Norwegian Meteorological Institute

PAPILA
Prediction of Air Pollution in Latin America and the Caribbean

Air Quality Policy

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Prologue

- The topic of air quality related legislation is broad!
- I will focus here only on policy aspects that can be supported by air pollution modelling / forecasting

Outline of presentation

- What can scientists do for air quality policy?
- A few examples of modelling products for policy support
- An example of a regulation: Air Quality Standards

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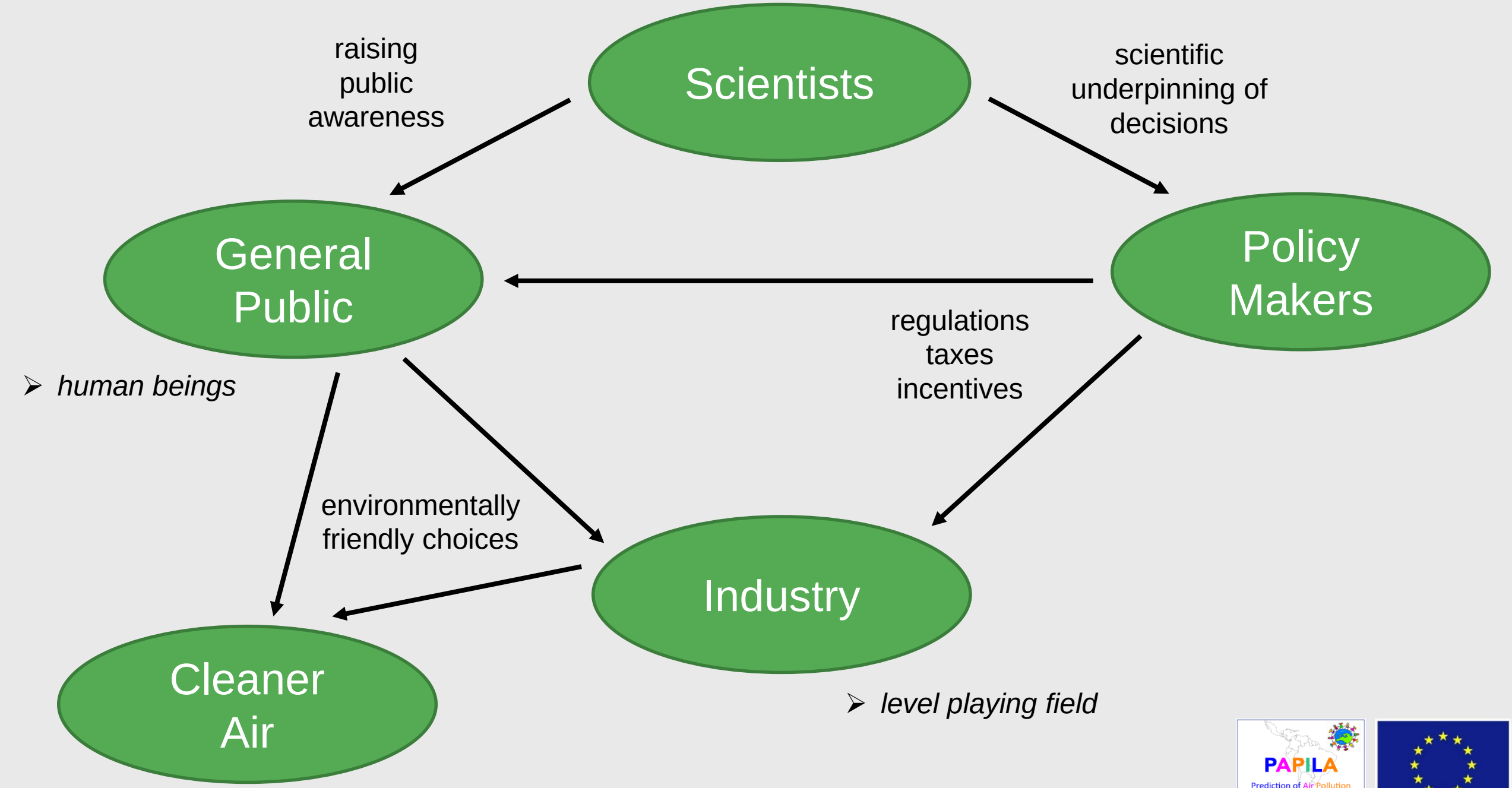
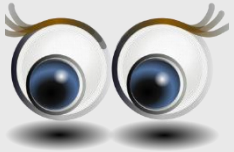

raising
public
awareness
Scientists
scientific
underpinning of
decisions
General
Public
Policy
Makers
regulations
taxes
incentives
➢ human beings
environmentally
friendly choices
Industry
Cleaner
Air
➢ level playing field

Air Quality Policy

- **International** air quality agreements (UN ECE LRTAP Convention, EU Air Quality Directive, US-Canada Air Quality Agreement, etc.)
- **National** air quality legislation (varies a lot from country to country)
- Legislation also (and sometimes *only*) exists at **province or municipality** level, or even smaller administrative divisions.
- Main ‘ingredients’:
  Regulation – Monitoring - Enforcement



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Approaching air quality policy makers

- Who are they? (exercise: find out for your country or municipality!)

- What do they need from you?
  - find out about their tasks
  - find out how you can help them fulfill their tasks

- We need to provide them with evidence in a clear and understandable manner
  - to help decision makers ‘higher up’ find the best trade-offs

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Some fundamental questions of AQ policy

- What are the levels of air pollution?
  - Measure/model variability in space and time
  - Assess the impacts of air pollution
  - Support alerts and compliance reporting
- Where does air pollution come from?
  - Natural vs. anthropogenic sources (relevant for assessing compliance)
  - Different activities / industry sectors (who/what are the main contributors to air pollution?)
  - Indigenous vs. imported air pollution (will local measures be helpful?)
- What can we do about it? (exercise: make a list of mitigation measures!)
  - Suggest short-term measures
  - Suggest long-term measures
  - Support air quality planning
    (assess the effectiveness of policies in the past and the future)

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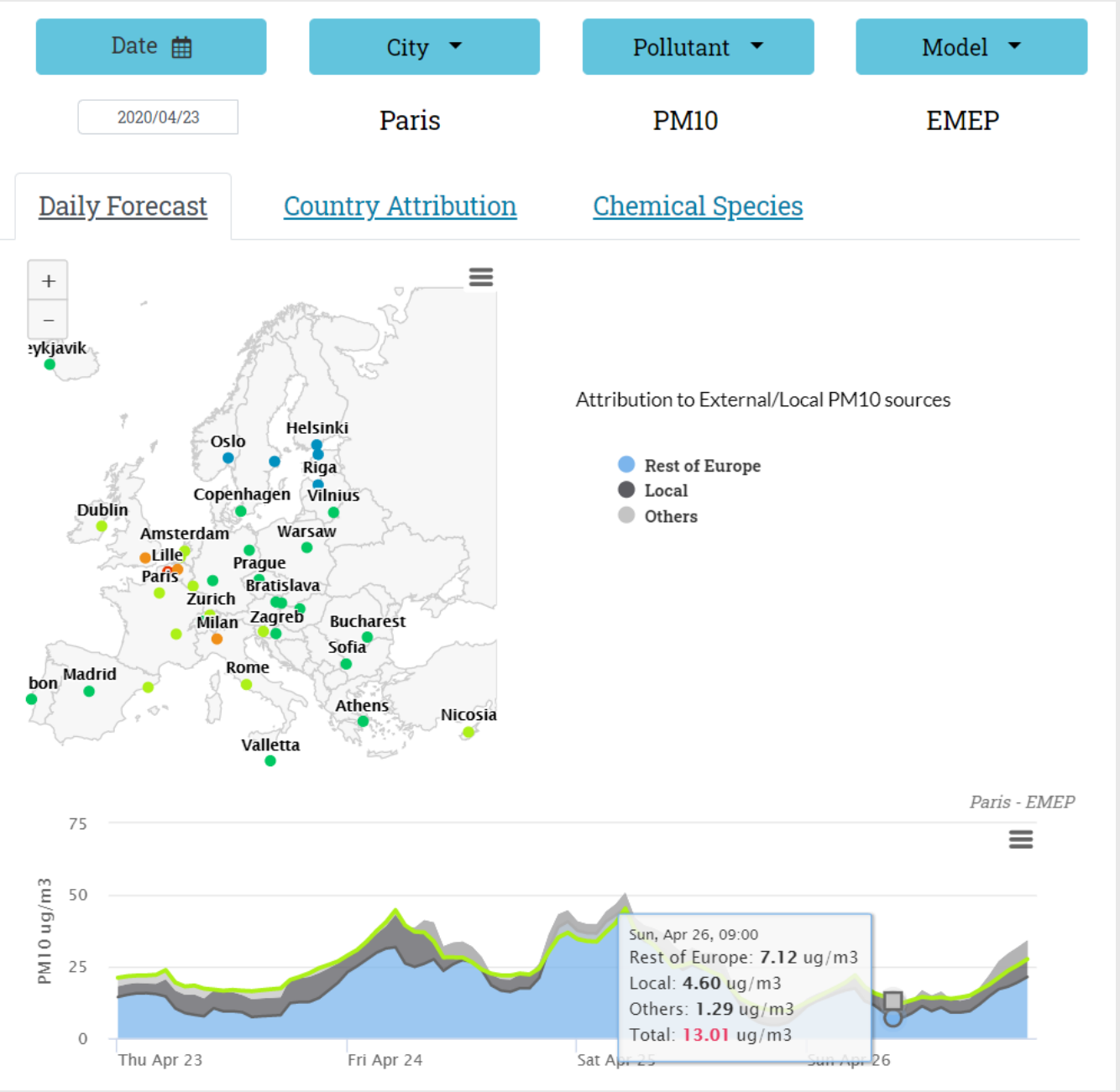
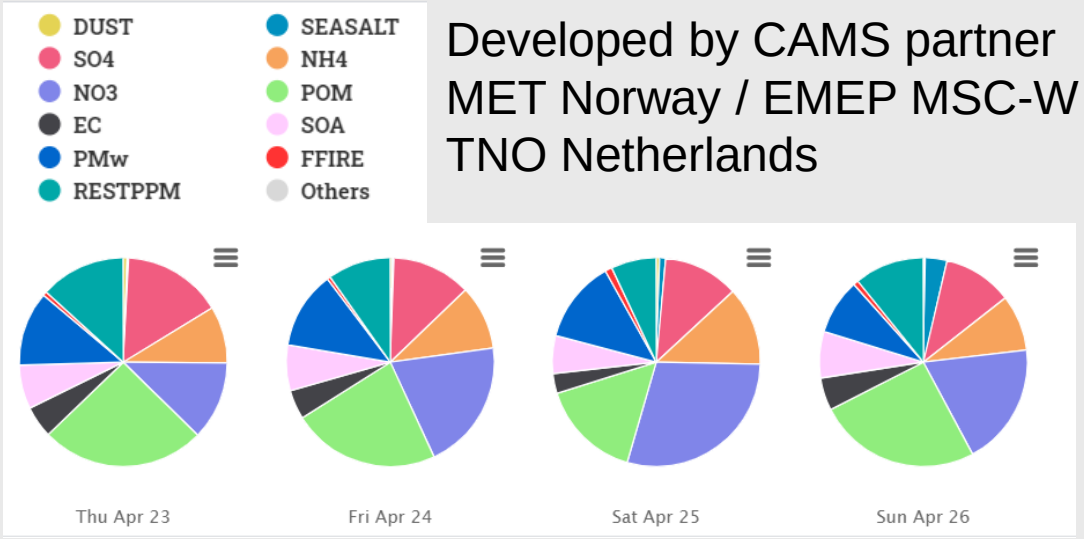
Source-Receptor calculations for European cities *(regional scale)*





Developed by CAMS partner
MET Norway / EMEP MSC-W
TNO Netherlands

Why use a model?

- spatial coverage
- relatively cheap once established
- always on
- forecast capability
- fast enough to support short-term mitigation
- … but be aware of the uncertainties!

https://policy.atmosphere.copernicus.eu/DailySourceAllocation.php

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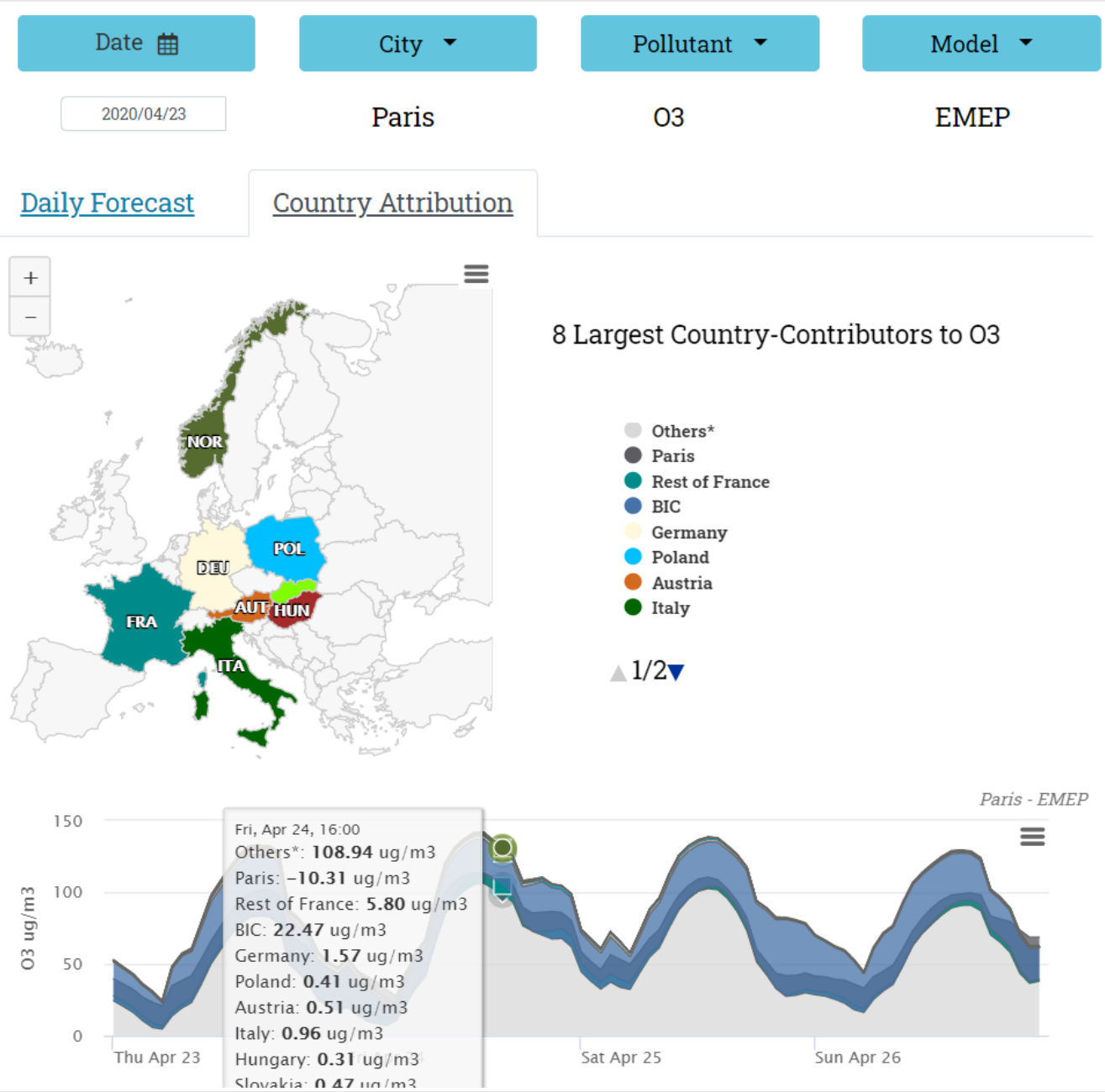

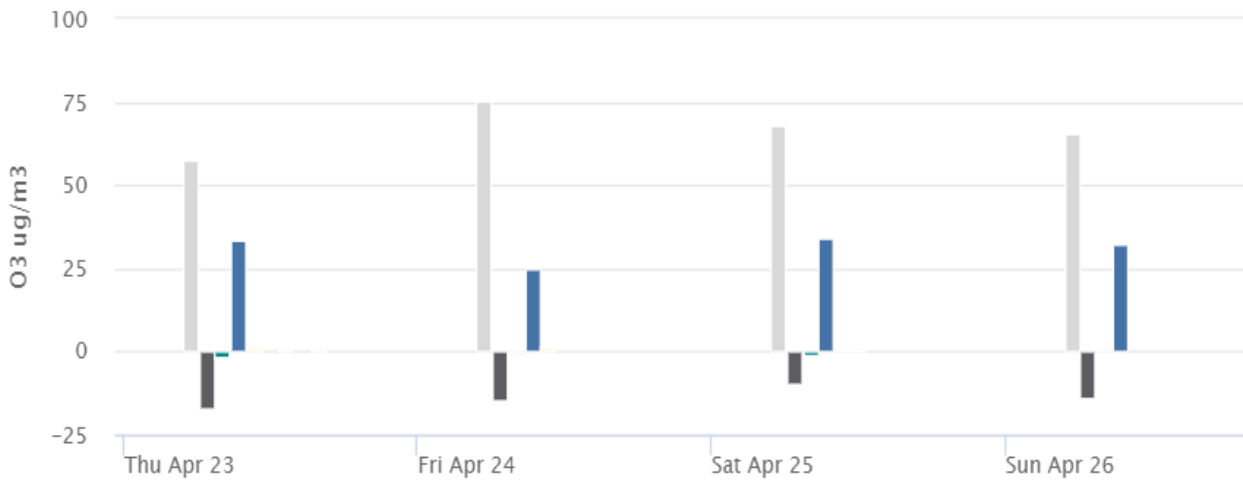

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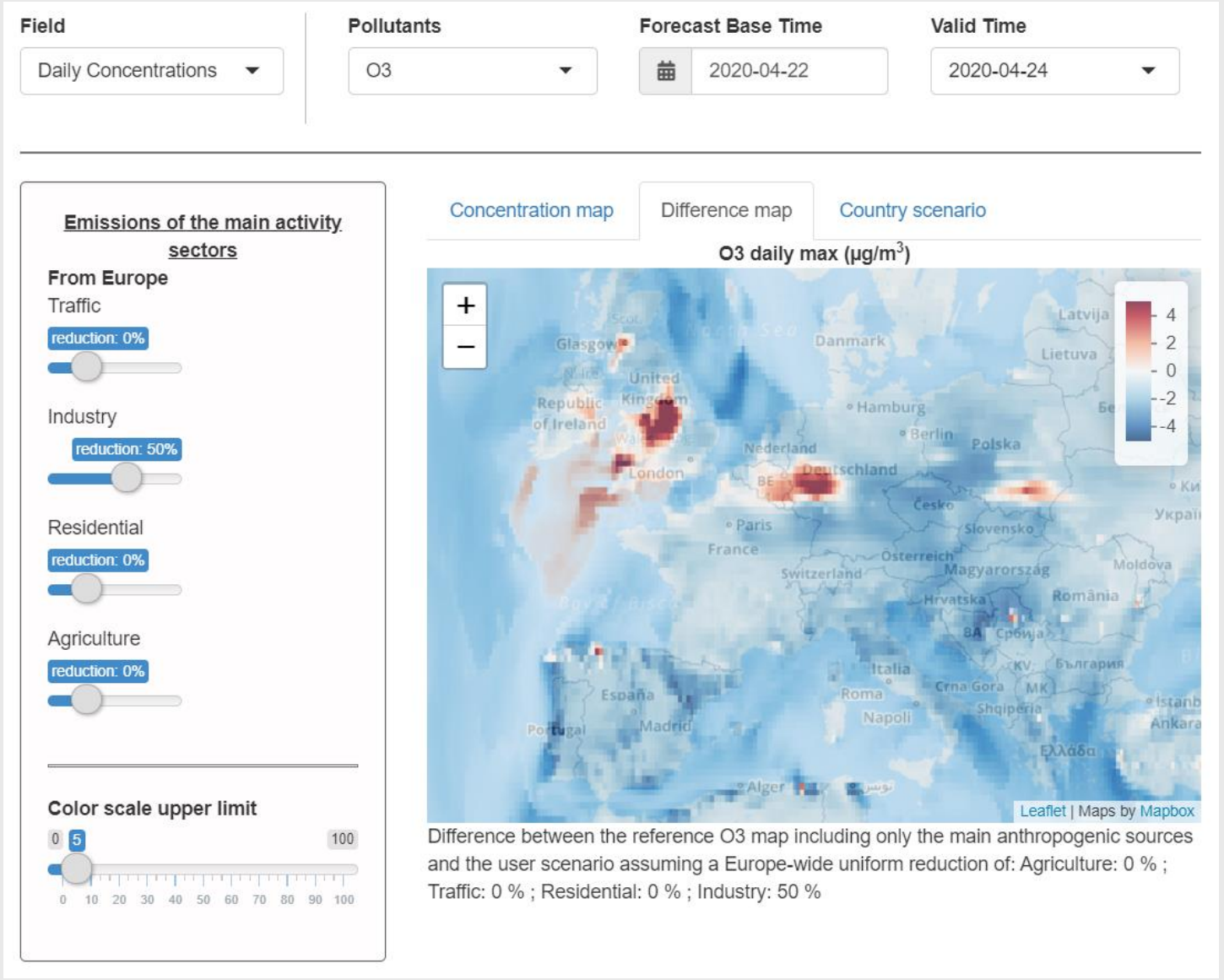
CAMS ACT: Air Control Toolbox



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Air Quality Standards (AQS) and Air Quality Indices (AQI)

- **Air quality standards** set limit values on *pollutant concentrations* in ambient air, which should not (or must) not be exceeded
- **Air quality indices** are a means to assess and *communicate* air pollution more efficiently

- Different standards and indices are used in different countries
  - AQS and AQI need to take local circumstances into account

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From AQ guidelines to AQ standards, e.g. particulate matter

		WHO guideline	EU Limit / Target	US Primary / Secondary	Chile Short-term standard / Alert level
Annual mean ($\mu g/m^3$)	**$PM_{2.5}$**	10	25 / 25	12 / 15	- / -
	PM_{10}	20	40 / -	- / -	- / -
24-hour mean ($\mu g/m^3$)	**$PM_{2.5}$**	25	- / -	35 / 35	50 / 80-109
	PM_{10}	50	50 / -	150 / 150	150 / 195-239

Standards can have different criteria for how many times they may be exceeded
(e.g. EU limit for 24-hr PM_{10} not to be exceeded more than 35 times in a calendar year;
US limit for 24-hr PM_{10} not to be exceeded more than once a year, etc.)

(Exercise: find out for your country and for other species!)

https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health
http://ec.europa.eu/environment/air/quality/standards.htm
https://www.epa.gov/criteria-air-pollutants/naaqs-table
Chile: PM_{10} http://bcn.cl/1vg5s / $PM_{2.5}$ http://bcn.cl/1v90q

Air Quality Standards – which species/limits?

- The species should be measurable (for enforcement)
- The limit value should be related to its impacts (see, e.g. WHO)

- The limit value should be attainable (i.e. not be too low)
- The limit value should evoke improvement (i.e. not be too high)

→ Best choices for limit values differ from country to country and can change over time…

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Conclusions and recommendations

- Policy makers need clear and relevant information from scientists for monitoring air quality and for designing and implementing regulations and abatement measures;
- Air quality policy is about finding best compromises between the effectiveness of measures, their feasibility and cost, and the possibility of monitoring and enforcement.
- A strong science-policy interface is a win-win
- *PAPILA* aims to integrate measurements and modelling capabilities into near-real-time assessment and forecasts of air quality also to assist policy makers;
- Regional services become even more useful when being downscaled, at least in strongly polluted/populated areas.