



# LMD-Climaction

## General Assembly

June 2022

# Introduction

- Since July 2019, the management has commissioned LMD-Climaction, formed with volunteers from the lab, to put the LMD on a path that is compatible with the *Sustainable Development Goals* of the United Nations.
- In April 2021, LMD-Climaction presented the 2019 LMD's carbon footprint (method in appendix) to the General Assembly, along with the results of an opinion survey that received responses from approximately 50% of the LMD's members.
- Since then, LMD-Climaction has been working on developing measures to reduce the laboratory's environmental and social footprint. These reflections and propositions of actions have so far focused on the **Missions**, **Digital**, and **Purchases** items, and need to be discussed with as many people as possible and revised in line with our concerns, before being put to a vote after the General Assembly.

# Carbon Footprint



**2019**

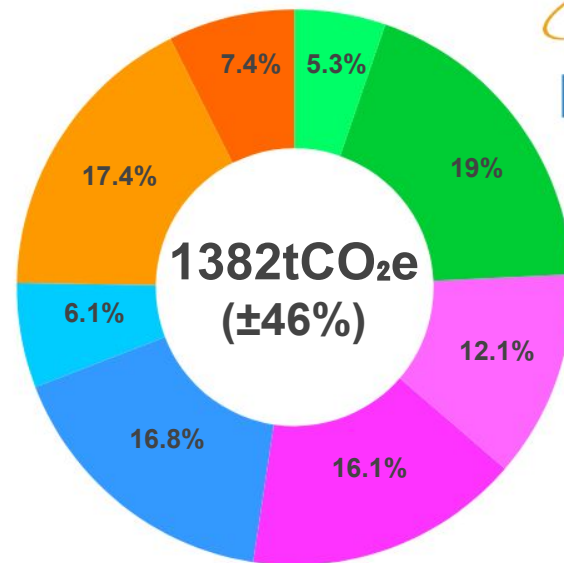
	[% total]	[tCO2e]	[δtCO2e]	[% incert.]
<b>HEBERGEMENT</b>				
[bâtiments / énergie]	7,4	102 ± 31	30	
[achats et services]	17,4	240 ± 106	44	

	[% total]	[tCO2e]	[δtCO2e]	[% incert.]
<b>DEPLACEMENTS</b>				
[domicile-travail]	6,1	84 ± 51	61	
[missions]	16,8	232 ± 119	51	

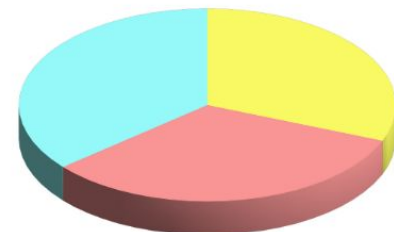
	[% total]	[tCO2e]	[δtCO2e]	[% incert.]
<b>DISPOSITIFS</b>				
[campagnes terrain]	16,1	222 ± 133	60	
[clusters calcul]	12,1	167 ± 68	41	

	[% total]	[tCO2e]	[δtCO2e]	[% incert.]
<b>ACHATS</b>				
[instruments]	19	263 ± 105	40	
[fonctionnement]	5,3	73 ± 29	40	

<b>BILAN LMD</b>				[% incert.]
total LMD en tCO2e	1382	± 642	46	
total LMD en tCO2e / personne	8,3	± 3,8		
extrapo tCO2e publique / français	0,7	± 0,32		
% objectif <2° (2 tCO2e)	35	± 16		



also see:  
**POSTER**

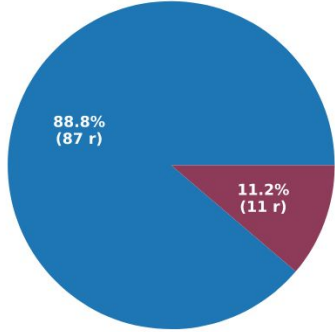


If the entire public service emitted like the average LMD member, it would account for  $0.7 \pm 0.32 \text{tCO}_2\text{e}$  in the consumption-based footprint of each French citizen.

Today the public service accounts for  $\sim 1.4 \text{tCO}_2\text{e}$  in the average total footprint, which is about  $\sim 10\text{t}$ . The target for this total footprint in 2050 is  $2\text{t/inhab./year}$ , so the public service must significantly reduce its carbon emissions.

	[%]	[tCO2e]	[δtCO2e]
<b>Vie du laboratoire</b> (hébergement + achats fonctionnement + domicile/travail)	36,2	499 ± 217	
<b>Déplacements recherche</b> (missions + campagnes terrain)	32,9	454 ± 252	
<b>Moyens recherche</b> (achats instruments + clusters calcul)	31,1	430 ± 173	

# Missions



88% would like a

calculator to estimate and monitor their individual footprint

monpetitcarbone.fr/en/calculateur

### New travel

Travel name: EGU

Departure date: 5/22/2022 | Date of return to residence (not mandatory): 5/28/2022

Is the return route the same as the outward route?  Yes

Fill in the different sections of your travel here (only those associated with your outward route)

#### Section n°1

Transport mode: Plane

Departure location: Paris | Arrival location: Vienne

+ Add a section

Save

DISTANCE: 2 067 km | CARBON FOOTPRINT: 231 kgCO2e

Map showing route from Paris (1) to Vienne (2) through Luxembourg and Stuttgart.

⇒ 2022: awareness year - carbon footprint calculator (MonPetitCarbone) mandatory for the missions (pdf file generated by the calculator to be attached to the mission order).

to be voted!

# Missions

Why use MPC?

- Makes it easy to follow your Carbon footprint; history over several years.
- Interesting to quickly compare different travel options (train versus airplane).
- Easier for future computation of the LMD carbon footprint (individual data remain anonymous but a few people - the direction - can monitor the total footprint of LMD at anytime).

Examples for **round-trips** (don't forget to calculate both trips with MPC!):

Paris-New York = 2.0 tCO<sub>2</sub>e

Paris-Tokyo = 3.2 tCO<sub>2</sub>e

Paris-Sydney = 5.6 tCO<sub>2</sub>e

Paris-Toulouse = 0.38 tCO<sub>2</sub>e by air, 0.008 tCO<sub>2</sub>e by train (*caveat: MPC assumes TGV for all of France*).

Paris-Vienne = 0.46 tCO<sub>2</sub>e by air, 0.08 tCO<sub>2</sub>e by train.

*Note: equivalent tCO<sub>2</sub> computed from MPC are slightly lower (by ~25%) than that computed for the 2019 LMD budget (different assumptions).*

# Missions

⇒ **2023+:** Implementation of CO<sub>2</sub> reduction measures (still to be devised), **with some following ideas :**

- based on carbon footprints 2019/2021 + MonPetitCarbone 2022 data
- CO<sub>2</sub> emission budget / long haul flight limits?
- individual / team / staff-category allocations?
- progressive trajectory to 2030
- carry-over credits from year to year

# Missions

How to reduce the carbon footprint of the Missions part? **Some ideas**

- If travel by train < 5h is available, then plane becomes the exception.

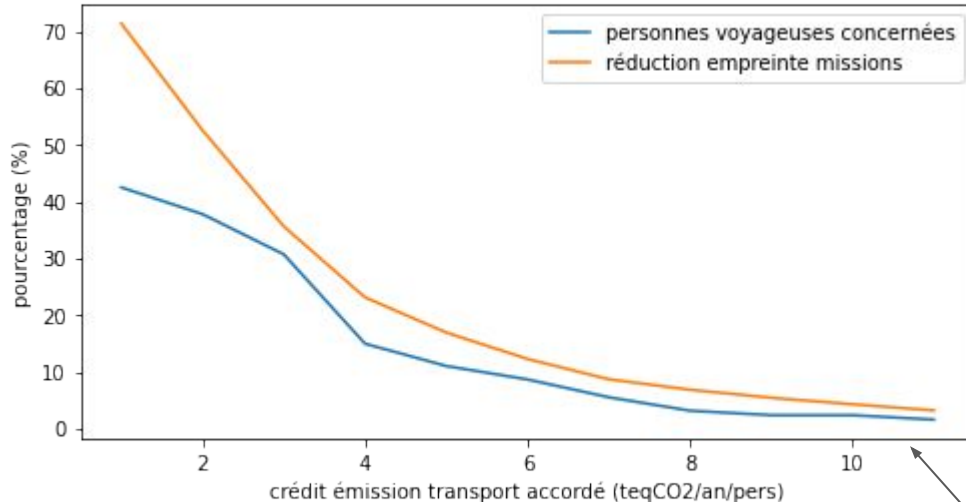
## From the 2019 Carbon Footprint:

- Represents 57 travels by plane for 42 persons (2019) = 34% of all travels by plane
- If train instead of plane:
  - Reduction of 16 tCO<sub>2</sub>e (**6 % of Missions emissions**)

# Missions

How to reduce the carbon footprint of the Missions part? **Some ideas**

- If travel by train < 5h available, then plane becomes the exception
- Individual emission budget (B) for missions



Calcul & Figure: A. Spiga

**From the 2019 Carbon Footprint:**

- Budget limit >2 tCO<sub>2</sub>e/an/pers → ~40% people impacted for **-50%** of travel emission.
  - Gives a rough idea of how we could “brutally” reduce by 50% the mission carbon footprint...!!
- **B = 4 tCO<sub>2</sub>e/an/pers** → 15% people impacted for **-25%** of travel emissions
  - More acceptable for short term?

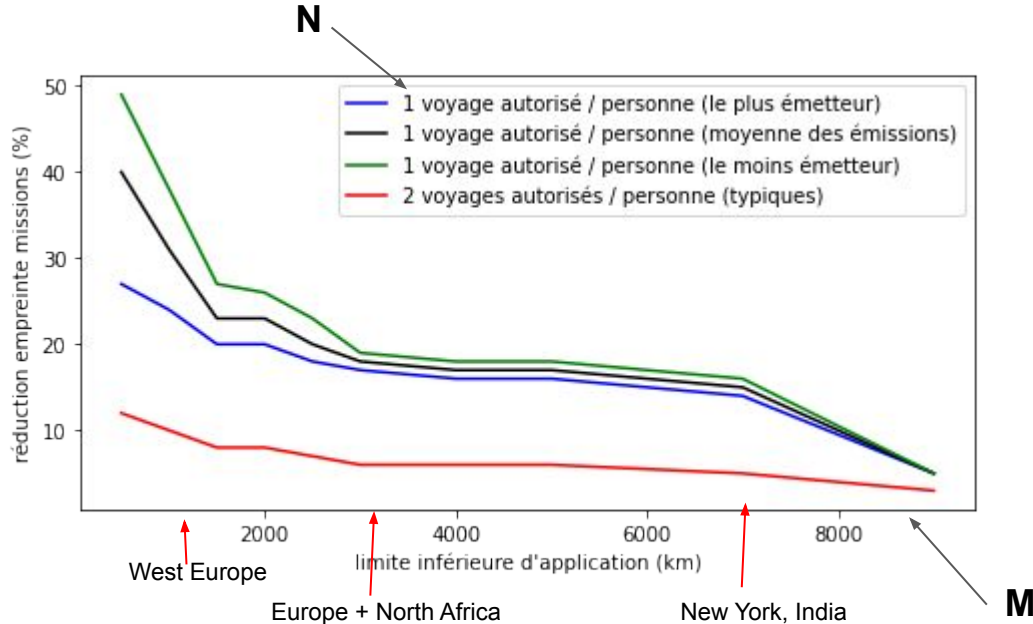
**B**



# Missions

How to reduce the carbon footprint of the Missions part? **Some ideas**

- If travel by train < 5h available, then plane becomes the exception
- Individual emission budget for missions
- Allowing only  $N$  travels >  $M$  kms per year (*define  $N$  and  $M$* )



**From the 2019 Carbon Footprint:**

- Limiting only one ( $N=1$ ) annual flight per person outside of Europe and the Mediterranean basin ( $M=2000$  km)  
→ -25% mission footprint (for 15 travellers)
- Limiting only one ( $N=1$ ) annual flight per person over 500 km ( $M=500$ km)  
→ -40% mission footprint
- Limiting to two ( $N=2$ ) annual flights per person  
→ -10% of the mission footprint, and concerns about 5 people in 2019.

Calcul & Figure: A. Spiga

# Missions

- Reminder of the government circular (13/11/2020): obligation to travel by train in France if the trip is < 3h by train.

to be voted !

**⇒ First step : Vote to make air travel exceptional in continental France? Extend this exceptional nature to Europe for trips < 5h by train?**

- Under discussion:
  - Allow long trips (e.g. night trains), to be incorporated in missions policy to come. At the moment, not accepted by management if the transport adds an overnight stay to the mission (legal liability).
  - Facilitate first class by train, with a standardized letter from the direction/a charter
  - Discussing emission budgets and travel limits with the teams

Best way to reduce carbon footprint will be to **join** actions and limits, along with discussions, internal communication and involvement of all.

# Purchases

## Purchasing Charter:

(under development, to be discussed and voted)

- > 25/40k€: 5-10% environmental / social requirements in the tender
- > 5k€: suggest carbon footprint/Life Cycle Analysis in addition to the 3 quotes
- < 5k€:
  - i. if going through France-Lise Robin: encourage responsible purchasing (e.g. green logo on UGAP) in agreement with the credit holder
  - ii. if using MatInfo (computer equipment): little room for manoeuvre, but possible personal adjustments (size of computer, reparability index, etc.)
  - iii. if using the Purchasing Card : raising awareness among cardholders

# Purchases

- Discussions to be held with instrument managers on the life cycle and data sharing
- Going outside the market for an ESAT (Établissement et Service d'Aide par le Travail) for part of the office supplies: under progress for SU / X / CNRS purchases
- Caterers: list of responsible caterers ; environmental criteria to be addressed when requesting a quote (example below)

Objet

Demande de devis Traiteur

Votre message

Nous souhaitons une prestation à faible impact environnemental donc nous avons les questions supplémentaires suivantes :

- les produits travaillés sont-ils d'origine responsable ? (par exemple : produits frais, de saison, issus de l'agriculture biologique ou d'une démarche agro-écologique, circuits courts, ...)
- les prestations proposées permettraient-elles une part de 50 % végétarien minimum ? (proportion à discuter)
- une prestation sans plastique/limitant les déchets est-elle envisageable ?
- quelle serait la prise en charge des restes alimentaires en fin de journée ?

En vous remerciant grandement pour votre temps, veuillez agréer mes sincères salutations.

En utilisant ce formulaire, vous acceptez le stockage et le traitement de vos données par ce site.

ENVOYER

# Digital

## Reminder of the orders of magnitude for the digital:

- **90% for High Performance Computing** (HPC - 45Mh computing time  $\approx$  167 tCO<sub>2</sub>e in 2019)
- **4 tCO<sub>2</sub>e/Mh** of computing, of which ~36% for manufacturing, ~7% for storage

## Areas of work:

- Act at IPSL scale (Working Group on Digital in IPSL-Climactions)
- Seminars on the digital technology footprint, and on algorithm optimizing/efficiency
- ⇒ **see IPSL Climactions Week !** (*especially Wed 29/06 and Thur 30/06*)
- GENCI/Labos1point5 discussions for a footprint provided by the computing centres
- Life cycle: discussions with J. Lenseigne, responsible practices already existing (eco-info audit?)
- A labelling was considered but eventually discarded (Label NR, <https://label-nr.fr/>)

# How to sustain the transition?

Since 2019, LMD-Climactions has involved up to 5-10% of the staff, mainly from Jussieu. Main actions :

- *assessment and analysis of the LMD Carbon Footprint for the year 2019 + poster*
- *an opinion survey performed on 50% of the lab staff in 2021*
- *the making of propositions for the LMD Climate Plan (presented today)*
- *regular discussions with the management and tutelles + information and feedback gathering from all the staff*
- *representation of the LMD in higher-scale environmental committees (IPSL-Climactions, SU-labs group for Environmental Issue “Réfèrent.EE.s”, Labos1point5 =  $\frac{1}{3}$  of the French labs to decrease their impact on the environment)...*

Now, we advocate for a **change of approach**, in line with every labs highly involved in emissions reduction among Labos1point5, that would be more representative, efficient and sustainable.

**⇒ Creation of a “Commission for Transition”, with representatives of each team, the management, and volunteers, to carry on the work done by LMD-Climactions?**

**⇒ Do we want the LMD to adopt a policy to reduce its Greenhouse Gases emissions? Goal -50% 2030, ensures continuity despite changes of management.**

# What to come?

- Today: discussions with you all !
- Within a few weeks: writing of charters and electronic vote on propositions
  - 1) Making mandatory to use the carbon footprint calculator **MonPetitCarbone** for all missions?
  - 2) Making air travel an exception in continental France, and extend this exceptional nature to Europe for trips < 5h by train?
  - 3) Buying 1st class train seats instead of 2nd class to improve travel comfort and encourage taking the train?
  - 4) Adding 5-10% of environmental / social requirements in big tenders?
  - 5) Asking for facultative LCA/carbon footprint/environmental criteria for purchases >5k€ and caterer quotes
  - 6) Committing the LMD to sustainably reduce its GHG emissions and to reach -50% in 2030 compared to 2019?
  - 7) Creating a “Commission for Transition”, with representatives of each team, the administration, and volunteers, to carry on LMD-Climactions work?

*Missions  
Charter*

*Purchases  
Charter*

*General  
Policy*

# What to come?

- 27/06 - 01/07: IPSL Climactions Week !

<https://climactions.ipsl.fr/evenements/semaine-climactions-27-juin-1er-juillet-2022/>

	Lundi 27/06	Mardi 28/06	Mercredi 29/06	Jeudi 30/06	Vendredi 01/07
9h00	<b>Petit déjeuner d'accueil</b> 9h-10h Jussieu	<b>Petit déjeuner d'accueil</b> 9h-10h Guyancourt	<b>Petit déjeuner d'accueil</b> 9h-10h Saclay		
10h00		<b>Prestation Café – Groupe de Réflexion Éthique</b> 9h30-10h30 Jussieu (salle IPSL 201)			
11h00	<b>Atelier « Écriture sur le Changement Climatique »</b> Mathieu Simonet  - 20 participants sur place - 10h30-12h30 Jussieu (Amphi Astier) & en visio	<b>Séminaire « Stratégies de Modélisation Climatique : entre Normes Stratégiques et Valeurs Sociales »</b> Julie Jobeille 11h-12h30 En visio	<b>Séminaire « Empreinte Environnementale du Numérique »</b> Emmanuelle Frenoux 11h-12h30 Guyancourt & en visio	<b>Séminaire « Efficacité du Numérique et Optimisation d'Algorithmes »</b> François Trahay 10h-11h30 Saclay & en visio	<b>Séminaire « Time for the Planet : la Science au Service d'une Société à Mission »</b> Philippe Drobniski 11h-12h30 Palaiseau & en visio
12h00			<b>Pique-Nique Eco-Friendly</b>  12h30-14h Jussieu	<b>Atelier « ClimaRisQ » (déjeuner à prévoir)</b> 12h-14h Jussieu (Amphi Charpak)	<b>Pique-Nique Eco-Friendly</b> 12h-14h Guyancourt
13h00					
14h00	<b>Atelier « Inventons nos Vies Bas-Carbone »</b>  - 24 participants -  14h-17h Jussieu (L'OCEAN)	<b>Atelier « Inventons nos Vies Bas-Carbone »</b> - 12 participants - 14h30-16h Guyancourt	<b>Escape Game (*)</b>  14h-17h Saclay	<b>Atelier « ClimaTicTac » (*)</b> François Dulac  14h-15h30 Jussieu	<b>Séminaire Groupe de Réflexion Éthique « Science Engagée et Engagement au Nom de la Science : une Perspective Historique »</b> Sylvain Laurens 14h-15h30 Saclay & en visio
15h00					<b>Atelier « Ma Terre en 180' »</b>  14h-16h Jussieu
16h00			<b>Séminaire « Décarbonation de la Recherche : Compromis entre Dépenses, Production et Emissions de CO<sub>2</sub> »</b> Olivier Aumont & Xavier Capet 16h-17h30 Jussieu & en visio		
17h00				<b>Projection-Débat « Alors, tu trouves ? » (*)</b> Hugo & Léo Dayan  17h-19h Jussieu (Amphi Charpak)	
18h00	<b>Séminaire « Parlons Climat – Des Connaissances pour Agir, des Obstacles à Surmonter »</b> Valérie Masson-Delmotte  18h-20h Jussieu (Salle RC27) & en visio				
19h00					
20h00					

- 20/10: IPSL-Climactions General Assembly

(common Carbon Footprint methodology and results, discussions and seminars...)





# LMD-Climaction

**thanks you for your interest in this presentation.**

**Your participation is essential to develop an environmental strategy for the whole LMD that is both ambitious and respectful of our work.**

# Appendix :

★ Contact list of LMD-Climaction active members is shown on :

<https://climactions.ipsl.fr/groupes-de-travail/lmd-climactions/>

★ The results slides from the opinion survey from April 2021 are in the following file (*in French*) :

*2021\_04\_14\_AG\_LMD\_Sondage.pdf*

★ Reminder of the 2019 carbon footprint methodology (more information - *in French too* - in the file *Methodologie\_bilan\_carbone\_2019\_du\_LMD.pdf*) :

- Hosting (SU / X / ENS): pro rata in staff and surface of the hosts carbon footprints, for *bâtiments et énergie* (scopes 1&2) and *achats et services* (scope 3)
- Commuting: usage of results of a survey (65% of responses) processed by GES1.5 and extrapolated
- Missions: anonymised GESLAB extraction for CNRS+SU missions, extrapolated for X et ENS
- Field campaigns: scoring of campaigns, and evaluation with commissioned institutes or through carbon footprints done by the campaign managers
- Computing clusters: clocking of computing hours, conversion into electrical kWh (GENCI+eco-info) and conversion into CO<sub>2</sub>e (ADEME and eco-info emission factors)
- Purchases: emission factors (ADEME, CEDA) relative to NACRES codes and sectorial extrapolation for purchases with missing factors

# To go further

- Would you like to be made aware of/trained on specific subjects?
- Would it be interesting to encourage environmental footprint estimations in funding applications?
- With unlimited resources (*allocated hours, storage, simulation speed*), should we restrict ourselves on HPC?
- Should we reach for more equality in the missions?
- Is the improvement of instrumental/modelling data sharing possible / desirable?
- How can we reconcile environmental ethics and academic freedom?
- Is our research resilient to upcoming crises?

50% of emissions induced by 14% of the traveling staff

