

# AN OVERVIEW OF CLIMATE HAZARD IMPACTS TO THE GLOBAL AIRPORT SYSTEM

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## ABSTRACT

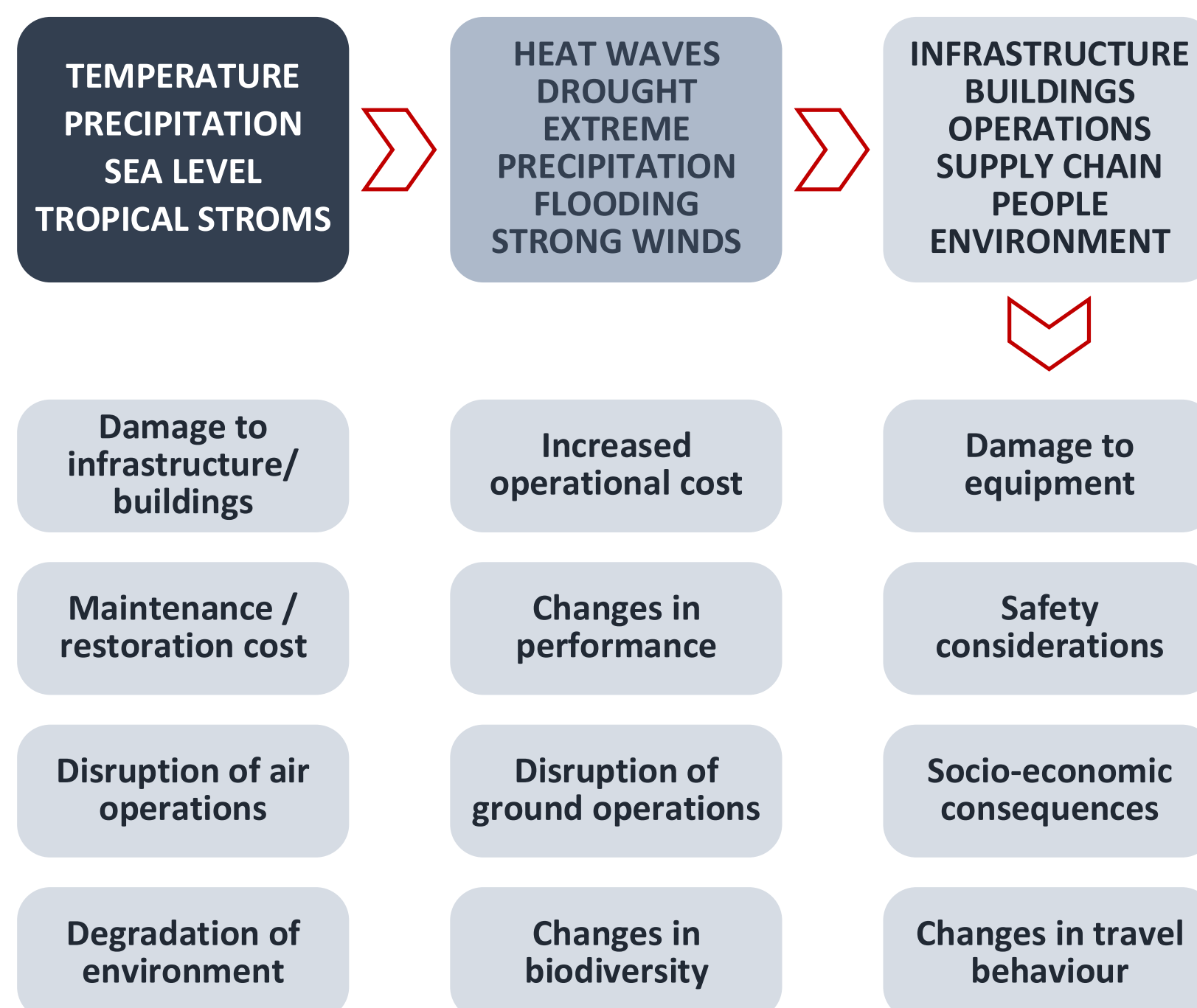
In recent years airports have demonstrated sensitivity to climate hazards, raising various safety, environmental and socio-economic concerns. Evidence from the literature indicates that the occurrence of climate hazard events, including sea level rise, extreme heat, precipitation changes and convective weather, is likely to become more frequent as a result of climatic change. This in turn is likely to place additional stress on airport infrastructure and threatening its ability to maintain their social and economic function. While climate adaptation and hazard management are more established in other major sectors, in the case of airports this issue has only more recently emerged as a risk.

By examining the key challenges airports face in different geographical regions and climate zones, this study examines how climate extremes and hydrological hazards affect the airport system and presents best practices to improve the resilience of airport infrastructure. The key objective of this contribution is to provide a better understanding of the direct and indirect impact of climate hazards and to outline some of the aspects that could be included in climate hazard risk reduction strategies in the future.

## Introduction

The global airport system is exposed to climate variability and change, raising various concerns. Increasing exposure of airports could be a major cause of long-term increases in economic losses from climate hazards as a changing climate scenario might result in inadequate design and operational standards for airports.

## Key climate hazards affecting airports



## What are the implications?



Kansai International Airport after Jebi

### Kansai International Airport & Typhoon Jebi (2018) Osaka, JAPAN

The airport remained closed for 3 days & resumed its operations after 17 days / **total economic impact more than half a billion USD (~ 0.3% of Kansai Region GDP).**



LaGuardia Airport after Hurricane Sandy

### LaGuardia Airport & Hurricane Sandy (2012) New York, USA

Damage to lighting and navigation systems & electrical equipment – the airport remained closed for 3 days / **nearly 17,000 flights were cancelled.**



Disruption at Gatwick Airport, Christmas Eve

### London Gatwick Airport & winter storms (2013/14) London, United Kingdom

Damage to electrical systems and impact on ground access (local roads & rail link) / **around 145 flights were cancelled – direct costs from disruption, damages & welfare costs: £3.2 million.**



Douglas-Charles Airport after Storm Erika

### Douglas-Charles Airport & Storm Erika (2015) DOMINICA, Caribbean Islands

Damage to infrastructure/electrical equipment / **damage USD\$14.5million – loss for the airport USD\$800000.**

## How do airports respond?

### Brisbane Airport – AUSTRALIA

Construction of the new runway 1m above the minimum regulatory requirements; better drainage systems, with channels to reduce tidal flooding and the construction of a seawall.

### San Francisco Airport – USA

Shoreline Protection Program - removal of the existing shoreline protection and installation of a system of concrete-capped steel sheet pile walls and steel king pile walls along the 8 miles of the airport's shoreline.

### Spanish Airports – SPAIN

New infrastructure will consider the rise in energy demand for A/C systems in terminal buildings and longer runways for potential aircraft weight restrictions.

## Conclusions

Climate hazards may lead to physical damage of airport infrastructure/equipment/ supply systems resulting in added restoration/maintenance costs and operational disruptions that affect air connectivity with a negative impact to regional economy.

As changes in extreme weather and climate events will probably increase with further global warming airport systems around the world would need to address climate challenges and to implement measures to improve climate resilience.