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NEW PUBLICATIONS

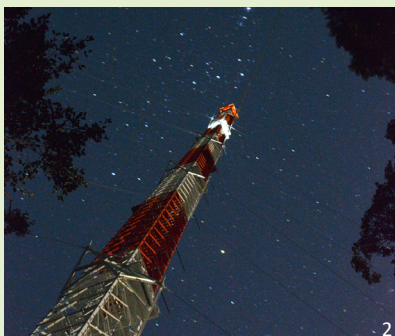
Papers published between June 2021 and January 2022



Corrêa et al.

A case study of a gravity wave induced by Amazon forest orography and low level jet generation[†], *Agricultural and Forest Meteorology*

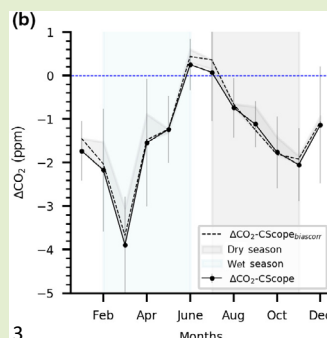
Polari Corrêa and his co-authors analyzed the atmospheric dynamics in and above the forest canopy during one particular night at ATTO. Those conditions changed throughout the night. Turbulence was followed by the formation of a gravity wave and a low-level jet. It was likely formed due to the breeze from the Uatumã River and the hilly terrain.



Botía et al.

The CO₂ record at the Amazon Tall Tower Observatory: A new opportunity to study processes on seasonal and inter-annual scales[†], *Global Change Biology*

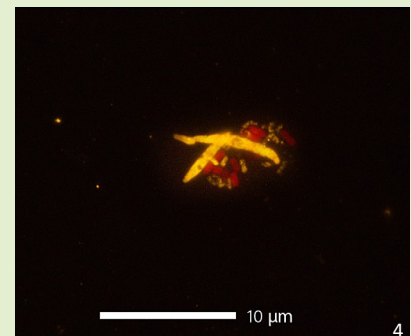
High-quality atmospheric CO₂ measurements are important to better understand the variability of sources and sinks of CO₂. Santiago Botía and his colleagues now published the first 6 years of continuous, high-precision measurements of atmospheric CO₂ at ATTO. They found a pronounced seasonal cycle, which could not be fully captured by model simulations.



Prass et al.

Bioaerosols in the Amazon rain forest: temporal variations and vertical profiles of Eukarya, Bacteria, and Archaea[†], *Science of the Total Environment*

Bioaerosols, such as pollen, fungi, and spores likely influence the formation of clouds and precipitation. The different types vary considerably in size, morphology, mixing state, as well as behavior like hygroscopicity and metabolic activity. Maria Prass and her colleagues used the FISH method to distinguish bioaerosols down to the domain level in samples from ATTO.



Machado et al.
How weather events modify aerosol particle size distributions in the Amazon boundary layer[†],
Atmospheric Chemistry and Physics

In their new study, Luiz Machado and his colleagues looked into the question of how clouds, and specifically weather events like thunderstorms, modify aerosol properties. They found that ultrafine particles increase significantly in abundance across such events, while larger particles decrease. They also found a pronounced daily cycle of the aerosol size distribution.



Edtbauer et al.
Cryptogamic organisms are a substantial source and sink for volatile organic compounds in the Amazon region[†], *Nature Earth and Environment*

Mosses and lichen appear to play a previously overlooked but important role in the atmospheric chemistry of tropical rainforests. A new study from Achim Edtbauer and colleagues shows that such cryptogams emit significant amounts of BVOCs, especially sesquiterpenes, comparable to the amount of emissions of plants. Cryptogams also take up oxidized compounds from the atmosphere.



Serra-Neto et al.
Simulation of the Scalar Transport above and within the Amazon Forest Canopy[†],
Atmosphere

In their new study, Edivaldo Serra-Neto and his colleagues showed that the PALM model was able to reproduce the flow behavior and turbulent exchanges of the atmosphere within and above the Amazon rainforest canopy. They found that strong and weak wind conditions presented different turbulence structures that drove different patterns of scalar exchange.

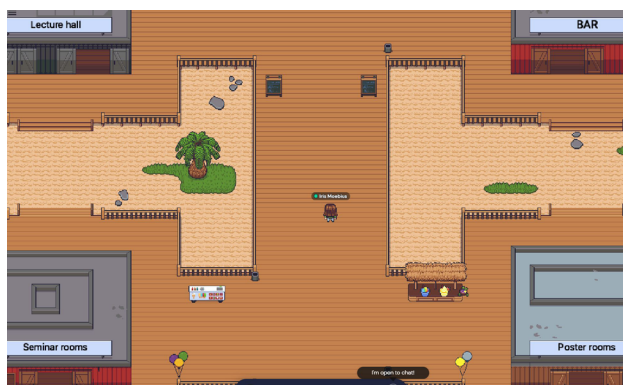


ATTO WORKSHOP RETROSPECT

Gathering virtually on gather.town



As a digital-only event, last year's ATTO Workshop took place in early October. The venue was the virtual platform gather.town. The ca. 160 participants met with their self-designed avatars in a virtual rainforest camp, designed by MPI-C graphic designer Dom Jack for the workshop.



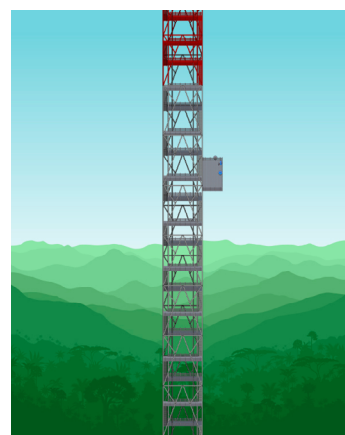
Like during the 2019 workshop, emphasis was once again placed on giving students the opportunity to present their work during extended poster sessions. „The offer of multilingualism was very well received. Everyone could present posters in their preferred language. This gave students, who speak little English, the opportunity to present their projects and did not have to



miss out because of the language barrier,” says Susan Trumbore. In addition, there were many discussion groups, in which people talked about everything from

upcoming campaign planning to various scientific topics to improving the usability of the data portal.

As a little break between the sessions, participants had the opportunity to go on a search for „hidden treasures”, such as a virtual model of the ATTO tall tower. The next ATTO workshop is scheduled for fall 2022, and can hopefully be held again at INPA in Manaus.



UPGRADES TO THE ATTO SITE

Campina Site, Flask Sampler, Micromet & infrastructure



Despite the Covid pandemic, a lot of progress has been made at ATTO in the past year.

- The Campina supersite was set up and is now fully operational thanks to an engaged team around Luis Machado and many others. The site, located in the white-sand Campina, will be used to study cloud formation processes in depth with a large set of state-of-the-art instruments, such as a cloud radar and a LIDAR.
- The Micromet team completed the instrumentation at the tall tower and the 80 m walk-up tower.

- The Jena ICOS team developed and successfully installed a flask sampler at the tall tower.
- General maintenance was completed according to the general maintenance plan.

Many additional infrastructure updates are planned for 2022, including renewal of climbing devices, new and advanced climbing device for HIGHSTEP lift, finalization of the robotic lift system for scientific profile measurements, set-up of an IT container and purchase of a new electric golf cart for exhaust-free transport on site.



MEET THE TEAM

Introducing new and old ATTO members



Carolina Nelson at MPI-C⁷

Carolina is a new PhD student in the group "Radical measurements" of Hartwig Harder at Max-Planck Institute for Chemistry in Mainz.

Because she is very concerned about the climate crisis, she wants to learn more about how the climate system works. So she pursued a Bachelor in Physics, and Master in Environmental Physics. Now in her PhD, she will develop a novel instrument to measure SO₂ in the atmosphere based on laser-induced fluorescence (LIF) that she will use for ground & airborne measurements.



GRADUATIONS

Congratulation to all Master's and PhD students on finishing their thesis



Bruna Holanda (MPI-C)

PhD thesis: „Atmospheric processing and relevance of biomass burning aerosols over the Amazon and the Atlantic“

Supervisors: Christopher Pöhlker, Meinrat Andreae, Ulli Pöschl

Bruna now continues as a Postdoc in the project at MPI-C.



Adriana Simonetti Peixoto (INPA):

Master thesis: „Distribution and geometry of forest gaps in Central Amazon combining photogrammetry and field data“

Supervisor: Daniel Magnabosco Marra

Adriana now continues as a PhD student in the project at INPA.



Marco Franco (University of São Paulo)

PhD thesis: „Vertical transport, growth processes, and aerosol characterization in Amazonia“

Supervisor: Paulo Artaxo

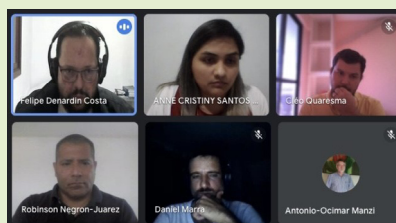


Anne Cristiny Santos de Mendonça (INPA)

Master thesis: „Regimes de turbulência na camada limite atmosférica - interação com a convecção profunda e a mortalidade de árvores na Amazônia“

Supervisors: Cléo Quaresma Dias-Júnior and Daniel Magnabosco Marra

She now continues as a PhD student in the project at INPA.



Denis Lepla (Uni Mainz)

PhD thesis: „Comprehensive Study of Secondary Organic Aerosol Particles from the Amazon Rainforest by High-Resolution Mass Spectrometry“

Supervisor: Thorsten Hoffmann

Do you know new students or colleagues joining the ATTO team? Or are any of your students graduating? Please send the info to iris.moebius@bgc-jena.mpg.de, so that they can appear in an upcoming ATTO newsletter!



Berlin Science Week Event at the Brazilian Embassy in Berlin on Nov 3, 2021

During the Berlin Science Week 2021, the Brazilian Embassy hosted a public event about ATTO. It was organized as a hybrid event with an in-person audience and live online streaming.

Susan Trumbore, Beto Quesada, Bruna Holanda, Santiago Botía, Jürgen Kesselmeier and Eliane Gomes Alves gave an overview of our research, and Flavia Durgante shared some information about the community project. In addition, there were speeches by the head of the Berlin Science Week, the Brazilian Ambassador to Germany, and representatives of the BMBF and the MCTIC. Recordings of the scientific presentations will shortly be available on ATTO's YouTube channel⁷ in English with subtitles in English, German and Portuguese.



National Week for Science and Technology in Brasilia on Dec 3-10, 2021

ATTO was also presented at the Semana da Ciência em Brasília as part of the INPA presence there. All Brazilian research institutes were invited to present their work to the general public, and many families turned out to visit the exhibition and presentation spaces.

Stefan Wolff, Cybelli Barbosa and Yago Santos took turns at the INPA booth explaining the project with a beautiful model of the tall tower. In addition, they gave two presentations to a live audience to share more details about our research.

Video recordings are available on YouTube in Portuguese:

Yago & Cybelli's talk: <https://youtu.be/aULQhB9jDxw>⁷

Stefan's talk: <https://youtu.be/Fke7cfLJ05Q>⁷

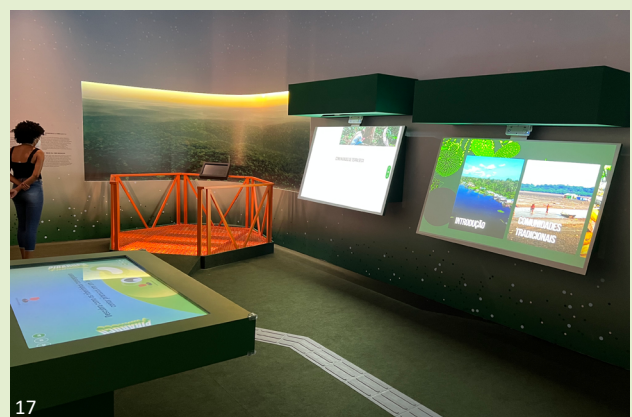


„Futuros - Tempos Amazônicos“ exhibition at Museu do Amanhã in Rio de Janeiro until June 2022

The Museu do Amanhã in Rio de Janeiro is currently hosting a special exhibition on the Amazon called „Futuros - Tempos Amazônicos“. Paulo Artaxo is the scientific advisor for the exhibition contributed information and material about ATTO, so that visitors of the exhibition can learn about our project: As you step onto a model of the tall tower, you can enjoy the panoramic view of the rainforest, and on several screens, you can watch videos and photos and read more about ATTO.

The exhibition will be open in Rio de Janeiro until June 12, and will subsequently travel to science museums across the world, with details to be announced later.

More information: fruturos.museudoamanha.org.br⁷



UPCOMING EVENTS



May 23-21 (*changed!*), Vienna, Austria & online
EGU 2022[↗]
Early Registration deadline: March 31.

June 7-9, Montpellier, France
European Conference of Tropical Ecology[↗]
Abstract submission deadline: February 10

June 12-17, Oxnard (CA), USA
Biogenic Hydrocarbons and the Atmosphere[↗]
Abstract submission deadline: March 11

July 11-15, Cartagena, Colombia
ATBC 2022[↗]
Abstract submission deadline: March 11

September 4-9 2022, Athens, Greece OR online
International Aerosol Conference[↗]
Abstract submission deadline: tba in February

September 4-9 2022, Bonn, Germany and online
European Meteorological Society Annual Meeting[↗]
Abstract submission deadline: April 26

Fall 2022, Manaus, Brazil
ATTO Workshop
details to be announced

December 2022 & January 2023, Brazil
CAFE Brazil campaign
details to be announced



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