6 / September 2020

ATTO Newsletter

ATTO
AMAZON TALL TOWER OBSERVATORY

In this issue

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New Publications

Articles published in peer-reviewed journals between April and September 2020

Chamecki et al.
Effects of Vegetation and Topography on the Boundary Layer Structure above the Amazon Forest↗, Journal of the Atmospheric Science

Studies in the Amazon region have thus far used the simplified assumption of wind flow over flat topography. However, there is a gentle topography, at ATTO of about 50-70 meters height difference between the highest and lowest points in the area. Marcelo Chamecki and his co-authors now discovered that this gentle topography below dense forest strongly affects the turbulence in the lowest 100 meters of the atmosphere, which should be considered in future atmospheric research.

2

Zannoni et al.
Surprising chiral composition changes over the Amazon rainforest with height, time and season↗, Communications Earth & Environment

Nora Zannoni and her colleagues measured BVOC emissions at the ATTO tall tower in several heights. Specifically, they looked at one particular BVOC called α-pinene, that comes in two chiral forms. They found that the two forms of such chiral BVOCs at ATTO are neither equally abundant nor is the ratio of the two forms constant over time, season, or height, as was previously assumed. They also discovered that termites might be a previously unknown source for BVOCs.

3

Botía et al.
Understanding nighttime methane signals at the Amazon Tall Tower Observatory (ATTO)↗, Atmos. Chem. Phys.

Santiago Botía and his co-authors analyzed methane in the atmosphere at ATTO. Over the course of five years, they measured methane along with other properties, such as wind speed, wind direction and the stratification of the atmosphere. They noticed frequent pulses of methane emissions during the night, but only under certain conditions.These nighttime events mostly occurred in the months of July to September – the dry season in the Amazon.

Resende et al.
Flood-pulse disturbances as a threat for long-living Amazonian trees↗, New Phytologist

Angélica Resende and her co-authors compared tree mortality of Eschweilera tenuifolia in igapó forests along the Jaú and Uatumã rivers. They found that the Uatumã region was severely affected by the construction of the Balbina dam, leaving 12% of the tree stands dead. The pristine Jaú ecosystem was much less affected. Tree mortality there appears to be linked to La Niña events. Even the well-adapted igapó forests are vulnerable to changing flooding regimes, both climatic and anthropogenic.

Fontes et al.
Convergent evolution of tree hydraulic traits in Amazonian habitats: implications for community assemblage and vulnerability to drought↗, New Phytologist

Clarissa Fontes and her co-authors investigated whether plant distribution between different habitats at ATTO and ZF2 can be explained by distinct hydraulic strategies of the different species, and if species in some habitats might be more vulnerable to embolism that would make water transport difficult during drought periods. They found strong functional differences among species but no differences in hydraulic safety margin among species, suggesting that all trees may be equally likely to experience hydraulic failure during severe droughts.


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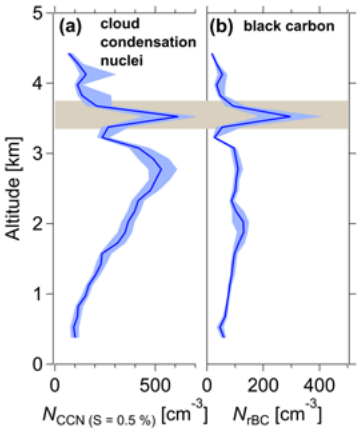
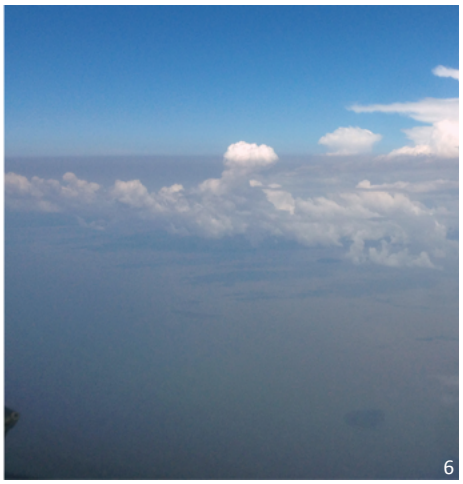
Holanda et al.
Influx of African biomass burning aerosol during the Amazonian dry season through layered transatlantic transport of black carbon-rich smoke↗, Atmos. Chem. Phys.

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Bruna Holanda and her co-authors compared data from the northeastern Amazon collected in 2014 during the ACRIDICON-CHUVA campaign with the HALO research aircraft with long-term data from ATTO. They found that polluted air layers, such as the one seen here, reach the Amazon basin seasonally each year. From July to September, biomass burnings in Africa are responsible for much of the air pollution with black carbon. From October to December, fires in South America are the main source of air pollution.

PROMOTION OF NEW PUBLICATIONS

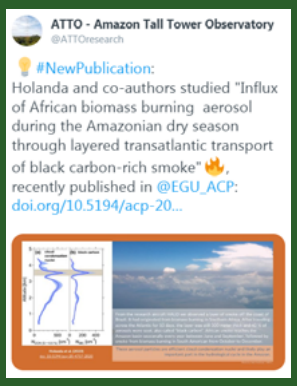
How we can help you to get the word out about your research

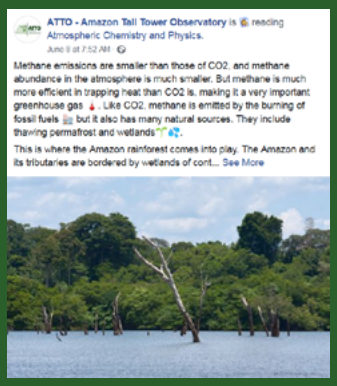
Every paper that uses ATTO data will be promoted and shared on the website and social media channels - *if we know about it*!

This includes:

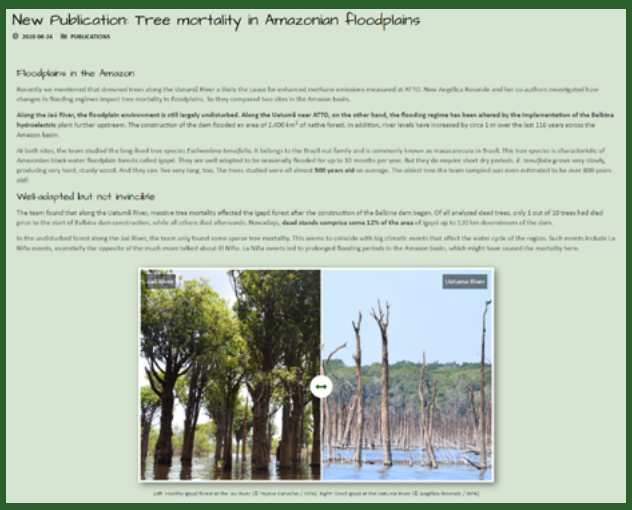
- adding your paper to ATTO publication list on ATTOproject.org & ATTO Research Gate project page
- posting a news story on ATTOproject.org & on the ATTO Facebook page
- a short summary in the next ATTO newsletter
- sharing your paper via Twitter
- potentially sharing the paper via Instagram (if there is some fitting photos available.

Papers submitted to Journals with Public Review can additionally be shared via Twitter upon submission to increase their visibility.





The news story consist of a plain language summary and 1-2 photos or figures. The aim is to provide a wider context for the research question, explain the main findings in terms accessible to a lay audience and underline the importance of those findings.
Iris will write the summary and send to you for approval before posting it. Alternatively, she will gladly assist you, if you want to have a go yourself.



To do this, it is important that you inform Iris about any new papers ahead of publication, and send her good photos, graphs or a graphical abstracts.
Overall, we want to make good science available as much as possible and advertise it via all channels available to us - and thus reach a maximum of audience.

BLOG: ATTO THROUGH TIME

Celebrating our anniversary

This year, we are celebrating the anniversaries of two milestones at ATTO. Five years ago, on 15 August 2015, the tall tower was officially inaugurated. Measurements at the station started in August 2010 on two smaller towers, already ten years ago. Since then, the observatory grew and evolved continuously.

For this occasion we take a look at how it all began. And what better way to do this than to ask the people who were there from the very beginning. We recently launched a new blog series on the ATTO website.

In multiple chapters, project members will report on the development of the research station from their perspective, reminisce and share their memories of those early days. Chapters will include the adventurous expeditions into the Amazon to identify the future ATTO site, the struggle with the climatic conditions, and finally the mammoth project to build a steel colossus in the middle of the rainforest. We bring these reminiscences to life with many photos and videos, and end with a glimpse into the future. If you have something to contribute - memories or photos, please contact Iris Moebius at iris.moebius@bgc-jena.mpg.de!

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Media Digest

Highlights from the reporting about our research in the media

Ciné-cipó - Cine liana↗
Two Amazonian local activists Natalina do Carmo and Milena Raquel Tupinambá, visited ATTO last year. Brazilian filmmaker Barbara Marcel went with them to capture the exchange between the scientists, who study the forest, and the communities who call the forest their home. You can now see what she discovered in a video installation called "Ciné-Cipó - Cine Liana" in the exhibition „Critical Zones - Observatories for Earthly Politics" by the ZKM - Zentrum für Kunst und Medien Karlsruhe. It will be open until February 2021. In addition to the exhibition, Barbara will also create a 90-minute documentary film, which she will submit to film festivals in Europe and Brazil. We will keep you posted!

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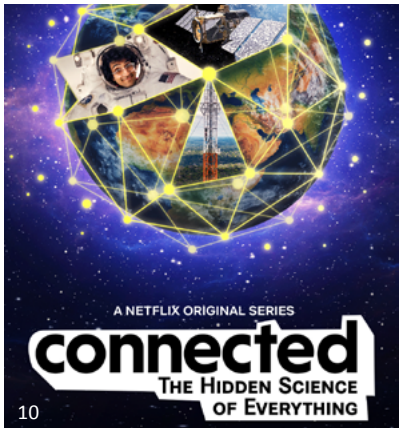
Connected - The hidden science of everything: Dust↗
Science reporter and host Latif Nasser investigates the fascinating and intricate ways that we are connected to each other, the world and the universe at large.
Episode 3 "Dust" follows the dust from the Saharan desert across the Atlantic all the way to the Amazon Rainforest, to ATTO. When Latif arrives there, he meets Stefan Wolff, who explains to him how we measure long-range transport of particles, and how the phosphorus in the dust acts as a fertilizer to the Amazonian soils.
The documentary series is available on Netflix worldwide.



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Wissen Was: Schwerste Waldbrände im Amazonas-Regenwald↗
In the YouTube series „Wissen Was" by the Max Planck Society, science influencers explain current topics studied in the Max Planck Institutes. In a recent episode, Cederic Engels aka Dr. Whatson took on deforestation of the Amazon Rainforest, its history and current development. He also spoke with Susan Trumbore, who explained the role the Amazon plays for global & regional climate, all the ecosystem services it provides and why we must protect it. She also talked about her research at ATTO and at the Tanguro Ranch, and of the effects of forest destruction (on the ecosystem).

Meet the Team

Introducing members of the ATTO consortium

Pedro Ivo Lembo Silveira de Assis, PhD student at INPA

Pedro is a biologist and a lover of the world of plants. He completed his MS degrees at the Institute of Botany at the University of São Paulo and then came to Manaus. For more than two years he worked at ATTO as a technician. He worked on the canopy walkways and set up the experimental design for a future PhD project that he started in 2017 with Bruce Nelson at INPA. He wants to understand how stomata respond to variations in light intensity, temperatures, humidity and CO_2 concentrations changes throughout the leaf aging process.

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Akima Ringsdorf, PhD student at MPI-C

Akima has a MS degree in Meteorology from the University of Frankfurt. She now works on her PhD project at MPI-C in Mainz. Together with Achim Edtbauer she uses PTR-TOF-MS measure volatile organic compounds with high sensitivity. They analyze the mechanisms leading to the emissions, induced by light, temperature or environmental stress, among other factors. Akima is extremely happy that this project that allows her to do interesting fieldwork and contribute to an important research topic.

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Marco Franco, PhD student at USP

Marco is a PhD student of Physics at the University of São Paulo (USP). He studied Physics, initially focusing on Plasma Physics applied to the analysis of carbon and nutrients in soils. But he realized we wanted to look not only at the ground but also at the sky. So he joined Paulo Artaxo's group at USP to study physicochemical properties of atmospheric aerosols in the lower Amazonian troposphere. Currently he spends some time at MPI-C with Christopher Pöhlker. Over the last 3 years he made wonderful memories, and whenever he goes to the site, he returns with great new experiences and friendships.

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Stefan Wolff, PostDoc at MPI-C

Stefan is a meteorologist and has been working in the ATTO project since 2010. He works for the MPI-C but spends most of his time in Manaus or at ATTO working in collaboration with the INPA. He studies carbon dioxide and reactive gases such as ozone, nitrous oxides and water and performs profile measurements to find out how the forest and the atmosphere interact. Besides his scientific work, Stefan is also very engaged in public outreach, often speaking to journalists and TV-crews, but also participating in the community project in the river communities close to ATTO to connect with them in a meaningful way.

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Short Notices

PhD Defence
Earlier this year, Nina Löbs defended her PhD thesis. Congratulations!
Nina studied „Cryptogams under the influence of tropical microclimate and their contribution to biosphere-atmosphere exchange“ at ATTO, among other places. Her supervisors at MPI-C in Mainz were Bettina Weber and Christopher Pöhlker.


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Farewell
We are sad to say Goodbye to Andrew Crozier. He has been our site engineer at ATTO for over six years, looking after all the instruments, maintaining them and performing all the necessary routine checks. We wish him all the best for his next adventure, returning to his native USA with his family, but he will be greatly missed!


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Upcoming Events

October 27-30 2020 Online
First Brazilian Symposium on Photosynthesis
Abstract submission deadline: Sept. 30 2020.

December 14-18 2020, Online
Festival of Ecology by the British Ecological Society
Abstract submission deadline: Oct. 12

December 3 - 8 2020, Online
AGU Fall Meeting
Early bird registration deadline: Oct. 30

January 10-14 2021, Online
American Meteorological Society Annual Meeting
Early bird registration deadline: Dec. 1

April 25-30 2021
EGU General Assembly
Abstract submission deadline: Jan. 13


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