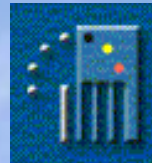


# Aviation and the Belgian Climate Policy : Integration Options and Impacts

## ABC Impacts

### Synthesis ABC Impacts project results and forthcoming work



Workshop on non-CO<sub>2</sub> aviation climate impacts

2 February 2009

# Content

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- I. ABC Impacts first phase
- II. ABC Impacts forthcoming work

# I. ABC Impacts first phase

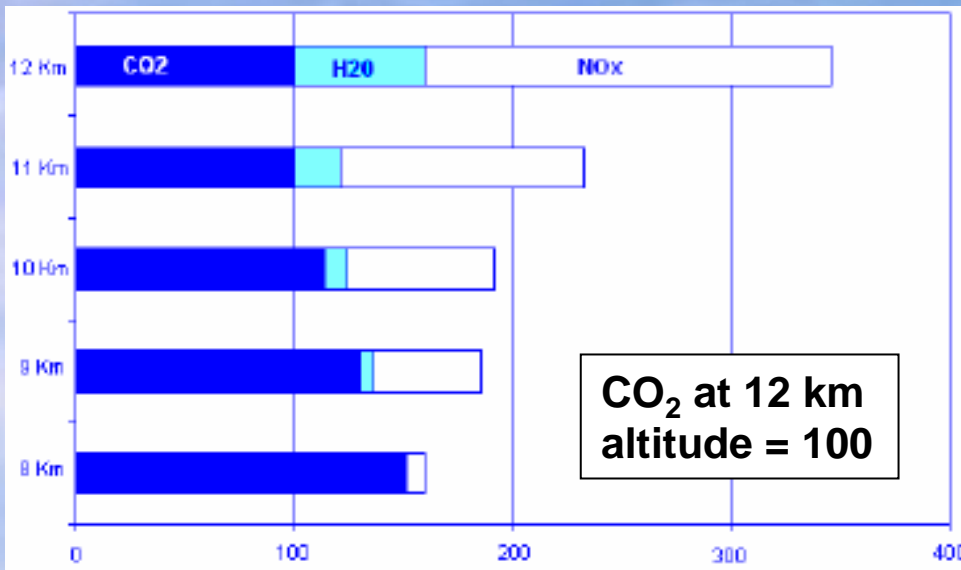
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Why should Belgium be interested in the mitigation of non-CO<sub>2</sub> aviation climate impacts ?

1. Non-CO<sub>2</sub> emissions from aircrafts have regional climate impacts
2. Geographical situation of Belgium (FLAP area)
3. Evolution of the number of overflights
4. Potential impacts concentrated above the Belgian territory
5. Conclusions

# 1. Regional aviation climate impacts

	Climate impact	Characteristics
CO <sub>2</sub>	<ul style="list-style-type: none"> <li>- Increase of the CO<sub>2</sub> concentration in the atmosphere</li> <li>→ temperature increase</li> </ul>	Global warming effect
H <sub>2</sub> O	<ul style="list-style-type: none"> <li>- increase of the concentration in water vapour in the atmosphere</li> <li>→ formation of condensation trails and cloud formation enhanced</li> </ul>	Local / regional Local / regional (mainly in the northern hemisphere)
NO <sub>x</sub>	<ul style="list-style-type: none"> <li>- increased ozone concentration in the atmosphere</li> <li>- destruction of methane in the atmosphere</li> </ul>	Local / global warming effect Global cooling effect
PM, soot	<ul style="list-style-type: none"> <li>- stimulation of clouds formation</li> </ul>	Local / regional
aerosols	<ul style="list-style-type: none"> <li>- stimulation of clouds formation</li> </ul>	Local / regional

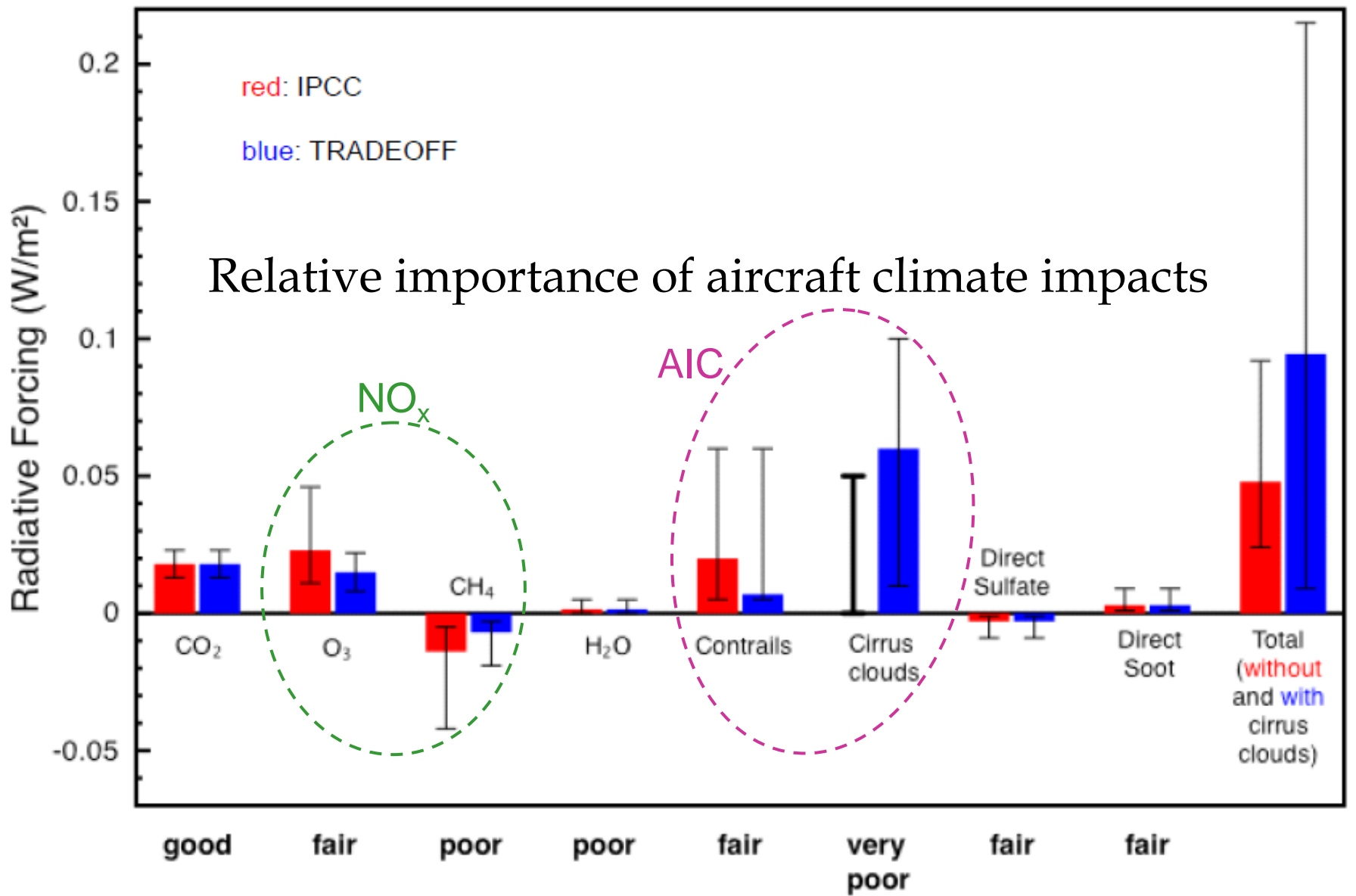


Source : Öko-Institut eV,  
Emissions trading in international  
civil aviation, 2004

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## Facts to keep in mind :

- most regional impacts = AIC (Aircraft Induced Cloudiness)
  - trade-off between CO<sub>2</sub> and non-CO<sub>2</sub> aviation climate impacts according to the flight altitude
- ⇒ risk to worsen the total aviation climate impacts if only CO<sub>2</sub> taken into account



Source: adapted from Schumann 2005 "Formation, properties and climatic effects of contrails" Comptes Rendus Physique 6 4-5, 549-565

## Facts to keep in mind :

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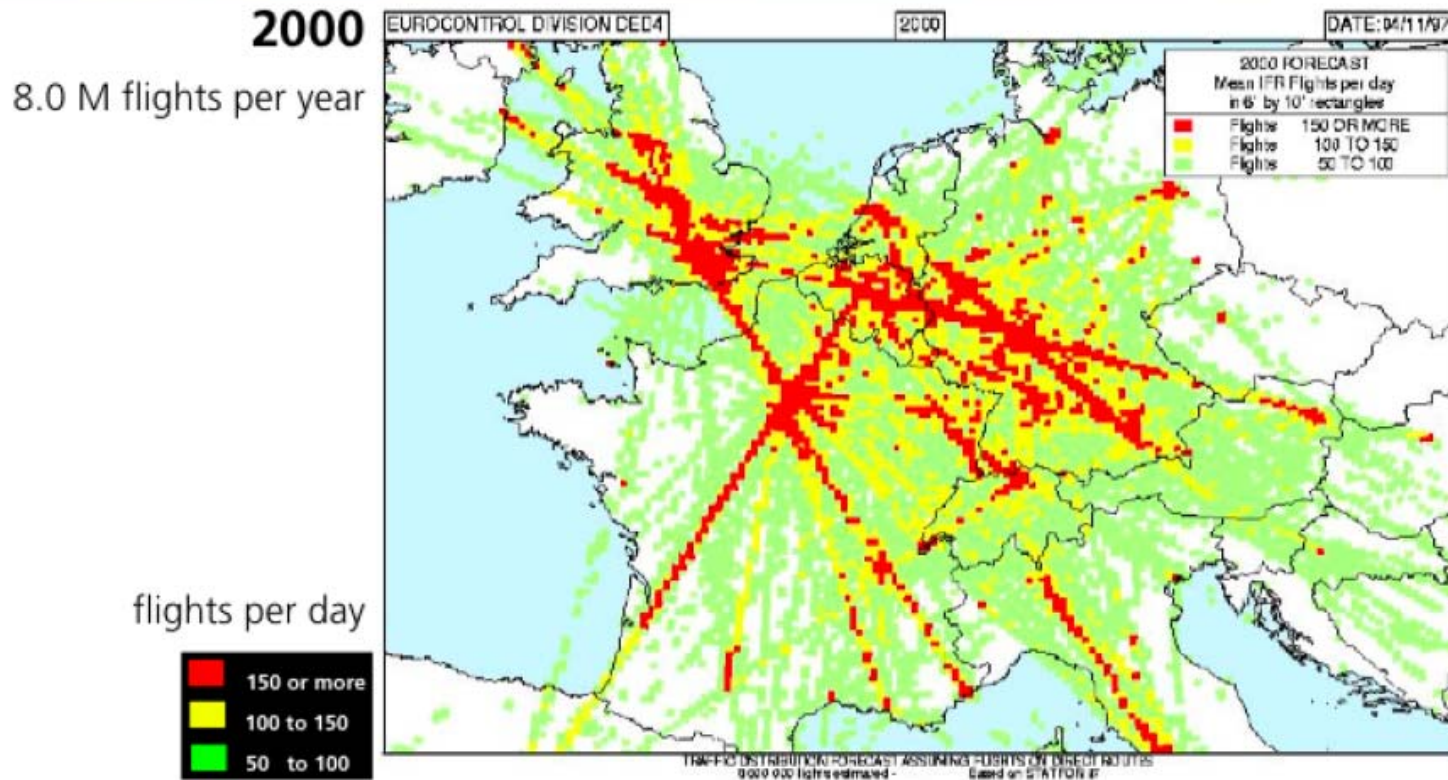
- recent scientific works highlight the importance of AIC in the total aviation climate impacts (different observations are in line with model predictions) more specifically than  $\text{NO}_x$
- certainty : non- $\text{CO}_2$  climate impacts have a at least a similar RF impact than  $\text{CO}_2$  but a shorter lifespan =>

Time horizon GWP	Multiplier non- $\text{CO}_2$ av. clim. impacts(average)
20 years	6
100 years	2,4

- uncertainty : the RF impact could be much higher than that
- secondary impacts on the carbon cycle and the  $\text{CO}_2$  uptake by oceans even not taken into account (local warming => less  $\text{CO}_2$  uptake by oceans => increasing global warming effect)

## 2. Geographical situation of Belgium (FLAP area)

### Trends and Challenges



Source: Eurocontrol



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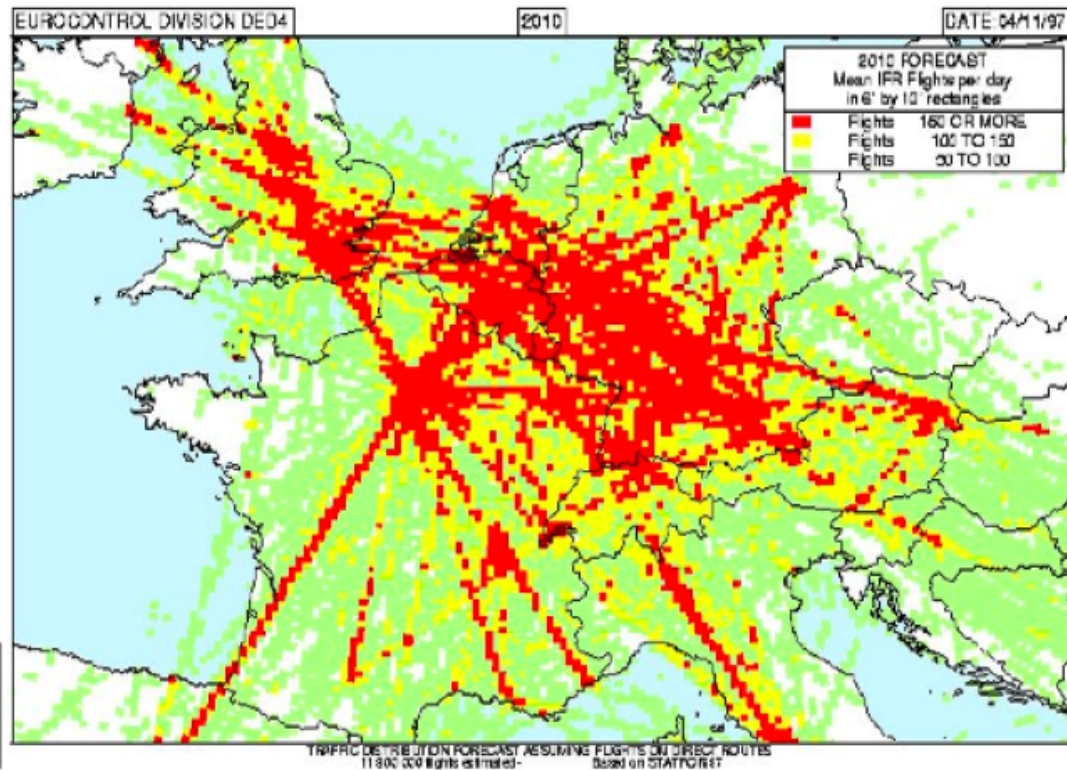
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# Trends and Challenges

**2010**  
11.9 M flights per year

flights per day



Source : Eurocontrol



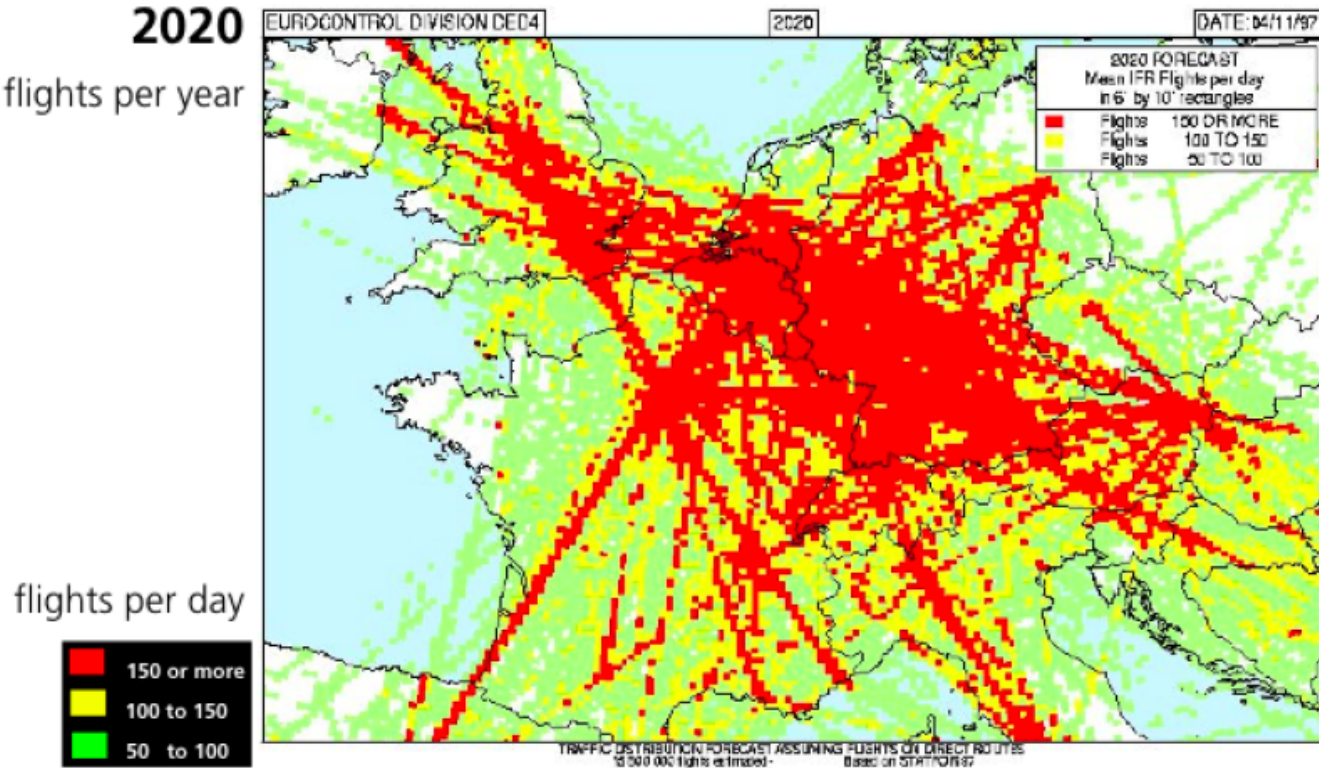
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# Trends and Challenges

2020  
15.8 M flights per year



Source : Eurocontrol

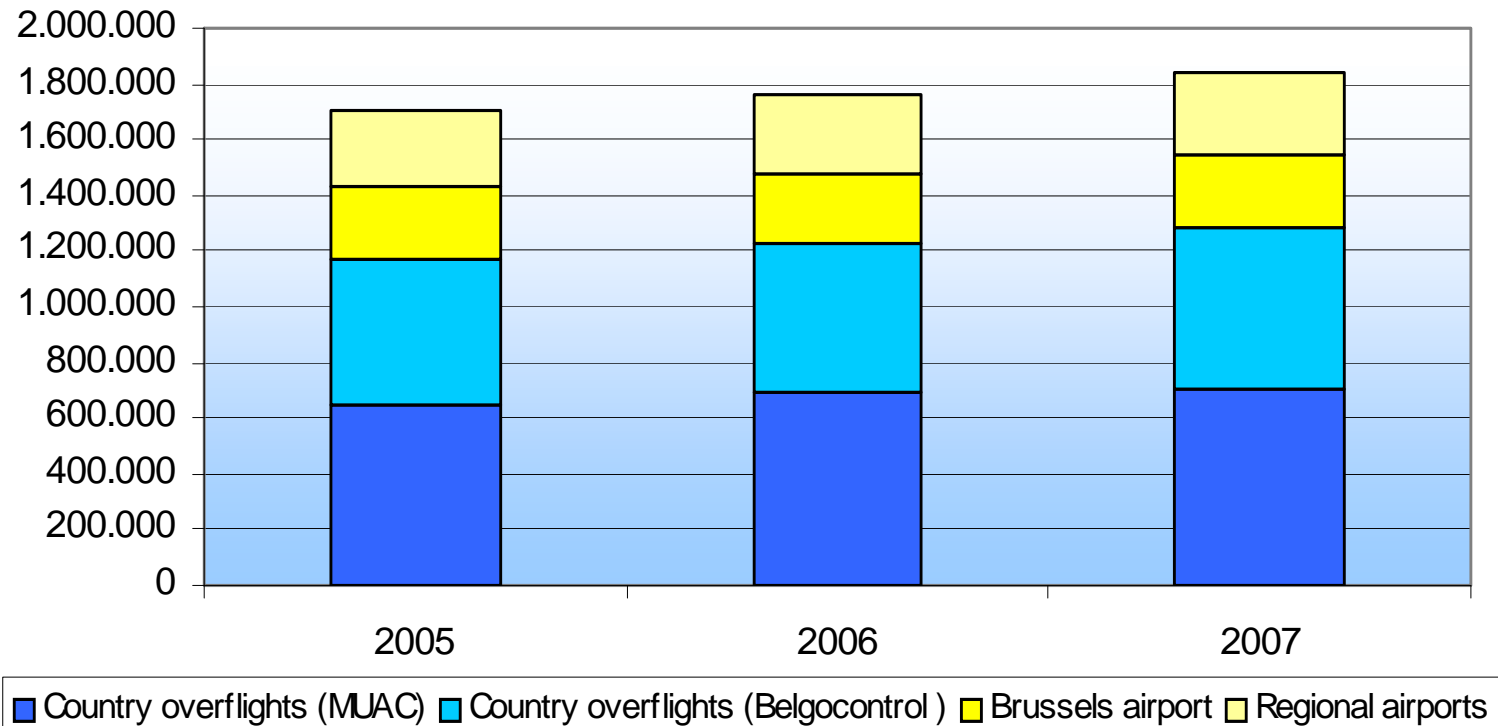


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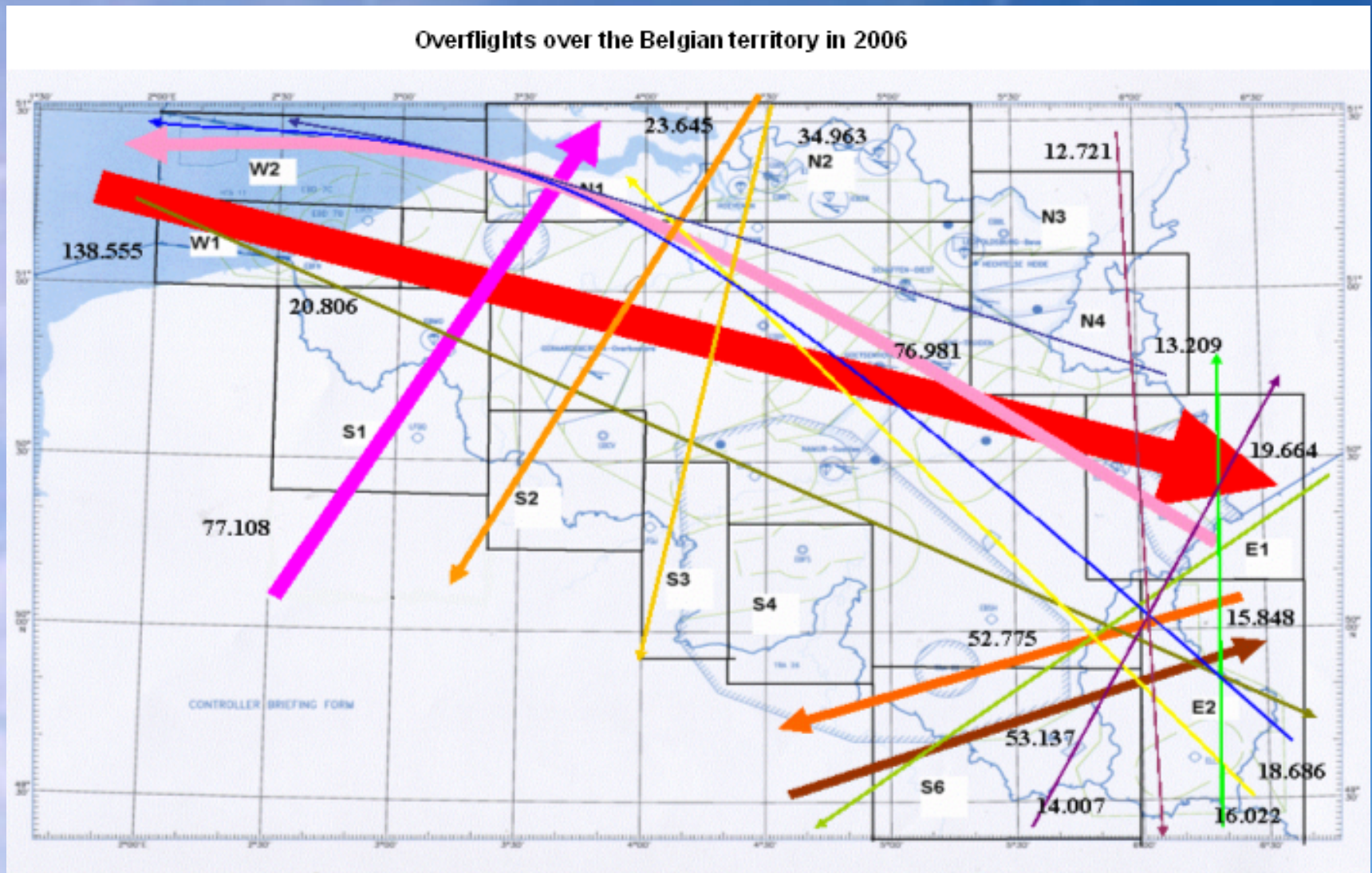
## Aircraft movements in the Belgian airspace



Source : based on Belgocontrol annual reports

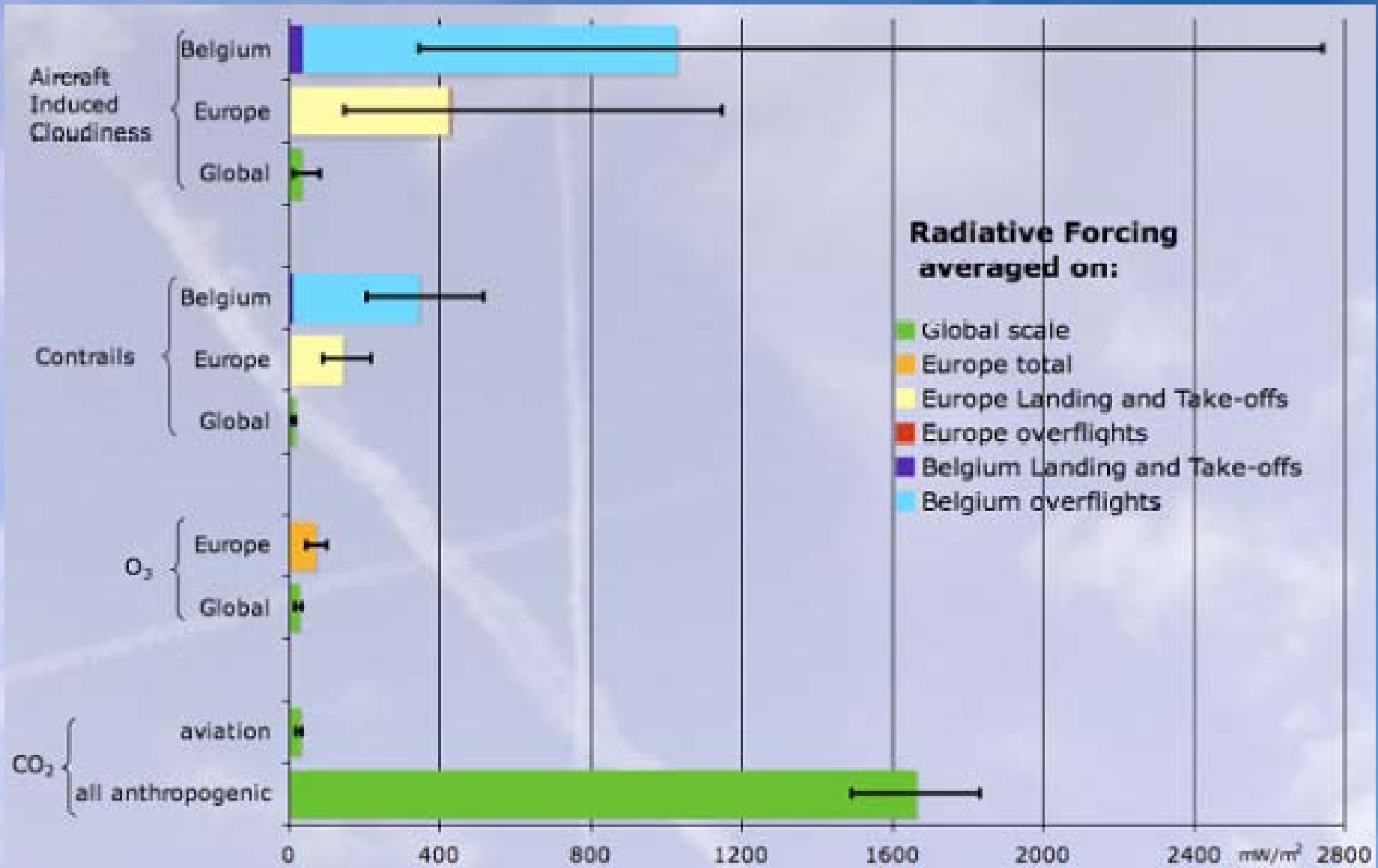
- ~70% of the flights in the Belgian airspace are overflights
- since 2002, movements at regional airports > movements at the Brussels airport, important diminution in the number of flights at Brussels in 2008

### 3. Overflights of the Belgian territory



Source : Belgocontrol, 2007

# 4. Regional climate impacts for Belgium



# 5. Conclusions

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- Belgium will suffer more intensely from non-CO<sub>2</sub> aviation climate impacts
- These impacts are not taken into account in mitigation measures such as the EU-ETS
- Different trade-offs between CO<sub>2</sub> and non-CO<sub>2</sub> mitigation options exist



- Necessity to carefully analyse the whole issue to avoid increasing aviation climate impacts
- Interest in defining complementary measures to mitigate non-CO<sub>2</sub> aviation climate impacts

## II. ABC Impacts forthcoming work

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What has changed since the end of phase I ?

### 1. EU Directive on aviation and ETS

- concerns only CO<sub>2</sub> emissions
- reactions of third countries and ICAO
- similar measures taken by third countries ?

### 2. Global economic crisis

- impacts on aviation development scenarios
- consequences on the EU-ETS efficiency

## II. ABC Impacts forthcoming work (2)

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To be watched closely :

1. EU-ETS revision
2. Post-2012 scheme and objectives
3. Third countries' reactions to the inclusion
4. Update of the aviation development scenarios

Focus on :

1. Regional climate modelling
2. Complementary measures to take non-CO<sub>2</sub> aviation climate impacts into account
3. Definition of the stakeholders' indicators for the MAMCA



Many thanks for your attention !

Any questions ?

More details and information available on :

<http://www.climate.be/abci>