



| ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

**PACIFIC SMALL ISLAND
DEVELOPING STATES
(PSIDS) LIAISON OFFICE**



Contingency Response – Natural Disasters

An ICAO Asia/Pacific Perspective



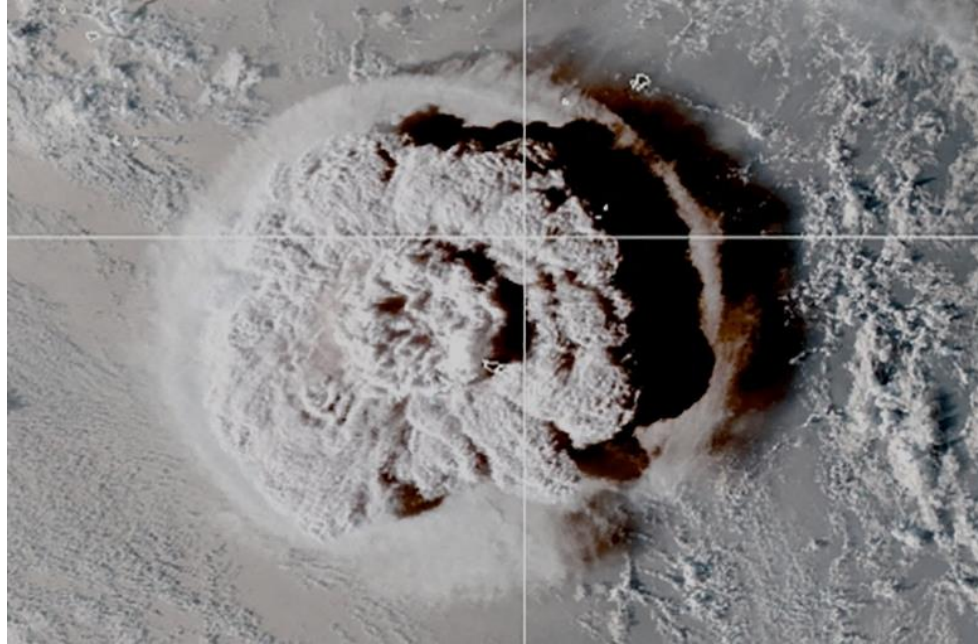
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Humanitarian Assistance and Disaster Response in Aviation

Operational ATM Contingency Response to Natural Disasters

Climate Adaptation and Resilience

Humanitarian Assistance and Disaster Response in Aviation (HADRA)



Humanitarian Assistance and Disaster Response in Aviation



HADRA

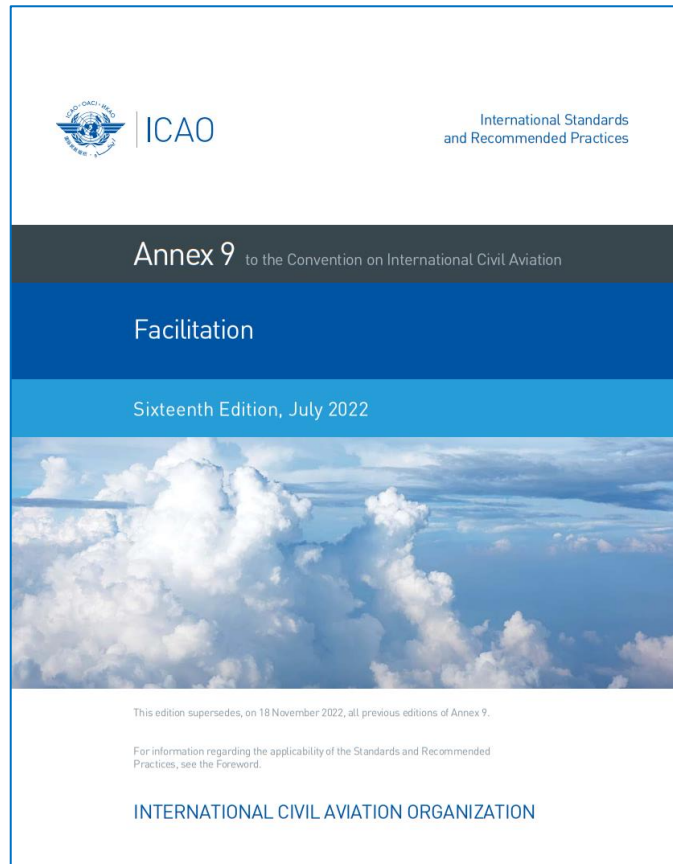
- Objective: *enhance preparedness and response capabilities of States, aviation stakeholders and humanitarian stakeholders in the event of a disaster.*
- Aviation – an essential lifeline in the aftermath of a disaster
- Equipment, supplies, humanitarian experts

Role of ICAO

- Chair of HADRA Experts Group



Relief Flights



Annex 9 - Facilitation

8.8 Contracting States shall facilitate the entry into, departure from and transit through their territories of aircraft engaged in relief flights performed by or on behalf of international organizations recognized by the United Nations or by or on behalf of States themselves and shall take all possible measures to ensure their safe operation. Such relief flights are those undertaken in response to natural and human-caused disasters which seriously endanger human health or the environment, as well as similar emergency situations where United Nations assistance is required. Such flights shall be commenced as quickly as possible after obtaining agreement with the recipient State.

8.9 Contracting States shall ensure that personnel and carry-on baggage, hold baggage, cargo and other goods arriving on relief flights referred to in 8.8 are cleared without delay.



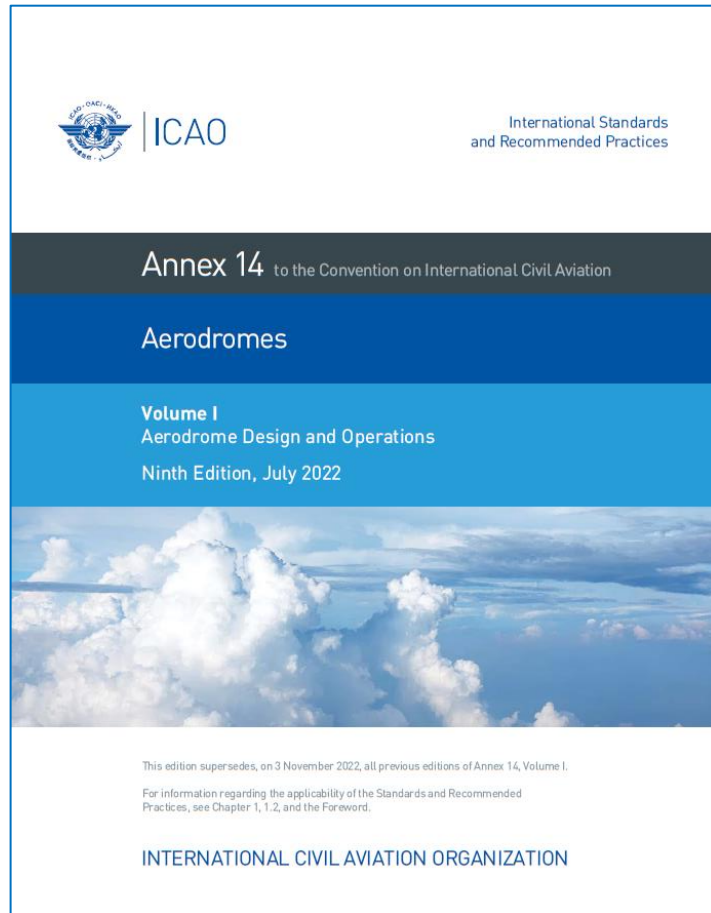
Operational ATM Contingency Response to Natural Disasters

Aerodromes

Air Traffic
Management



Aerodrome Emergency Planning

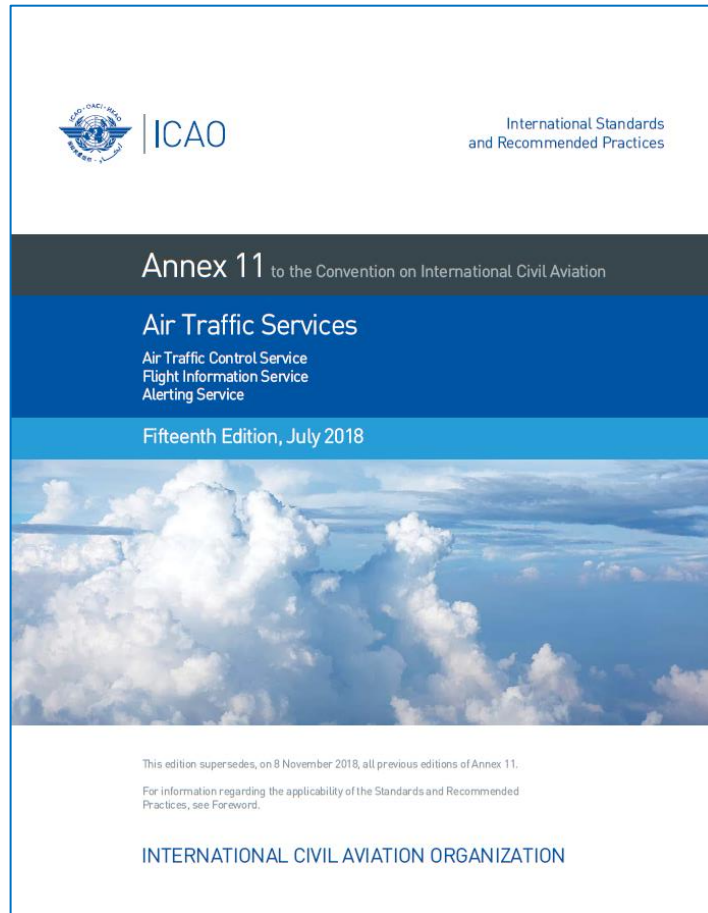


ICAO Annex 14 – Aerodrome Design and Operations
Standard requiring *aerodrome emergency plan* commensurate with aircraft operations and other activities, and providing for the coordination of the actions to be taken in an emergency occurring at an aerodrome or in its vicinity

Examples of emergencies:

- aircraft emergencies
- sabotage including bomb threats,
- unlawfully seized aircraft
- dangerous goods occurrences,
- building fires
- **natural disaster**
- **public health emergencies.**

ATM Contingency Planning



ICAO Annex 11 – Air Traffic Services

Standard requiring that *ATS authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services....*

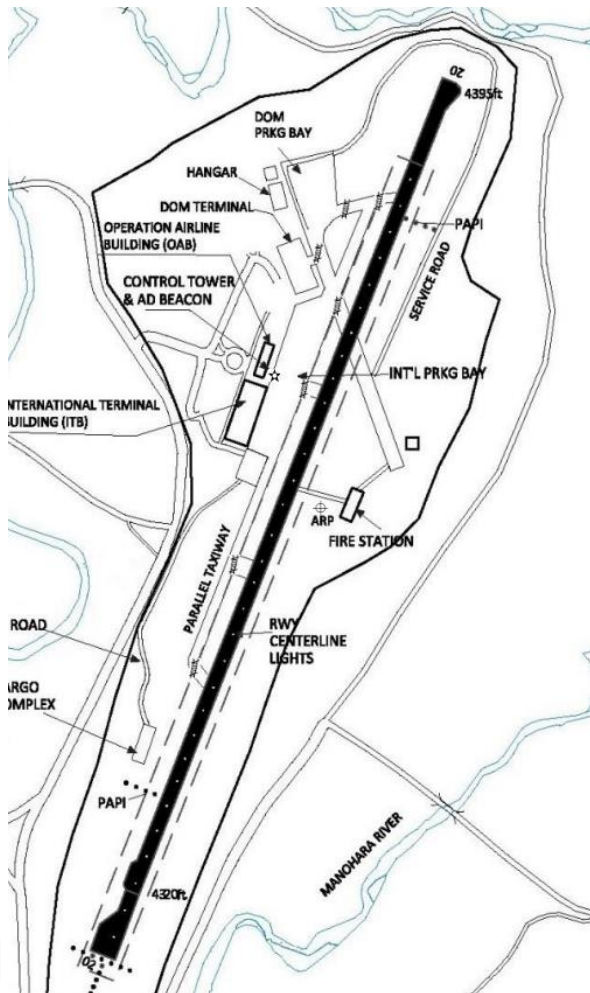
- Preparation of general contingency plans (generally foreseeable events)
- Special contingency plans
 - natural disasters
 - public health emergencies
 - military conflicts
 - unlawful interference with civil aviation

Example 1: Nepal Earthquake April 2015

- Impact
 - Approx. 9000 killed and 22000 injured
 - Major damage
 - Severe disruption to Air Navigation Services
- ICAO – considerable coordination
 - HQ, Regional Office
 - All Air Navigation Services Areas
 - Detailed coordination with Nepal and India
- Importance of ATM Contingency Plans and Aerodrome Emergency Plans
 - Inclusion of natural disaster-induced contingencies
- Importance of collaboration with neighbouring States
 - India – major relief effort covering all sectors
 - ATM and ATFM support



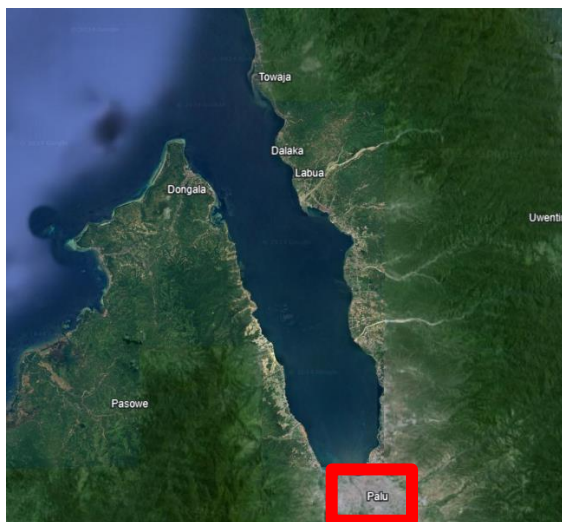
Example 1: Nepal Earthquake April 2015



Nepal Earthquake April 2015

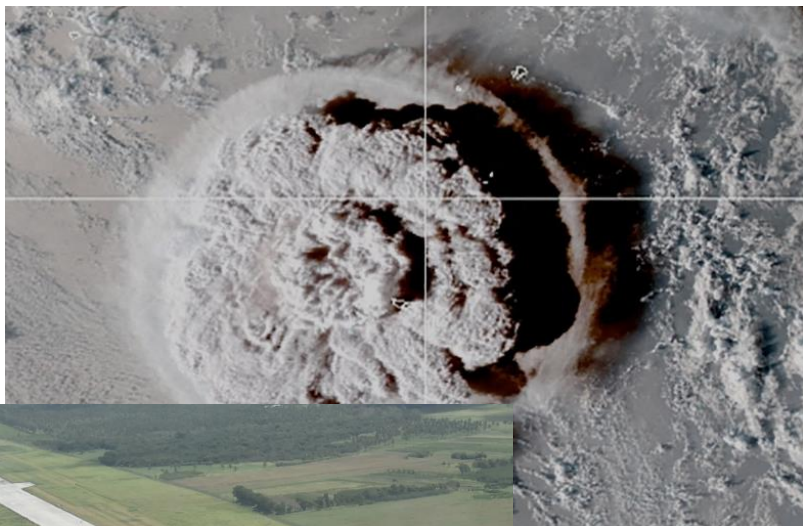
- Importance of moderation in ICAO communications
 - Local ATS and aeronautical authorities overloaded with both aviation and non-aviation demands
- UN and Relief Agencies (and States) Coordination
 - Must take into account the needs of the State
- Operational considerations
 - Limited ATS
 - Aerodrome movement and parking capacity
 - Available approaches and approach and runway lighting
 - Pavement strength
 - MET Services
 - Published coordinate data

Example 2: Palu Indonesia Earthquake and Tsunami – September 2018 -



- More than 4,000 deaths
- Benefits of a robust ATM Contingency Plan
- Benefits of strong communications links between ICAO Regional Offices and States affected by natural disasters or ATM contingencies
- UN Agencies Coordination
 - Nearest aerodromes for relief flights
- International promulgation of domestic NOTAM

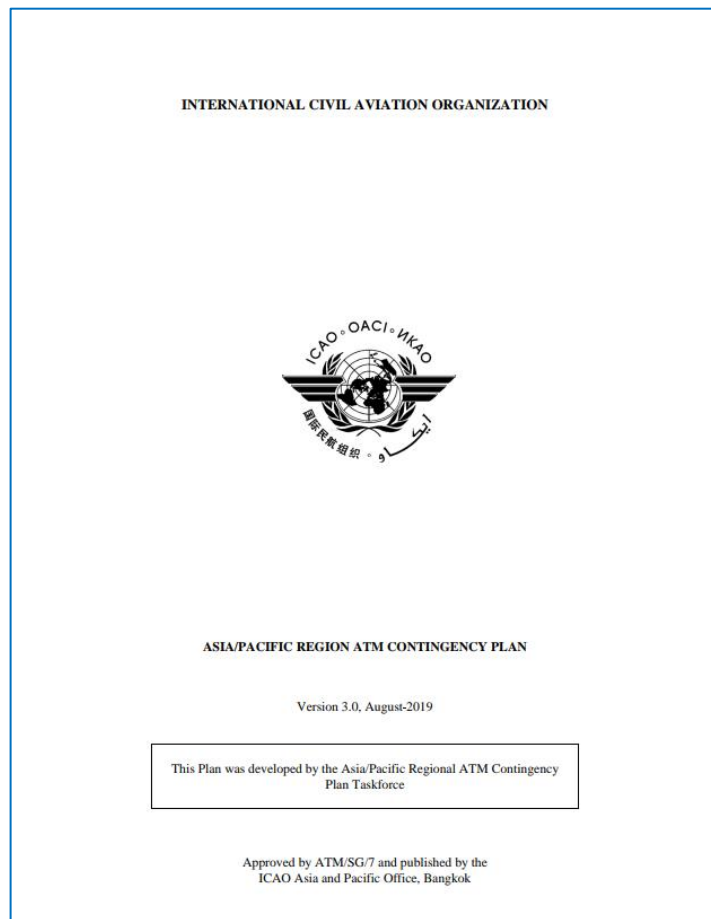
Regional ATM Contingency Plan – Volcanic Ash



- Tonga Sectors within Auckland Oceanic (New Zealand) FIR - NZZO
 - ATS contingency arrangements
 - Initially - Loss of all external communications except HF MWARA
 - Reduction of Air Traffic Services - limited ATC in CTR only, FIS (NZZO) in other parts of Tonga Sector
- Volcanic Ash Contamination
 - Significant contamination of Fua'amotu International Airport
 - Clearing volcanic ash was a big challenge
 - Initially attempted to flush clear with water – unsuccessful
 - Several days to clear using manual means
- Relief operations – RNZAF and RAAF initial relief flights



Asia/Pacific Regional ATM Contingency Plan – Volcanic Ash

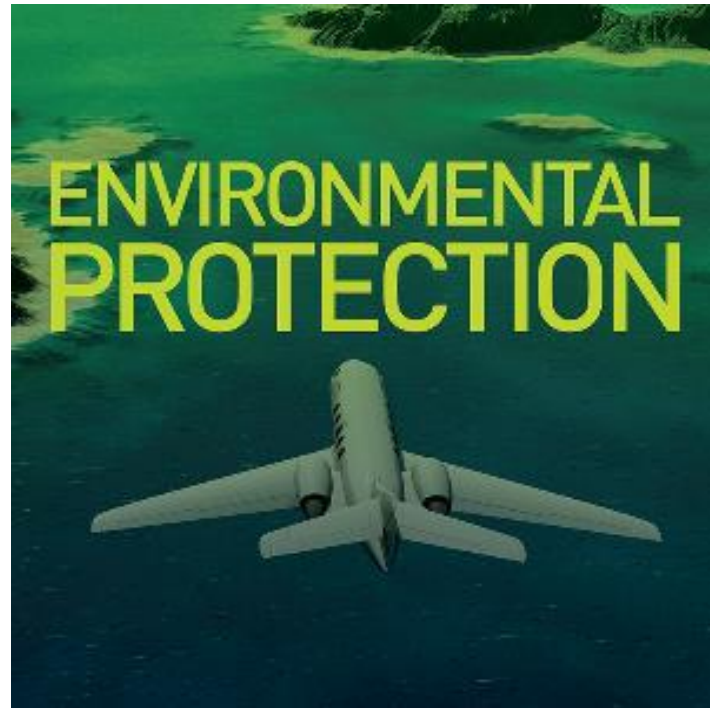


- Regional guidance for response to volcanic ash events
- ATS and Aerodromes
- References:
 - ICAO ATM Volcanic Ash Contingency Plan Template
 - Handbook on the International Airways Volcano Watch – ICAO Doc 9766
 - Flight Safety and Volcanic Ash – Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination – ICAO Doc 9974

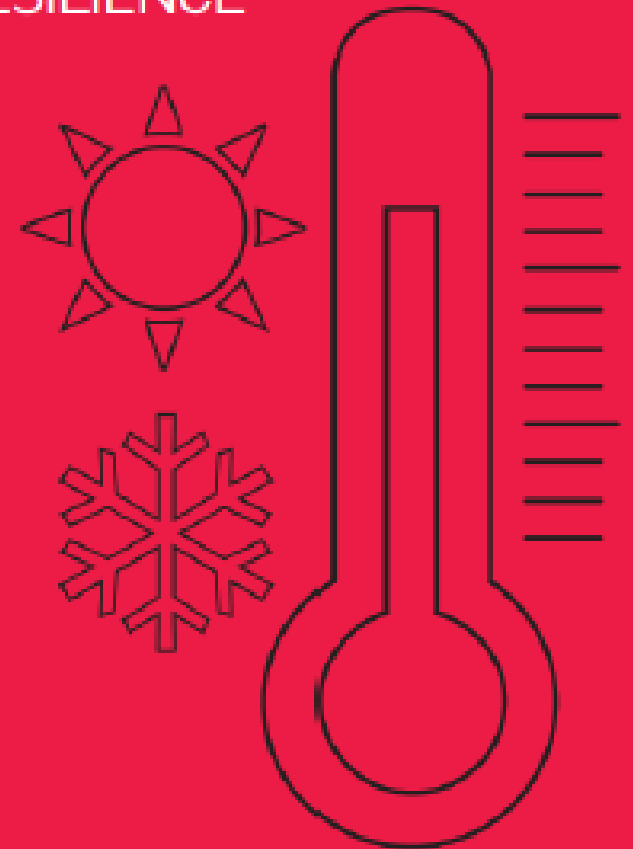
VOLCANIC EXERCISES – COMING SOON TO THE PACIFIC

Climate Adaptation and Resilience

(Airports)



CLIMATE CHANGE ADAPTATION AND RESILIENCE



ICAO Assembly Resolutions on Climate Change

Resolution A38-18 (2013) Paragraph 33. Requested Council:

- to **monitor and disseminate relevant information** on the potential impacts of climate change on international aviation operations and related infrastructure, in cooperation with other relevant international organizations and the industry;

Resolution A39-2 (2016) Paragraph 19. Requested Council:

- to identify the potential impacts of climate change on international aviation operations and related infrastructure and **identify adaptation measures to address the potential climate change impacts**, in cooperation with other relevant international organizations and the industry;

Resolution A40-18 (2019) Paragraph 26. Requested Council:

- to identify the potential impacts of climate change on international aviation operations and related infrastructure, identify adaptation measures to address the potential climate change impacts **and develop guidance on climate change risk assessment for international aviation**, in cooperation with other relevant international organizations and the industry

Resolution A41-21 (2022) Paragraph 29. Requested Council:

- to identify adaptation measures to address the potential climate change impacts and **maintain and enhance guidance on climate change risk assessment and adaptation measures** for international aviation, in cooperation with other relevant international organizations and the industry

ICAO Climate Risk Assessment, Adaptation and Resilience Guidance 2022

[\[link\]](#)



Examples of Climate Impacts and Effects on Airports

CLIMATE IMPACT	RISK CATEGORY	POTENTIAL EFFECT	MENU OF ADAPTATION OPTIONS
Higher Average and Extreme Temperatures	Operations	Runway length: Limits to operations due to reduced climb performance Increased risk of fire	<ul style="list-style-type: none"> - Extend runway length - Cooling runways with recycled water - Pavement design for higher temperatures – design and re-design, maintenance as needed
Increased Intensity of Storms	Business and economics	Revenue losses and/or increased costs linked to: Flight delays, schedule changes, cancellations, and to operations interruptions and others	<ul style="list-style-type: none"> - Early warning systems and emergency management plan - Improved weather data availability and quality for flight planning and during flight execution ^{SIDS}
Sea Level Rise	Operations	Temporary closures of coastal and river airports during recovery from a high tide or storm surge event	<ul style="list-style-type: none"> - Allow a safe degree of inundation ^{SIDS} - Upgrade drainage capacity
Changing Precipitation	Infrastructure	Flooding due to insufficient capacity of storm drainage systems , Disruption to ground transport links	<ul style="list-style-type: none"> - Rainwater catchment systems to adapt to potential water scarcity - Ensure drainage networks are clear, functioning and with sufficient capacity for expected impacts ^{SIDS}

The table adapted from ICAO Guidance on Climate Risk Assessment, Adaptation and Resilience



Thank You!