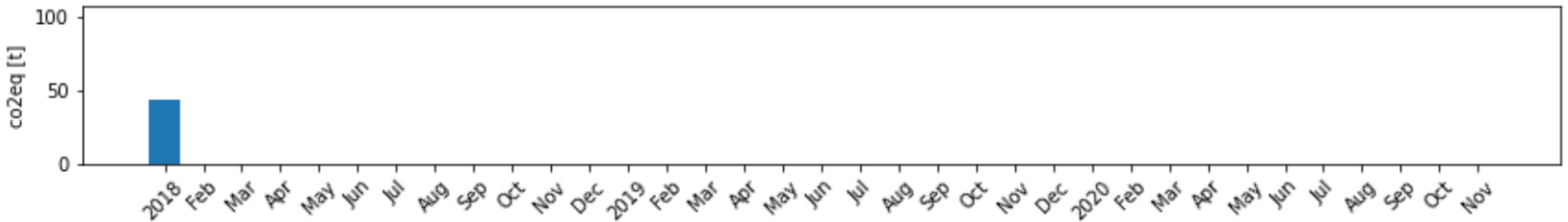
An assessment of MPIA's travel activities

2018-2020



MAX PLANCK SUSTAINABILITY NETWORK

Sustainability@MPIA

We are just a bunch of people interested in sustainability
Please join us…

SustainabiliTea meetings Fridays 11:30am on Titan

Sustainability

→ **Nachhaltigkeit:**

Umweltverträglicheit,
Regenerationsfähigkeit,
Zukunftsfähigkeit,
Generationengerechtigkeit,
….

Die Erde:

Von nah ….

und fern ...

Erdaufgang von Mondoberfläche; Apollo 8, 24.12.1968; Astronaut William Anders

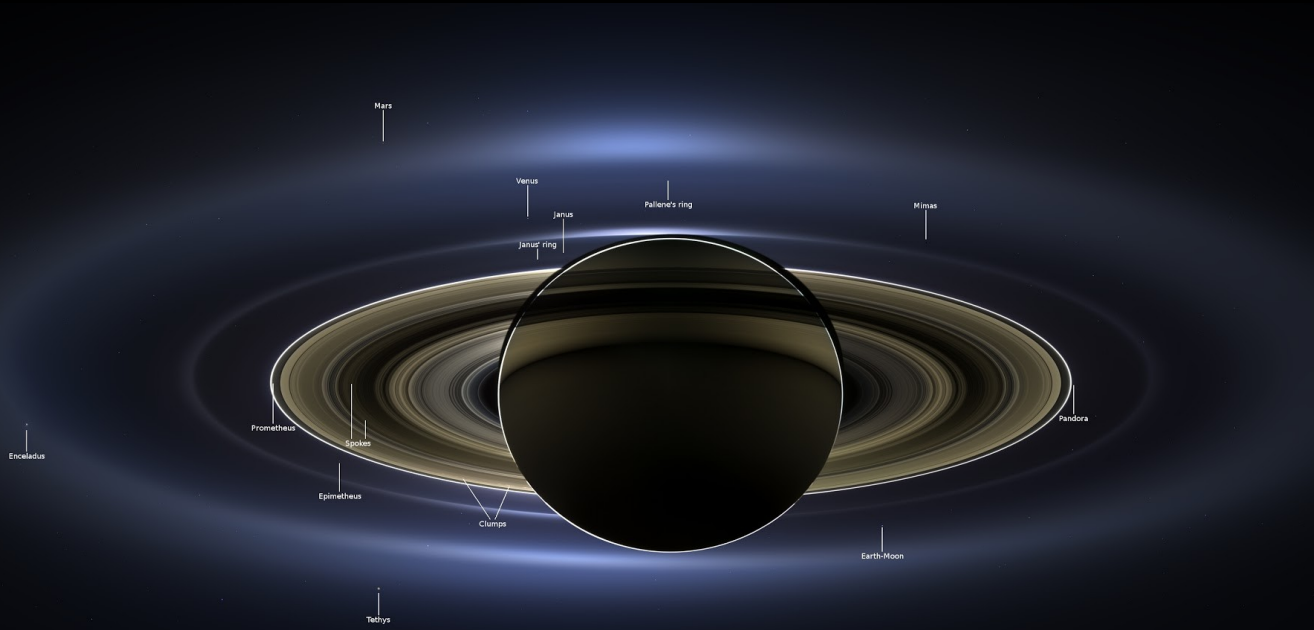
Erde vom Mond; 11.12.1972 (editiert)

The “Pale Blue Dot”

Raumsonde Voyager 1 (1990):
Erde aus etwa 6 Mrd km
= 40,5 AE

Fernstes Bild der Erde
(immer noch)

(Vorschlag v. Carl Sagan)



“The Day the Earth smiled”; Aufnahme v. Cassini-Huygens, 13.7. 2013

“The Day the Earth smiled”; Aufnahme v. Cassini-Huygens, 13.7. 2013

Die Erde vom Space Shuttle:
Krümmung,
Kontinente,
Meere,
Wolken ….

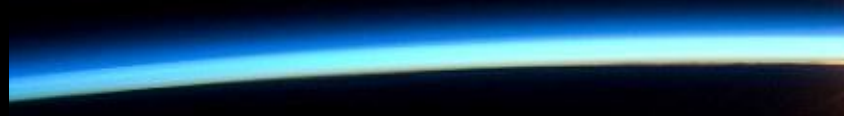
Die Erde vom Space Shuttle:

Die Atmosphäre !!!

Die Erde vom Space Shuttle:

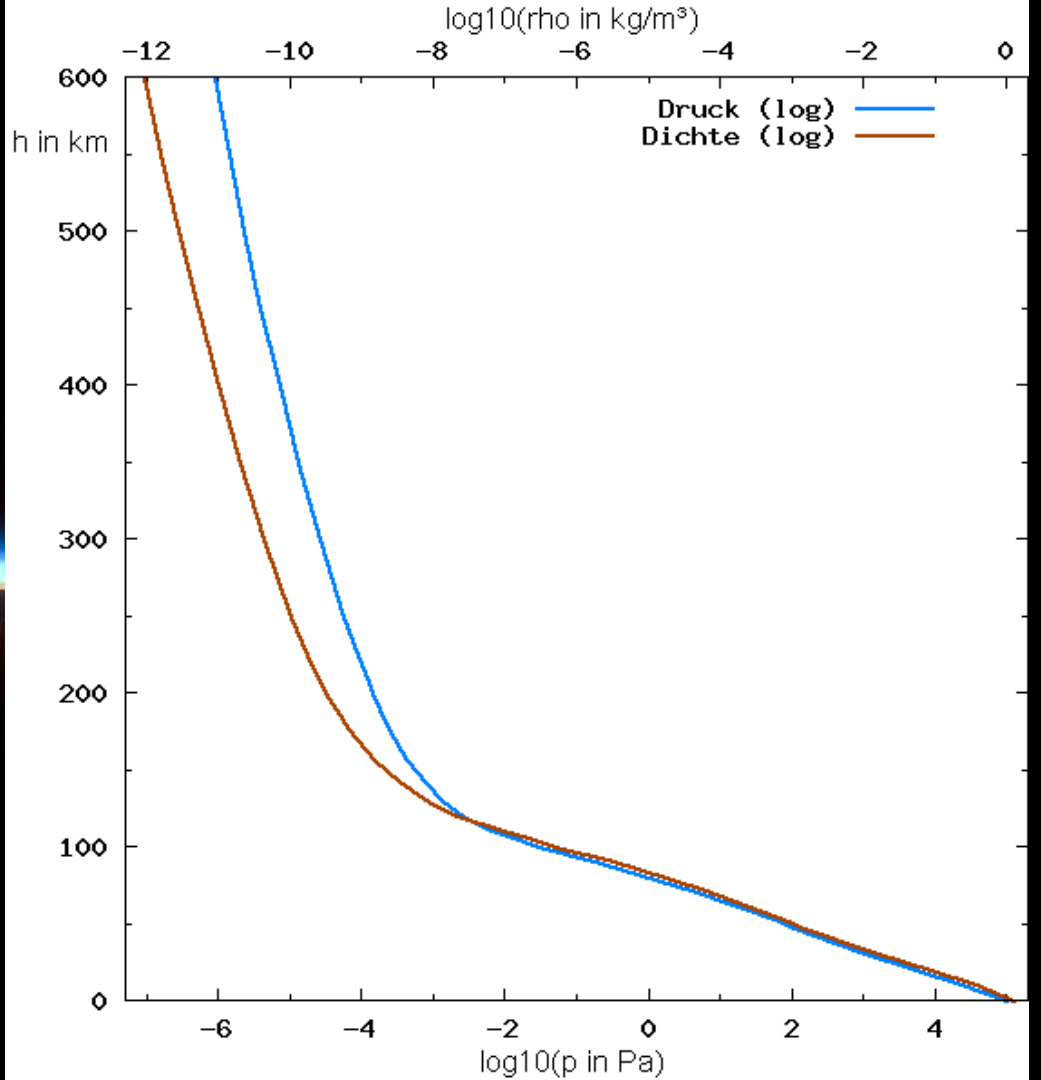
Die Atmosphäre !!!

78% Stickstoff, 21% Sauerstoff
…
“Treibhausgase”:
Wasserdampf, Kohlendioxid CO2



“Untere Atmosphäre”: bis 15 km
→ Leben !!!

Luftmasse: 5 x 10^19 kg
Wassermasse: 10^21 kg
Erdmasse: 6 x 10^24kg



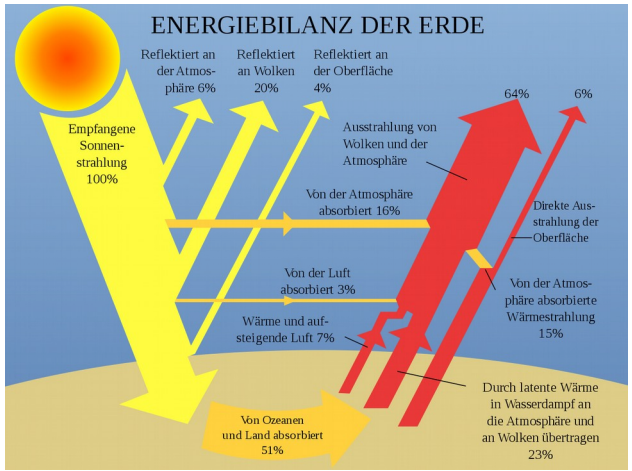
Treibhauseffekt

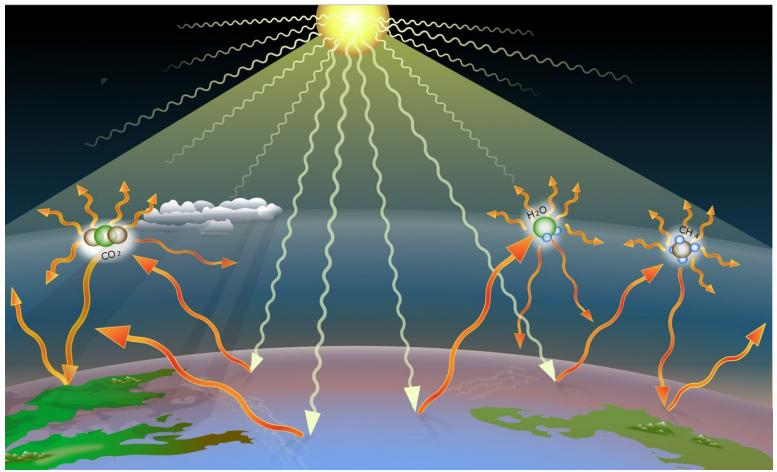
→ stört gegenwärtigen Wärmehaushalt der Erdatmosphäre

→ **Treibhausgase:** Wasserdampf,

Kohlendioxid aus Verbrennung fossiler Brennstoffe

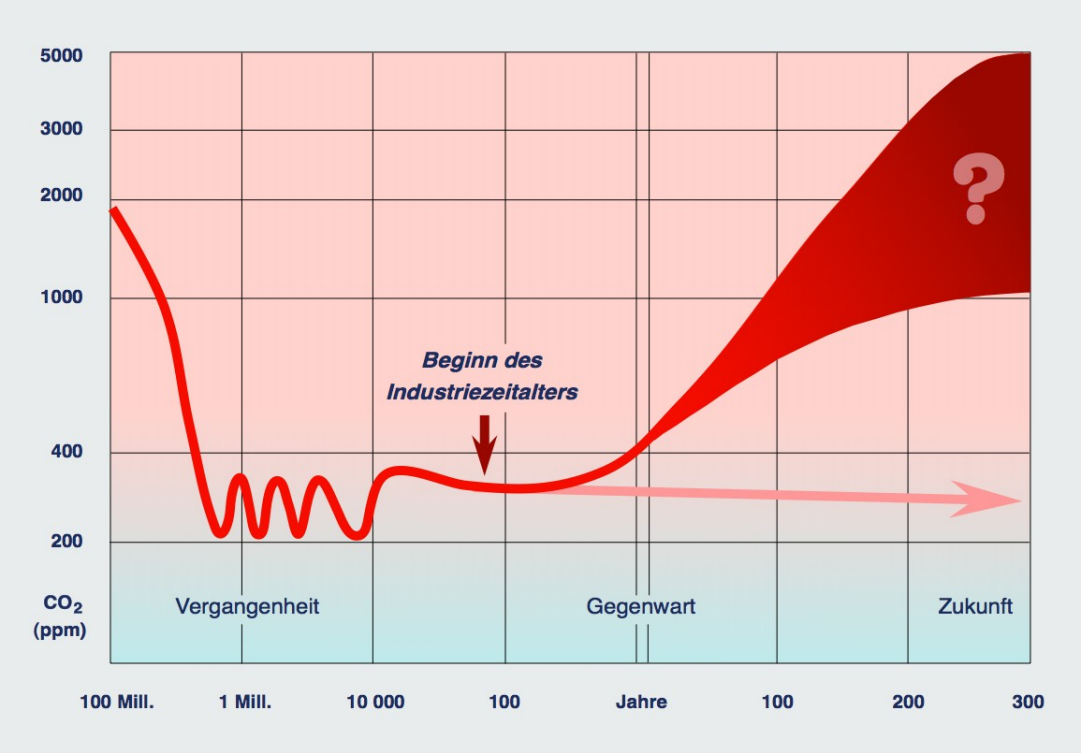
verhindern Abstrahlung zugeführter Sonneneinstrahlung → **Aufheizung**





Treibhauseffekt

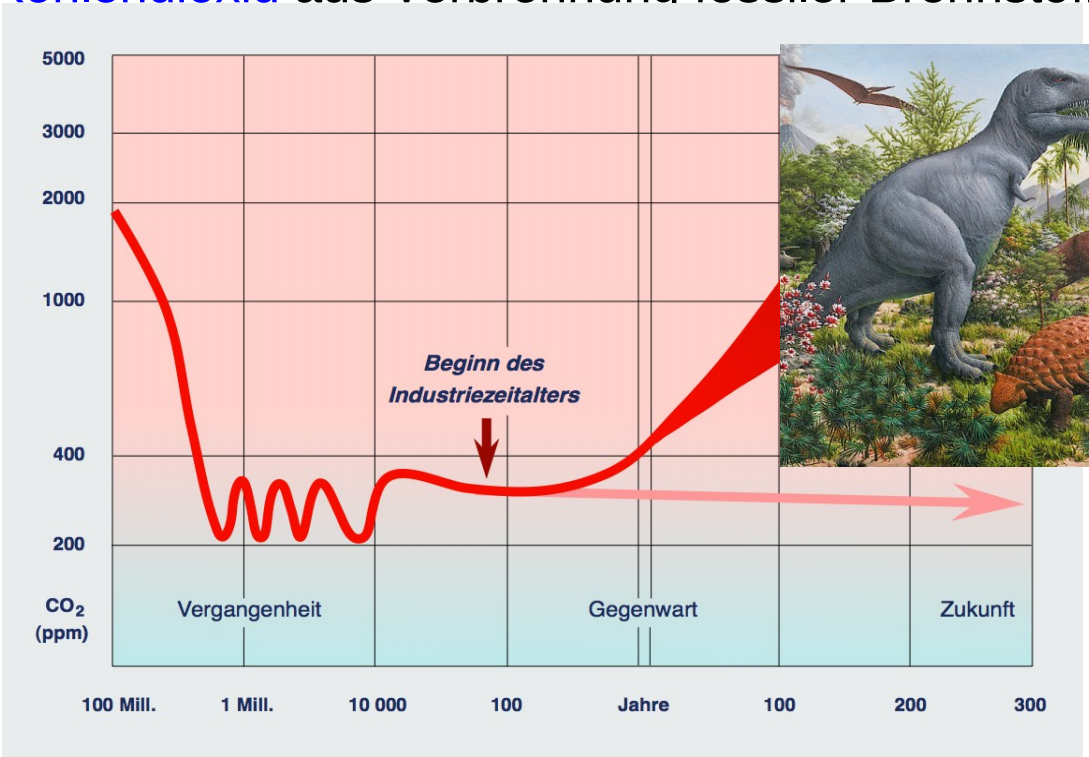
Kohlendioxid aus Verbrennung fossiler Brennstoffe



Zeitskala nicht linear ….

Treibhauseffekt

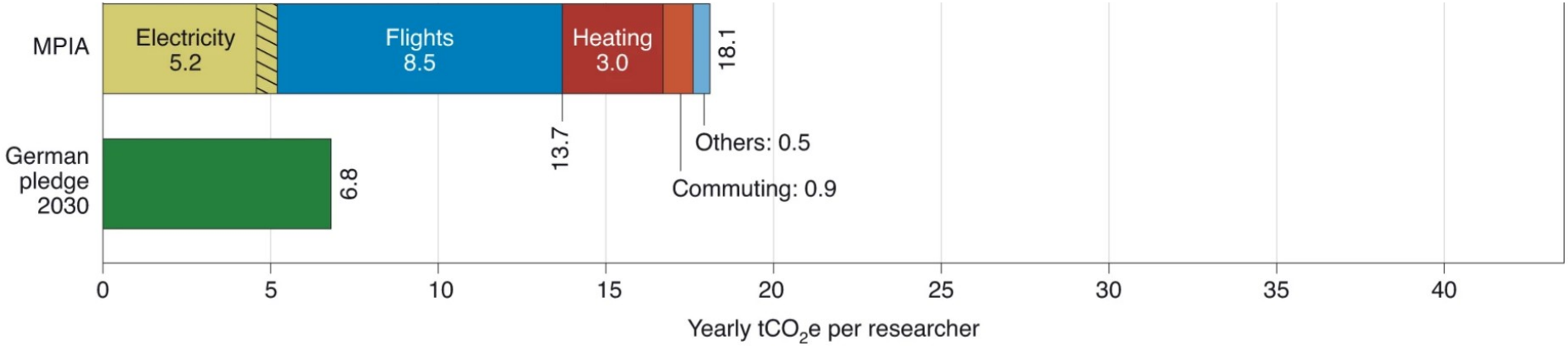
Kohlendioxid aus Verbrennung fossiler Brennstoffe



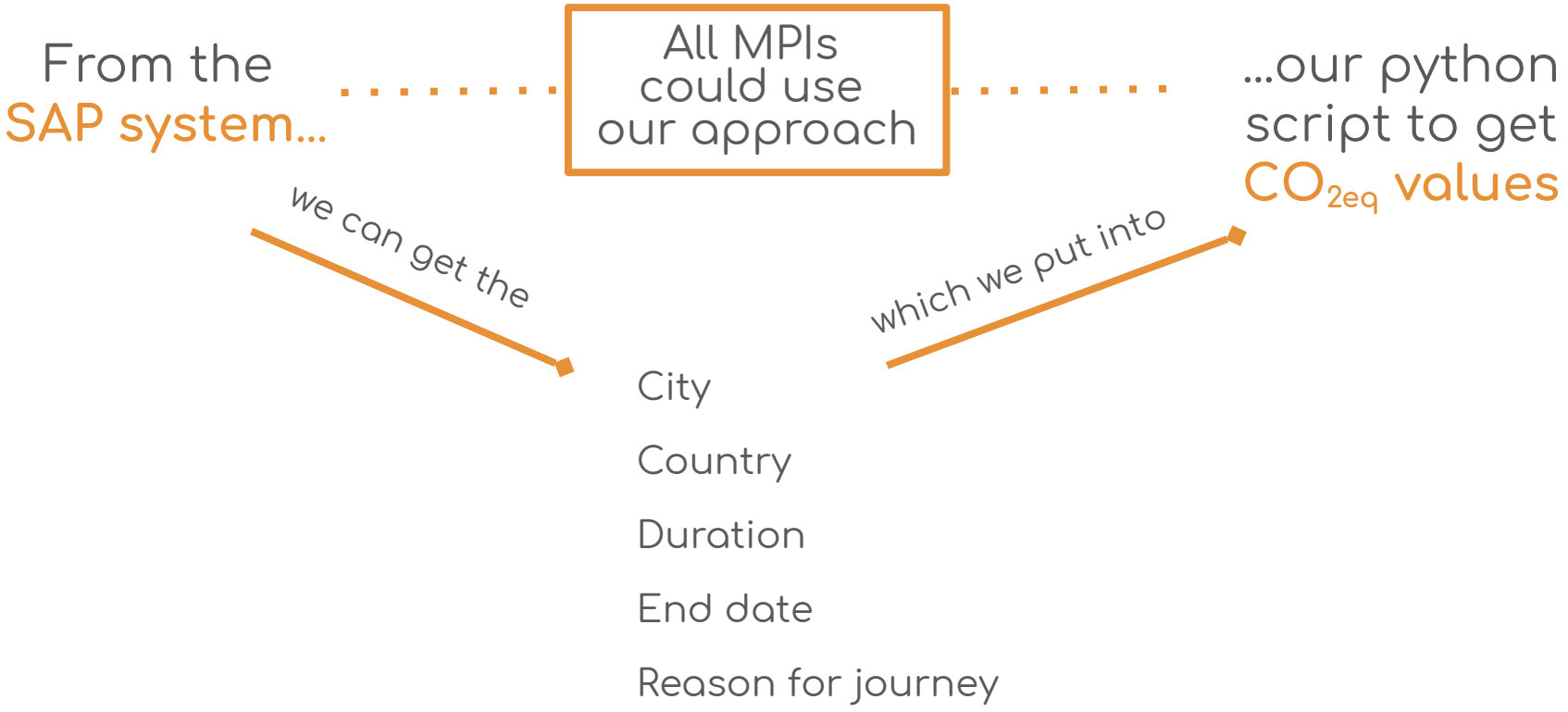
Zeitskala nicht linear ….

How about astronomy? How about MPIA?

→ Flying first , computing second



How do we get our data?



How do we get our data?

From the SAP system...

All MPIs could use our approach

...our python script to get CO_{2eq} values

we can get the

which we put into

City

Country

Duration

End date

Reason for journey

took the longest travel:
'Leiden und Boston, NL' → 'Boston, US'

misspellings:
'Noordwyjk, NL' → 'Noordwijk, NL'

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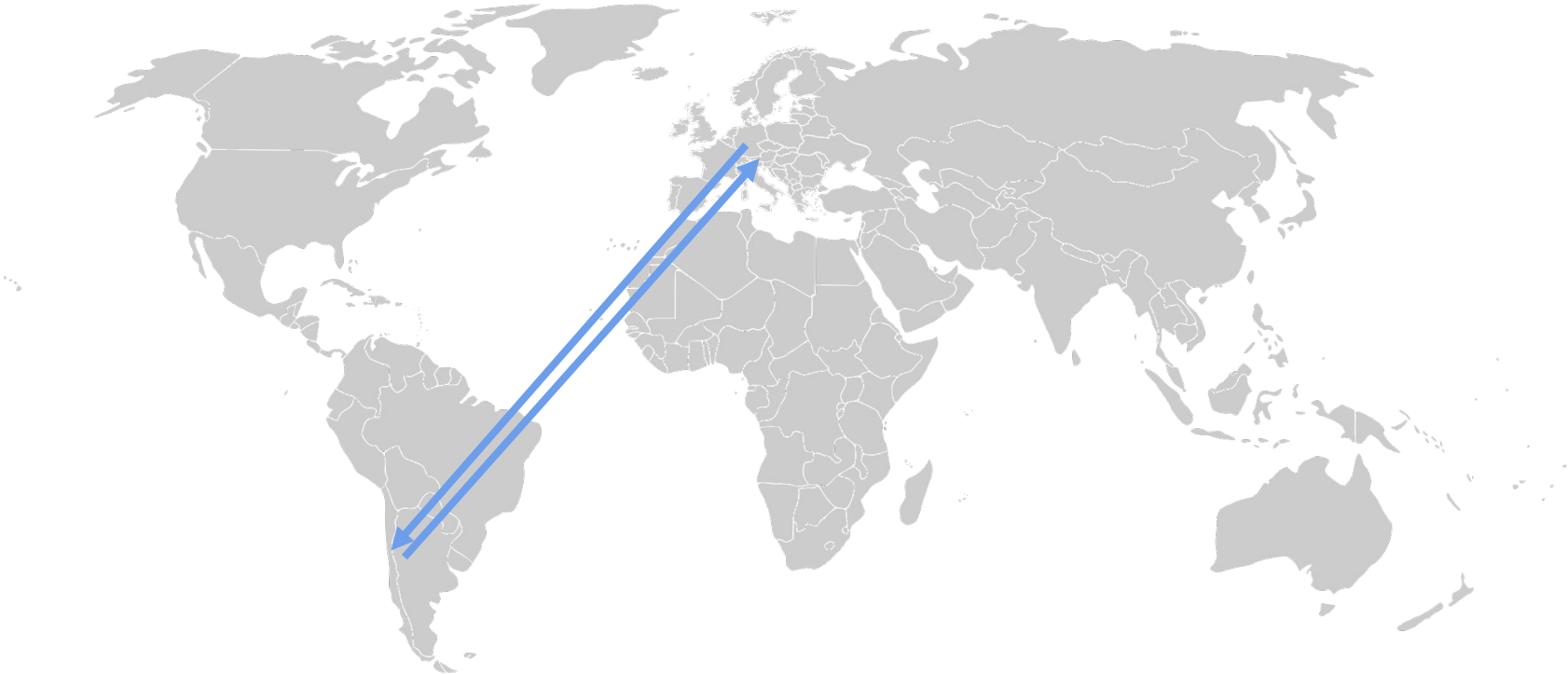
classified this manually
Collaboration
Conference
Commissioning
Observation
Other

Assumptions

we draw a direct line on the globe

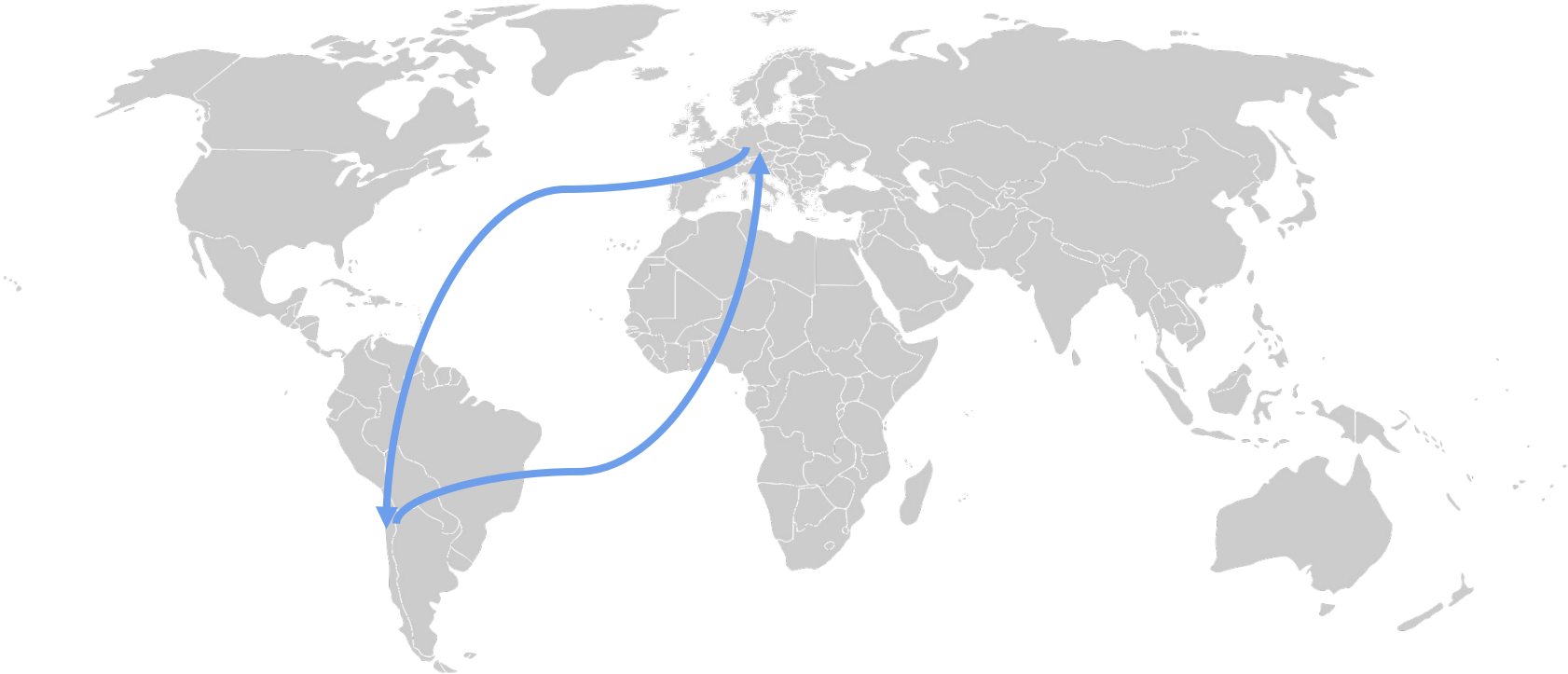
Assumptions

we draw a direct line on the globe → we assume return flight

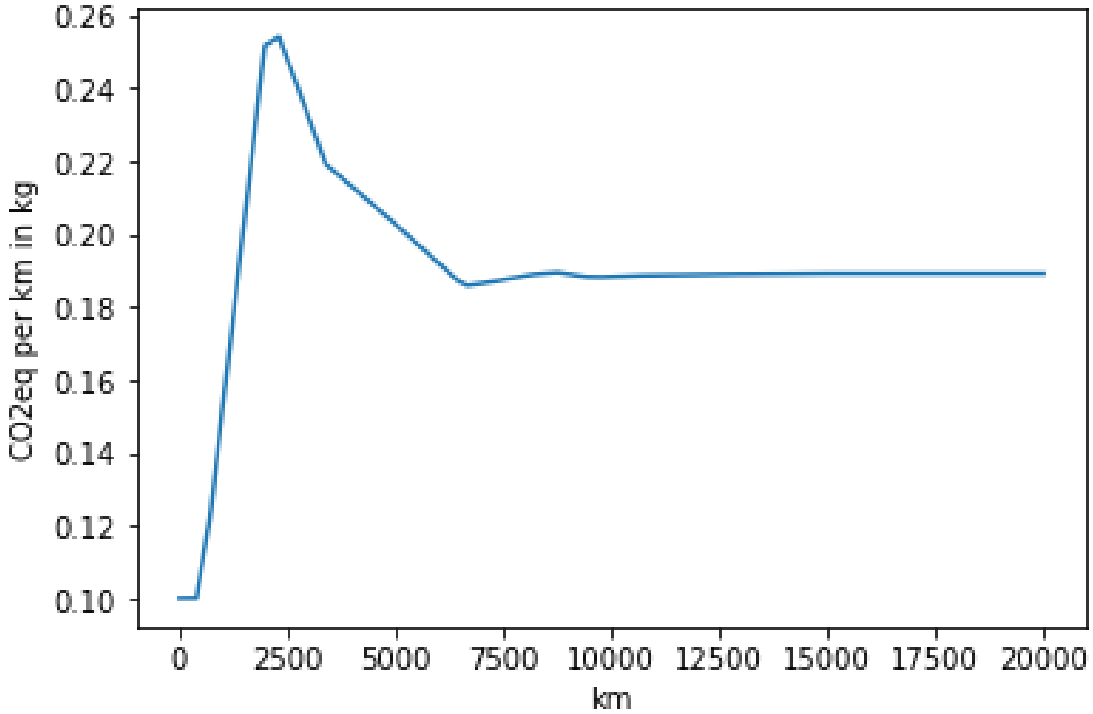


Assumptions

we draw a direct line on the globe → we assume return flight → we add 20%



Assumptions



< 500 km = no flights

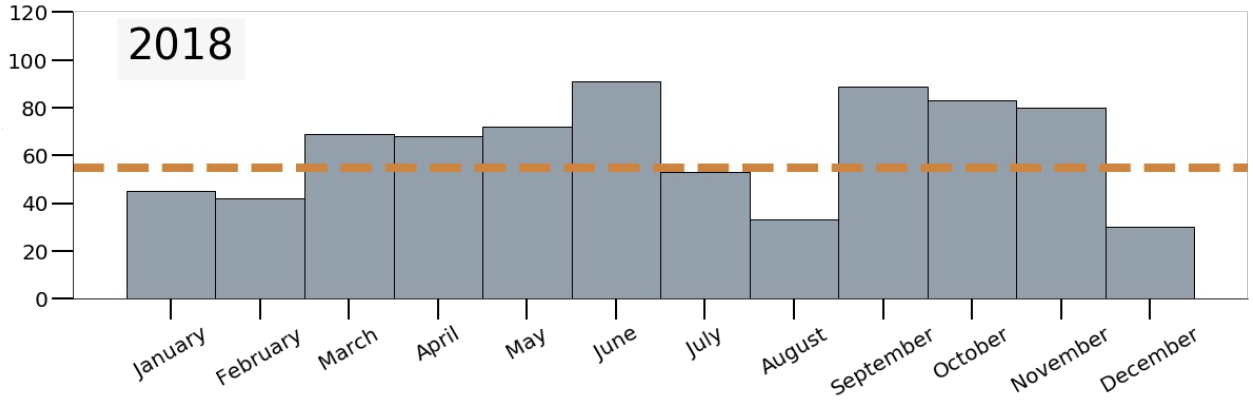
> 2000 km = 100% flights

We calculate
the **CO_{2eq}emissions** from:

travel-footprint-calculator.irap.omp.eu

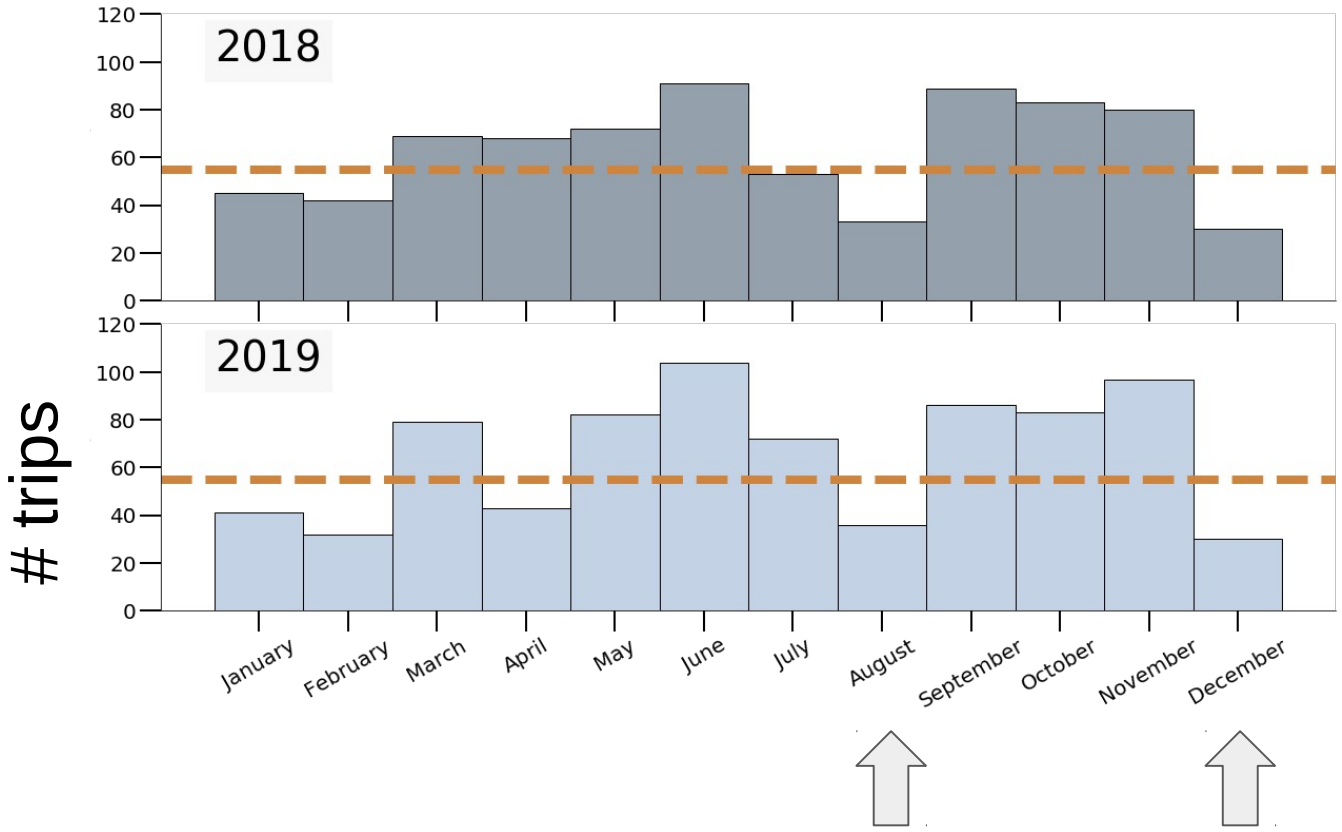
Note: CO2 equivalent (!!)
→ depends on energy mix

So how many trips did we take?



trips

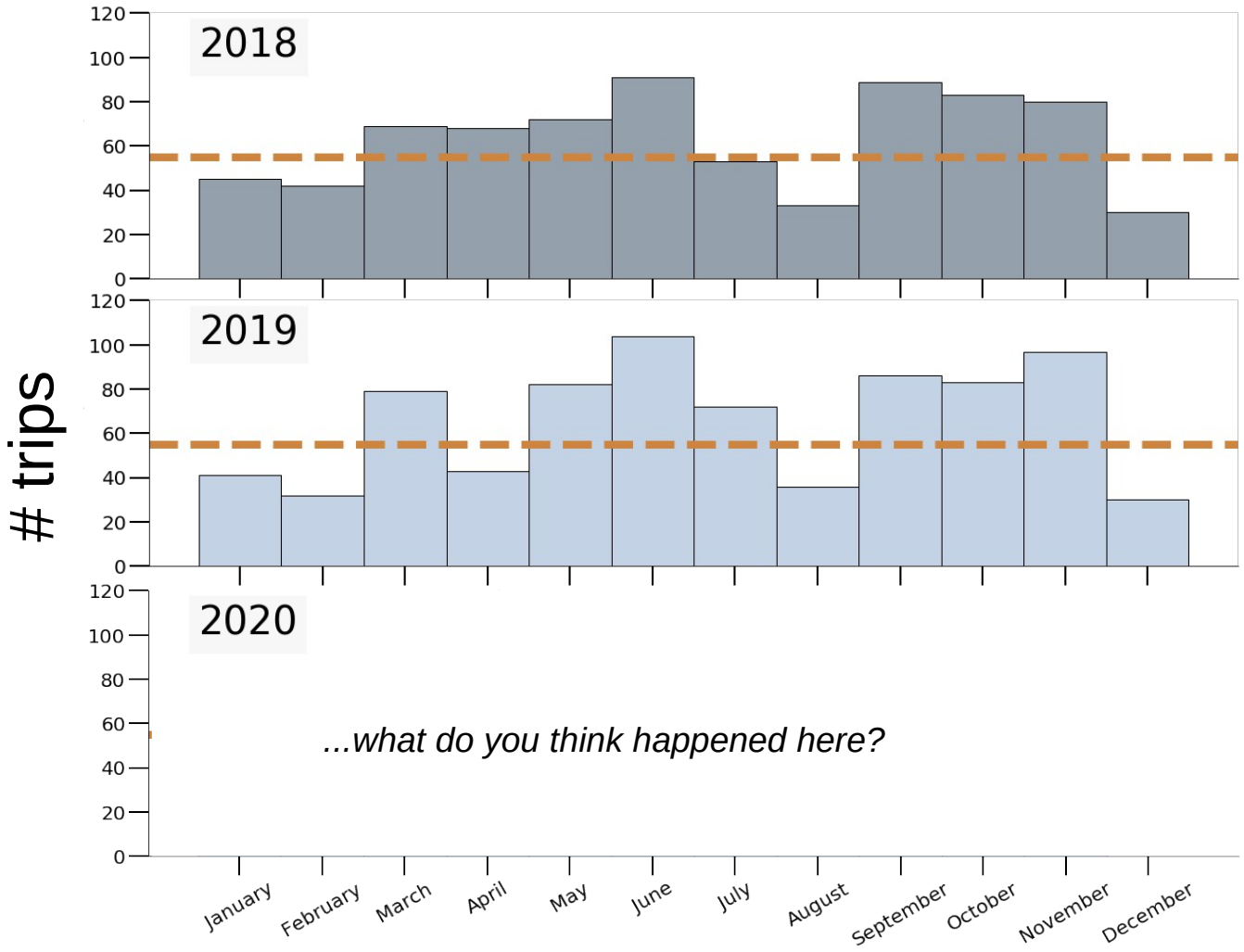
total #: 755
total CO2(t): 571
CO2(t)/travel: 0.8



total #: 755
total CO2(t): 571
CO2(t)/travel: 0.8

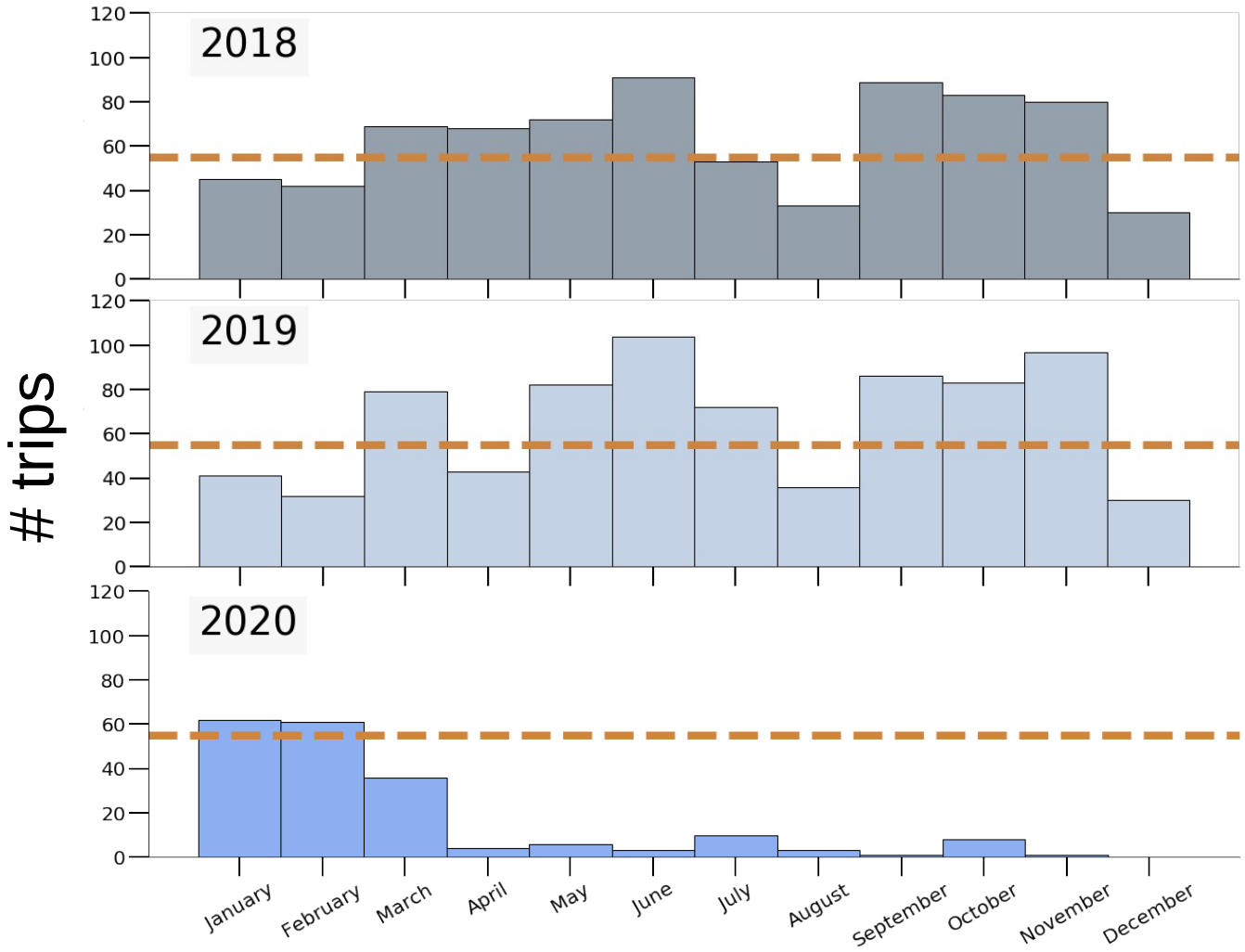
total #: 785
total CO2(t): 588
CO2(t)/travel: 0.7

when we take vacation



total #:	755
total CO2(t):	571
CO2(t)/travel:	0.8

total #:	785
total CO2(t):	588
CO2(t)/travel:	0.7



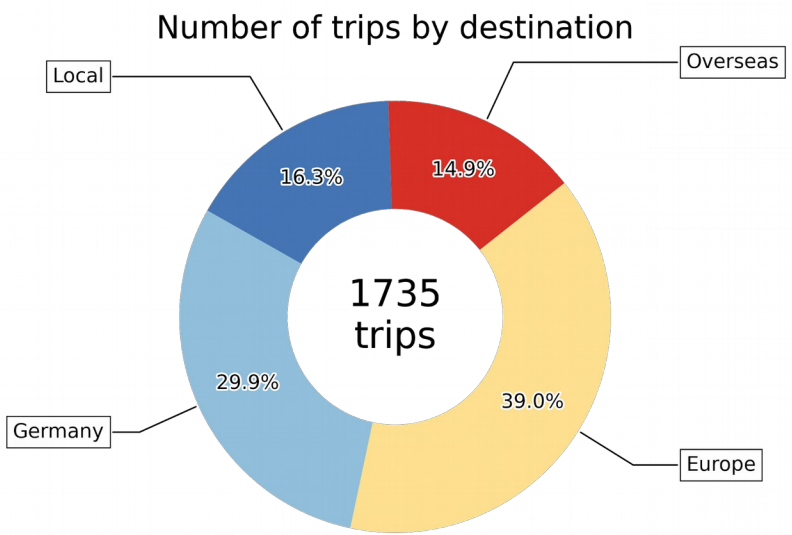
total #:	755
total CO2(t):	571
CO2(t)/travel:	0.8

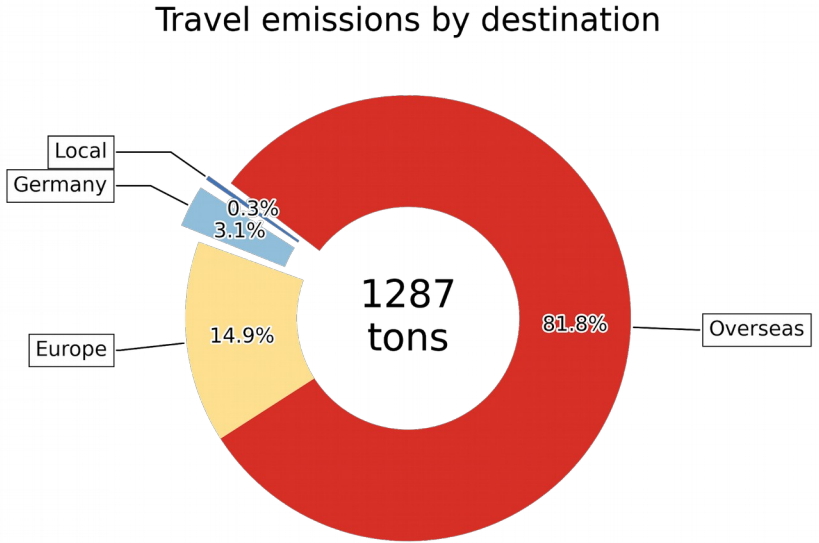
total #:	785
total CO2(t):	588
CO2(t)/travel:	0.7

total #:	195
total CO2(t):	127
CO2(t)/travel:	0.7

So where are we flying to?

Number of flights vs. CO_{2eq} emissions by destination

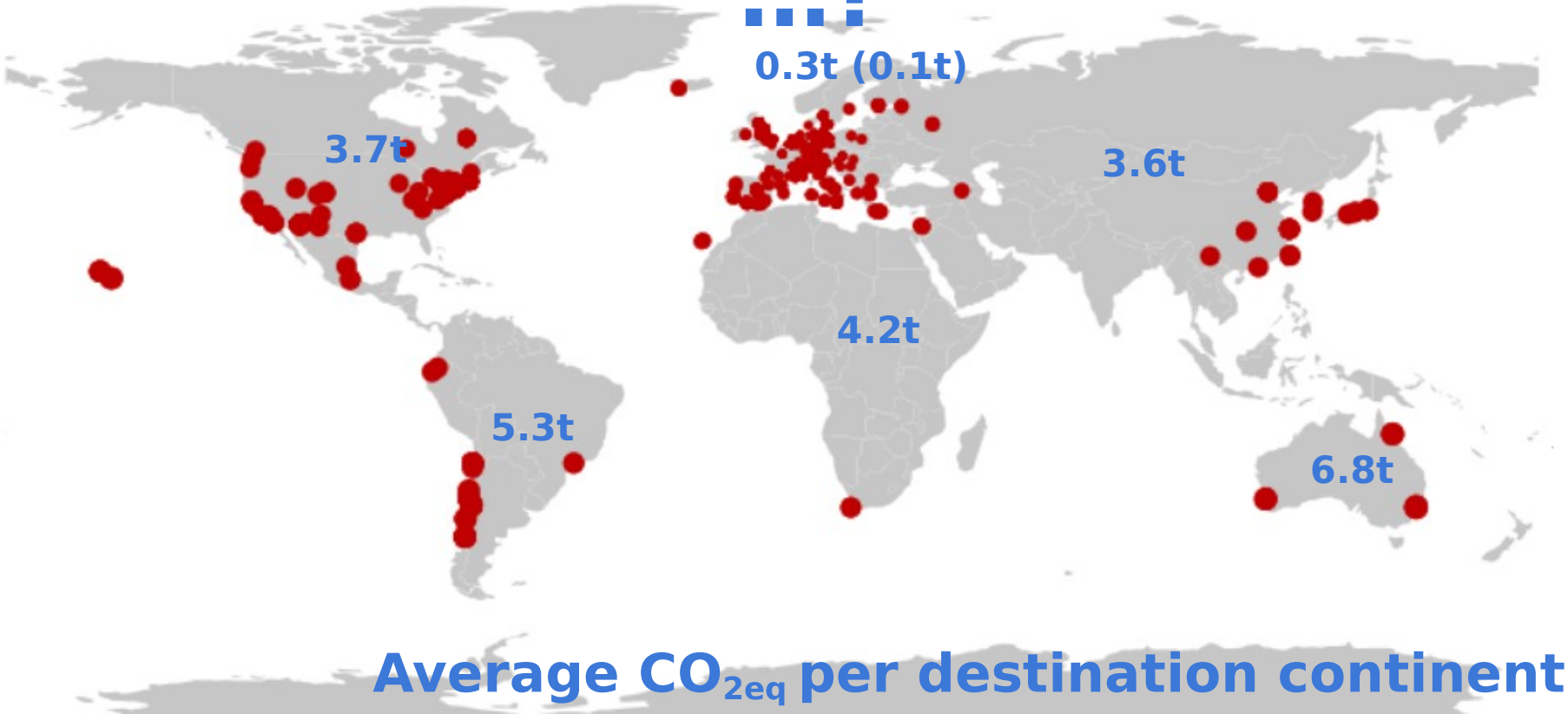




Overseas make up **15%** of trips **by number...**

...but **82%** of trips by CO_{2eq} **emissions.**

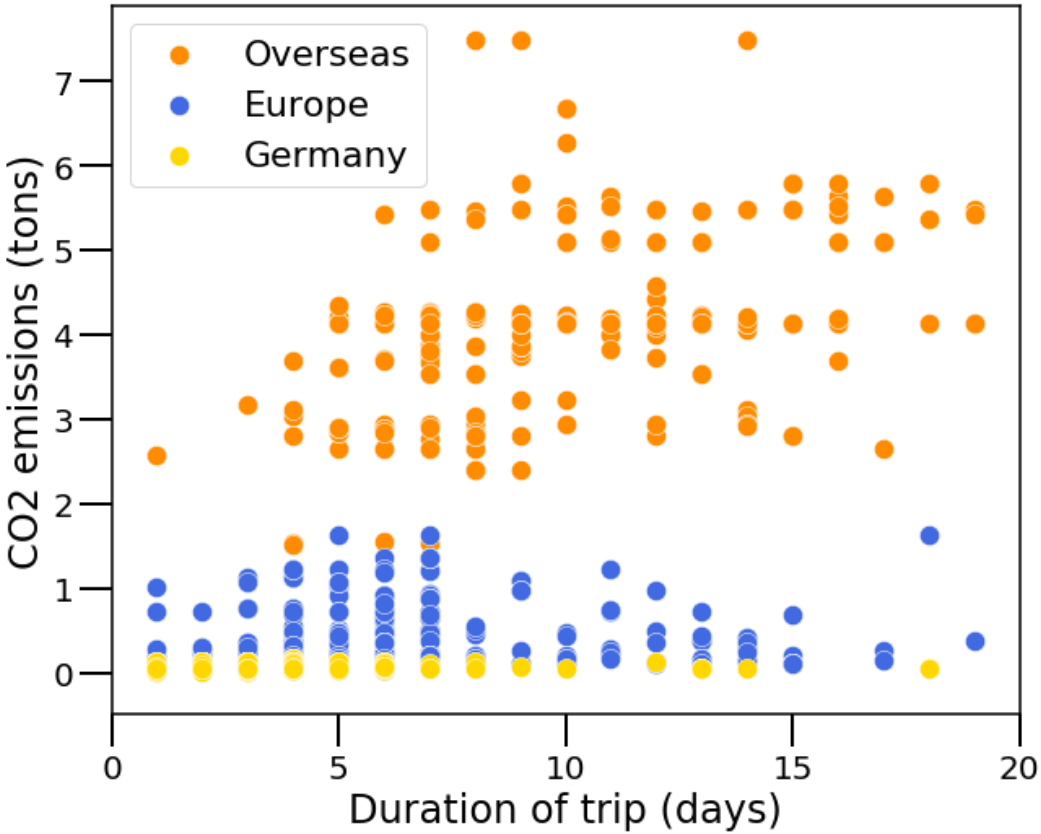
What if we want to travel to ...?



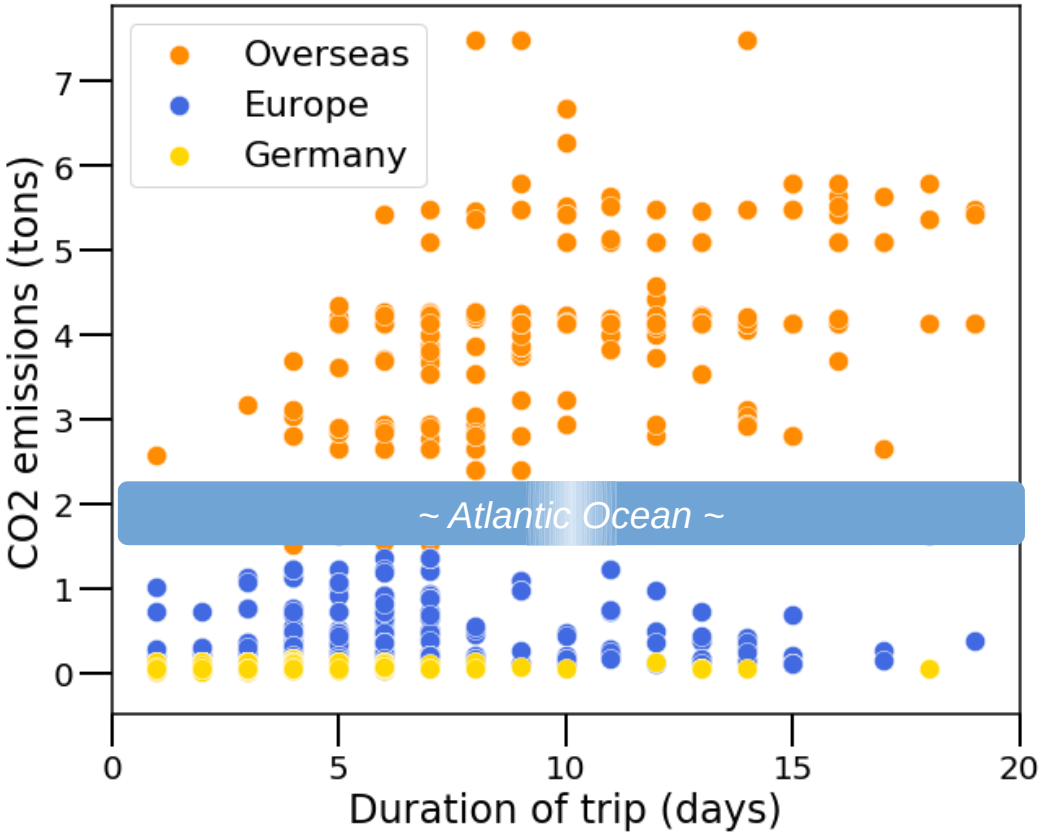
Average CO_{2eq} per destination continent

How long do we stay there?

CO_{2eq} emissions vs. duration of travel

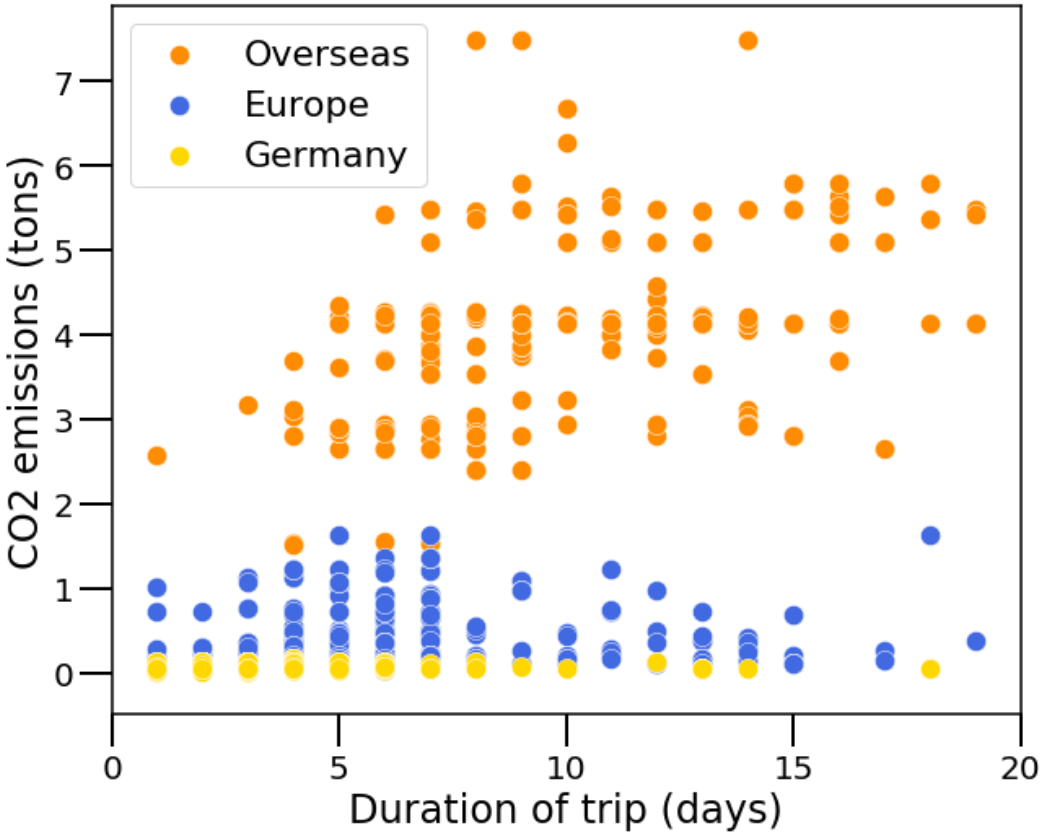


CO_{2eq} emissions vs. duration of travel



What are we doing, when flying overseas?

We are taking the same plot and...



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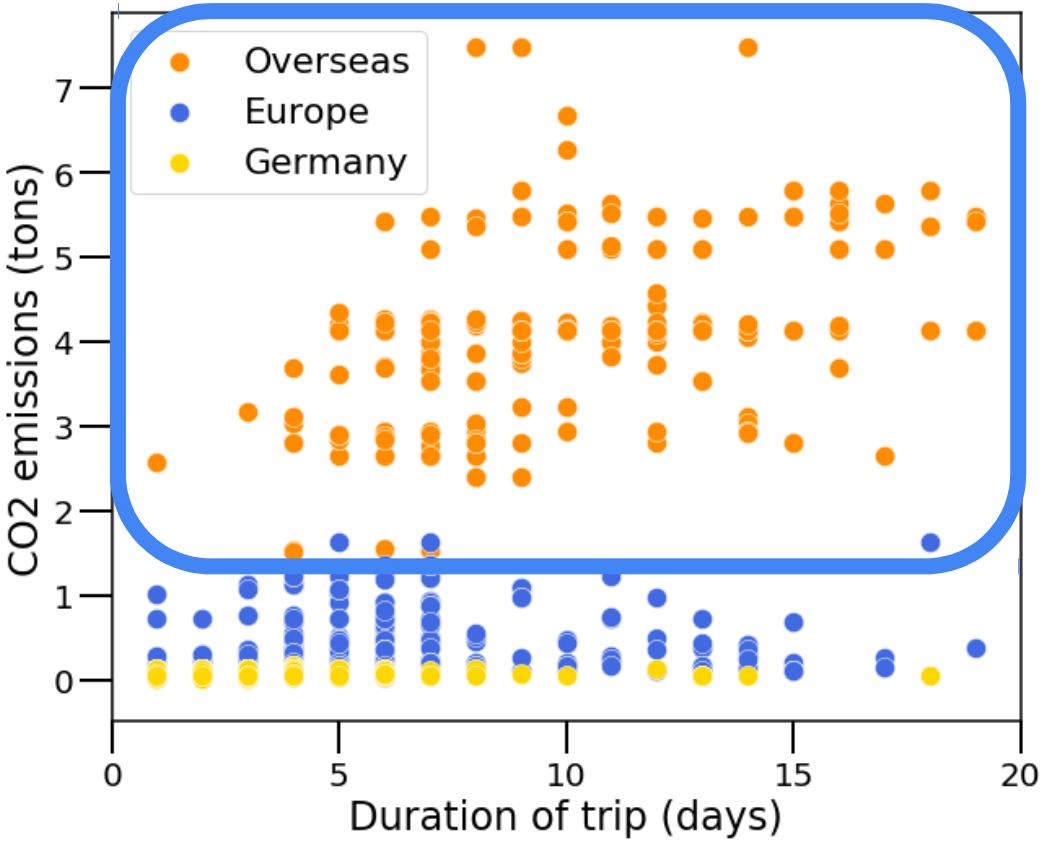
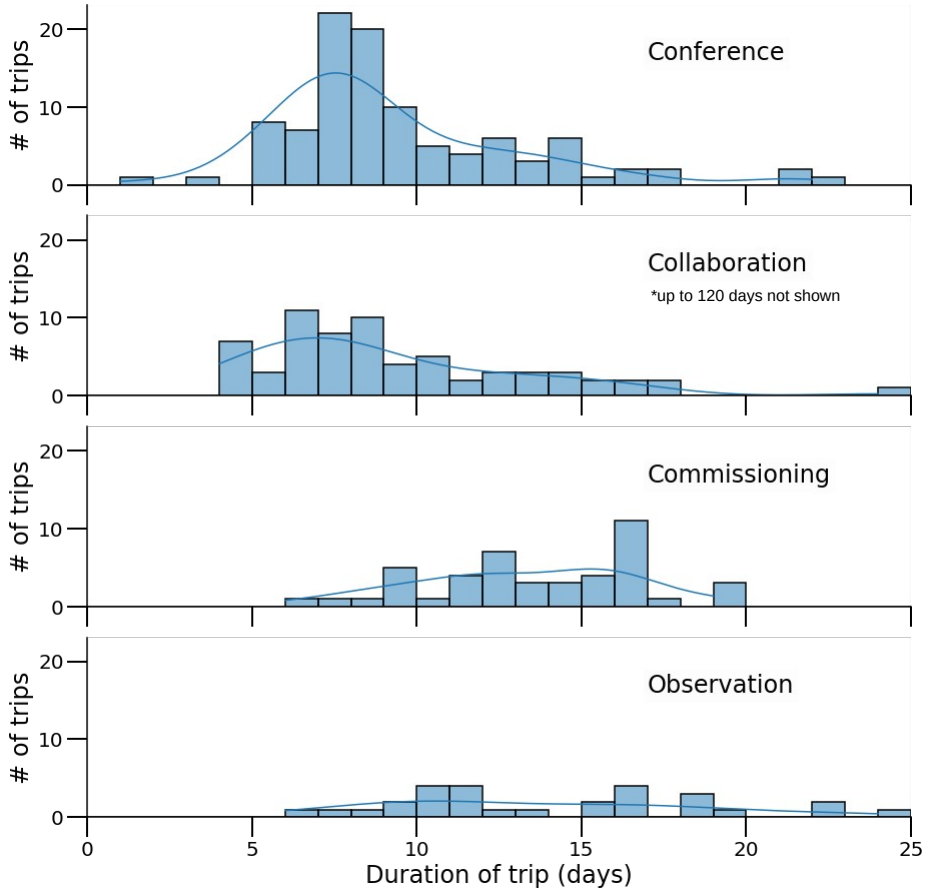


...focusing on the higher emitting flights

Duration of travel by reason for trips overseas

101 trips

380t
3.8t/ trip



79 trips

307t
3.9t/ trip

45 trips

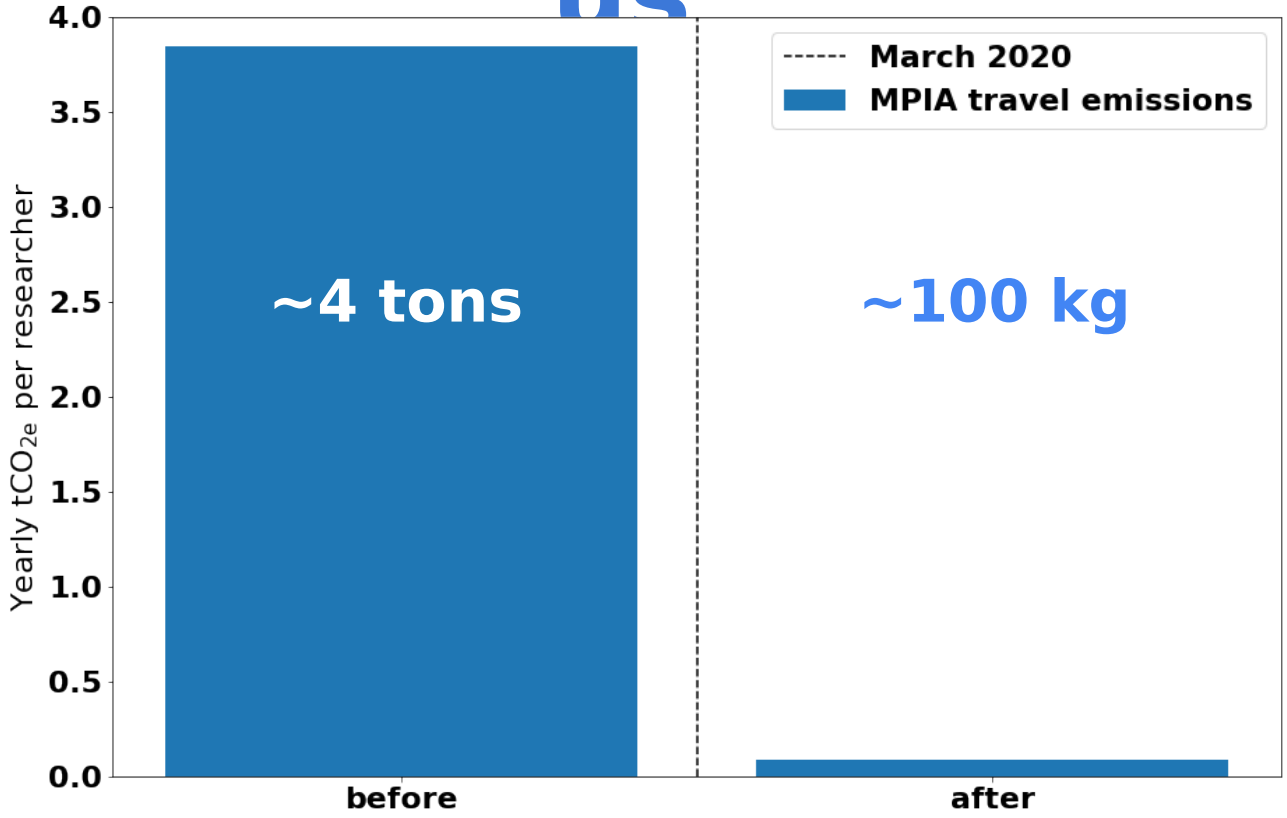
196t
4.3t/trip

29 trips

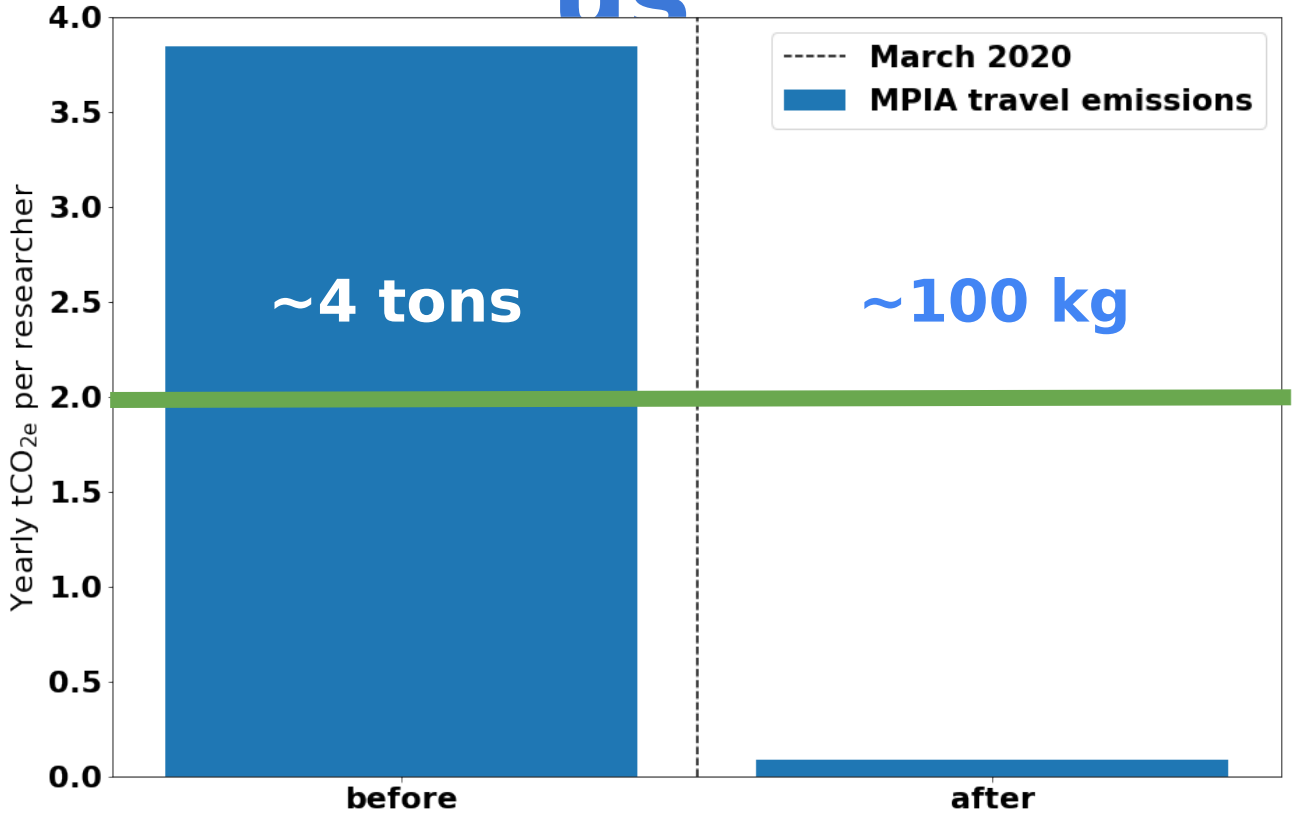
150t
5.2t/trip

Per year and researcher we have ~0.75 overseas flights (outside of the pandemic)

How did the pandemic affect us



How did the pandemic affect us



Summary

Overseas flights are having by far the highest CO_{2eq} impact

During the pandemic the travel emissions dropped by a factor of 40

We could do this analysis for 50% of the MPIs and have a yearly travel monitor

Short anonymous survey among GC science colleagues:

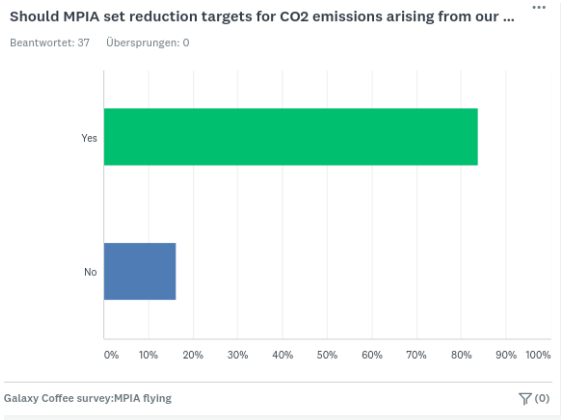
Should MPIA set reduction targets for CO2 emissions arising from our travel activities?

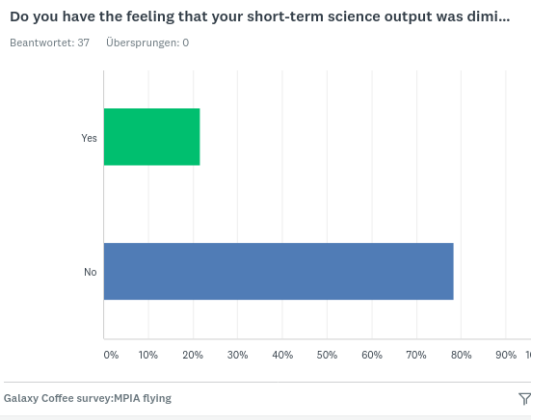
Do you have the feeling that your short-term science output was diminished due to less flying during the pandemic?

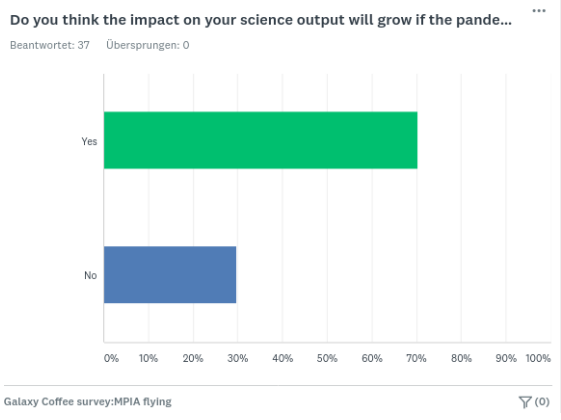
Do you think the impact on your science output will grow if the pandemic situation persists?

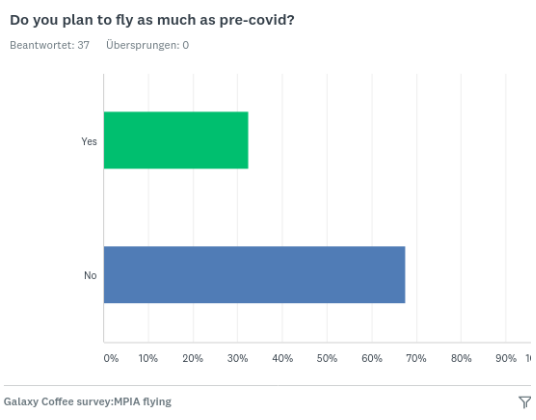
Do you plan to fly as much as pre-covid?

Showing the results for galaxy coffee audience









Food for thought

What did we take from the pandemic?

→ Conferences, meetings, workshops, collaborations: can we do this all online?

→ Commissioning needs personal visit (?)

→ Are you missing something due to the pandemic?

Different dimensions for flying:

→ observation, collaboration, conference, commissioning, career development, “prestige”, settling abroad ...

How is your flight experience?

→ Which journeys were good, which were bad (science/collaboration wise)?

How will young career astronomers feel about not having the chance to network in person?

Making a conscious decision when flying. What do you gain by flying somewhere?

Thanks for listening !!

Questions ?

Comments, suggestions ?

Discussion?