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Went to French Guiana looking for answers, but ended up with more questions: Kabi Khatiwada's FLUXNET Secondment experience (https://fluxnet.org/2025/08/26/went-to-french-guiana-looking-for-answers-but-ended-up-with-more-questions-kabi-khatiwadas-fluxnet-secondment-experience/)

by *Kyle Delwiche (https://fluxnet.org/author/kyledelwiche/)* - August 26, 2025

Kabi Raj Khatiwada, recipient of the 2025 FLUXNET Secondment Program award, has completed the program and wrote the following to share with the FLUXNET community:

Went to French Guiana looking for answers, but ended up with more questions

25 August 2025

As a PhD student, my goal is to understand and model greenhouse gas fluxes in forested wetlands, and I know that it requires deeper understanding of the underlying processes. This opportunity to explore these processes in French Guiana, a tropical region, was an exciting opportunity for me. As I was flying to French Guiana, I was both nervous and eagerly excited. Nervous, because I will be soon entering into a dense tropical rainforest, home to the snakes and spiders — I dreaded. Excited at the thought of staying within walkable distance to the beach. Interestingly, my journey from North to South America took me via Europe, I was crossing the Atlantic Ocean twice to reach to French Guiana with layover in Paris. For a moment, I thought I might step out of the airport to explore the city, since French Guiana is officially part of France, but I quickly realized that my destination, though administratively French, was thousands of kilometers away and profoundly different in its landscape, culture, and environment.

I spent four weeks in French Guiana, an experience that enriched both my scientific career and life experiences. During my stay, I came to realize how unique this region truly is. Geographically it is dominated by tropical rainforest, ecologically it is Amazonian, politically and historically it is European and moreover French, socially it is remarkably diverse and yet harmonized, and environmentally it remains relatively undisturbed. For anyone interested in nature and eager to understand tropical processes in their most authentic form, I felt French Guiana offers one of the best settings.

Apart from the natural beauty and unique location, French Guiana also carries a distinctive history. I was fortunate to observe some of its historical remnants. I had the opportunity to visit the Salvation Islands, a place marked by a complex and significant socio-political past. This region is also home to the Guiana Space Centre,

a major hub for European space launches. By chance, I was lucky to witness one of these launches, and it became one of the interesting moments of my month in French Guiana.

Exploring the natural beauty and unique landscape was deeply rewarding. However, it took me some time to adjust to the hot and humid tropical climate. Just like adapting to the thin air of high-altitude mountainous environment takes a few days, acclimating to the tropical environment required me few days. I am especially grateful to my host, Laëtitia Bréchet, who supported me throughout my stay, she helped me with the logistics, accommodation, and other essential information. Together we carried out multiple field measurements of CO2 and CH4 flux near the Paracou Research Station. This station is a large-scale forest disturbance experiment in Amazonia, set up by French agricultural research and international cooperation organization (CIRAD) in 1982 to study the impact of silvicultural treatments on the dynamics of natural tropical rainforests. Among the ongoing research projects, I was glad to assist Laëtitia with her research related to the greenhouse gas flux measurements from the soil and tree stems. These field activities help me to deepen my understanding of local flux dynamics and also enhance my appreciation of the forest diversity.

It was exciting to be in the middle of the tropical forest, conducting the flux measurements. However, there were always risks of being bitten by random insects, many of which were impressively camouflaged in the environment. Measurements became even more challenging whenever there was sudden rain during the field work. I felt that the limited internet data availability, combined with the heat, humidity and constant possibility of getting lost among the trees, added further difficulties to working in this environment. I was fascinated by Laëtitia and her team's dedication, and their ongoing efforts to better understand fluxes in this tropical ecosystem. We attempted to use the floating chambers to measure the flux for the first time. The results were not exciting, but they were explainable based on the site descriptions.

In French Guiana, GuyaFlux tower (GF-Guy: GuyaFlux) has been measuring carbon and water fluxes via eddy covariance since 2003. The tower is approx. 55 m tall, and measures major greenhouse gases including CO2, CH4, N2O, and has a footprint covering approx. 50-100 hectares of undisturbed tropical rainforest. Although the measurements of some gases were discontinued for few years, especially for CH4 and N2O, the tower now provides data on the major greenhouse gas exchange between the forest and the atmosphere. I was excited to climb to the top of the GuyaFlux tower and take photos, but during the climb, I became mindful of the potential challenges posed by technical failures of the instruments and limited resources available for repairs and maintenance. As I work on my thesis studying methane flux production, oxidation, and transport processes, I often find myself frustrated with poor or missing data when fitting models. This experience has helped me realize just how complex flux measurements can be under different conditions. Carbon flux dynamics in tropical forests are fascinating, and site characteristics such as soil type and limited nutrient availability add an extra layer of complexity to these dynamic systems. This visit made me appreciate the importance of the in-situ data from GuyaFlux.

I also had the chance to meet the technicians, Benoît Burban and Jean-Yves Goret, who were studying on how tree phenology responds to environmental change. Local colleagues, like Jocelyn, were equally invaluable. Their traditional knowledge of trees and animals enriched our fieldwork with helpful insights. While a tree may appear to me as just an ordinary tree, I admired how they could recognize subtle details; each faint sound or scent carried a distinct meaning and served as an important reference within the forest. I felt a deep respect for the local people who uphold the traditional ways the forest has been used, even as perspectives toward the forest continue to evolve. I was also glad to meet a few students from France who were there as a part of

their master's or PhD research. They explained to me that French students travel to French Guiana as a part of their field work on tropical flora, fauna, and ecological diversity, and stay for a few weeks to several months. I also had the fortune of meeting a few people who had first arrived as curious interns and eventually made French Guiana their second home.

I work in the Landscape Flux Group at the University of Arkansas, and after our weekly group meetings, there is a dedicated hour specifically focused on discussing instrumentation and fieldwork. In the US, technical problems with instrumentation can often be resolved relatively quickly due to easy access to supplies and expertise. However, I wonder about the experience in parts of the world where the resources are limited. Let's think about French Guiana: if there is some issue with the instrument, it has to travel all the way to Central Europe or even the US and it might take several weeks to be resolved. Even on the FLUXNET website, there are some sites which have only a limited number of years of available data. I believe funding appears to be a major reason for interruptions, and it is typically not related to a specific brand or instrument. However, this prompts important questions about the sustainability of flux measurements and the factors that contribute to sites discontinuing their observations. Are there sufficient resources, both in terms of equipment and skilled personnel, to support sustained instrumentation, data management, and site maintenance globally?

Last but not least, I would like to thank the Secondment Committee for allowing me to participate in the Secondment Program, Laëtitia for welcoming me into her lab and supporting me throughout, and Jocelyn for being super helpful. My French is terrible, I could barely pronounce a dozen words, and this post is dedicated to everyone who understood my tragic Franglais and helped me survive in French Guiana. 😊



(https://fluxnet.org/wp-content/uploads/Kabi_1.jpg)
(Jocelyn, Laëtitia and Kabi (in clockwise direction) with a portable floating chamber)



(https://fluxnet.org/wp-content/uploads/Kabi_2.png)

(Me, trying to show how tall I am in front of this almighty tree buttresses)



(https://fluxnet.org/wp-content/uploads/Kabi_3.jpg)
(Hello, from the top of the 55m tall GuyaFlux tower)



(https://fluxnet.org/wp-content/uploads/Kabi_4.jpg)
(Information about the tower)



(https://fluxnet.org/wp-content/uploads/Kabi_5.jpg)
(The tower as seen form the ground)



(https://fluxnet.org/wp-content/uploads/Kabi_6.jpg)
(Trying to pose with replica of rocket at Guiana Space Centre)



(https://fluxnet.org/wp-content/uploads/Kabi_7.png)
(The Salvation Islands, located about 11 km off the coast of French Guiana, consist of three islands. Top: a view of one island from another. Bottom: remains of a house on the island.)



(https://fluxnet.org/wp-content/uploads/Kabi_8.png)
(Trying to capture the depth of the tropical forest: (left to right) tall trees with few branches, orchids and mosses on the tree stem, dense vegetation, and a thick canopy cover)



(https://fluxnet.org/wp-content/uploads/Kabi_9.png)
(Stem, roots, and other interesting features in the forest)



(https://fluxnet.org/wp-content/uploads/Kabi_10.png)
(Differences in the color of water within just a few kilometers)



(https://fluxnet.org/wp-content/uploads/Kabi_11.jpg)
(Cayenne is the capital city of French Guiana)



(https://fluxnet.org/wp-content/uploads/Kabi_12.jpg)
(A normal day at Kourou, French Guiana looks magical during the sunset)

0 (https://fluxnet.org/2025/08/26/went-to-french-guiana-looking-for-answers-but-ended-up-with-more-questions-kabi-khatiwadas-fluxnet-secondment-experience/#respond)

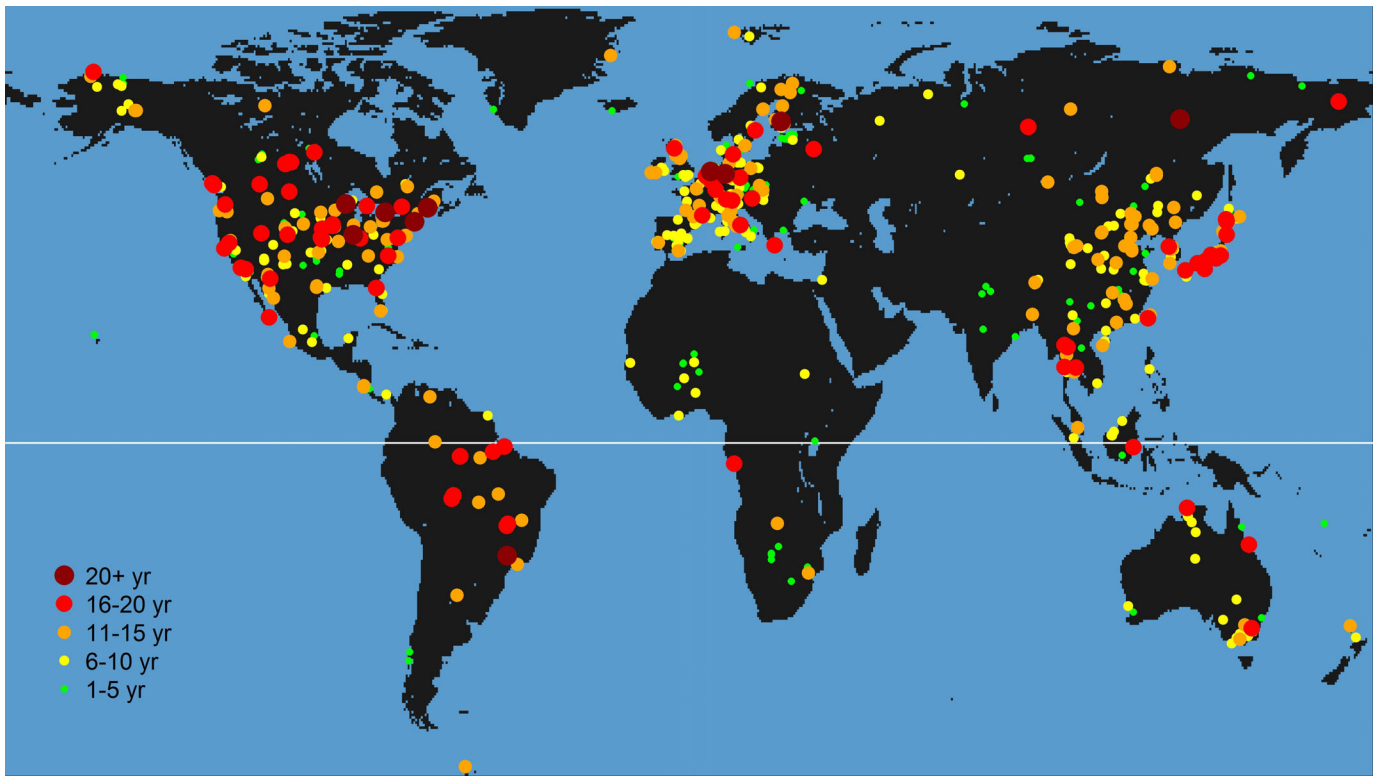
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