HCERES 2023 The climate issue at IAP

Hélène Roussel and Jean-François Cardoso

All research institutes feel a mounting pressure, both from the government and from civil society, to respond to climate change, that has become acute enough to require rapid and efficient action at all levels, from local to international structures.

In 2021, the IAP direction looked for volunteers to undertake the role of "référent Enjeux environnementaux", first for the University (SU/FSI) and then for CNRS.

Two persons were nominated and organized a discussion group named "Climaction" (see below). The work on quantifying the greenhouse gas emission budget of IAP had already started before then, and continues today (see Section 2).

Their tacit mandate, as they view it, is manifold: quantify the carbon footprint of IAP as a whole, and monitor its evolution; raise awareness among all categories of personnel; relay important information from the developing referent networks at the local and national levels (with regular meetings and rich exchanges, not described below); facilitate the emergence of fruitful ideas aiming at an efficient reduction of our imprint on the climate and the environment, while preserving the quality of the research.

1 Climaction

The Climaction group (currently 20 persons, including the two referents) was set up in September 2021 – with a dedicated mailing list – immediately following the second general assembly on the issue of climate change. We briefly list in this section all the local activities not directly related to the assessment of the greenhouse gas emissions (GHGE).

All the relevant documents are temporarily archived on this page .

- General assemblies: Two general assemblies were organized in the summer and fall of 2021, the first one to review the climate crisis and summarize the latest IPCC report at the time; the second one to present a preliminary GHGE inventory for 2019, plead for action within the laboratory and recruit volunteers for the Climaction group.
- Meetings: We had 7 group meetings with an agenda (plus several impromptu meetings) to discuss particular topics. Several were devoted to brainstorming on the issue of professional travel (the main contributor to our local GHGE budget, see below).
- Newsletter: We wrote and published within the lab three newsletter issues devoted to the national and international situation (see the section "Bulletins" on our page).
- Survey of IAP collective catering users: We conducted this survey as user representatives, and took advantage of this occasion to highlight the carbon footprint of food in France, to raise awareness on this topic.
- Internal seminar: At the occasion of the internal seminar in Angers in May 2022, we continued our outreach work and presented our ideas for a path of action at IAP. Two documents can be perused: our presentation, and a memorandum on professional travel.



Figure 1: Inventory of carbon emissions at IAP for the year 2019

- Règlement intérieur : The IAP direction wanted to inscribe in the "Internal rules" document its willingness to commit the lab to a trajectory of GHGE reductions. We were kindly invited to co-write a new article that we wished to name "Responsabilité environnementale", but that CNRS rulers imposed to name "Développement durable".
- Poster board in the entrance hall of IAP: This is designed as a daily reminder of the issue of climate change for our colleagues, but is also aimed at anybody coming at IAP for public events.

2 Carbon footprint analysis

We conducted a carbon footprint census for IAP using the GES1.5 online tool provided by labos1point5.org. We did a complete analysis for the year 2019 and an analysis of travel-related emissions over the 2012-2023 period.

2.1 The 2019 IAP carbon footprint

For the year 2019 (the most recent year before the Covid disruptions), we collected data related to all activities under IAP control. This is summarized in figure 1 with the following keys, in order of decreasing impact:

- Missions. Travel related emissions. This is the major offender, vastly dominated by air transportation, itself dominated by long-distance flights.
- Achats info. This covers all IT purchases (PCs, servers, screens, laptops, etc) but excludes any other kind of expenditure by the lab (furniture, catering, etc).
- Calcul distant. Remote computing and storage.
- Chauffage. Heating of the IAP building.
- Electricité. About half of our electricity is spent for running our HPC servers and keeping them cool.
- Restauration. Food-related emissions for the meals taken at IAP.
- DDT. Déplacement domicile-travail is the daily commute. Thanks to the central location of IAP, this is a small contribution to the overall emissions.
- Fluides. Leaking of refrigerant fluids (average over 10 years).

According to the above estimates, the carbon footprint of IAP for the year 2019 is

6 tons of equivalent CO_2 per lab member.



Figure 2: Yearly travel emissions by category

Unfortunately, this estimate *ignores* the environmental footprint of observatories and other large research infrastructures.

Preliminary studies (e.g. Knödlseder, Nature Astronomy, 2022) reveal that, at the international level, this could be as large as (36 ± 14) tons of equivalent CO₂ per astronomer per year.

2.2 Travel emissions 2011-2022

From the 2019 analysis, it appears that the most accessible leeway for reducing the carbon footprint of our research activities might be, at least in a first step, to act on our travel-related emissions. For that reason, we have extended the analysis of travel-related emissions to all the available data, covering the 2012-2022 period.

We found – see Fig. 2 – that 2019 was in fact our worst year in that respect, but not deviating much from the decadal average. Another "bad year" is 2015. It turns out that this is due to a large attendance to the annual IAU meeting in Hawaï. Hopefully, this kind of events are a thing of the past.

3 Perspectives

In the short term, planned actions are:

• To estimate travel-related emissions individually, while ensuring anonymity: each staff member of IAP (plus PhD students and postdocs) will receive a personal mail listing all his/her travel-related carbon emissions.

This task is almost complete but has been very time-consuming, because the information system at CNRS is not adapted to it. We are told that progress is coming, but the cooperation of the CNRS administration in that direction should be urgently ramped up. This is a recurrent problem and a big concern for all the labs working with labos1point5.org. • To hold a general assembly for deciding lab-wise environmental policies with focus on the reduction of travel-related emissions. Such a meeting must be carefully prepared to obtain as wide a support as possible, and to keep efficiency in mind.

4 What is missing to support our action

With almost a two-year hindsight, it has become clear that it is extremely difficult to keep the personnel engaged or even concerned, even with explicit support from the lab direction. This is a general conclusion of all labs from which we heard of within the network "Référents Enjeux environnementaux", even those that were pioneers in their commitment.

Perhaps the main cause of this difficulty is that everything we do in this framework has for the moment no institutional recognition. The time or resources devoted to the issue of climate change somehow have to be drawn from unacknowledged sources, to the detriment of research or administrative activities, and impinging on private life. This is why we strongly support the call from Labos1point5 "Pour la reconnaissance de l'engagement des personnels de l'enseignement supérieur et de la recherche en faveur des enjeux environnementaux".

On the other hand, our regulatory authorities are slow to take full account of the scale of action needed to face the climate crisis. The striking lack of ambition of the recent CNRS call for low-carbon projects is a good illustration of this. The research personnel have now collectively spent a lot of time for thought and assessment. It is high time to take action. If this does not happen at the institutional level, the risk is high to discourage goodwill and to generate frustration.