



*International Civil Aviation Organization*

## **INFORMATION PAPER**

### **TWENTIETH MEETING OF THE METEOROLOGY SUB-GROUP (MET SG/20) OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG)**

*Bangkok, Thailand, 6 – 9 June 2016*

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#### **Agenda Item 6: Research, development and implementation issues in the MET field**

##### **6.1 Observations, reports, forecasts, advisories and warnings**

### **WORK ON THE IMPROVEMENT OF SIGMET ISSUANCE**

(Presented by China)

#### **SUMMARY**

This paper presents work undertaken by China on improving the availability and quality of Significant Meteorological information (SIGMET) in the region, including actions taken during SIGMET trial and planned enhancements, to support the provision of SIGMET advisories for the region to contribute towards the safety, regularity and efficiency of civil aviation.

#### **1. INTRODUCTION**

1.1 Problems with either the issuance, dissemination and/or formatting of SIGMET exist in many regions which is a major concern to the aviation industry. At the first ICAO Meteorological Warnings Study Group (METWSG) meeting in November 2007, a group of experts discussed ways to improve the reliable issuance of accurate, coherent and complete SIGMET by Meteorological Watch Offices (MWO). It has been recognized for some time by the Air Navigation Commission (ANC) that there is a need to improve the capabilities of MWOs to issue SIGMET.

1.2 Since METWSG/2, many efforts were put into the issue of SIGMET improvement and several actions were undertaken by China, such as hosting SIGMET advisory trial in Asia, developing system for the preparation, issuance and dissemination of SIGMET advisory, issuing SIGMETs for the Phnom Penh (VDPP) FIR, providing on-the-job training for forecasters from the State Secretariat of Civil Aviation (SSCA) of Cambodia, and arranging training courses under the Voluntary Cooperation Programme (VCP) of WMO to help to develop the knowledge in the issuance of SIGMETs and in application of the SIGMET advisory information.

1.3 While the Regional Hazardous Weather Advisory Centre (RHWAC) workstream under the Working Group on Meteorological Information and Service Development (WG-MISD) works to develop a holistic solution to meet the users' requirement on hazardous weather information, to provide technical support and advice for preparation of SIGMET, China plans to strengthen its support for regional collaboration through its Asian Aviation Weather Centre (AAWC) to be established.

## 2. DISCUSSION

2.1 Actions taken to improve the quality and efficiency of SIGMET issuance.

2.1.1 SIGMET advisory trial in Asia

2.1.1.1 The third meeting of the ICAO Meteorological Warnings Study Group (METWSG/3) had identified China to host the SIGMET advisory trial in Asian region during 4 May to 30 July, covering 10 countries, namely Bangladesh, Cambodia, Mainland China, Democratic People's Republic of Korea, Lao People's Democratic Republic, Mongolia, Myanmar, Nepal, Thailand and Vietnam, i.e. 19 FIRs (18 MWOs).

2.1.1.2 During the trial, SIGMET advisories were issued in both textual and graphical format for thunderstorms and severe turbulence occurring above 10,000 feet (> FL100) every 4 hours, with possible updates when there are significant changes in the weather phenomena (only for thunderstorms during the trial) before next advisory. The textual advisories were disseminated via both AFTN and internet (the Asian Aeronautical Meteorology Service website, <http://www.aamets.org>), while the graphical ones were disseminated only via the internet.

2.1.2 System for SIGMET advisory issuance

2.1.2.1 To underpin the provision of SIGMET advisory, a system, named SIGMET Advisory Information System, was developed for weather monitoring and for the preparation, issuance and dissemination of SIGMET advisory, which is based on the numerical weather prediction model outputs, meteorological satellite products, weather radar data, air reports and other weather information.

2.1.2.2 The most important function of the system is that the SIGMET advisories (both the textual and graphical ones) can be prepared, issued and disseminated automatically by the system or by human through the man-machine interface in the system.

2.1.2.3 The system was used for the SIGMET advisory trial in Asia and contributed much to the success of the trial. Results of the 3-month running showed that this system run steadily with friendly interface. And it can also be used for SIGMET issuance. A snapshot of the system was shown in the following figures.

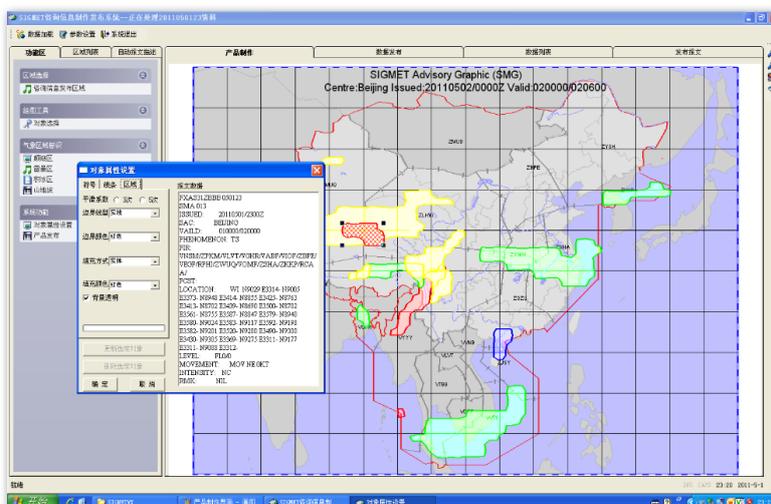


Figure 1. Properties setting interface of the SIGMET advisory system.

### 2.1.3 High-resolution numerical weather prediction model products

2.1.3.1 Another system to underpin the provision of SIGMET advisory is NWP. The China Aviation Numerical Forecast Systems (CANFS), which have been deployed in Beijing, Shanghai and Guangzhou by ATMB of CAAC, has an update cycle of 3 hours and validity period of 72 hours. The coverage area of the CANFS deployed at Guangzhou is indicated in Figure 2. A global model T639 (with resolution about 28km) is also used to provide global numerical weather forecasts.



Figure 2. Coverage area of CANFS products (Guangzhou).

### 2.1.4 Website for dissemination

2.1.4.1 The Asian Aeronautical Meteorology Service website (<http://www.aamets.org/>) established by China for the WMO RA II Pilot Project to develop support for developing countries has been fully operationally used from November 2010 and allows access by all authorized users. The website provides amongst others, aeronautical forecast products such as thunderstorm area, potential icing and turbulence area, convective parameters, dust storm, composite radar image, FY-2G(?) satellite product, etc. It was also used to disseminate the SIGMET advisories during the SIGMET advisory trial. Further enhancement to the website will be undertaken to enrich its content, and to make it more informative and user-friendly.

### 2.1.5 The WMO Severe Weather Forecasting Demonstration Project in Southeast Asia

2.1.5.1 (SWFDP-SeA) hosted by National Meteorological Center of China Meteorological Administration (CMA), has set up its website (<http://eng.weather.gov.cn/swfdp/>). From July 2012, products of disaster weather monitoring and forecast, which are based on CMA's global numerical weather prediction system and FY2 stationary satellite, have been published and provided through the website to four Southeast Asian recipient countries.

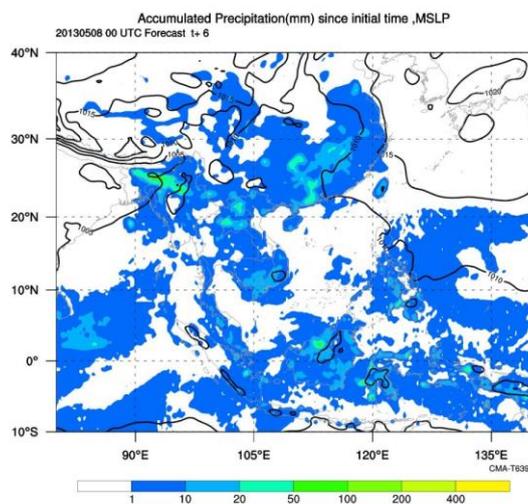


Figure 3. SWFDP-SeA products

#### 2.1.6 Links with the MWOs

2.1.6.1 Close contact with some participating MWOs by telephone or email was established during the SIGMET advisory trial, especially with the MWOs that are identified to have SIGMET deficiencies, which made the communication easier and more effective to discuss and improve the SIGMET and SIGMET advisory issuance and the application of SIGMET advisory. The links are kept and updated, especially via the VCP training courses and would be useful for future contact.

2.1.6.2 Close contact with Phnom Penh MWO will be also kept through the exchange visits between both China and Cambodia and on-the-job trainings, which will be arranged regularly in future.

#### 2.1.7 Issuance of SIGMET for the Phnom Penh FIR

2.1.7.1 A bilateral Letter of Agreement between the Air Traffic Management Bureau of the Civil Aviation Administration of China (ATMB of CAAC) and the Flight Operation and Safety Department of the State Secretariat of Civil Aviation of Cambodia (FOSD of SSCA) became effective on 1 June 2009. In light of the bilateral Letter of Agreement, Kunming (ZPPP) MWO (from 1 June 2009 to 31 August 2010) and Chengdu (ZUUU) MWO (since 1 September 2010) issues SIGMET for the Phnom Penh FIR on behalf of the Phnom Penh MWO.

2.1.7.2 Four Exchange visits meeting between both sides and two on-the-job trainings was provided for aviation weather forecasters from Cambodia. Forecasters from Cambodia were also invited to work together with local forecasters to better understand how to issue SIGMETs for Phnom Penh FIR and Kunming FIR.

#### 2.1.8 WMO VCP training course

2.1.8.1 In recent years, under the framework of WMO VCP framework, four VCP training courses were organized by China to develop the knowledge about the SIGMET issuance, nowcasting methods and meteorological service for terminal area, aviation meteorological personnel competency assessment, and future Aeronautical Meteorological services (see accompanying IP/06). Apart from providing SIGMET advisory information, in future, VCP training courses will also be arranged regularly, at least one two week course every year, to train aeronautical forecasters to develop

knowledge about the issuance of SIGMET and share of best practice. The VCP training course for 2016 is planned to be conducted in October. MWO aviation forecasters in the region are welcomed to attend.

### **3. FUTURE WORK**

3.1 A new generation of FY satellite, FY-4A, will be launched in late 2016 or early 2017. FY-4A will have 14 spectral channels at resolutions of 0.5 to 1km for visible channels and 2 to 4 km resolutions for IR and NIR channels. In addition to Advanced Geostationary Radiation Imager (AGRI) for radiance measurement, FY-4A will be equipped with Geostationary Interferometric Infrared Sounder (GIIRS) and Lightning Mapping Imager (LMI) for obtaining vertical profiles and lightning data. This would keep us in good stead to support the issuance of SIGMET in the region.

3.2 Noting the success of the SIGMET trial, where the statistics showed the availability of SIGMETs during the trial had improved over the same period for the past three years, in particular for two MWOs in LAO PDR and DPR Korea where there are SIGMET deficiency concern and the positive feedbacks from MWOs and users (detailed evaluation and performance indicators of the results of the SIGMET advisory trial were summarized in the Summary of Discussion of METWSG/4), it is considered that these systems so developed should be further consolidated and enhanced to support the issuance of SIGMET in the region to contribute towards safety, efficiency and regularity of civil aviation. In this regard, China plans to strengthen its support for regional collaboration by providing SIGMET advisory information through its Asian Aviation Weather Centre to be established as a collaborative effort of CAAC, CMA and the Hong Kong Observatory.

3.3 China will continue its effort in the provision of SIGMET training under WMO VCP framework. MWO aviation forecasters in the region are welcomed to attend.

### **4. ACTION BY THE MEETING**

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

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