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Aviation Decarbonisation: A Bibliometric Analysis of Productivity, Research Trends, and Gaps



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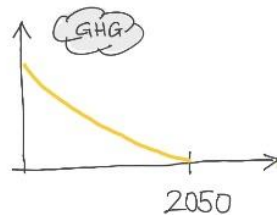
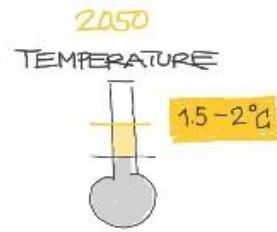
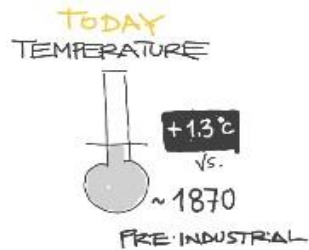
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Context



Temperature increase and suggested ceiling by science

Paris Agreement EU Green Deal leading to **Net Zero 2050**

Air Transport commitment to Net Zero 2050, but **what about researchers?**

Impact of aviation emissions on the climate

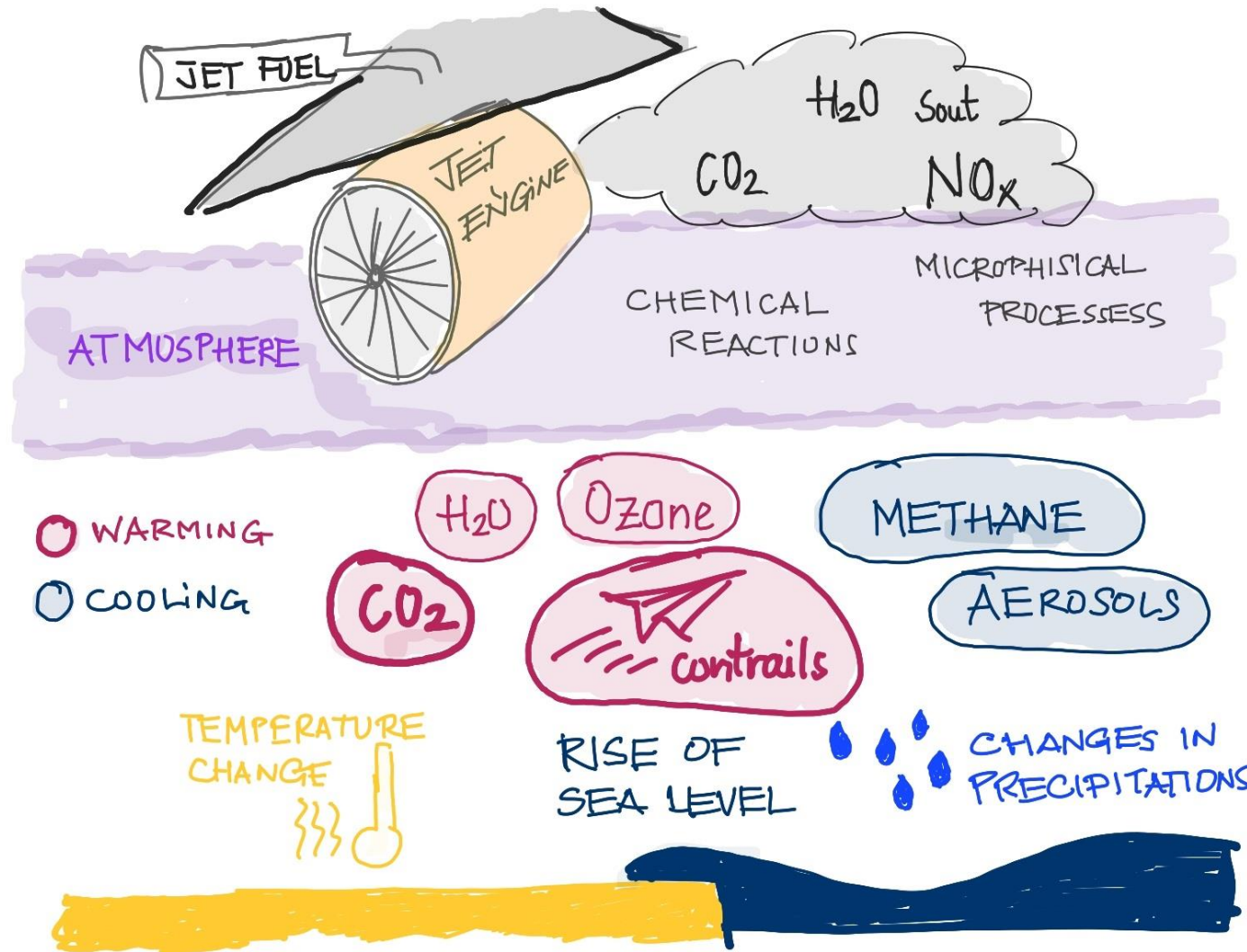
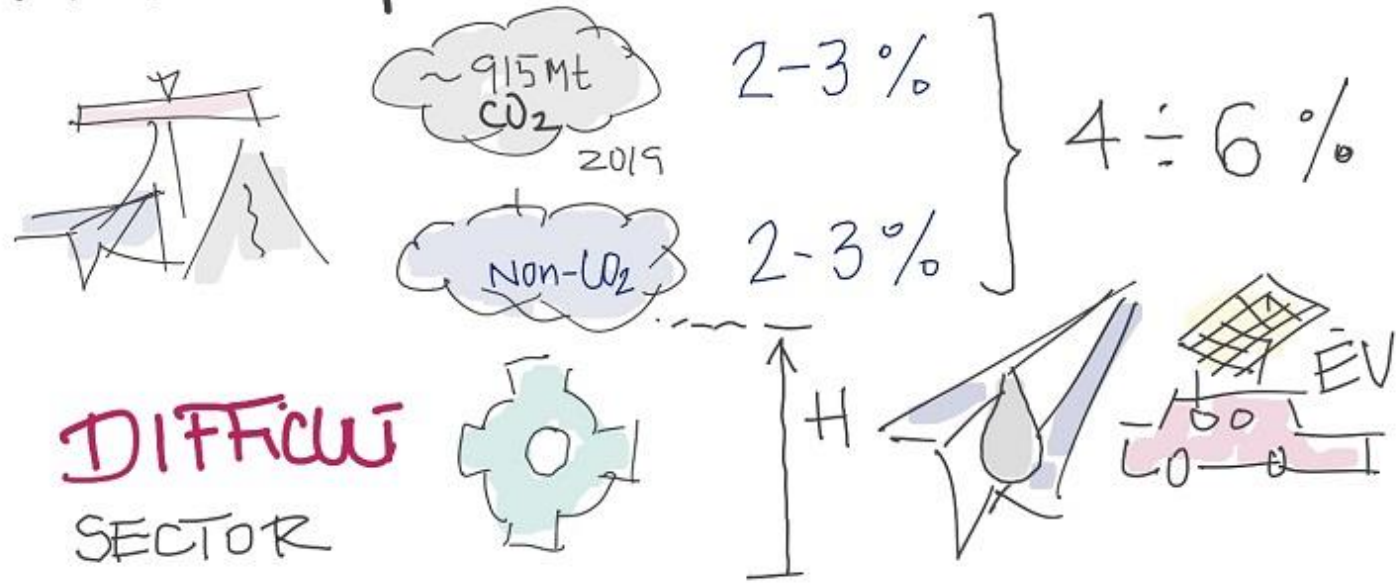
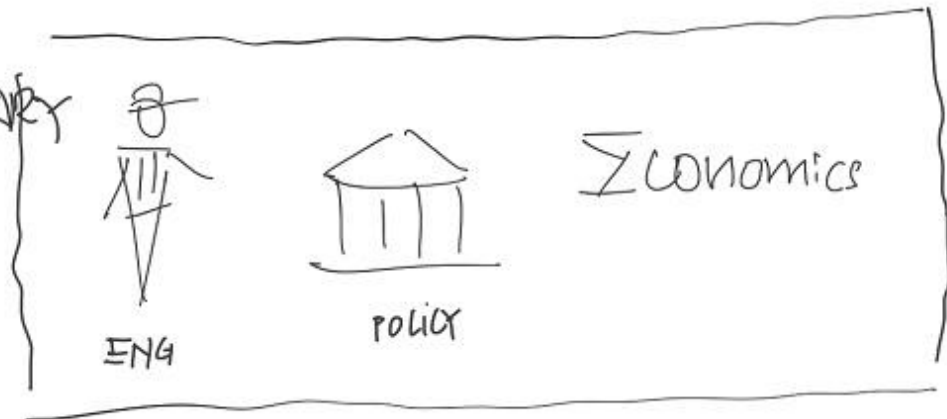


Figure 2: Impact of aviation emissions on the climate (Martín-Domingo, L. 2024 – based on German Environmental Agency (2023))

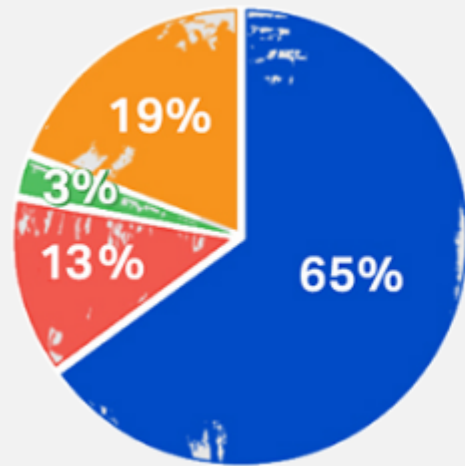
WHY THIS STUDY?



MULTIDISCIPLINARY RESEARCH



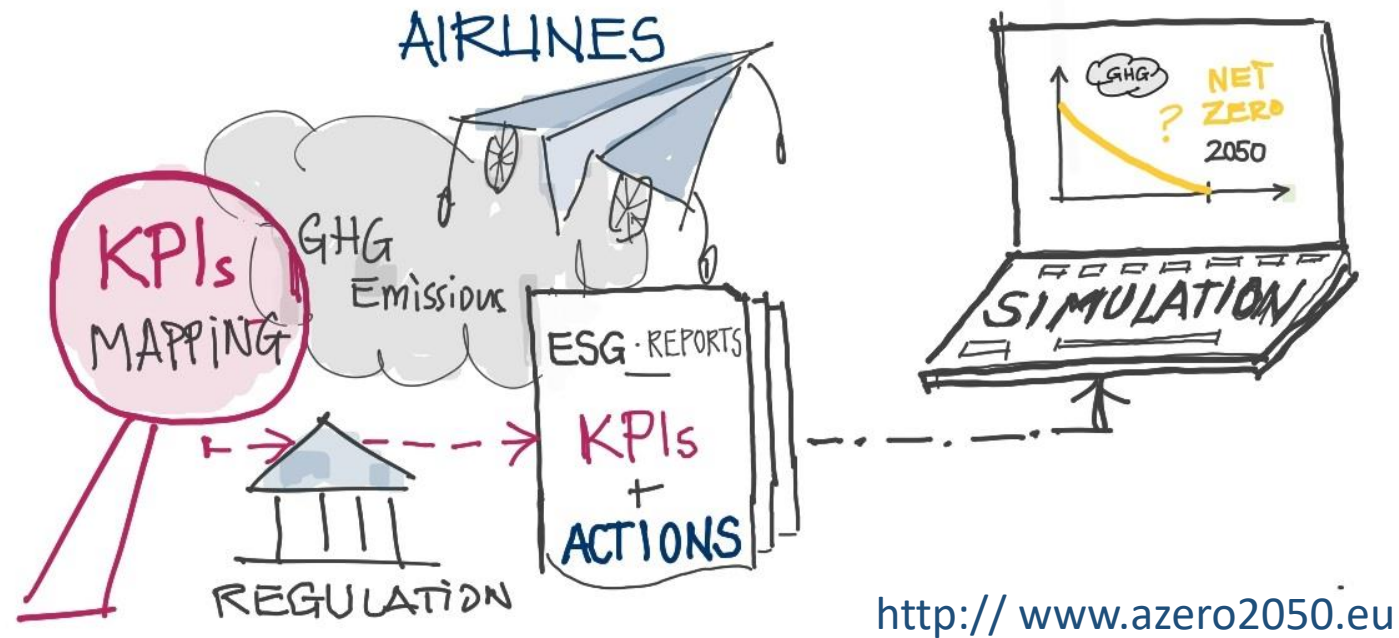
IATA strategy towards net zero CO2 emissions 2050



- **65%** Sustainable Aviation Fuel (SAF)
- **13%** New technology, electric and hydrogen
- **3%** Infrastructure and operational efficiencies
- **19%** Offsets and carbon capture

Source: IATA at <https://www.iata.org/en/programs/sustainability/flynetzero/>

Aviation Zero Emissions 2050 (AZERO) Project



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RESEARCH QUESTION



• ACADEMIC OUTPUT

DECARBONISATION

OPS (AIR + Ground)

TECH.

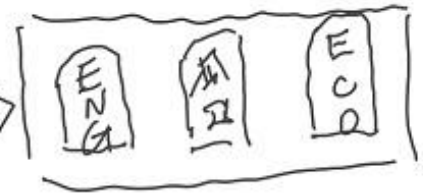


SAF



Policy & MKT based
ACROSS DOM. DISC

DEMAND MGT



METHODOLOGY



BIBLIOMETRIC ANALYSIS:

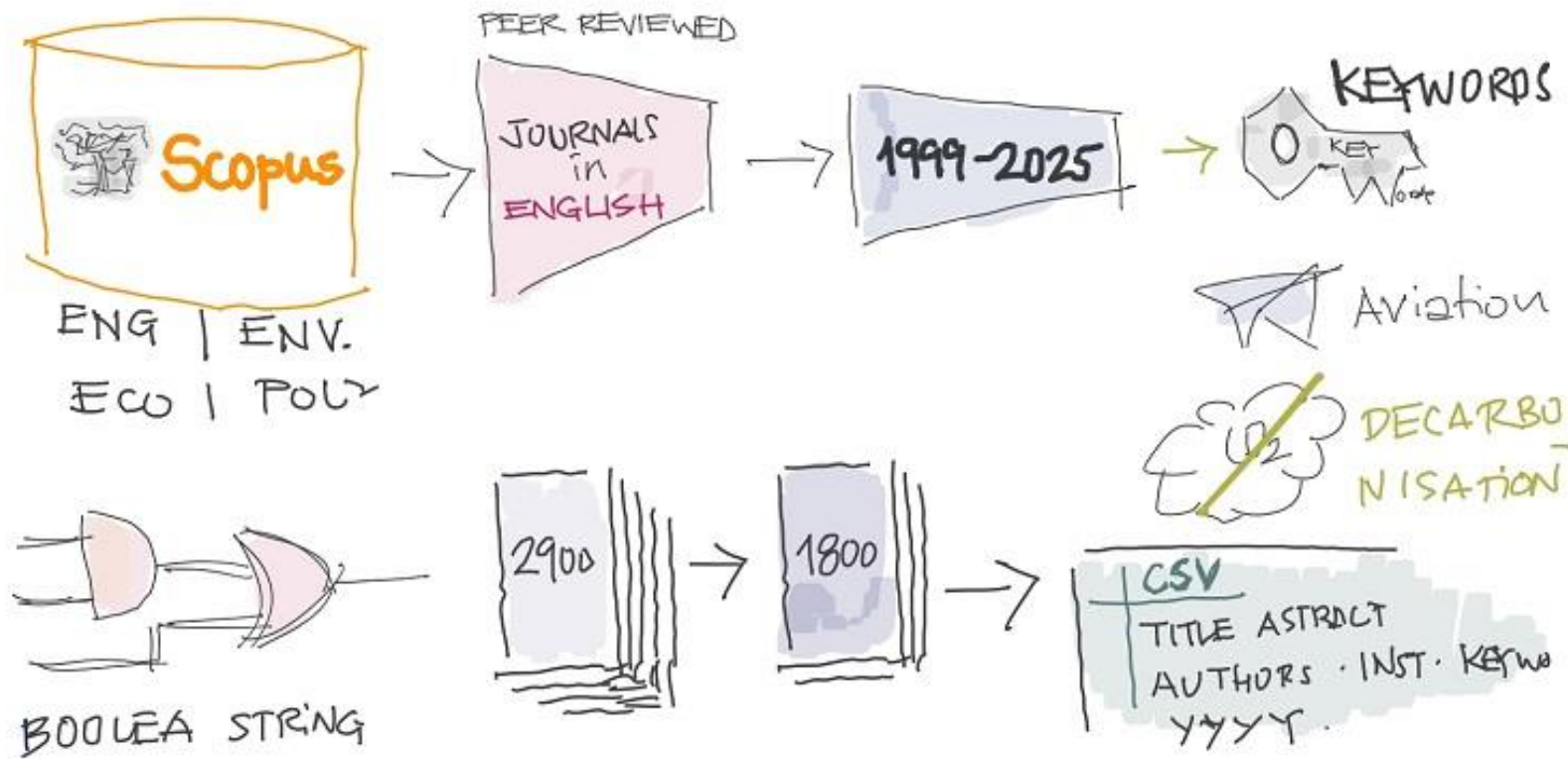
1)  RETRIVAL

2)  PRE-PROCESSING

3)  ANALYSIS
BIBLIOMETRIX.R
PACKAGE

4)  VOSviewer

DATA AND SCOPE



BIBLIOMETRIX.R
PACKAGE

VOSviewer

Results: Scientific production of aviation decarbonisation

Geographically, dominated by:



US



UK



DE



CN



2012



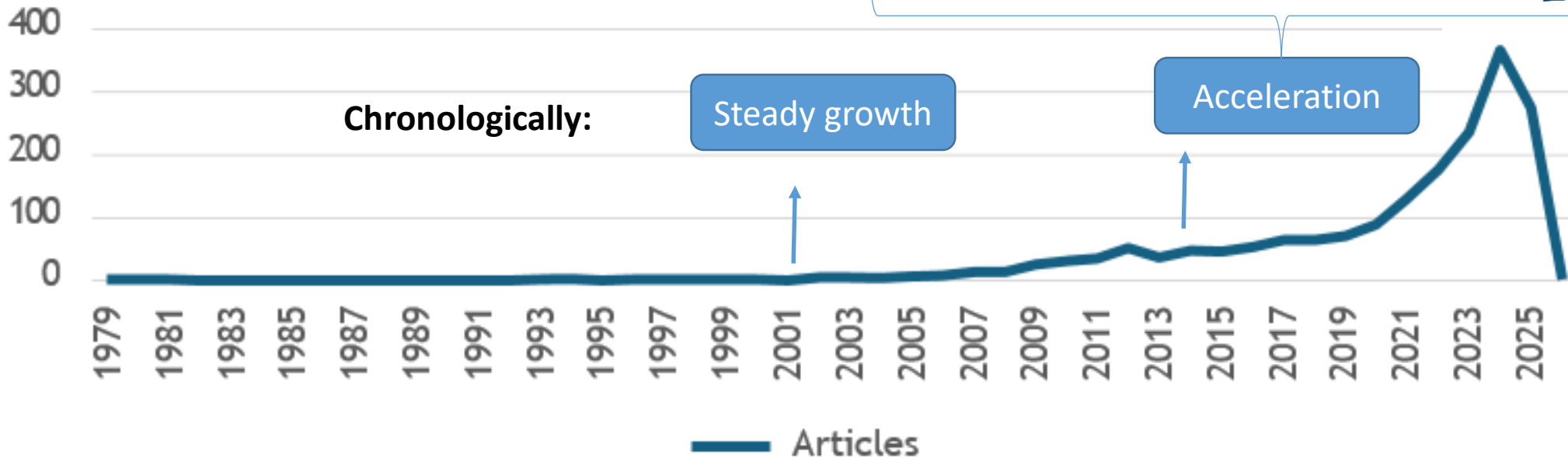
PARIS: 2015
UN CLIMATE CONF.



2016



GREEN DEAL
2019



Results: Keyword word cloud



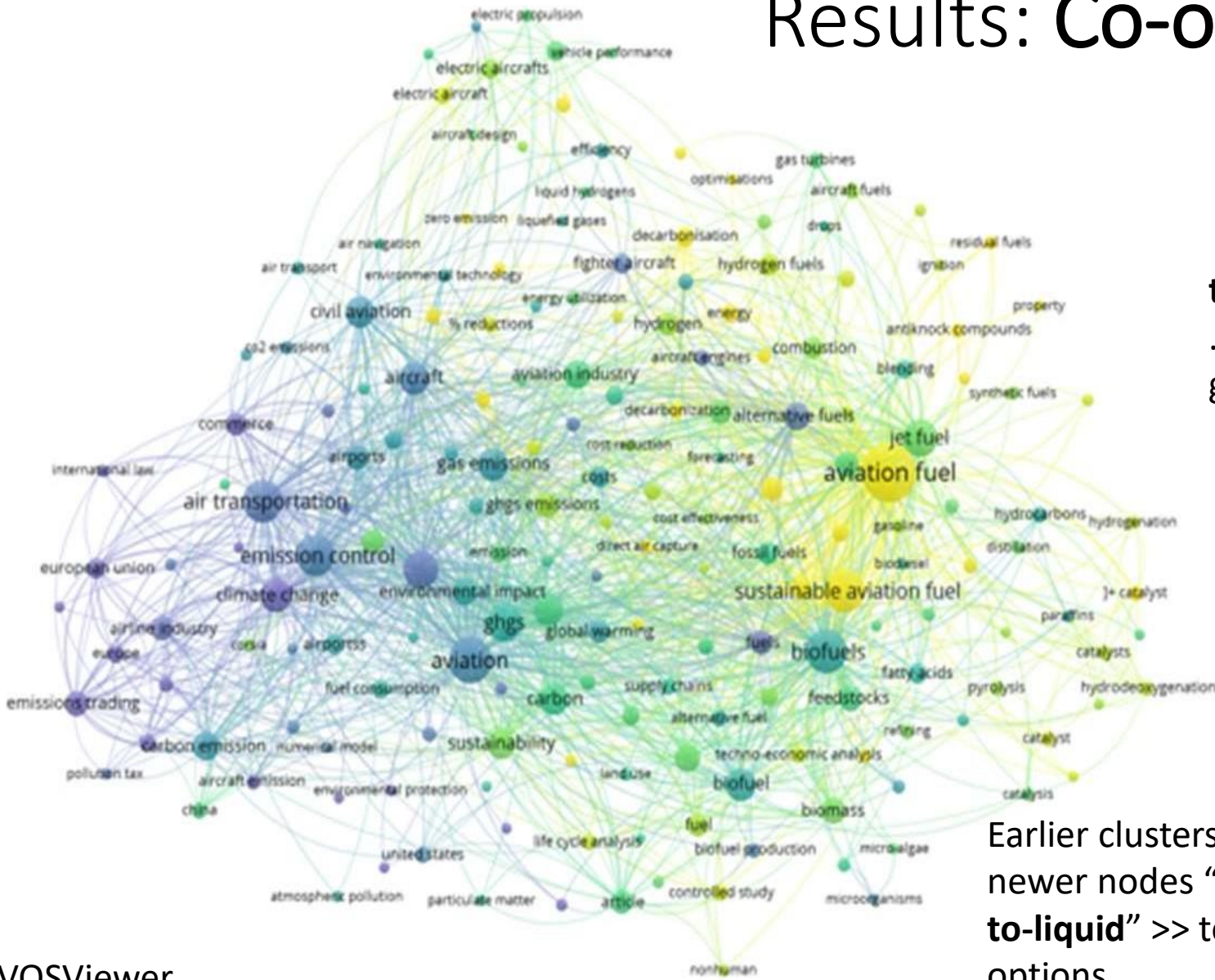
“aviation fuel” and “sustainable aviation fuel” reflects the central role of **fuel substitution** in the research agenda,

“air transportation” and “carbon dioxide,” show the sectoral and pollutant-specific

“biofuels,” “emission control,” and “climate change” highlight a dual emphasis on technological mitigation and environmental outcomes

Absence of **demand-side** and **justice-oriented** keywords indicates limited integration of societal perspectives

Results: Co-occurrence analysis



technology-first orientation (e.g. SAF)
... but limited connection to behavior and governance and equity.

terminological fragmentation
(e.g. GHG vs. greenhouse gas)

Earlier clusters **“biofuels”** and **“CO2 emissions,”**
newer nodes **“electric aircraft,”** **“green hydrogen,”** and **“power-to-liquid”** >> towards long-term, disruptive decarbonisation options.

VOSViewer
10,369 keywords, 188 keyword co-occurrence >20 times

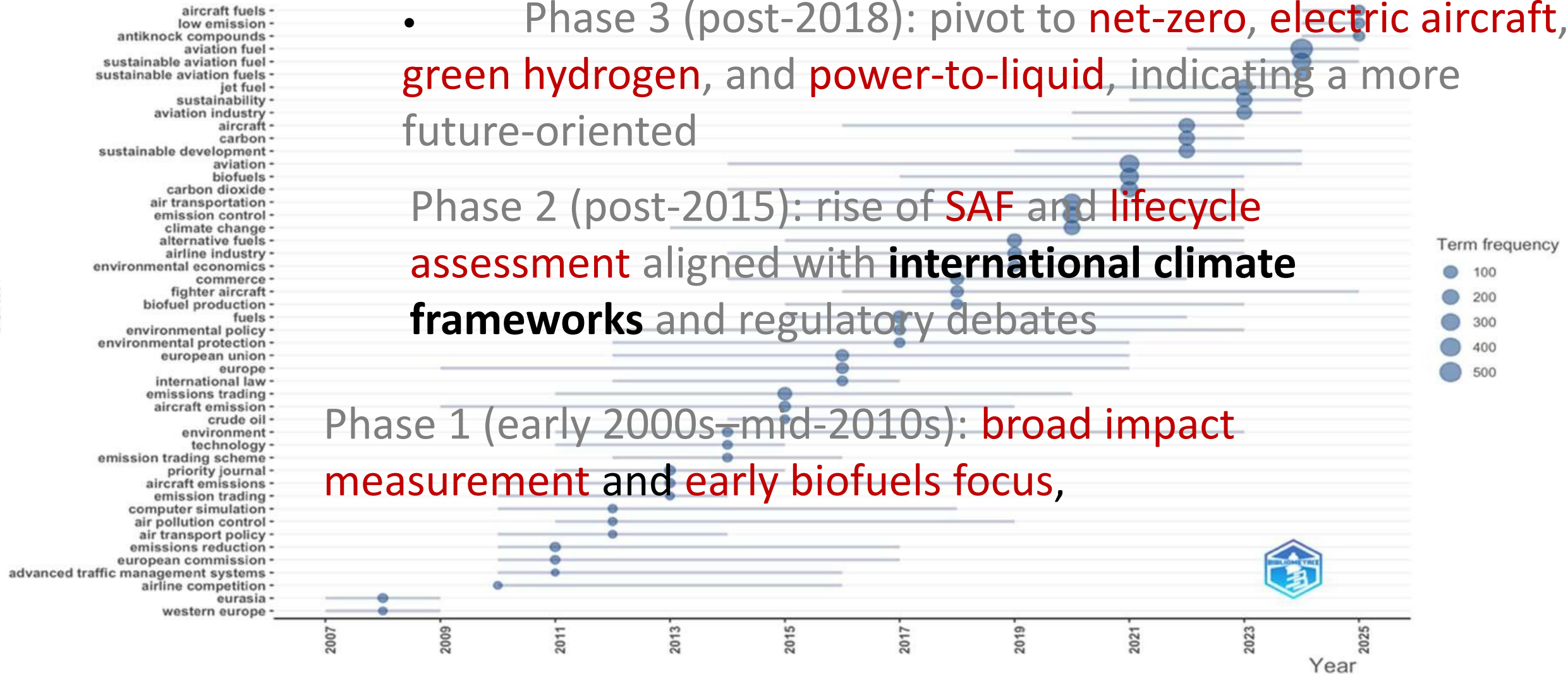


Trend Topic Analysis

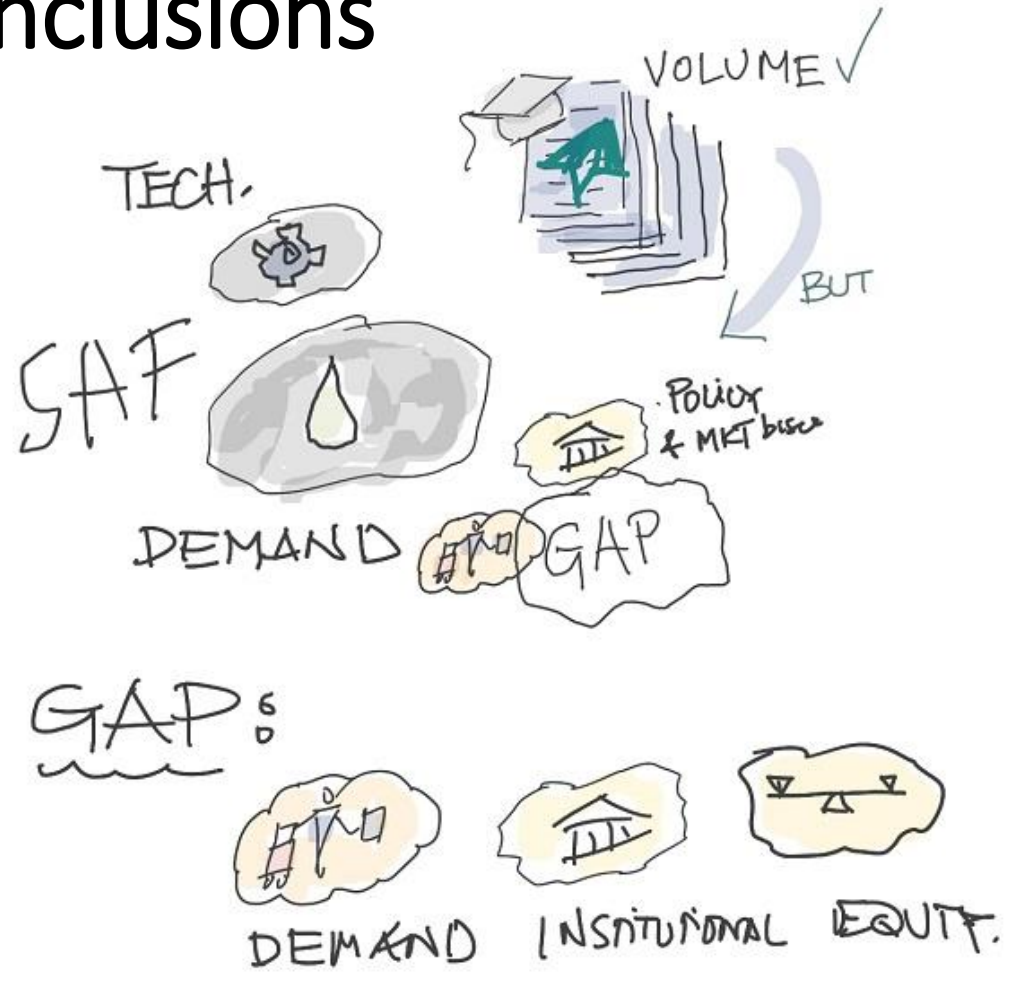
- Phase 3 (post-2018): pivot to **net-zero, electric aircraft, green hydrogen, and power-to-liquid**, indicating a more future-oriented

Phase 2 (post-2015): rise of **SAF and lifecycle assessment** aligned with **international climate frameworks** and regulatory debates

Phase 1 (early 2000s–mid-2010s): **broad impact measurement and early biofuels focus,**



Conclusions



Geographically, dominated by:



US



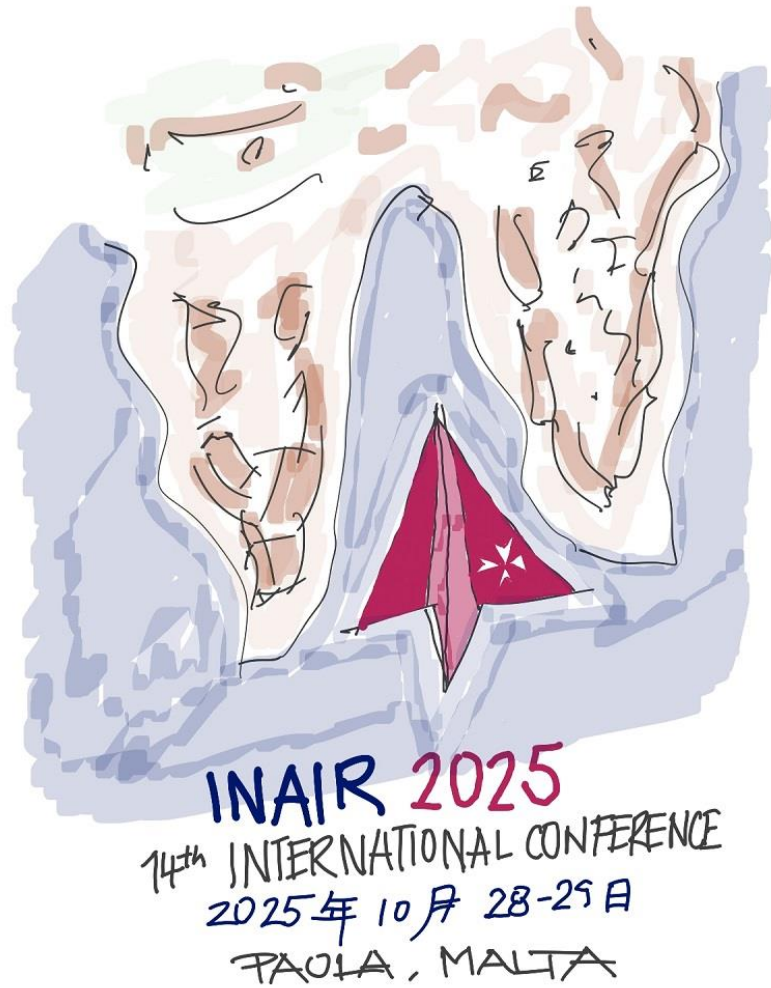
UK



DE



CN



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Thank you



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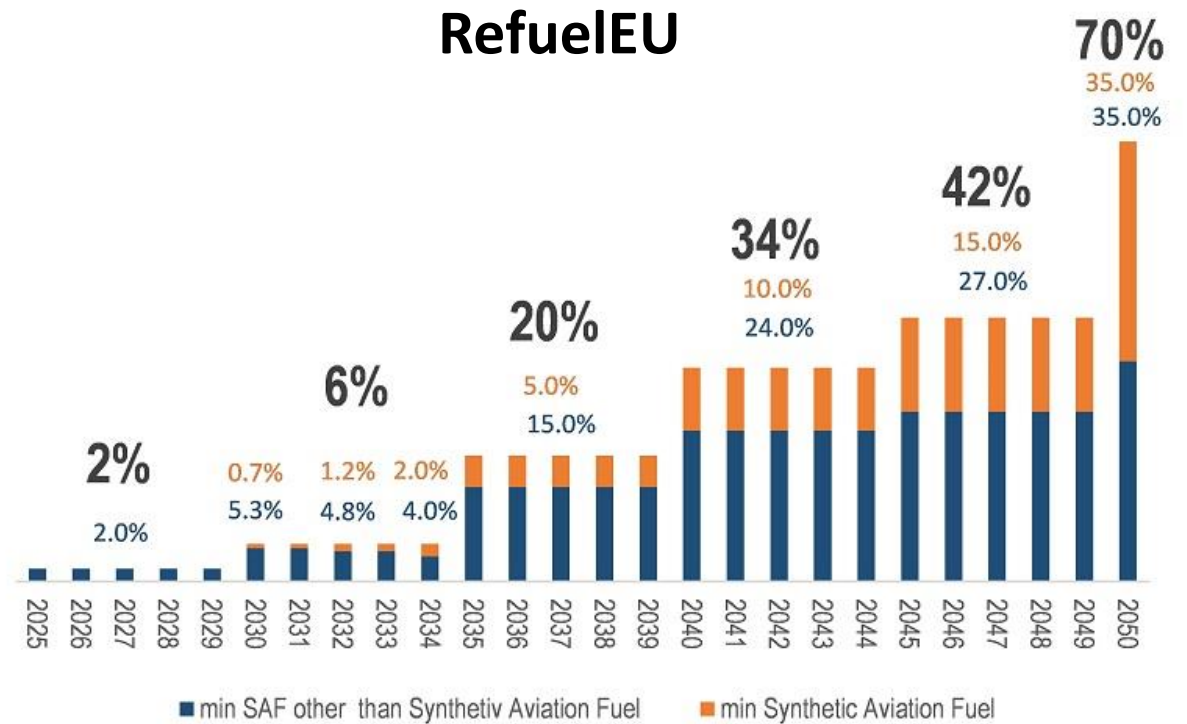


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Backup Slides

Backup slide 1



Mandated blending of Sustainable Aviation Fuels (SAF)

Backup slide 2