EUROCONTROL

Climate change risks for European aviation

Le rapport de l'OACI « Risk Assessment Guidance »

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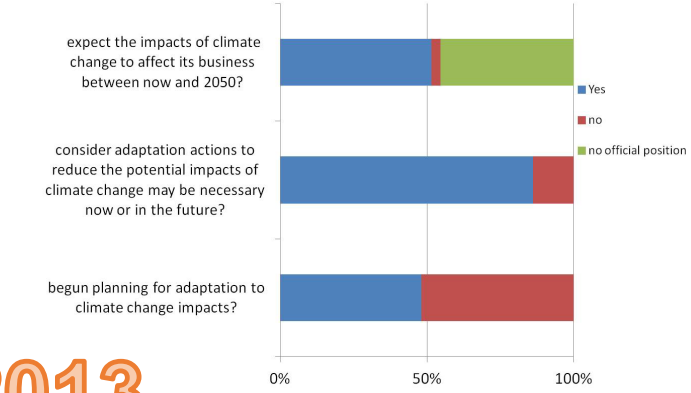
SÉMINAIRE « Résilience des aéroports au changement climatique & aux risques météorologiques extrêmes »

23 NOVEMBRE 2022

EUROCONTROL's work on climate change risk and adaptation

2008



2013

2014

2018

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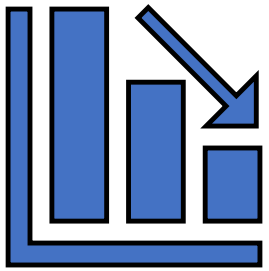
Climate Change Risks for European Aviation 2021

- An overview of short-term weather impacts on European aviation
- Impact of changes in storm patterns and intensity on flight operations
- Impact of sea level rise on European airport capacity
- Impact of climate change on tourism demand
- Impact of changes in wind patterns on flight operations

https://www.eurocontrol.int/publication/eurocontrol-study-climate-change-risks-european-aviation

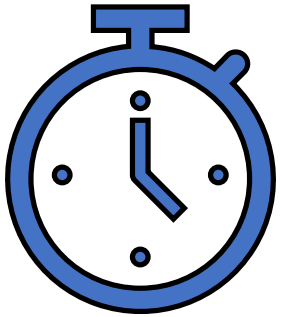
IMPACT OF CHANGES IN STORM PATTERNS AND INTENSITY ON FLIGHT OPERATIONS

Whilst the frequency of major storms associated with SWD is forecast to drop by 2050, the intensity of storms that do affect flights will lead to more significant delay



-8% to -12%

Forecast drop in share of all flights likely to be delayed by a major storm (*if there was no change in the aviation system in 2050)*

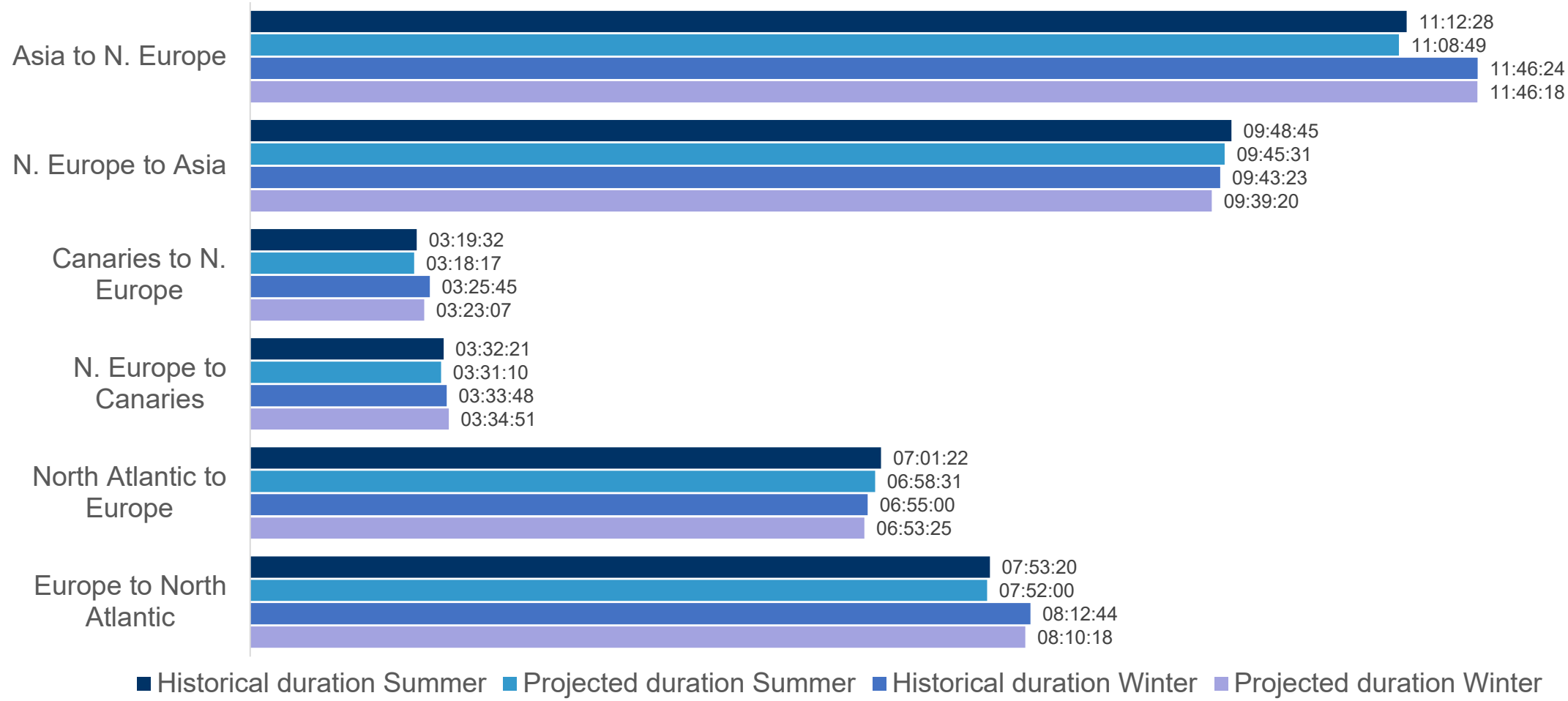


20 to 22 minutes

Forecast average en-route ATFM delay due to weather per flight delayed by a major storm in 2050

IMPACT OF CHANGES IN WIND PATTERNS ON FLIGHT OPERATIONS

Overall flight durations will be shorter for both eastbound and westbound transatlantic flights by 2050



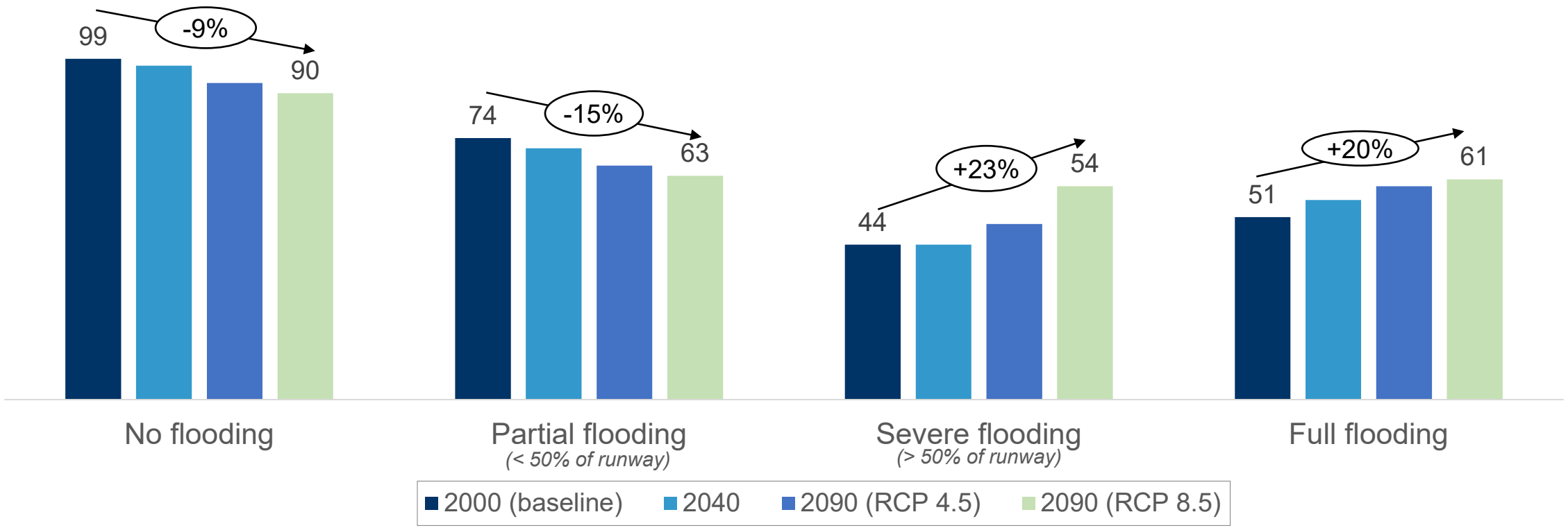
** Where apparent contradictions to the existing literature exist - this is due to more recent TP algorithm and climate models being used in present analysis, including multi-model.*

Average flight duration

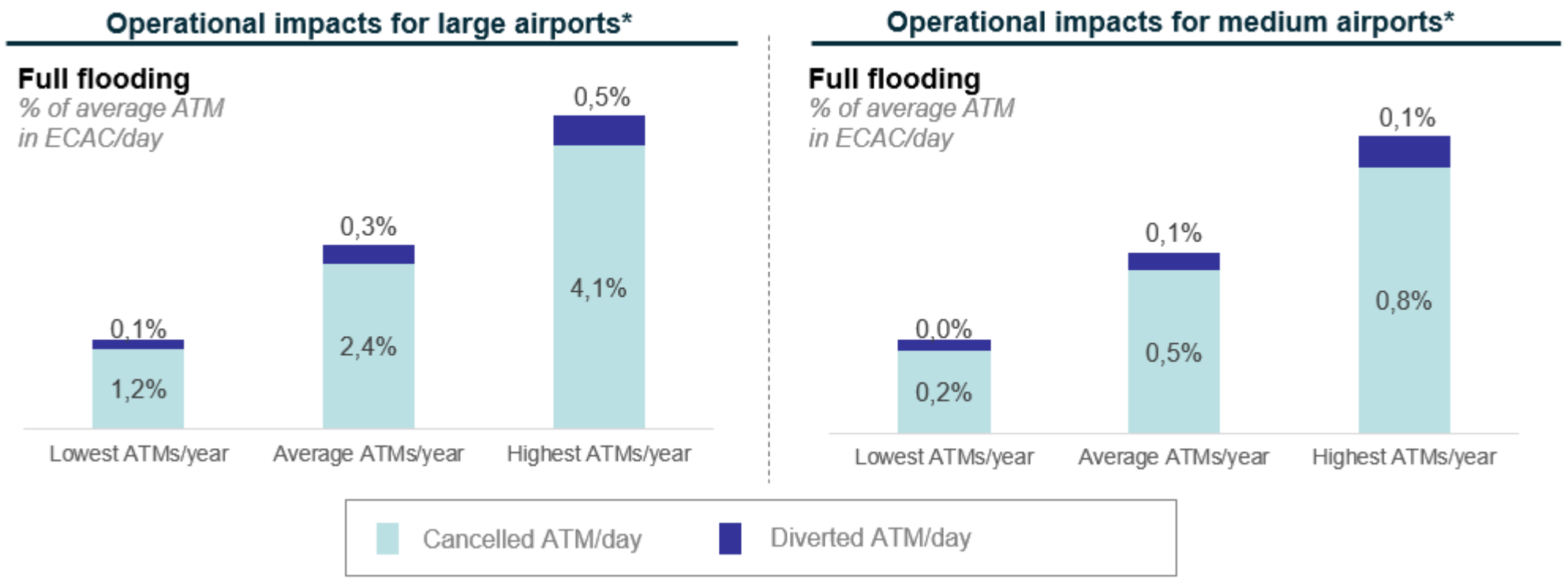
IMPACT OF SEA LEVEL RISE ON EUROPEAN AIRPORT OPERATIONS

Two thirds of coastal and low-lying airports are expected to be at risk of storm surge marine flooding up to 2090

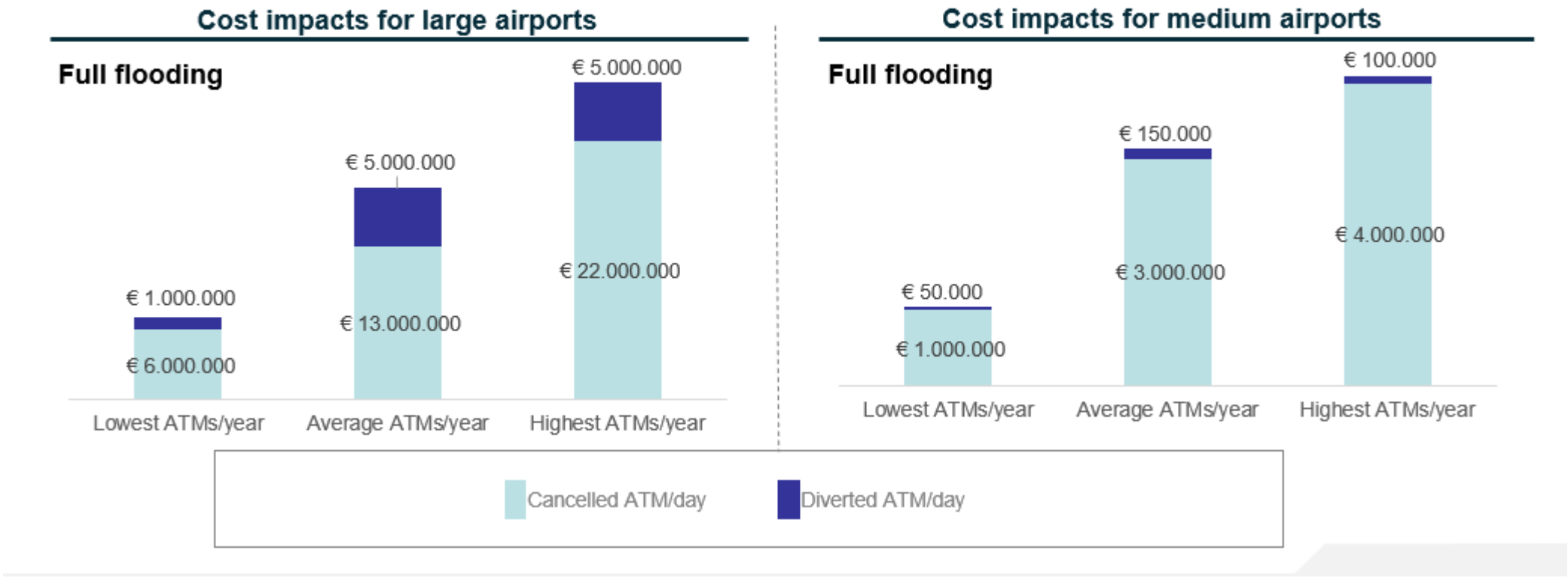
Sample of 270 airports



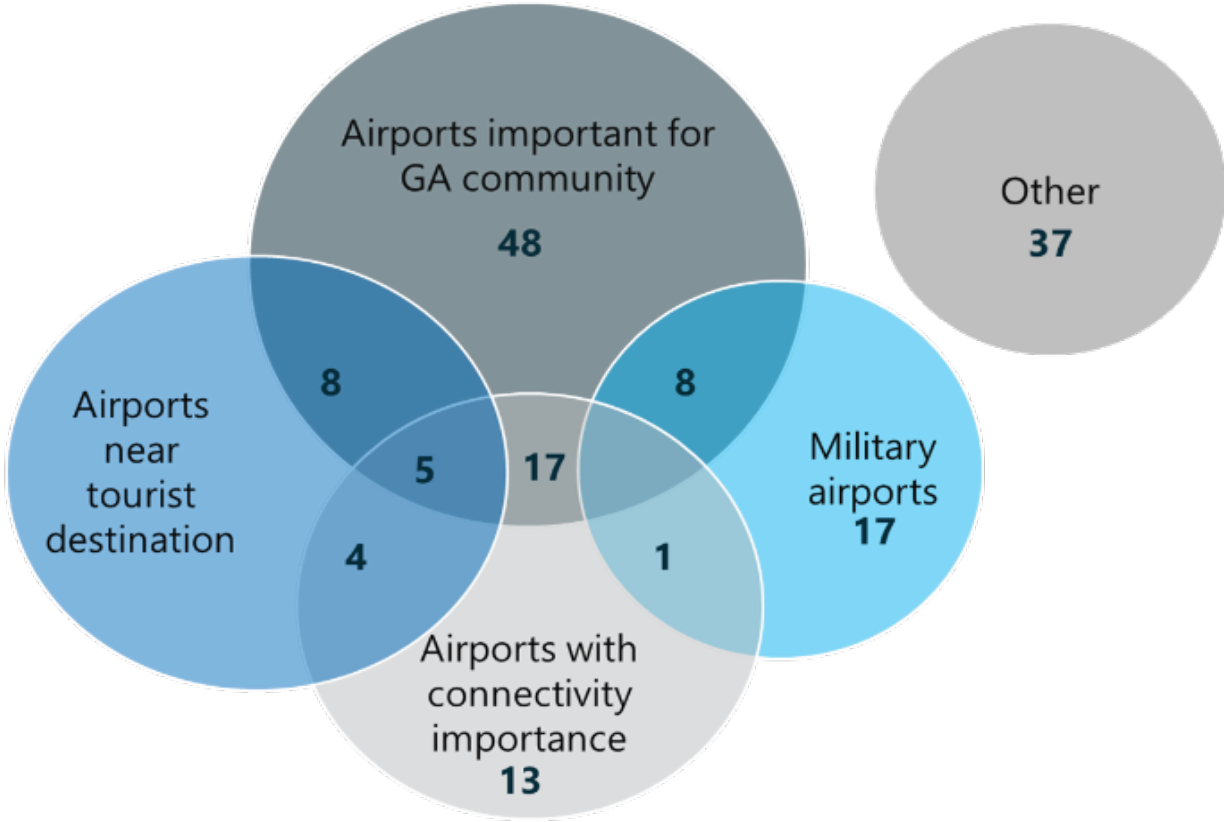
One-day airport closures due to full flooding will have operational impacts



Operational impacts translate into high costs for all stakeholders as a result of loss of activity and damage

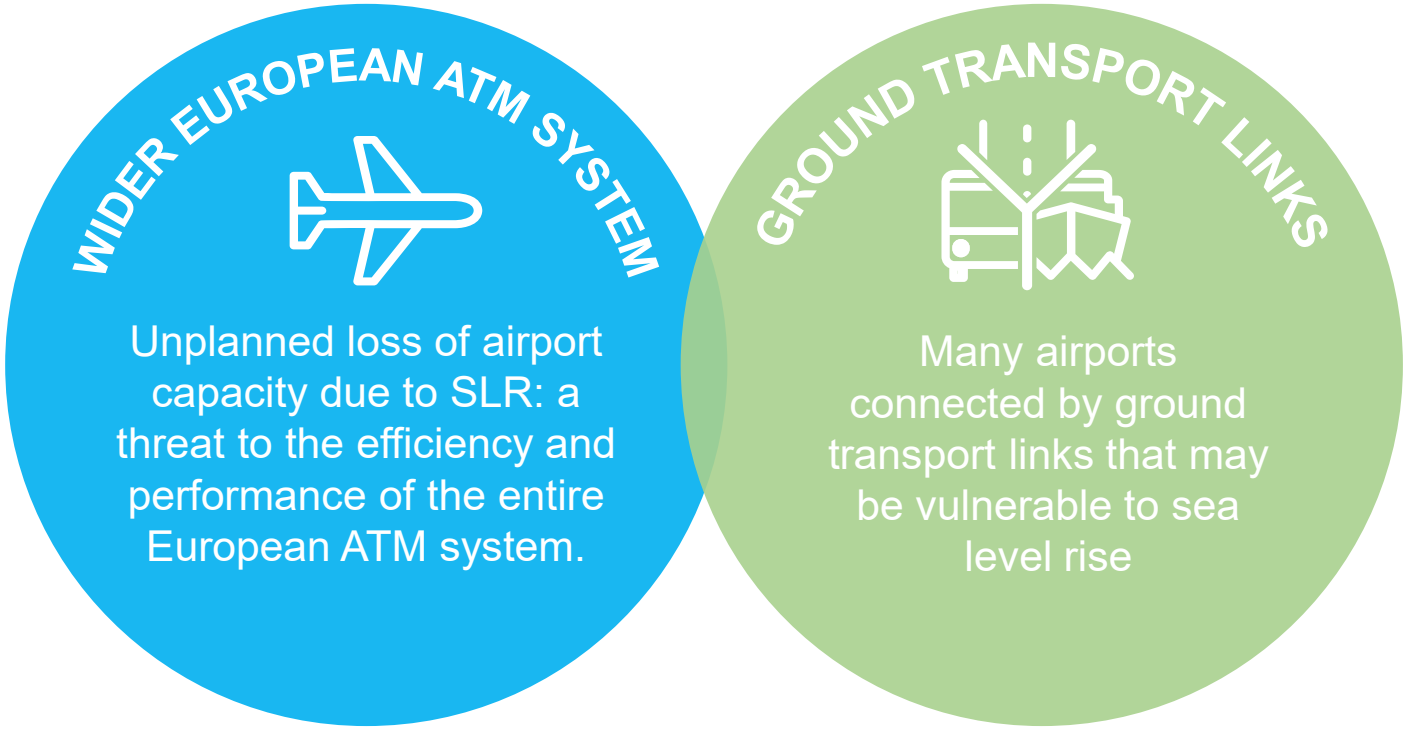


91% of airports at risk of flooding are small airports



Limited cost from delayed/diverted/cancelled flights:
cost to the local economy far more significant

Other consequences beyond direct operational and cost impacts



IMPACT OF CLIMATE CHANGE ON TOURISM DEMAND

Methodology: Tourism Climatic Index (TCI)

The TCI combines five climate variables (**temperature, relative humidity, precipitation, wind speed and sunshine duration**) to quantify the effect of the climate on tourist comfort when undertaking general, light tourism activity such as sightseeing.

Focus on Summer tourism

Timeframe 2050

CID = Daytime comfort

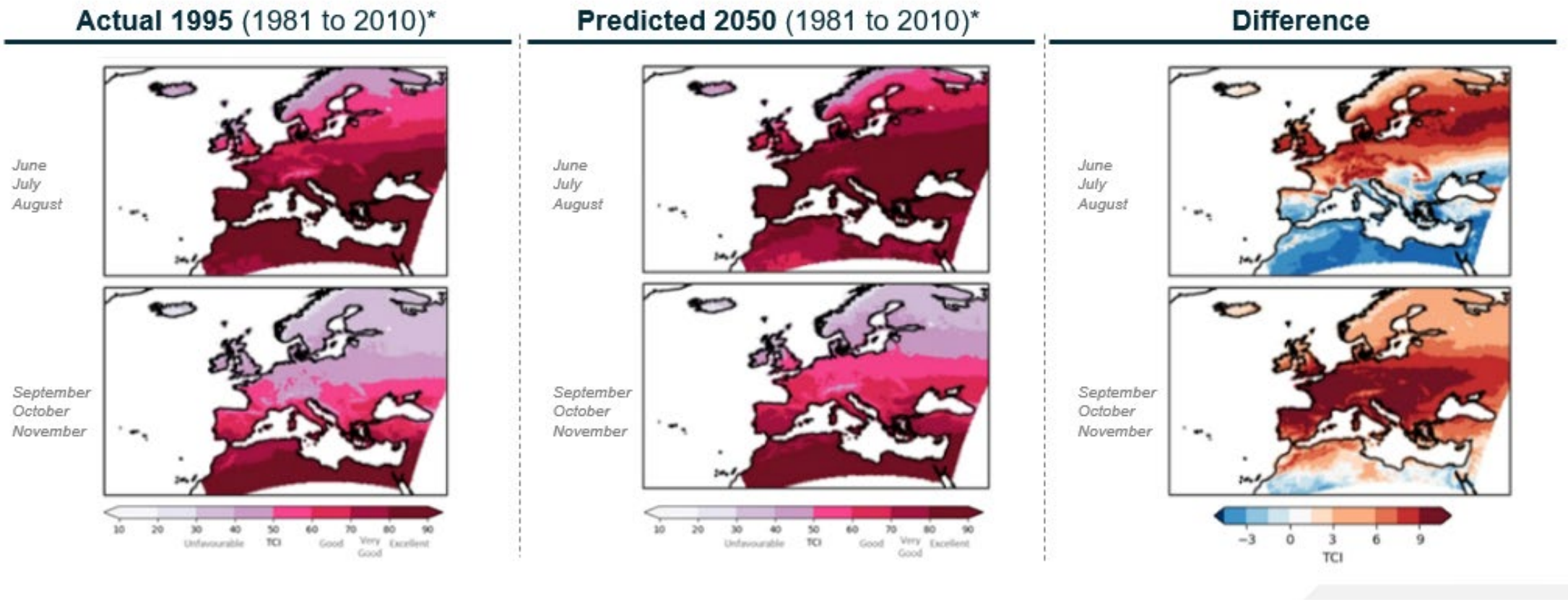
CIA = Average daily thermal comfort

R = Precipitation

S = Sunshine duration

W = Windspeed

Countries are projected to have longer periods of ‘good’ to ‘ideal’ climate for general, low level tourist activity



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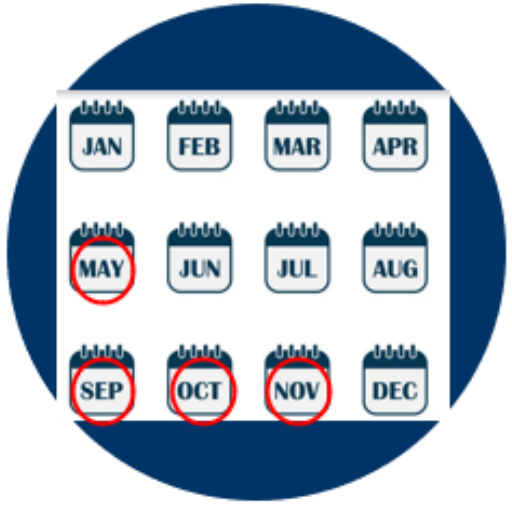
Key trends could drive a growth in tourism flows in shoulder months and potentially shift to north-western Europe

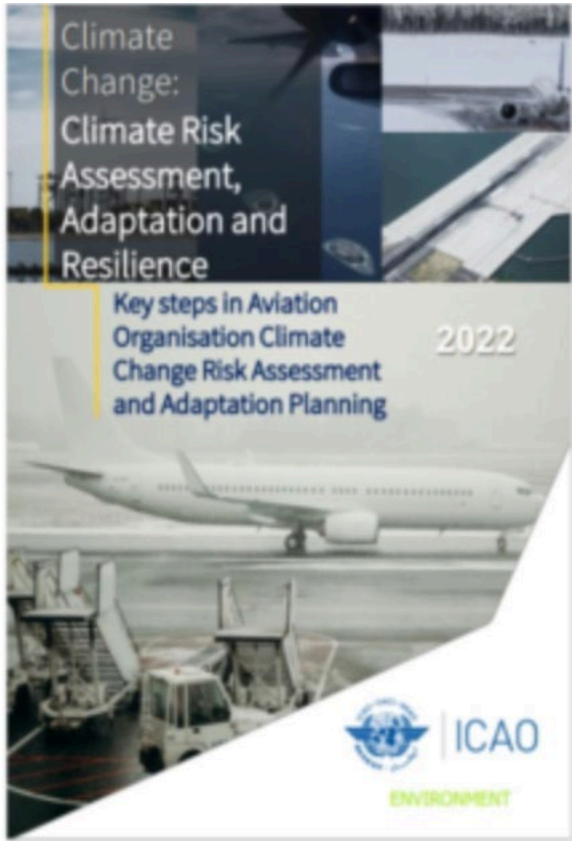


A more favourable climate for general tourism in shoulder months

Increasingly flexible tourist base

Potential for a North Westerly shift

ICAO GUIDANCE ON CLIMATE CHANGE RISK ASSESSMENT AND ADAPTATION PLANNING FOR AVIATION ORGANISATIONS



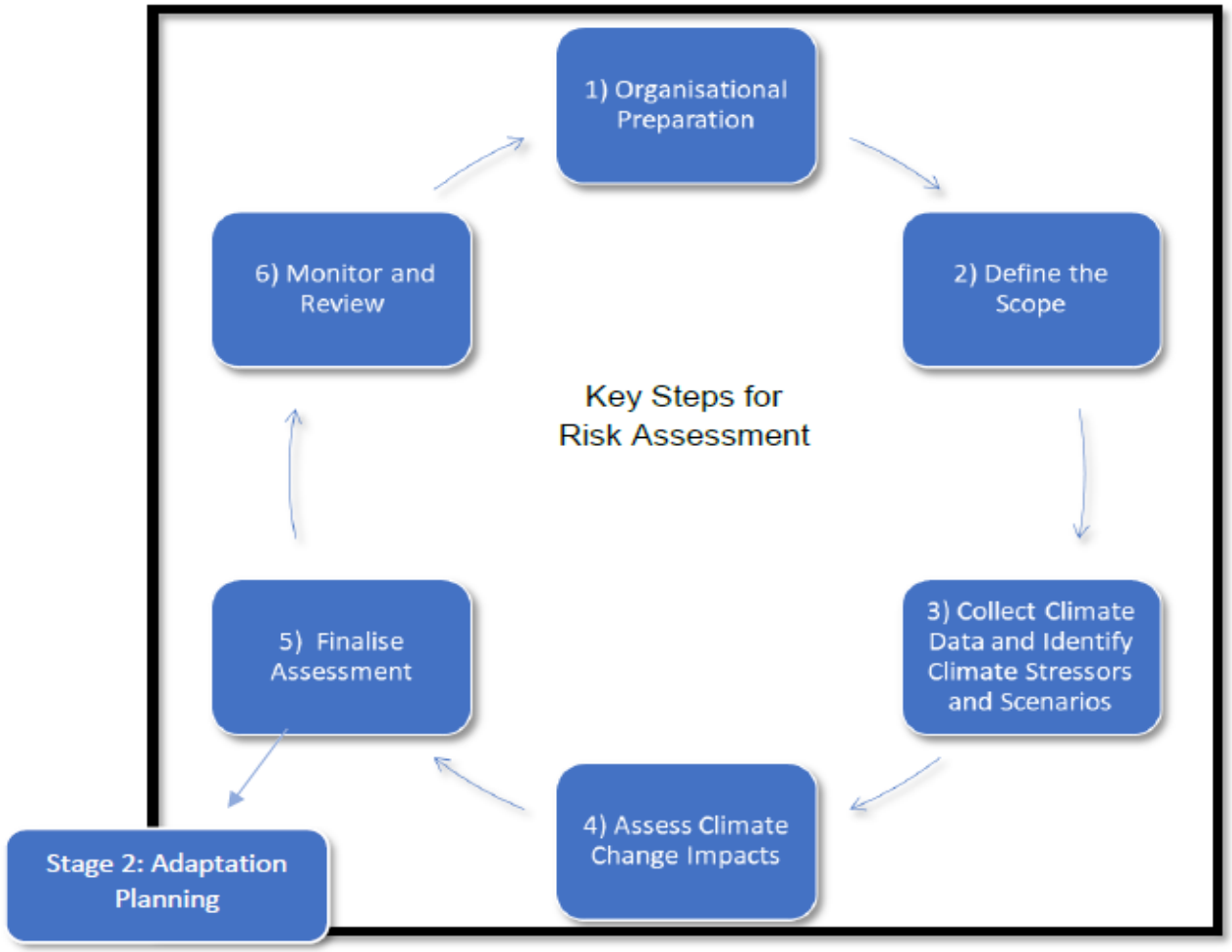
Key Steps for Aviation Organisation Climate Change Risk Assessment and Adaptation Planning

This document sets out a step-by-step process divided into two stages, "Risk Assessment" and "Adaptation Planning", to carry out a climate change risk assessment and develop and implement a climate change adaptation plan. This process can be scaled and utilized by States and organisations of any size or structure.

ICAO Climate Change Risk Assessment and Adaptation Planning Guidance

- Aim: to provide support to States and aviation organisations to adapt and build resilience to the risks of climate change.
- Developed over a three-year period by the ICAO CAEP Working Group on Airports and Operations.
- Approved by the ICAO Council.
- Available from ICAO website https://www.icao.int/environmental-protection/Pages/Climate-Change-Climate-Risk-Assessment,-Adaptation-and-Resilience.aspx
- Provides *generic and non-prescriptive* guidance on:
  - How to do a climate change risk assessment and develop and implement a climate change adaptation plan.
  - An overview of key climate change vulnerabilities which a State or organisation may be at risk from.
  - A menu of potential adaptation options for States and organisations to consider.
- Intended for use by airports, aircraft operators and air navigation service providers (ANSP) across the global aviation network.
- Can also be used by States for climate change risk assessment of their aviation sector.

Stage 1: Key Steps in Aviation Organisation Climate Change Risk Assessment

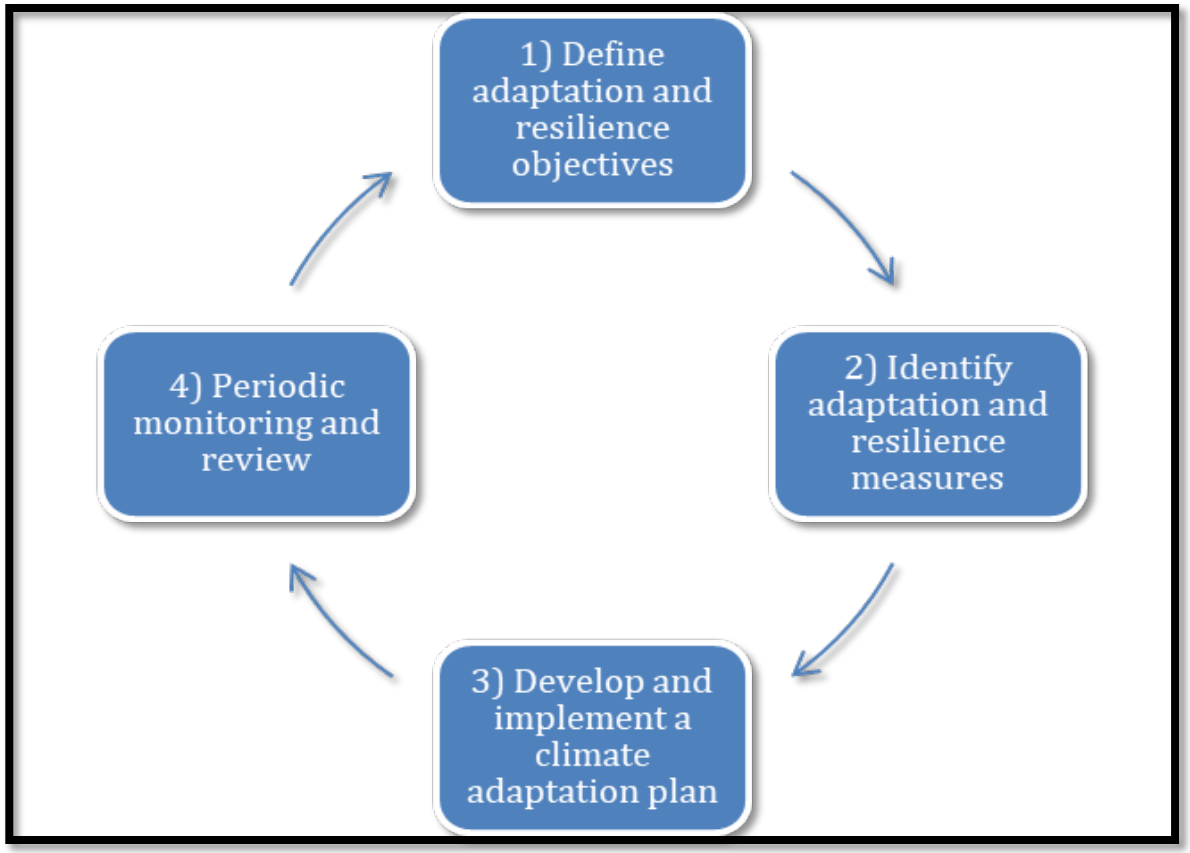


Source: ICAO CAEP WG2 climate change risk assessment GM

Key step 1: Prepare the Organisation for the Assessment

- 1.1 • Get senior leadership commitment
- 1.2 • Identify whether the organisation has any existing governance related to climate change risk and opportunity
- 1.3 • Identify internal expertise and input required across the organisation, and from external partners as required
- 1.4 • Assign roles and responsibilities
- 1.5 • Identify drivers and resources to promote the assessment
- 1.6 • Develop timeline to perform the assessment and identify any intermediary deadlines

Stage 2: Key Steps for Aviation Organisation Climate Change Adaptation Planning



Source: ICAO CAEP WG2 climate change adaptation planning GM

Key Step 1: Define adaptation and resilience objectives

1.1 • Prioritize the criticality of assets and operations

1.2 • High-level identification of potential adaptation and resilience measures

1.3 • Identify risk acceptance level

1.4 • Identify Potential Opportunities

Key Climate Change Vulnerabilities for Aviation Organisations

This document provides an overview Key Climate Change Vulnerabilities for Aviation Organisations for the four climate change impacts categories which respondents to the 2018 ICAO Climate Adaptation Synthesis Report stakeholder survey identified as the climate impacts categories they expect to be most affected by. These are: Higher Average and Extreme Temperatures, Changing Precipitation, Increased Intensity of Storms, and Sea Level Rise. For each organisation type (airports, air navigation service providers (ANSPs), aircraft operators), the document presents a breakdown of potential effects by impact category.

Key Vulnerabilities

CAEP WG2 CLIMATE RISK ASSESSMENT, ADAPTATION AND RESILIENCE:
KEY CLIMATE CHANGE VULNERABLITIES FOR AVAITION ORGANISATIONS

Potential effects from four main climate impacts to aviation risk categories[1]

Airports		
Climate Impact	**Risk Category**	**Potential Effect**
Higher Average and Extreme Temperatures	**Operations**	Runway length: • Limits to operations due to reduced climb performance: higher temperatures reduce thrust and lift of aircraft during take-off, reducing take-off performance and requiring more fuel, or a reduction in overall weight. • Reduced ability of certain airports to take certain aircraft due to runway length limitations and reduced climb performance.

Menu of Adaptation Options

The document provides a menu of possible adaptation options which States and organisations can consider and select from to adapt to and build resilience against identified vulnerabilities. Small Island Developing States (SIDS) can face specific climate change vulnerabilities, especially due to storms and sea level rise, which makes adaptation measures particularly important. In the Menu adaptation options which may be critical for SIDS are indicated with a **"SIDS"** marker

Menu of Adaptation Options

CAEP WG2 CLIMATE RISK ASSESSMENT, ADAPTATION AND RESILIENCE:
MENU OF ADAPTATION OPTIONS

Adapting Airports

Higher Average and Extreme Temperatures

Operations

- ☐ Increase cooling capability in buildings
- ☐ Increase external air conditioning to match demand (e.g., air conditioning pumping cold air outdoors, or supply of pre-conditioned air to aircraft)
- ☐ Implement program to promote safety in the heat for ground staff – potentially extending to aircraft operator and ground handling staff
- ☐ Implement or update wildlife management plans to account for changes in wildlife impacts

Adelaide Airport in Australia is in a trial of irrigating the airport buffer, which may result in lowering airport surface temperatures and improving human thermal comfort.

Infrastructure

- ☐ Extend runway length
- ☐ Move obstacles at the end of the runway (to adjust for reduced take-off performance due to reduced thrust and lift)

EUROPEAN AVIATION CLIMATE CHANGE ADAPTATION WORKING GROUP (EACCA WG)

Purpose of Group

- A need to take a **coordinated and collaborative approach at European level** to build climate change resilience has been identified.
- Important work already being done at network level to mitigate weather impacts on delays and the environment.
- But disruption will increase due to climate change and be compounded by additional impacts such as sea level rise and higher average and extreme temperatures.
- **European Aviation Climate Change Adaptation Working Group (EACCA WG)** intended to ensure that the European aviation sector acts in a proportionate and timely manner to adapt and build resilience to the impacts of climate change.
- Purpose of the Working Group is to provide the European aviation sector stakeholders with a methodology, companion guidance, peer support and good practices on adapting the European aviation sector to the impacts of climate change, with an initial focus on airports.
- Established as part of the Working Arrangements under the Airport Operations Team (AOT).

Role and deliverables

- Act as a **forum for sharing of guidance, best practices and peer support** on adapting the European aviation sector to the impacts of climate change.
- Tasks and deliverables to be defined and agreed by the group during its first meetings and may include, but are not limited to:
- Identify the **areas of action to adapt and build the resilience** of the European aviation sector to climate change, with an initial focus on airports.
- Build on the ICAO guidance on Key Steps in Climate Change Risk Assessment and Adaptation Planning for Aviation Organisations: tailored methodology and expanded guidance material in the context of the complex and interconnected European aviation system.
- Develop a set of good practices on climate change risk assessment and adaptation planning for the European aviation sector, and the sharing of case studies and lessons learnt.
- Develop content which may be used for training purposes e.g. good practices.
- Long-term objective: consider developing the European Aviation Action Plan for Adapting and Building Resilience to the Impacts of Climate Change.

EACCA/1 21st September 2022

- 40 participants (30 in-person) Operational stakeholders (Airports, ANSPs, Pilots)
- Reinforced need to work together across the European Network
- Agreed to develop Expanded guidance material on climate change risk assessments and adaptation planning in the context of the complex and interconnected European aviation system
- Carry-out “baselining” of European aviation stakeholders to establish current level of climate change adaptation.
- Need to consider human factors more: passenger and staff well-being
- Need to use the experience and solutions put in place by stakeholders already heavily touched by climate change and see what kind of developments are already in place in other parts of the world where climate change adaptation is more advanced than in Europe.
- Highlighted that the **aviation sector does not work in isolation and is highly dependent on ground based systems such as transport,** energy and others. Therefore, the discussion on the Expanded Guidance cannot omit the inter-dependent stakeholders.
- **Consider work from other sectors like roads group, water ports, railway.**
- Next meeting 17 January 2022

Thank you for your attention

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