

ISTerre Laboratory's Eco-Responsible Commitment

Validated by majority decision by the whole laboratory in May 2021, and voted by the laboratory council in January 2022

The IPCC reports, including the latest one (Feb. 2022), have shown that greenhouse gas (GHG) emissions responsible for climate disruption have continued to increase without slowing down since the COP21 in 2015. If the average global temperature, which is already above 1°C compared to the pre-industrial period, increases by more than 1.5°C, the risks of chain reactions will become considerable leading to uncontrollable societal and environmental upheavals (accelerated decline in biodiversity, population migrations, political instabilities...). The IPCC concludes that the only way to avoid these disasters is to reduce GHG emissions by 45% from current levels by 2030.

France is one of the 195 states that signed the Paris agreements in 2015 to limit warming to 2°C, and one of the 66 states that signed up in September 2019 to the goal of carbon neutrality by 2050.

As members of academic research and higher education in the field of earth and environmental sciences, we, the members of ISTerre, have a duty to be exemplary for the following reasons:

- we are among the best informed,
- our research activities are highly emissive (see below),
- we are responsible for the training of a part of the next generation,
- we have a certain autonomy on the orientation of our research,
- we use public money.

The greenhouse gas (GHG) emissions assessment, carried out at ISTerre in 2019 by the eco-responsibility workshop, evaluated our emissions for the year 2017 at 1065 tons CO₂e, i.e. 4.2 tCO₂e per agent within the framework of work alone (for comparison, the current French average - all activities combined - is 11.9 tCO₂e/year/inhabitant). 62% of ISTerre's emissions are due to business travel, all means of travel combined, and 57% to air travel (Figure 1).

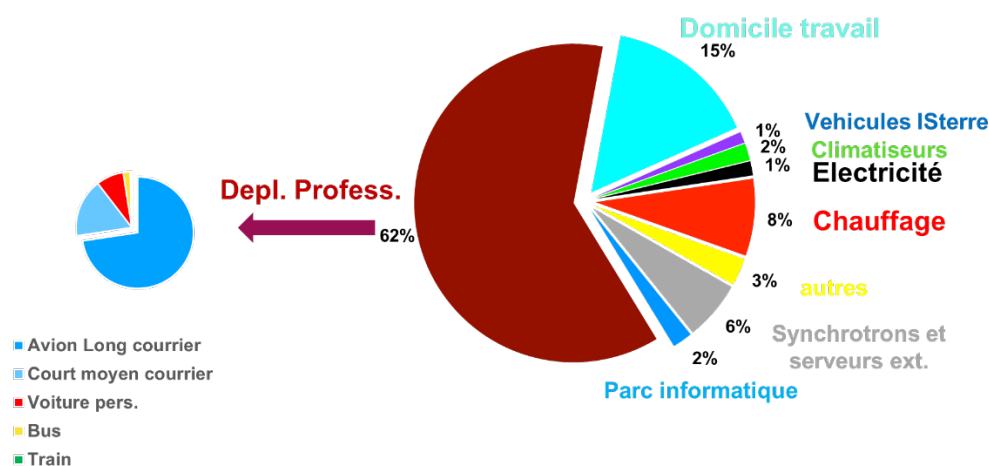


Figure 1: Percentage distribution of GHG emissions (in CO₂e) at ISTerre. Full report and methodology (in French) at: <https://www.isterre.fr/french/actualites/a-la-une/article/isterre-publie-son-bilan-des-emissions-de-gaz-a-effet-de-serre-ges.html> These calculations take into account the indirect effects of aviation (contrails and NO_x emissions, resulting in radiative forcing)¹. The impact of these indirect effects is significant, even if their quantification is uncertain¹. Not taking them into account reduces these emissions by a factor of about 2.

We believe that quality research is compatible with an effort to reduce our emissions. Inspired by laboratories that have already made public their commitment to environmental responsibility and adopted concrete measures to reduce their emissions (e.g. LOCEAN in Paris ², or LAMA in Chambéry ³), the ISTerre laboratory is committed to giving itself the financial, human and organizational means to monitor and reduce its GHG emissions by 50% by 2030 (emissions related to the laboratory's workforce). This commitment is accompanied by a **set of rules**, listing the practical measures for all aspects of the laboratory's life and the procedures for monitoring them. This set of rules will be revised periodically in order to adjust the laboratory's carbon trajectory.

This charter and the regulation below are the result of a co-construction process led by the eco-responsibility workshop and based on the laboratory's governance structures. In practice, debates took place in the General Assembly and in the laboratory council, polls were taken by majority judgment (1 agent = 1 vote), and the text was adopted by a vote in the laboratory council, then in the General Assembly.

The ISTerre laboratory asks its supervisory bodies to take all the measures in their power to contribute to reducing its carbon footprint (insulation of buildings, waste sorting, mode of evaluation of projects and researchers, management tools, public contracts, etc.).

References

- (1) <https://climactions.ipsl.fr/vote-au-locean-2829-septembre-2020/>
- (2) <https://www.lama.univ-savoie.fr/index.php?page=Presentation&lang=fr#Charte>
- (3) https://en.wikipedia.org/wiki/Environmental_effects_of_aviation#Non-CO2_emissions

Ecoresponsability regulation

Adopted by vote of all members of the laboratory on March 2022.

Participation rate : 78.5%.

Each rule received more than 75% of votes « In favor ».

Introduction

This regulation commits the laboratory and all its members collectively, in the context of their professional activities at ISTerre. It includes a set of good practices intended to progressively reduce the GHG emissions associated with the laboratory's activities. These measures aim to initiate and support changes in practices, and to formalize new practices already adopted by many of us.

It will be revised periodically according to the reduction trajectory evaluated based on the GHG emission assessments.

This regulation also includes requests addressed to the supervisory authorities (UGA / CNRS/ USMB / IRD / Univ Gustave Eiffel), as certain aspects of our eco-responsible approach fall under their jurisdiction.

Daily life in the laboratory

- 1- The laboratory commits to implement practical measures in favor of soft transport (e.g.: improvement of the bicycle garage, repair workshops, distribution of fluorescent vests, etc.)
- 2- Single-use plastic tableware is prohibited in France. The laboratory is committed to limiting the use of single-use tableware, even renewable, and to using as a priority washable tableware (provided by the laboratory), and to give preference to caterers who offer washable dishes.
- 3- Lab-funded meals and “pots” must include vegetarian dishes.

Equipment and consumption related to research

Some figures:

The manufacture of a fixed PC + screen generates 1283 kg CO₂e; that of a 21-inch laptop generates 501 kg CO₂e (source ADEME base carbone). In addition to CO₂e emissions, the manufacture of a 2kg PC requires 22kg of chemicals and 1.5t of water (source: WWF WeGreenIT study).

The use of a laptop + screen for one year generates 10 kg of CO₂e (source EcoInfo).

200,000 hours of computing on GRICAD generates about 1t CO₂e (including manufacturing) (<https://hal.archives-ouvertes.fr/hal-02549565v4/>).

A 4-day experiment (12 shifts of 8h) on a synchrotron beamline consumes 28,800 kWh (source ESRF), that is 1.65 t CO₂e (0.0599 kg CO₂e/kWh, source ADEME).

The manufacture of an electron microscope at 100,000 € generates about 40 t CO₂e (0.4 kg CO₂e/€, source: Groupe Empreinte Labos1point5 and ADEME)

- 4- Each time a new piece of equipment is ordered, users are informed of the GHG emissions associated to the manufacture of this equipment (when this data is available)
- 5- Users are informed of the GHG emissions linked to the use of computer resources (storage, calculation) and to other activities (synchrotron, microprobe, specific experimental rooms)
- 6- A day of cleaning hard disks and messaging systems is organized regularly to encourage agents to delete their unused data.
- 7- Users are encouraged to keep their equipment as long as possible, and to choose the longest possible warranty period.

Professional travel

Some figures:

A round trip from Lyon to Rennes by plane generates at least 338 kg CO₂e, for an estimated duration of 4 hours, against 4 ± 1 kg CO₂e by train for an estimated duration of 6 hours.

A round-trip flight from Lyon to Vienna in Austria via Paris generates at least 674 kg CO₂e.

A round trip flight from Paris to New York by plane generates at least 1.80 t CO₂e.

A round flight from Lyon to San Francisco via Amsterdam generates at least 3.13 t CO₂e.

Source and calculation method: <https://labos1point5.org/travels-simulator/>

Important remark: As in the laboratory's 2019 GHG assessment, these calculations take into account the indirect effects of aviation (contrails and NO_x emissions, resulting in radiative forcing)¹. The impact of these indirect effects is significant, even if their quantification is uncertain¹. Not taking them into account reduces these emissions by a factor of about 2.

Air travel accounts for approximately 60% of our greenhouse gas emissions (ISTerre GHG report for 2017). We can reduce them by simple changes of practices.

8- The members of the laboratory are invited to follow the following recommendations when requesting a mission:

- Make maximum use of video conferencing systems,
- Consider the need for travel at the time of their request,
- Optimize the mission by combining different objectives.
- Choose the means of transportation with the lowest GHG emissions: train, bus, bicycle, carpooling, boat for the transport of material.

9- - Travel by car (personal, lab or rental) is reserved for field missions, and for places not or poorly served by public transport. For trips between Grenoble and Le Bourget-du-Lac, public transportation and carpooling are strongly recommended.

10- Train trips of more than 2 hours can be done in 1st class in order to be able to work during the trips.

11- For destinations accessible in less than 6 hours by train, the latter must be used instead of the plane.

GHG emissions balance and trajectory

12- The GHG emissions balance must be done every two years, for the whole laboratory

13- This eco-responsibility regulation will be revised at least every five year

Requests to be sent to the supervisory authorities

The implementation of these requested measures will make it possible to remove certain bottlenecks and to make our regulations evolve in the future.

14- The supervisory authorities and international organizations must encourage the use of video-conferencing for consultation/management meetings.

15- The awarding of public contracts for equipment (computer and other) must include sustainability criteria for manufacturing and life cycle. These contracts should require suppliers to estimate the GHG emissions associated with the manufacture of the equipment.

16- Mission management tools must allow for the booking of train tickets anywhere in Europe, including overnight sleeper berths

17- The supervisory authorities must allow first class for train journeys of more than 2 hours, so that agents can work during the journey.

18- The supervisory authorities must allow carpooling such as blablacar for professional travel.

19- Mission management tools must provide each agent with a GHG emission counter.

20- Mission management tools must allow for automatic extraction of GHG emissions for the laboratory.

21- The universities (UGA and USMB) must respect their commitments concerning the energy performance of the buildings.

22- Public contracts with cleaning companies must include selective waste sorting.

23- The universities (UGA and USMB) must provide bicycle parking facilities adapted to our needs.

Reference

1 https://en.wikipedia.org/wiki/Environmental_effects_of_aviation#Non-CO2_emissions