International Civil Aviation Organization

INFORMATION PAPER

ICAO Asia and Pacific (APAC)
Twenty-Sixth Meeting of the Meteorology Sub-Group
(MET SG/26)

Online, 1 to 5 August 2022

Agenda Item 6: Research, development and other initiatives

WIND SHEAR PREDICTION SYSTEM IN THE REPUBLIC OF KOREA

(Presented by the Republic of Korea)

SUMMARY

The Republic of Korea is operating a wind shear prediction system to support the safe operation of aircraft taking-off and landing at airports. The wind shear prediction system produces the probability of vertical wind shear, horizontal wind shear, and vertical wind shear on the take-off and landing route based on the Republic of Korea's independent local forecast model.

1. INTRODUCTION

1.1 Since 2020, the Aviation Meteorological Office (AMO) of the Republic of Korea has operated a wind shear prediction system to support safe take-off and landing of aircraft, particularly for Jeju International Airport, which has the most delays and cancellations of flights in the Republic of Korea because of wind shears.

1.2 As airports without Low Level Wind shear Alert System (LLWAS) are in growing need of wind shear prediction system, in February 2022 the AMO expanded the wind shear prediction system to airports across the country.

2. DISCUSSION

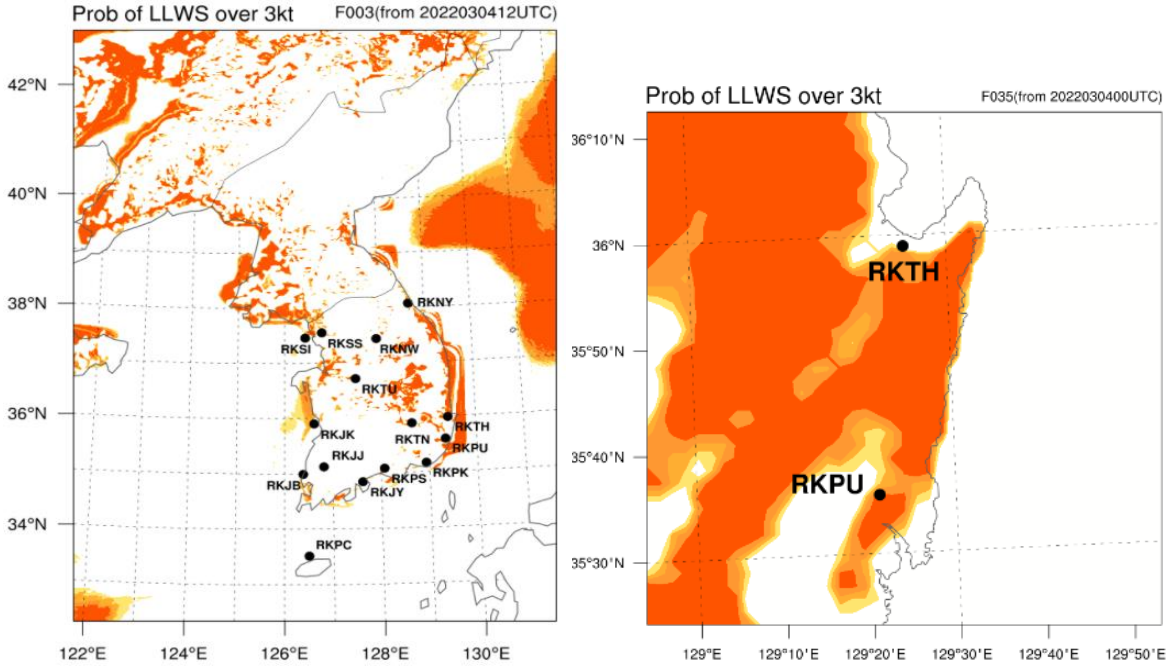
Method

2.1 The Korea Meteorological Administration Post-Processing (KMAPP) method (100 m resolution) that reflects detailed topographic effects is used for weather forecast data at a grid interval of 1.5 km from LDAPS, a UM-based local forecast model of the Korea Meteorological Administration (KMA).

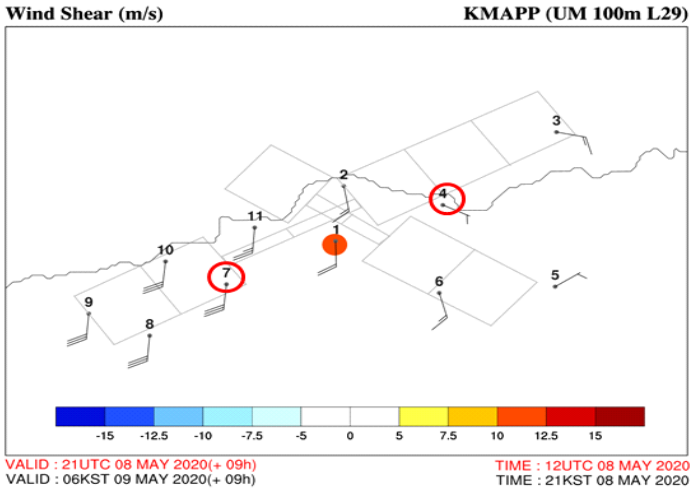
2.2 Vertical wind velocity vectors, rapid wind direction information and others are produced using KMAPP.

Prediction Elements

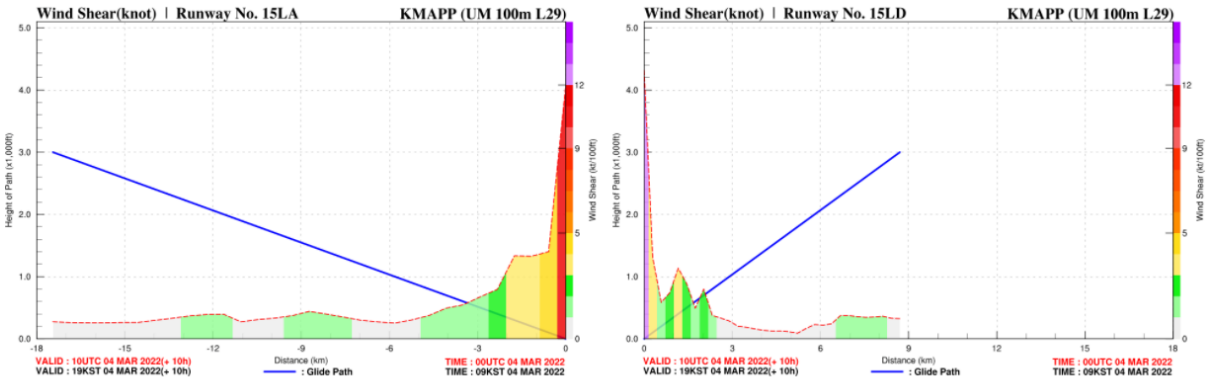
2.3 Probability of vertical wind shear – The wind shear prediction system predicts the existence and probability of vertical wind shears at an altitude of 2,000 ft or below at Jeju International Airport and its surrounding areas. The prediction information is produced twice a day (00, 12 UTC) and provides 72-hour forecasts. The system is operating at 15 airports across the country.



2.4 Horizontal wind shear – The system predicts the likely locations and intensity of horizontal wind shears on the runways and surrounding areas of Jeju International Airport. The forecast data from the airport's LLWAS observation point are converted into runway direction components to calculate headwind and crosswind, and if the difference is more than 15 kts, it is considered as a wind shear. The prediction information is produced four times a day (00, 06, 12, 18 UTC) and provides 48-hour forecasts. The system is operating at Incheon, Jeju, and Yangyang International Airports, which all have LLWASs.



2.5 Vertical wind shear on the take-off and landing route – The system predicts the altitude and intensity of wind shear for a fixed take-off and landing route at Jeju International Airport. When the difference of wind vector at intervals of 100 ft is 5 kts or more on the aircraft take-off and landing route, it is considered as a wind shear. The prediction information is produced four times a day (00, 06, 12, 18 UTC) and provides 48-hour forecasts. The system is operating at 15 airports across the country.



Utilisation

2.6 Referring to the wind shear prediction system, the AMO forecasters issue wind shear warnings and produce weather information for airports.

Future Plans

2.7 The AMO plans to evaluate the usability of the horizontal wind shear prediction system based on LLWAS, as well as of the vertical wind shear prediction system based on AMDAR.

2.8 In addition, the AMO plans to analyse the LLWAS algorithm to allow even the airports without LLWAS to predict horizontal wind shears.

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.