dengue using the mosquito GLOBE protocol. This activity took place along with the traveling exhibition on dengue and other arboviruses carried out with ZikaBus and with 120 students from public schools in Matinhos whom, in the aftermath of their classes, visited the UFPR-Litoral campus.

Due to the COVID-19 pandemic and the closure of schools, visits were suspended indefinitely. Teachers who were interested in participating in the project at the beginning year were invited to take these Online Training Courses so that, when classes return, we could continue with the proposal presented above.

The experience lived by the scholarship holder in this GLOBE program contributed to student master's thesis from UFPR-Litoral, with the theme “Citizen Science and Teacher Training in Monitoring the *Aedes Aegypti* Mosquito in Public Schools on the Coast of Paraná”.

In Rio de Janeiro State, The Minas Gerais School attended at IVSS 2020 with the scientific research: “Does the presence of reconstruction residues in the school increase the incidence of mosquito larvae in capture traps?”:

- <https://www.youtube.com/watch?v=ADxBeKnPEFc&t=12s>

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In May, a virtual meeting took place with five schools involved in the AEB GLOBE BRASIL 2020 Project to evaluate the possibility of preparing and sending short videos showing where the schools and the neighborhoods are located in the city of Rio de Janeiro, as well as the visualization of schools on the GLOBE PROGRAM website (globe.gov), as a mean of publicizing the AEB GLOBE BRASIL 2020 Project on “educa_aeb”'s Instagram profile.

- <https://www.youtube.com/watch?v=U-T4SbdqVcM&feature=youtu.be>
- https://www.instagram.com/educa_aeb/?igshid=mwrbjued18eg

During a meeting of teachers who were participating in AEB GLOBE Brasil 2020, the evolution of student projects involving the application (MHM) and the GLOBE actions developed by schools was evaluated. Some results of these initiatives include:

- The Zika Education and Prevention Program provided funding for Minas Gerais School to participate in the GLOBE 2020 Annual Meeting, from July 13th to 19th:

- <https://www.youtube.com/watch?v=yg1UOLSL3-Q&feature=youtu.be>

- Minas Gerais School's Science Club won, for the 2nd time, four badges for the Project developed through the mosquito protocol (MHM) presented at the 2021 International Symposium on Virtual Sciences (IVSS);

- Presentation of E.M. Minas Gerais at the 2020 GLOBE Virtual Annual Meeting:

- <https://www.youtube.com/watch?v=ADxBeKnPEFc>

In another meeting with schools participating in AEB GLOBE Brasil 2020, the development of protocol projects for mosquitoes with traps and the participation of students in GLOBE online meetings was evaluated.

The construction of the material (video and explanatory leaflet for students) about the GLOBE Mosquito Bundle can be seen at the link:

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- <https://www.youtube.com/watch?v=Q07WPKVgG84&t=4s>

GLOBE ZIKA EDUCATION AND PREVENTION – MINAS GERAIS PROJECTS



In the state of Maranhão, a research project was developed with a scout's club, Clube de Desbravadores Ômega de São Luís, and a graduate student of the Federal University of Maranhão, who used to be a GLOBE scholarship holder. The scout's club is composed by 5 students, 12 teachers and 3 citizen scientists. They work with the GLOBE Observer protocols and created 7 didactic videos were made and posted, of which: 3 videos with testimonials about online training, 1 didactic video about the “cloud in a jar” challenge and 3 videos about the quarantined clouds challenge.

Other scholarship holders had difficulty to develop researches in their states due the pandemic restrictions and the closure of schools. Their participation on the programs was helping with the workshops and developing educational materials.

Unfortunately, the grant's financial support was suspended in April 2020. Some teachers and students kept running their research projects by themselves, but many activities were suspended as well.

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COMMUNITY

In 2020, AEB created an Instagram profile "educa_aeb" to publicize AEB's educational actions. In this profile, the project team released materials produced by scholarship holders, teachers and students. Games, educational videos on data collection protocols and presentations were created.

Some of the products are presented in the following links:

- <https://www.youtube.com/watch?v=QvrvLber64g&t=4s>
- <https://www.youtube.com/watch?v=Jeqp5-0taCM&feature=youtu.be>
- <https://www.youtube.com/watch?v=rCSWOsSEBAI>
- <https://www.youtube.com/watch?v=2tIsWRuy3dE&feature=youtu.be>
- <https://www.youtube.com/watch?v=U-T4SbdqVcM&feature=youtu.be>
- https://www.instagram.com/educa_aeb/?igshid=mwrbjued18eg
- <https://www.youtube.com/watch?v=Q07WPKVgG84&t=4s>

The ZikaBus project was developed in partnership with the Federal University of Paraná. The project's proposal is to be a traveling exhibition installed in an adapted minibus that runs through public schools on the coast of Paraná. However, its activities were suspended due to the COVID-19 pandemic.

In 2021, the educa_aeb Instagram profile was replaced by a series of social media posts on the AEB's official Instagram account (@agenciaespacialbrasileira). The AEB Virtual School

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platform was launched to offer online courses and workshops to the community in Space themed STEAM fields, including the GLOBE Program.

APENDIX

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