



ICAO

ENVIRONMENT

Climate Adaptation Synthesis

Changing precipitation

Factsheet



2018

Aviation and Precipitation

Precipitation can include rain, sleet, snow, hail and drizzle as well as a few less common occurrences such as ice pellets, diamond dust and freezing rain. Climate change is expected to change types and quantities of precipitation. Most regions of the world are already experiencing an increase in extreme precipitation events such as extreme rainfall or prolonged drought.

Potential Effects

- More frequent or more intense precipitation can cause flooding and flood damage to runways, and infrastructure. This may affect operations leading to capacity reduction, delays and cancellations and inundation of infrastructure
- Storm drainage systems may not be designed to handle the increased volumes of water. Drainage systems failure could cause pollution control systems to fail, risking groundwater contamination.
- Disruption of ground transport links can reduced access to airports.
- Hazardous take-off and landing conditions may result in the closure or reduction in capacity of airports, or reduction of capacity of Air Traffic Control (ATC) sectors.
- Reduced visibility can increase the application of low visibility procedures.
- Forecasting conditions and precipitation type (e.g., rain, snow, freezing rain) will be more challenging due to warmer temperatures at higher latitudes leading to temperatures fluctuating around the freezing point.
- Drought conditions may lead to reduced water availability with restrictions imposed on water intensive activities.
- Changes in snow conditions may lead to increased requirements for snow clearing and de-icing equipment in some locations but reduced requirements at others. Increased snowfall may cause delays and cancellations, or there may be staffing issues if staff cannot reach the airport.
- In some regions, increased snowfall may cause flooding when temperatures warm, which can damage permafrost under runways.
- The cancellation or delay of flights due to disruptive or extreme weather conditions has financial implications due to lost revenues and increased operating costs and passenger inconvenience

Adaptation and Resilience Measures

- Implementing operational measures to increase robustness and flexibility
- Using augmented low visibility procedures, for example ground based augmentation system (GBAS).
- Improving use of meteorological (MET) forecasting
- Establishing decision-making procedures such as Airport Collaborative Decision Making (A-CDM) and information sharing and training.
- Determining needs for adequate snow and ice removal equipment.

- Implementing a strategy for snow and ice removal at airports, designating a specified number of runways to keep open, measures to enable better access during weather disruptions and grooving of runways to improve traction and drainage during heavy precipitation events.
- For drought conditions, measures to reduce water consumption, protect freshwater resources and build drought resistance are needed.
- Precipitation projections should be taken into account when planning and developing new infrastructure as well as ensuring that appropriate design standards are applied to new buildings to address risks from water ingress and flooding

Sources and additional information:

2018 ICAO CAEP WG2 Task O7.0 Climate Adaptation Synthesis Analysis