



International Civil Aviation Organization

**THE FIFTH MEETING OF ASIA/PACIFIC METEOROLOGICAL  
HAZARDS TASK FORCE (MET/H TF/5)**

Seoul, the Republic of Korea, 18 – 20 March 2015

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**Agenda Item 3:      Guidance material**

**USE AND UPGRADE OF KOREA TURBULENCE GUIDANCE**

(Presented by the Republic of Korea)

**SUMMARY**

This paper presents the information of improved forecast guidance on turbulence: seasonal and the Korean Peninsula-Korea Turbulence Guidance, – which is used to issue area forecast and the SIGMET information. KMA is planning to develop the global turbulence forecast guidance and provide users with more useful data related to flight operations.

**1.      INTRODUCTION**

1.1            Korea Meteorological Administration (KMA) introduced “*Korea Turbulence Guidance (KTG)*” in the last meeting (MET/H TF/4), and was invited to provide a detailed report on progress and performance of KTG system.

1.2            Forecasters are using KTG data to constantly issue low and mid-level area forecast, SIGMETs and AIRMETs. This data is open to members on the website for the relevant services units. After the last meeting, KMA upgraded the quality of turbulence guidance, resulting in the development of seasonal-KTG and the Korean Peninsula-KTG system. Forecasters have started to user the data since February 2015.

1.3            KMA also continues to develop forecast guidance on hazardous weather phenomena to flight, such as icing and fog (part of them developed already). KMA is planning to conduct research and development (R&D) on global turbulence.

**2.      UPGRADE OF KTG**

2.1            KMA uses the KTG to provide more accurate turbulence information based on the numerical weather prediction model of KMA and data reported by pilots (PIREPs) covering East Asia and Incheon FIR. Development and validation of seasonal-KTG have been finished in consideration of different causes of turbulence for each season.

2.2 In addition, KMA developed the Korean Peninsula-KTG system (KP-KTG) optimized for Incheon FIR by using the method of operational KTG system based on local NWP model - with horizontal resolution of 1.5km - and PIREPs. This data is made four times (00, 06, 12 and 18UTC) per day at an interval of three hours with a lead time of 24 hours, so forecasters can use more detailed and accurate data near Incheon FIR. KMA continues to try to improve the performance of forecast through validation using recent PIREPs.

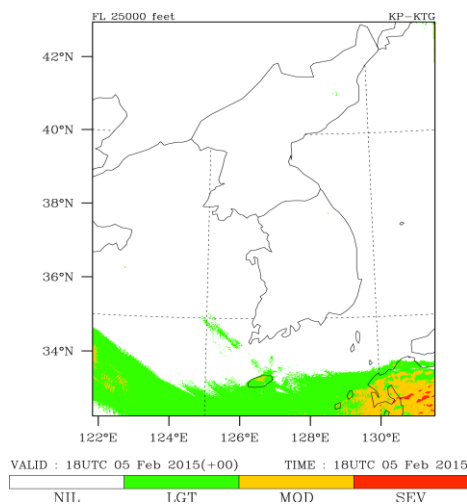


Fig.1 the Korean Peninsula KTG forecast data

2.3 A few turbulence indices are selected and combined to make KP-KTG, KMA uses 15 indices in this algorithm. When using a function of combined several turbulence indices, predictability of turbulence was much more improved compared with only one index. Especially AUC (Area Under Curve) value in using a function combined 5 indices had the highest predictability (AUC value was 0.886) of turbulence in the Korean Peninsula.

### 3. USE OF KTG DATA

3.1 Forecasters issue low and mid-level area forecast, SIGMET and AIRMET information for turbulence by using KTG, seasonal-KTG and KP-KTG. Moreover, as KTG data is available internally from Integrated Meteorological Analysis System in KMA, it is possible to overlap with various forecast data in this system.

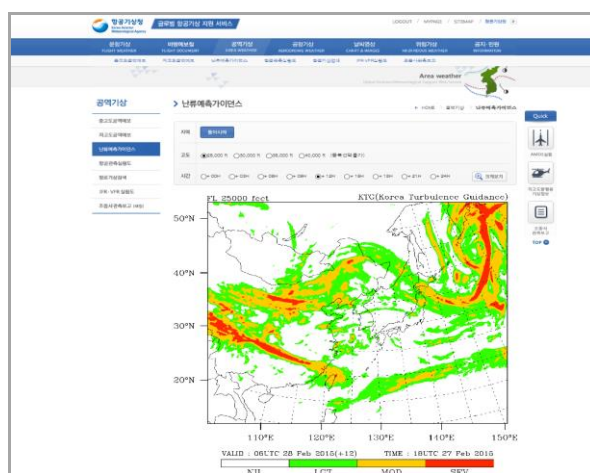


Fig.2 KTG data services through website

3.2 KMA has started to provide the KTG data officially through its website since October 2014 for the relevant service units including flight control center, airlines, etc.

#### **4. FURTHER PROCESS**

4.1 KMA is planning to provide more KTG data which is mid-level(10000, 15000 and 20000ft) and low-level(5000ft) forecast guidance this year. Thus KMA expects to provide more useful data for the flight safety and reduction of unexpected damage, especially at the low altitude.

4.2 KMA will undertake development and validation of the global forecast guidance on turbulence from 2015, based on global numerical weather prediction model of KMA, it plans to provide the data to states in need and is looking forward to contributing to air navigation in the region and the world.

#### **5. ACTION BY THE MEETING**

5.1 The meeting is invited to note the information contained in this paper.

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