International Civil Aviation Organization

FIFTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP (CNS/MET SG/15) OF APANPIRG

Bangkok, Thailand, 25 – 29 July 2011

Agenda Item 8: Regional Implementation of World Area Forecast System (WAFS)

REGIONAL PROGRESS IN WAFS IMPLEMENTATION

(Presented by Chairman, WAFS Implementation Task Force)

SUMMARY

This paper reports on the progress of WAFS implementation in the ASIA/PAC Region.

This paper relates to – **Strategic Objectives:**

A: **Safety** – Enhance global civil aviation safety
C: **Environmental Protection and Sustainable Development of Air Transport**

Global Plan Initiatives:
GPI-19 Meteorological Systems

1. Introduction

1.1 This paper reports on the progress of WAFS implementation in the ASIA/PAC Region subsequent to CNS/MET SG/14 and discusses the follow-up actions that are needed to ensure implementation and utilization of the WAFS products in the ASIA/PAC Region.

2. Regional Progress

2.1 The progress of WAFS implementation in the ASIA/PAC Region has been tracked by the document ASIA/PAC WAFS Implementation Plan and Procedures developed and maintained by the WAFS/I TF since 1998. This document was last updated by CNS/MET SG/14 in July 2010 and is included as Appendix A to this paper for review and necessary updating by this meeting.

2.2 The meeting is invited to review the progress of WAFS implementation in the ASIA/PAC Region against the "Indicative Timetable for Implementation of WAFS" given in the ASIA/PAC WAFS Implementation Plan and Procedures (see Appendix A), in particular the progress of the following items, which are already due for completion or will be due for completion within the next year:

Item	Task/Stage of Implementation of WAFS	Anticipated Date
19	WAFCs provide web-based gridded forecasts of icing, turbulence and CB	Removed from WAFS long term plan
20	Regional training on the use of the gridded forecasts	TBD
21	WAFS end-user workstations upgraded to accept the GRIB2 code form	May 2011 – Nov 2013
22	Termination of the ISCS-G2 service	30 June 2012
23	Broadcast of WAFS forecasts in the GRIB1 ceases	Nov 2013

2.3 Regarding item 20, training through the provision of computer-based training products and web-based training package for States on the operational use of new gridded WAFS forecasts would be deferred until visualization standards for these elements had been finalized and timescales for their operational implementation had been determined. However, to support the operational use of the new gridded WAFS forecasts, WAFSOPSG/6 agreed to develop guidance on their interpretation (Conclusion 6/12). In addition it was agreed that the WAFS Provider States would review the training requirements for the new gridded WAFS forecasts for CB clouds, icing and turbulence in light of the development of the guidance on their interpretation (Conclusion 6/13).

2.4 The meeting may also wish to note that, at the WAFSOPSG/6 meeting, the users reiterated the requirement for SIGWX forecasts in their current format. However, it is noted that the WAFS SIGWX charts were not the same as the WAFS upper-air gridded forecasts. Visualization of the WAFS upper-air gridded forecasts could not be expected to duplicate or align with the current SIGWX forecasts since the latter was human-produced and the former was computer produced. In this connection, the WAFSOPSG/6 meeting agreed that the WAFC Provider States should continue with the provision of WAFS SIGWX forecasts in the current formats, viz. BUFR code and PNG chart forms (Decision 6/17). In addition, the IATA member was invited to develop, in consultation with the World Meteorological Organization (WMO), a detailed concept of operations which would include requirements for the provision of probabilistic forecasts of icing and turbulence expressed in terms of indices rather than categories (Conclusion 6/16).

2.5 The WAFSOPSG/6 meeting endorsed the draft Amendment 76 to Annex 3 - *Meteorological Service for International Air Navigation* (Conclusion 6.3), which would:

a) enable the provision of concatenated route-specific wind/temperature forecasts;
b) introduce additional wind and temperature forecasts for FL 410 (175 hPa) prepared by the world area forecast centres (WAFC);
c) introduce additional geopotential altitude forecasts for FL 270 (350 hPa) and FL 410 (175 hPa) prepared by the WAFCs;
d) render operational the WAFS gridded significant weather (SIGWX) forecasts for CB clouds, icing and turbulence[1]; and

[1] The rendering of the "operational" status of the gridded forecasts for CB, icing and turbulence is conditional upon the successful harmonization of the WAFS gridded data sets for these products; positive results of the forthcoming verification of the forecasts; and provision of updated guidance material on the new gridded data.

e) enable the alignment of SIGWX charts during back-up operations between WAFCs.

3. Future Work Programme

3.1 In the light of the above discussion, the meeting may wish to consider the necessary changes to the ASIA/PAC WAFS Implementation Plan and Procedures, and to review the work programme and composition of the WAFS/I TF (Appendix B) and formulate the following decision:

Decision 15/xx – ASIA/PAC WAFS Implementation Plan and WAFS Implementation Task Force

That,

(a) the ASIA/PAC WAFS Implementation Plan and Procedures be amended as shown in Appendix xx to the report;

(b) the work programme and composition of the WAFS Implementation Task Force be amended as given in Appendix xx to the report.

4. Issues on WAFS trial gridded forecasts

4.1 At the WAFSOPSG/6 meeting, WAFC Provider States were invited to provide updated guidance material on the interpretation of new gridded data, pursue further improvement and harmonization of the WAFS gridded forecasts for turbulence, icing and CB cloud and to conduct routine verification of the WAFS gridded forecasts using extensive datasets to establish to the extent possible the quality of the products in different parts of the world and report back to WAFSOPSG/7.

4.2 To support this effort, Hong Kong, China gathered icing reports in March 2011 and conducted qualitative comparison with trial gridded maximum icing potential. All reports were within Hong Kong FIR and between FL190 and FL260 for comparison with the trial gridded forecast of maximum icing potential for FL180 and FL240 issued by WAFC Washington and WAFC London.

4.3 Figures 1 to 4 show the details of the icing reports and the corresponding maximum icing potential forecast (latest WAFS forecast received during the time of aircraft reports). Figure 5 shows the time series of 9 hour forecast of maximum icing potential at location of aircraft icing observation for a period of one week (25 – 31 March 2011) covering all the 4 reports. Figure 6 shows the 5 x 5 grid points forecast of maximum icing potential with central grid point at the location of aircraft icing observation. The followings are observed:

4.4 Temporal Coverage

a) As shown in Figure 5, forecast by WAFC Washington were often lower in category than those by WAFC London. WAFC London often forecast at FL180 and FL240 a higher category of 6 (85% - 100%) and 5 (70% - <85%) respectively while WAFC Washington forecast lower categories (mostly in categories 1-3).
b) For WAFC London, the forecast at the time of aircraft icing observation was mostly higher than other forecast times.
c) For WAFC Washington, the forecast at time of aircraft icing observation was sometimes lower when compared with values at other times.

4.5 Geographical Coverage

a) As shown in Figure 6, forecasts by WAFC Washington were in general lower in terms of category than those by WAFC London.

b) WAFC London forecasts at FL180 and FL240 indicated a higher category of 6 and 5 respectively at the location of report in all the four cases. Looking at a wider area (Figures 1 to 4), the proportion of grids with higher categories of 5 and 6 was also high.

c) WAFC Washington FL180 forecast values at location of aircraft icing report were rather low (category 3 in or below), as compared with the highest value (category 5 or 6) within 5 x 5 grid points at the same level. Hence, the likelihood of icing at location of report was not prominent as shown by the forecasts.

4.6 WAFC Provider States mentioned in WAFSOPG/6 that neither the maximum nor the mean icing potential had any relationship to severity or intensity. However, interpretation of such products, especially the likelihood of encountering icing at a given location, is still rather difficult and very different between the two WAFC forecasts.

4.7 Subsequent to the implementation of amendment 75 to ICAO Annex 3 which took effect from November 2010, icing or turbulence of moderate intensity or above encountered by aircraft should be reported as special aircraft observations. Moreover, ICAO Annex 3 Appendix 3 3.1.1 stipulated that the meteorological watch office shall transmit without delay the special air-reports received by voice communications to WAFCs. Much more actual reports should now be available to WAFC Provider States for verifying their products or for enhancing guidance materials on interpretation of their products.

4.8 In view of the foregoing, it is apparent that the identified issues in the compatibility of the gridded forecasts of the two WAFCs will need to be further addressed before their operational use. Considerations should also be given in the verification and interpretation of gridded forecasts using actual pilot reports.

5. Reception of SIGMET from WAFS

5.1 To support the SIGMET Advisory trial in Asia, Hong Kong, China has been closely monitoring the reception of SIGMETs from MWOs participating in SIGMET Advisory trial in Asia. The availability of these SIGMETs as well as SIGMETs for Hong Kong FIR in SADIS satellite broadcast, SADIS FTP and WIFS were compared against those received from AFTN on 28 June 2011. Result is listed in Table 1. Following is a summary:

	Source of SIGMETs			
	AFTN	SADIS Broadcast	SADIS FTP	WIFS
Number of SIGMETs received (excluding repeating messages)	46	45	41	37

5.2 Based on the above observations, the availability of SIGMETs from SADIS FTP is apparently higher as compared with WIFS. Furthermore, there are still a number of SIGMETs available from AFTN but not received via SADIS FTP and WIFS. It was understood that WIFS has been considered operational. Considering the impending termination of the ISCS satellite broadcast

scheduled for June 2012, there is urgent need to further improve the completeness of WIFS's OPMET data streams.

6. Information on radioactivity information included in SIGWX chart (BUFR and PNG) issued by WAFC London and WAFC Washington

6.1 Since the accidental release of radioactive material by Fukushima nuclear power plant that occurred off northeastern Japan on 11 March 2011, radioactivity symbol was included in SIGWX commencing, in general, from 16 March 2011. Relevant standards regarding inclusion of radioactivity symbol as stipulated in ICAO Annex 3 Appendix 2 are extracted in Appendix C. Below are some observations regarding the inclusion of radioactivity symbol in SIGWX charts.

6.2 A reminder "CHECK NOTAM FOR RADIATION LEAK" is included in the legend of SIGWX chart issued by WAFC London (see Figure 7). This is in accordance with standard 1.3.3 (j) of ICAO Annex 3 Appendix 2. However, no such reminder was found in SIGWX chart issued by WAFC Washington (see Figure 8).

6.3 Latitude/Longitude of the site of the accident

a) WAFC London slightly changed the latitude and longitude of the site of the accident quite often in the SIGWX charts (in BUFR code). Figure 9 showed a list of latitude and longitude encoded in BUFR code of WAFC London SIGWX Chart during the period from 16 March 2011 to 30 June 2011. Below is a summary of the latitude/longitude that were encoded in BUFR code and PNG chart during the period:

BUFR		PNG	
Latitude	Longitude	Latitude Longitude	Remarks
37.3999	142	37.4N 142.0E	This figure appeared on chart valid for 20110527 12UTC and 18UTC
37.3999	141.0099	37.4N 141.0E	The figure given in tenths of degree is normally found in PGN charts since 16 March 2011. For figures encoded in BUFR code, see Figure 9 for date of charts
37.3999	141		
37.3999	140.9900		
37.3900	141		
37.3900	140.9900		
37.3900	140.9799		
37.3900	140.97		

b) In WAFC London SIGWX (PNG) chart, location is given in tenths of degree (37.4N 141.0E). Hence, most of the above variation in latitude/longitude were not reflected in PNG chart, except the first one (37.4N 142.0E) which has appeared on chart valid for 20110527 12UTC & 18UTC.

c) WAFC Washington did not often change the latitude and longitude of the site of the accident in the SIGWX charts, except for the following on chart valid for 20110413 12UTC:

BUFR		PNG	
Latitude	Longitude	Latitude Longitude	Remarks
37.3999	141	37.4N 141E	This figure is normally found in charts since 16 March 2011
37.1000	141	37.1N 141E	This figure only appeared on chart valid for 20110413 12UTC

d) WAFC Washington has not included radioactivity symbol in PNG charts (valid for 20110421 18UTC and 20110420 00UTC, see Figure 10). There were also a number of occasions that radioactivity symbol was not included in BUFR code.

6.4 As seen from the above observations, coordination between two WAFCs and the RSMC concerned should be enhanced to ensure consistency and accuracy of radioactive information, including the location and timing of radioactivity symbol.

7. Action by the Meeting

7.1 The meeting is invited to note the information provided in this paper and to exchange views on the progress of WAFS implementation in the Asia/Pacific Region. Following the discussions on the issues highlighted in Sections 4 to 6 above, the meeting may wish to formulate the following draft Conclusion:

Draft Conclusion 15/xx – Improvements to WAFS Implementation

That,

a) the WAFC Provider States be urged to work on (i) harmonizing the trial gridded forecast products; (ii) verifying the trial gridded forecast products, including the use of actual pilot reports; and (iii) providing guidance on interpretation of trial gridded forecast products. These trial gridded products should only be considered for operational use subject to (i) successful harmonization of products; (ii) positive verification results and (iii) availability of updated guidance materials;

b) the WAFC Provider States be urged to improve upon the availability of OPMET data; and

c) the WAFC provider States be urged to enhance their coordination with the RSMC to ensure consistency and accuracy of radioactive information on SIGWX charts.

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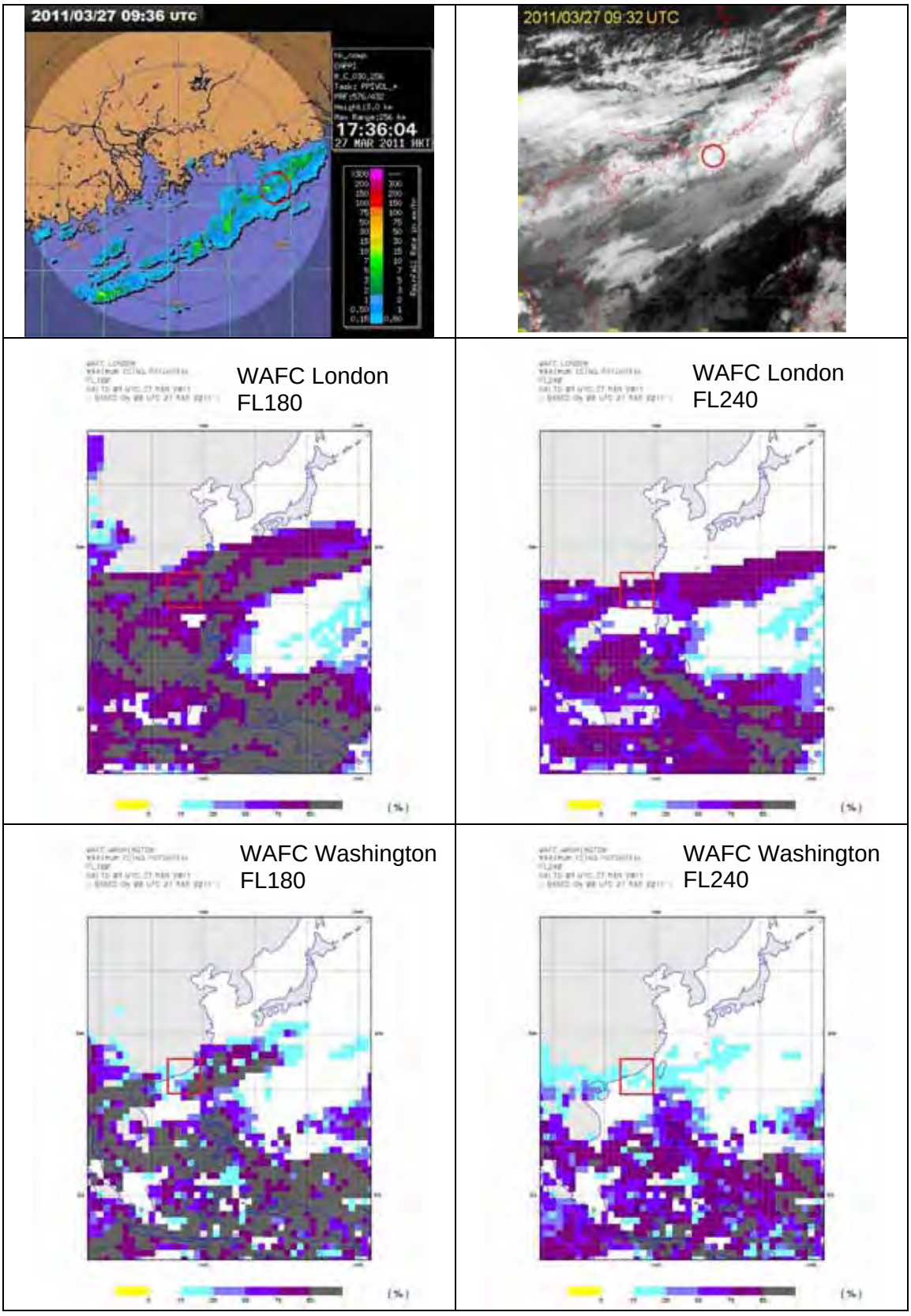


Figure 1: Moderate to severe icing was observed at 20110327 0936UTC.
Location N2215 E11545 FL200/260 (marked in red circle in radar/satellite image and in red square in WAFC forecast), aircraft type A321

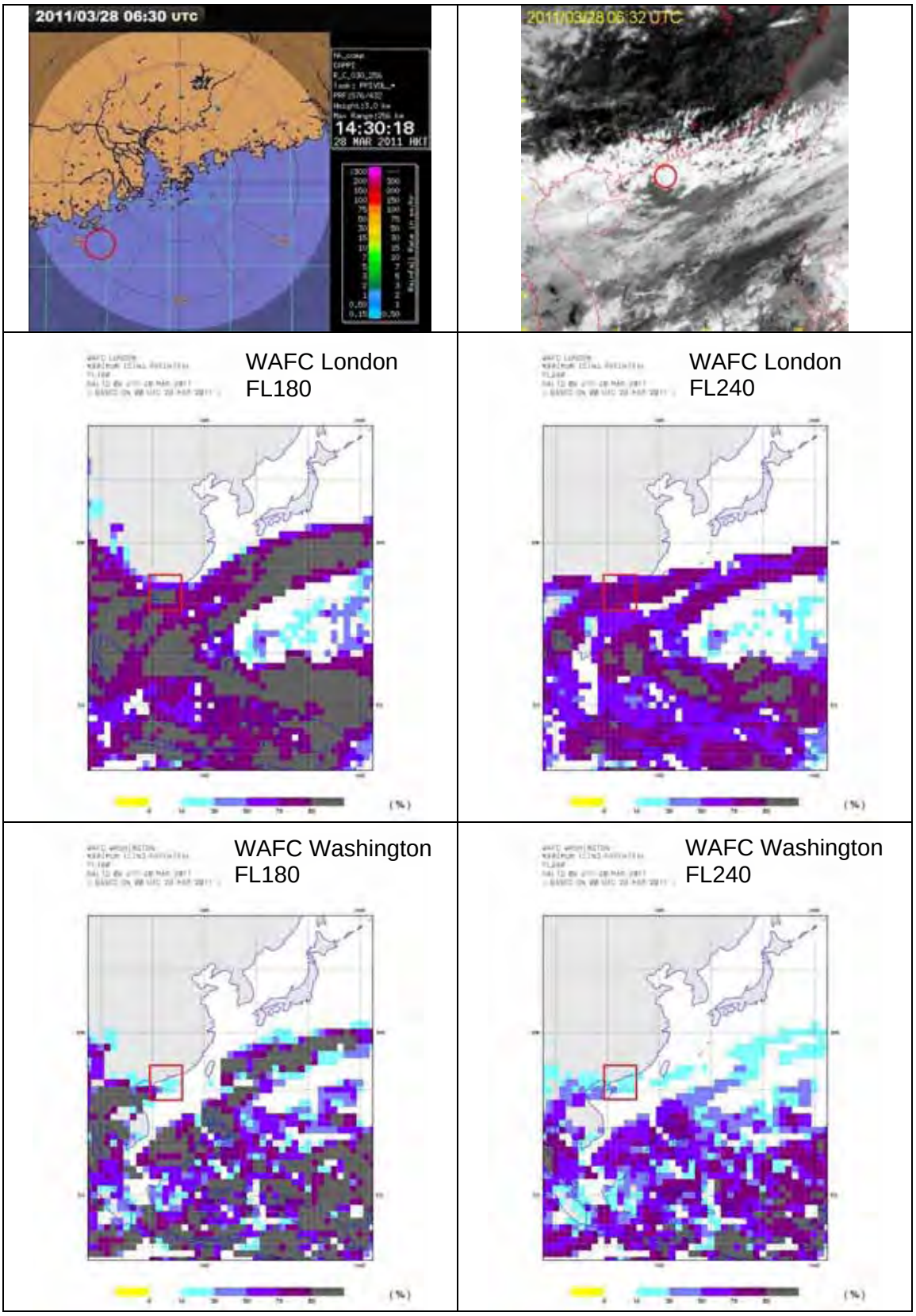


Figure 2 Moderate icing was observed at 20110328 0630UTC
Location N2118 E11252 FL200 (marked in red circle in radar/satellite image and in red square in WAFC forecast), aircraft type B738

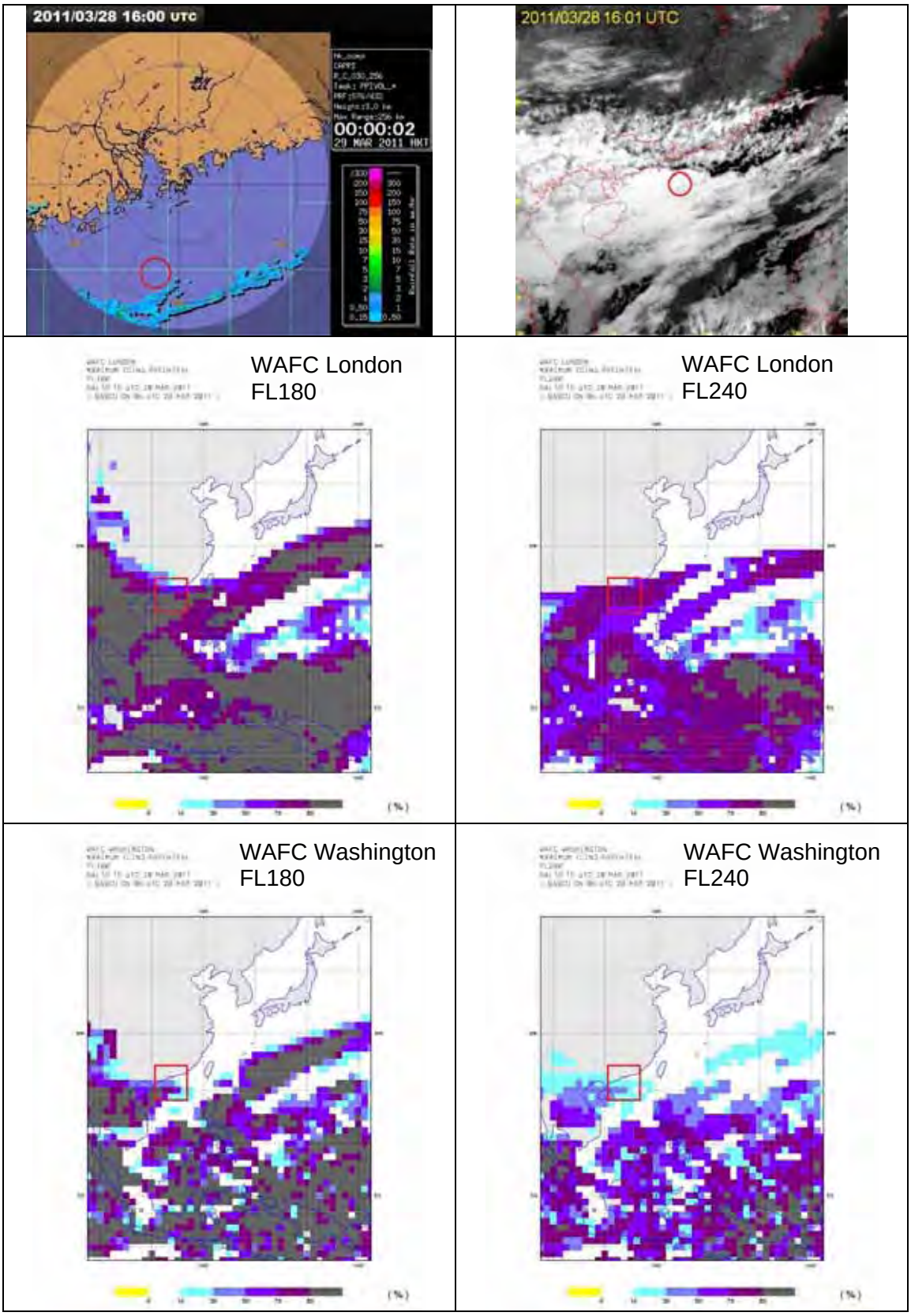


Figure 3: Severe icing was observed at 20110328 1604UTC
Location N2056 E11347 FL250 (marked in red circle in radar/satellite image and in red square in WAFC forecast), aircraft type A333

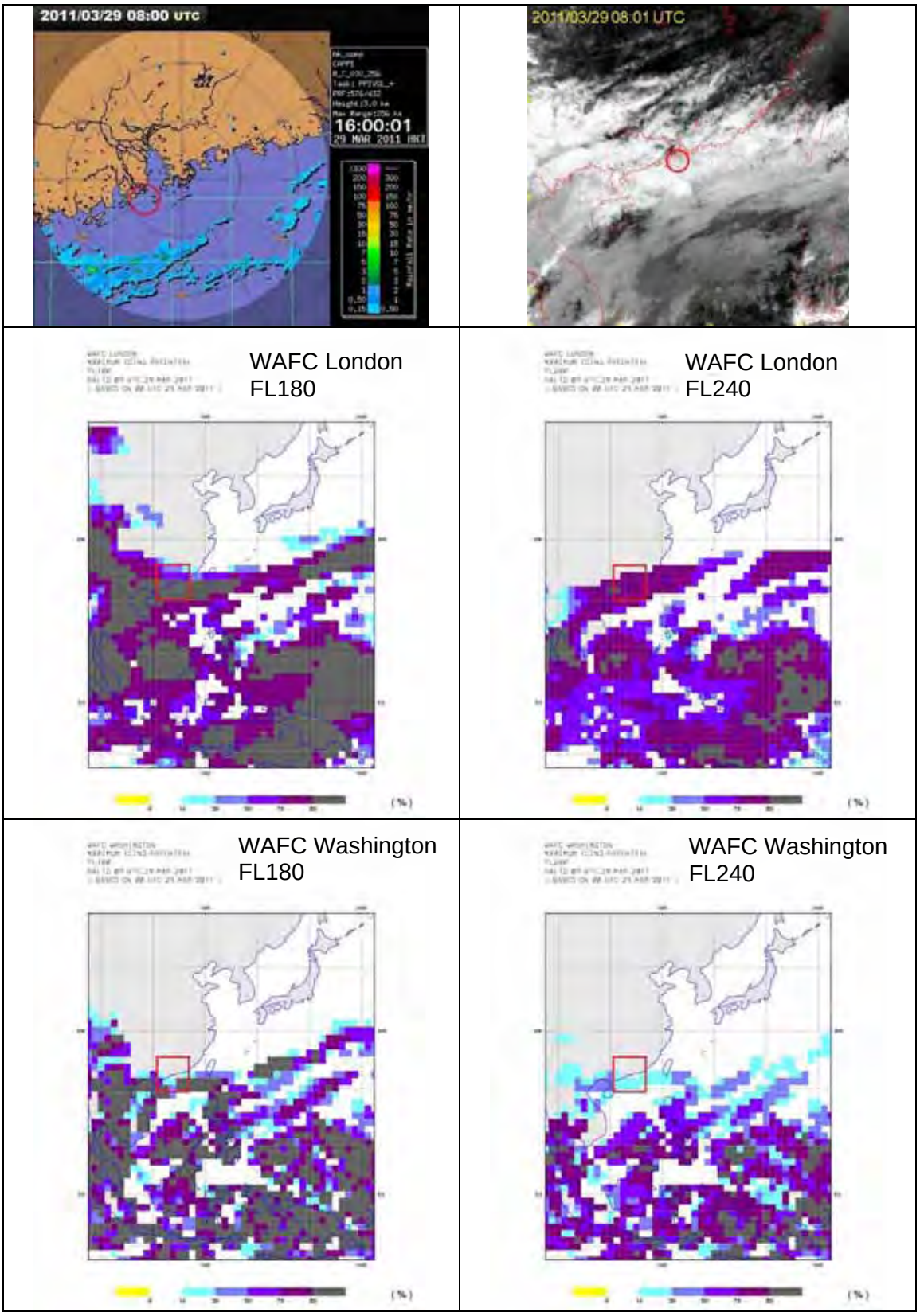


Figure 4: Moderate icing was observed at 20110329 0805UTC
Location N2159 E11333 FL190 (marked in red circle in radar/satellite image and in red square in WAFC forecast), aircraft type A343

To facilitate comparison, the maximum icing potential is categorized as follows:

Maximum icing potential (%)	0 – <10%	10% – <30%	30% – <50%	50% – <70%	70% – <85%	85% – 100%
Category	1	2	3	4	5	6
Color scale						

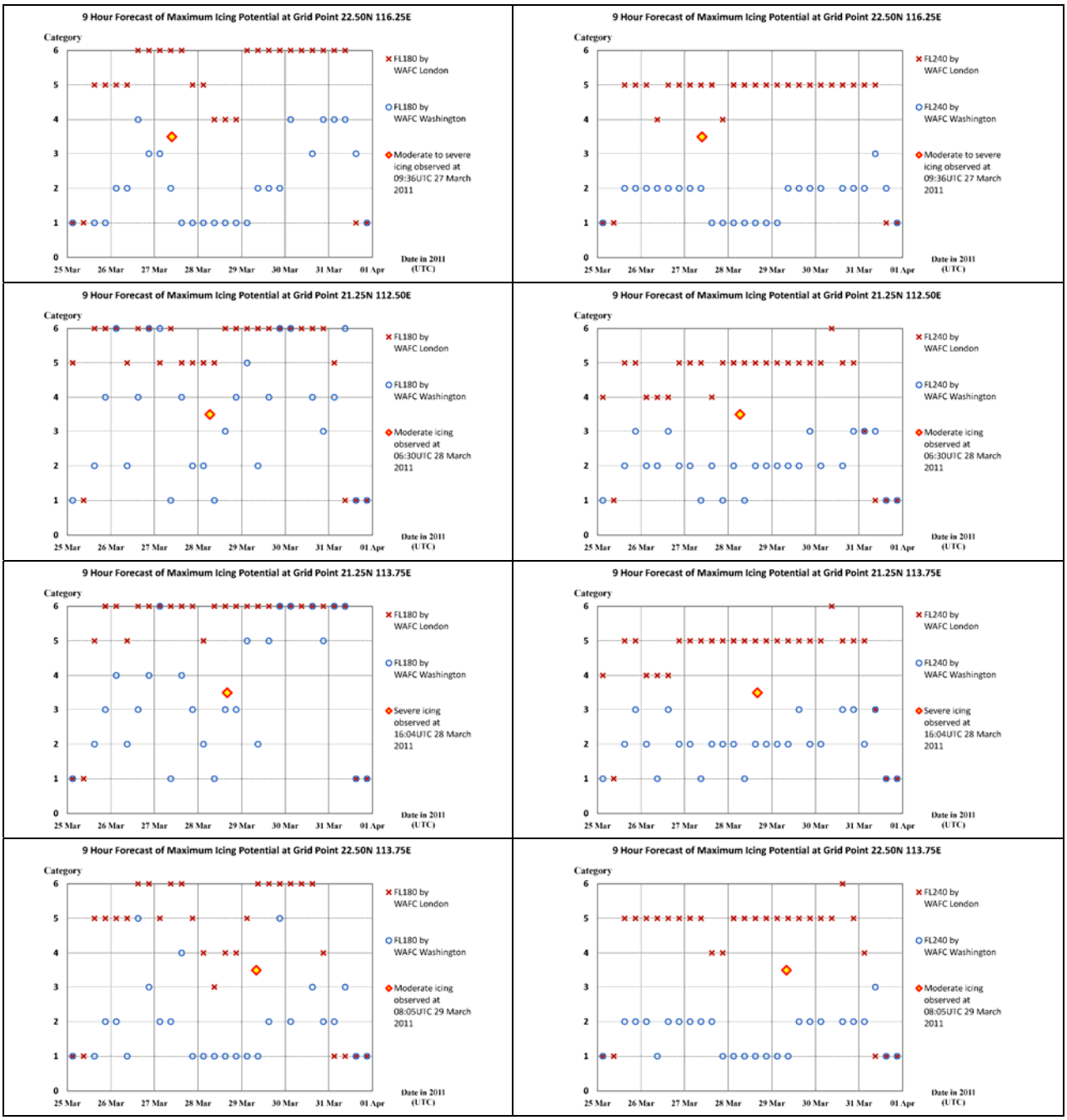


Figure 5: Time series of 9 hour forecast of maximum icing potential at location of aircraft icing observation for a period of one week (25 – 31 March 2011)

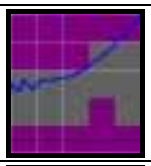
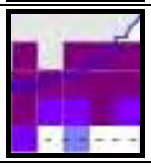
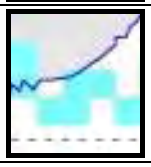
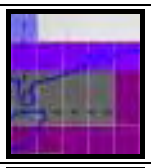
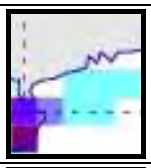
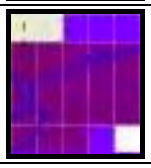
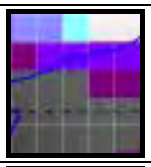
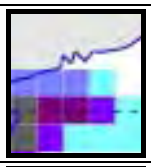
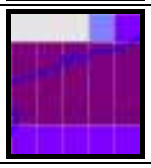
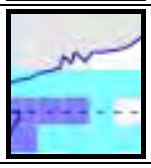
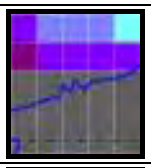
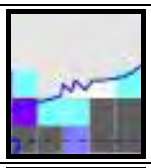
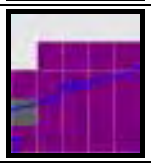
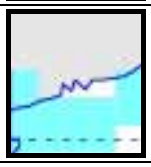
Aircraft Report	Aircraft Type	Date/ Time (UTC)	Location	Gridded forecast of maximum icing potential at location (latitude/longitude) of report			
				WAFC London		WAFC London	
Moderate to severe icing	A321	20110327 0936	N2215 E11545 FL200/260	Forecast for 20110327 0900 based on 20110327 0000			
				FL180		FL180	
				FL240		FL240	
Moderate icing	B738	20110328 0630	N2118 E11252 FL200	Forecast for 20110328 0600 based on 20110328 0000			
				FL180		FL180	
				FL240		FL240	
Severe icing	A333	20110328 1604	N2056 E11347 FL250	Forecast for 20110328 1500 based on 20110328 0600			
				FL180		FL180	
				FL240		FL240	
Moderate icing	A343	20110329 0805	N2159 E11333 FL190	Forecast for 20110329 0900 based on 20110329 0000			
				FL180		FL180	
				FL240		FL240	

Figure 6: 5 x 5 grid points forecast of maximum icing potential with central grid point at location of aircraft icing observation

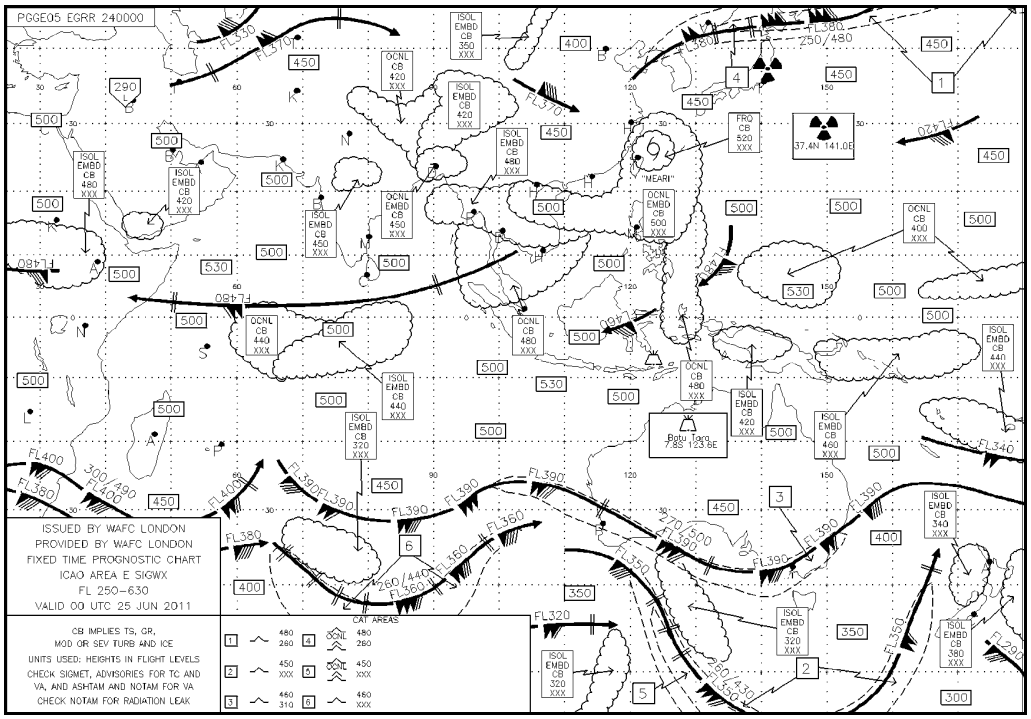


Figure 7 : SIGWX FL250-630 issued by WAFC London valid for 00UTC 25 June 2011.

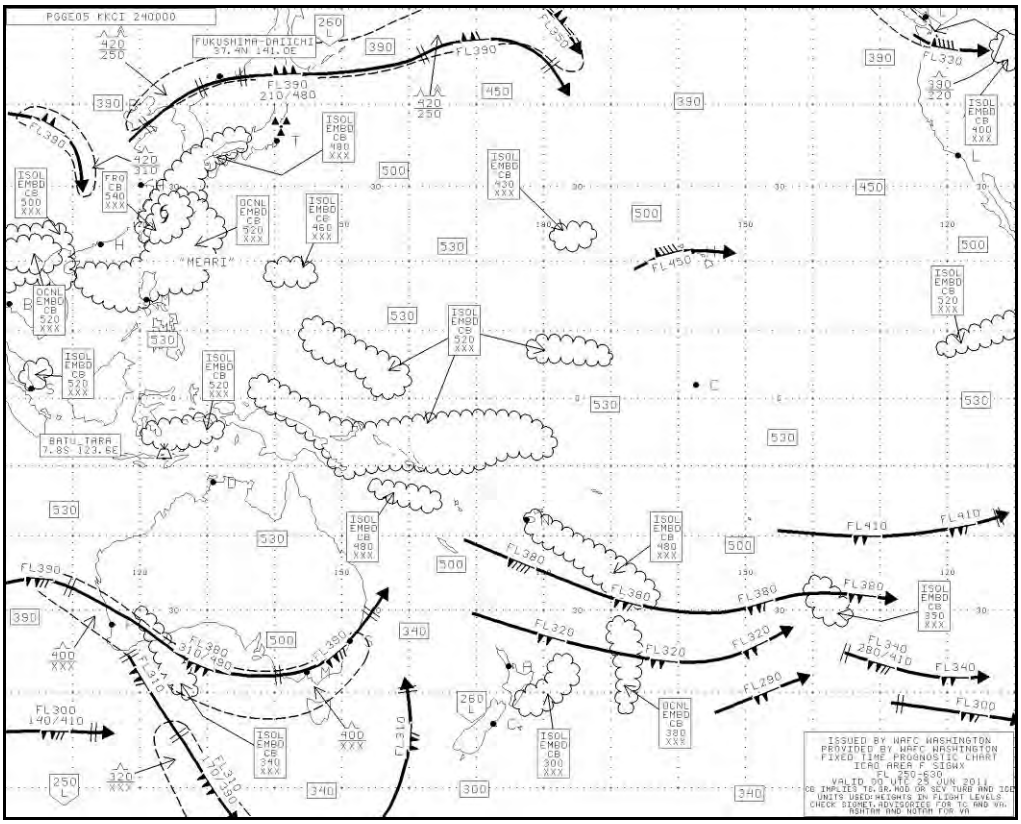


Figure 8 : SIGWX FL250-630 issued by WAFC Washington valid for 00UTC 25 June 2011. No reminder “CHECK NOTAM FOR RADIATION LEAK” is included in legend.

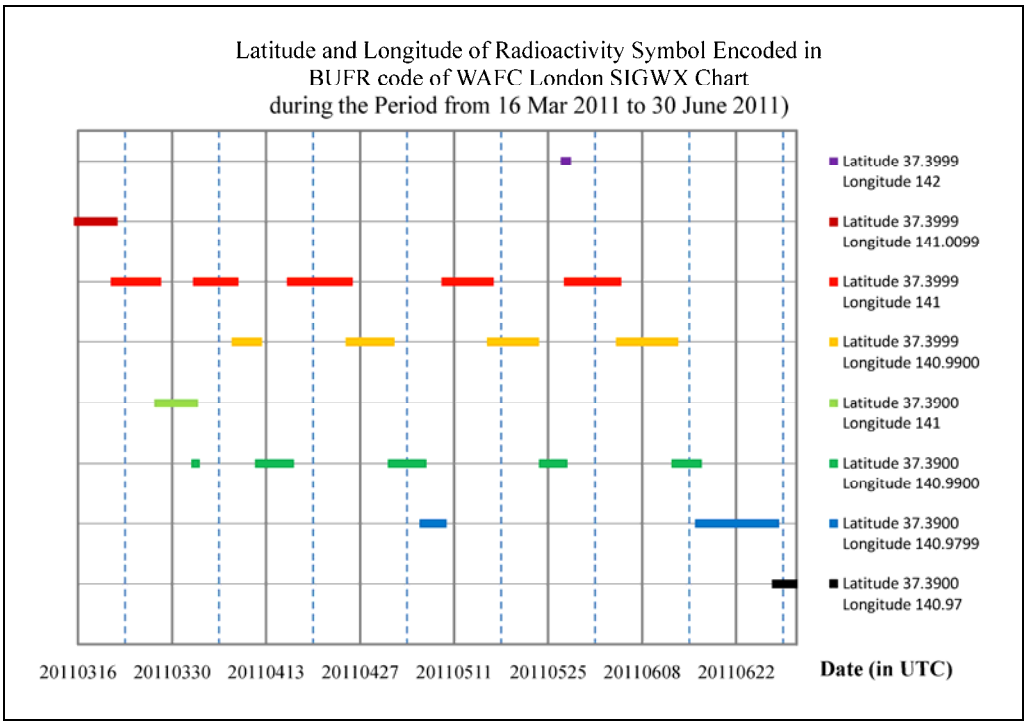


Figure 9 : List of latitude and longitude encoded in BUFR code of WAFC London SIGWX Chart during the period from 16 March 2011 to 30 June 2011

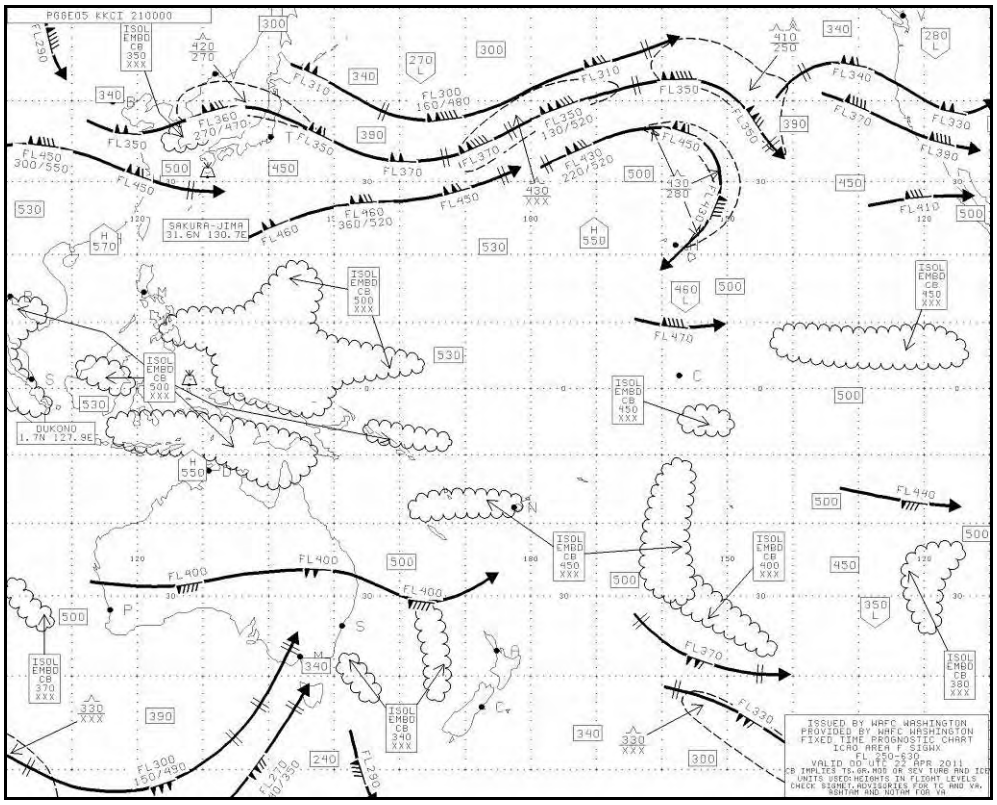


Figure 10 : SIGWX FL250-630 issued by WAFC Washington valid for 00UTC 22 April 2011. Radioactivity symbol was not included.

Table 1 : Comparison of availability of SIGMETs received from AFTN, SAIDS broadcast, SADIS FTP and WIFS

Name of FIR	SIGMET Sequence Number	AFTN	SADIS satellite broadcast	SADIS FTP	WIFS
VHHK HONG KONG FIR	VHHK SIGMET 1	✓	✓	✗	✓
	VHHK SIGMET 2	✓	✓	✓	✓
	VHHK SIGMET 3	✓	✓	✓	✗
	VHHK SIGMET 4	✓	✓	✓	✓
	VHHK SIGMET 5	✓	✓	✓	✓
	VHHK SIGMET 6	✓	✓	✓	✓
VDPP PHNOM PENH FIR	VDPP SIGMET 1	✓	✓	✓	✗
	VDPP SIGMET 2	✓	✓	✓	✗
	VDPP SIGMET 3	✓	✓	✓	✗
VVNB HA NOI FIR	VVNB SIGMET 1	✓	✓	✓	✓
	VVNB SIGMET 2	✓	✓	✓	✓
	VVNB SIGMET 3	✓	✓	✓	×
	VVNB SIGMET 4	✓	✓	✓	✓
	VVNB SIGMET 5	✓	✓	✓	✓
VVTS HO CHI MINH FIR	VVTS SIGMET 1	✓	✓	✓	✓
	VVTS SIGMET 2	✓	✓	✓	✓
	VVTS SIGMET 3	✓	✓	✓	✓
ZBPE BEIJING FIR	ZBPE SIGMET 1	✓	✓	✓	✓
	ZBPE SIGMET 2	✓	✓	✗	✓
ZGZU GUANGZHOU FIR	ZGZU SIGMET 1	✓	✓	✗	✓
	ZGZU SIGMET 2	✓	✓	✓	✓
	ZGZU SIGMET 3	✓	✓	✓	✓
	ZGZU SIGMET 4	✓	✓	✓	✓
	ZGZU SIGMET 5	✓	✓	✗	✗
	ZGZU SIGMET 6	✓	✗	✓	✓
ZHWH WUHAN FIR	ZHWH SIGMET 1	✓	✓	✓	✓
	ZHWH SIGMET 2	✓	✓	✓	✓
	ZHWH SIGMET 3	✓	✓	✓	✓
ZJSA SANYA FIR	ZJSA SIGMET 1	✓	✓	✓	✓
	ZJSA SIGMET 2	✓	✓	✓	✓
	ZJSA SIGMET 3	✓	✓	✓	✓
	ZJSA SIGMET 4	✓	✓	✓	✓
ZLHW LANZHOU FIR	ZLHW SIGMET 1	✓	✓	✓	✓
	ZLHW SIGMET 2	✓	✓	✓	✗
	ZLHW SIGMET 3	✓	✓	✓	✓
	ZLHW SIGMET 4	✓	✓	✓	✓
ZPKM KUNMING FIR	ZPKM SIGMET 1	✓	✓	✓	✓
	ZPKM SIGMET 2	✓	✓	✓	✗
	ZPKM SIGMET 3	✓	✓	✓	✓
ZSHA SHANGHAI FIR	ZSHA SIGMET 1	✓	✓	✓	✓
	ZSHA SIGMET 2	✓	✓	✓	✓
	ZSHA SIGMET 3	✓	✓	✓	✗
	ZSHA SIGMET 4	✓	✓	✓	✓
	ZSHA SIGMET 5	✓	✓	✗	✓
ZWUQ URUMQI FIR	ZWUQ SIGMET 1	✓	✓	✓	✓
ZYSH SHENYANG FIR	ZYSH SIGMET 1	✓	✓	✓	✓
	Total	46	45	41	37

Appendix A

ASIA/PAC WAFS Implementation Plan and Procedures

13th Edition - July 2010

Appendix A

ASIA/PAC WAFS Implementation Plan and Procedures

13th Edition - July 2010

Introduction

1. The Asia/Pacific WAFS Implementation Plan and Procedures has been revised to take account of progress made in the region.

The Implementation of WAFS

2. This plan is based on the understanding that the implementation of WAFS in the Asia/Pacific Region involves the:

a. Production and dissemination by the WAFCs of global forecast winds, temperatures, tropopause height, tropopause temperature and humidity in GRIB format.

b. Implementation of communication system/s for the reception or retrieval of WAFS products in the Asia/Pacific Region by all States in support of international air navigation. The current communication systems include satellite broadcast (SADIS and ISCS/G2), FTP and WAFS Internet File Service (WIFS) and will soon include Secure SADIS FTP. States may need to use an alternative distribution system.

c. Production and distribution by the WAFCs, of Global, quality controlled SWH (FL 250 - 630) in BUFR format and in PNG format for the ICAO standard areas.

d. Production and distribution by the WAFCs of quality controlled SWM (FL 100 - 250) in BUFR format and in PNG format over limited geographical areas where required by PIRGs.

e. Capability of States to convert current BUFR and GRIB messages to graphical products on an operational basis.

f. Implementation of WIFS.

g. Access to WAFS data on the planned Secure FTP server at WAFC London.

h. Development and utilization of gridded forecasts of icing, turbulence and CB~~convective clouds~~.

i. Transition from GRIB1 to GRIB2 WAFS data.

Appendix A

WAFS SIGWX Forecasts & Gridded Data Fields

3. There will be an ongoing requirement for NMSs to monitor the quality of WAFC products.

4. Action required to be taken by States to adhere to the provision of Annex 3 to ensure the relevant advisories for tropical cyclones, volcanic ash, the accidental release of radioactive material and SIGMETs are made available to the WAFCs in a timely manner. The WAFS Implementation Task Force will coordinate with the ICAO Secretariat and the VAACs in the Region to also make available ASHTAMs and NOTAMs for VA to the WAFCs in a timely manner.

5. The SIGWX forecasts produced by WAFC Washington are also available on the US NWS Aviation Weather Center Internet site at: http://aviationweather.gov/iffdp/sgwx.php. All WAFC London and WAFC Washington products are available on the internet-based SADIS FTP server.

6. States are encouraged to provide regular feedback to WAFC London and WAFC Washington about the quality and accuracy of both SIGWX forecasts and various gridded data fields. Contact details for comments are:

WAFC Washington

i. NWS/Aviation Weather Center
Attention: Mr Michael Pat Murphy
Warning Coordination Meteorologist
7220 NW 101st Terrace
Kansas City, Missouri
USA 64153-2371

ii. E-mail addressed to: Michael.Pat.Murphy@noaa.gov

iii. Fax number: 1 816 880 0650

WAFC London

i. The Met. Office
Attention: Mr. Nigel Gait
International Aviation Manager
Fitzroy Road
Exeter
Devon EX1 3PB
United Kingdom

ii. E-mail addressed to: nigel.gait@metoffice.gov.uk

iii. Fax number: +44 (1392) 885 681

Appendix A

Gridded Forecasts of Icing, Turbulence and CB~~onvective Clouds~~

7. Gridded forecasts of icing, turbulence and CB~~convective clouds~~ are made available on a trial basis by the two WAFCs via SADIS FTP & WIFS for evaluation by NMSs. Currently there is no standard method for the displaying of these gridded forecasts. Work is underway at WAFSOPSG to determine a standardized method of displaying these parameters and provide "at a glance" products, similar to current SIGWX charts, for flight planning purposes. Training will be provided to WAFS users on the utilization of the gridded forecasts. This training is likely to be provided in the form of computer based training (CBT).

Distribution of WAFS Products

8. The two WAFCs provide global forecast winds, temperatures, tropopause height, tropopause temperature and humidity in GRIB format, global quality controlled SWH and quality controlled SWM for limited geographical areas in PNG and BUFR formats. These products are available via satellite (SADIS & ISCS) and internet (FTP & WIFS) communication channels. Suitable decoding and visualization software is required by States in the Asia/Pacific Region to operationally construct graphical SIGWX from the BUFR files~~messages~~ and a range of products from the GRIB files of gridded datasets. The provision of PNG formatted SIGWX charts from WAFCs is expected to continue for the foreseeable future.

9. Recently the two WAFCs offered a range of gridded datasets in GRIB2 format. The GRIB2 products offer a higher spatial resolution (unthinned 1.25° x 1.25°, rather than thinned 2.5° x 2.5°) and higher temporal resolution (3 hourly rather than 6 hourly). The two WAFCs welcome feedback on these new GRIB2 fields as well as the new communication channels (secure FTP and WIFS).

WAFC London Services

10. WAFC London provides WAFS data over its satellites service (SADIS 2G) and via SADIS FTP internet based service. The SADIS 2G service will continue to operate until at least 2015. States wishing to utilise the satellite service should arrange for the procurement of the necessary hardware, and as necessary, compliant visualization software. Guidance material for users accessing the SADIS 2G broadcast is available at the SADIS web site – http://www.metoffice.gov.uk/sadis/index.html.

11. The current SADIS FTP service is made available for the purpose of providing a backup to the satellite based service. To improve deficiencies in the FTP protocol, specifically proof of source and data integrity, WAFC London is in the process of implementing a secure SADIS FTP service using Digital Signing technology. It is anticipated that this service will be available by November 18, 2010.

WAFC Washington Services

12. WAFC Washington plan to terminate the ISCS satellite broadcast on 30 June 2012. The data currently provided by ISCS satellite service will then be available via WIFS. The WIFS commenced operation in May 2010. WIFS provides access to WAFS products which are stored in directories, grouped by type. This data is accessed by the WAFS workstation application using the GNU "wget", a free software package for retrieving files using HTTPS, a widely-used secure

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Internet protocol. This open source package is available for Windows or Linux Operating Systems. States wishing to get access to WIFS:

- require WIFS server access details. To obtain these details, each State needs to submit a WIFS registration form, which is available on the WIFS web site, http://aviationweather.gov/wifs.
- should commence discussions with their WAFS visualisation/workstation provider to ensure their software supports WIFS data retrieval. Further details on the WIFS can be found at the aforementioned WIFS web site.

Indicative Timetable for Implementation of WAFS

13. The table given in Attachment 1 provides an indicative timetable for the implementation of WAFS within the Asia/Pacific Region.

Volcanic Ash Advisory Centres (VAACs)

14. The VAACs are encouraged to monitor WAFS SIGWX forecasts that cover their areas of responsibility, and to advise the appropriate WAFC to ensure the accurate inclusion of the volcanic ash symbol.

Tropical Cyclone Advisory Centres (TCAC)

15. The TCACs are encouraged to monitor WAFS SIGWX forecasts that cover their areas of responsibility, and to advise the appropriate WAFC to ensure the accurate inclusion of the tropical cyclone symbol.

16. The operational contact points in the WAFCs for coordination with the VAACs and TCACs are:

WAFC Washington
i. NWS/Aviation Weather Center
7220 NW 101st Terrace
Kansas City, Missouri
USA 64153-2371
ii. Tel: 1 816 584 7269

WAFC London
i. The Met. Office
Attention: WAFC London Forecaster
Fitzroy Road
Exeter
Devon EX1 3PB
United Kingdom
ii. Tel: 00-44-1392-884926 or 00-44-1392-884908

Appendix A

Attachment 1

ASIA/PAC WAFS Implementation Plan and Procedures

Indicative Timetable for Implementation of WAFS

Item	Task/Stage of Implementation of WAFS	Anticipated Date
1	WAFC London products on access controlled internet site	Completed
2	The establishment of back-up distribution arrangements for WAFS products	Completed
3	Training in the operational conversion of GRIB forecasts to Wind / Temp charts	Completed
4	All states that receive GRIB products capable of converting GRIB forecasts to Wind / Temp charts	Completed
5	Removal of T4 Facsimile Wind / Temp charts from the satellite broadcast	Completed
6	Training in the operational conversion of BUFR to SIGWX charts	Completed
7	States having the ability to operate the decoding software to convert BUFR SIGWX messages into graphical format	Completed
8	The satellite distribution by the two WAFCs of global SWH and of SWM for limited geographical areas in BUFR format	Completed
9	Launch of SADIS 2G service	Completed
10	SADIS 2G seminar for ASIA/PAC States	Completed
11	Removal of T4 Facsimile SIGWX products from the satellite broadcast	Completed
12	Procurement of SADIS 2G hardware by SADIS user States	Completed
13	Termination of the SADIS 1G service	Completed

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Item	Task/Stage of Implementation of WAFS	Anticipated Date
14	Launch of trial gridded forecasts of icing, turbulence and convective clouds	Completed
15	Implementation of WAFS Internet File Service (WIFS)	Completed
16	Workshop on gridded forecasts of icing, turbulence and convective clouds	Completed
17	WAFCs begin ~~parallel broadcast~~provision of WAFS forecasts in the GRIB2 code form via internet based services (FTP/WIFS)	Completed
18	WAFCs begin broadcast of WAFS forecasts in the GRIB2 code form (excluding gridded forecasts of icing, turbulence and CB) via satellite services (SADIS/ISCS)	November 2010
19	WAFCs provide web-based gridded forecasts of icing, turbulence and CB	Suspended until WAFSOPSG/6
20	Regional training on the use of the gridded forecasts	To be discussed at WAFSOPSG/6 Mar 2011
21	WAFS end-user workstations upgraded to accept the GRIB2 code form	May 2011 – November 2013
22	Termination of the ISCS-G2 service	30 June 2012
23	Broadcast of WAFS forecasts in the GRIB 1 ceases	November 2013
24	Implementation of Secure SADIS FTP Service	November 2010

Appendix B

ASIA/PAC WAFS IMPLEMENTATION TASK FORCE

1. Terms of Reference

(a) Assist in expediting~~Expedite~~ the implementation of the World Area Forecast System (WAFS) in the Asia and Pacific Regions;

(b) Maintain awareness of current and future requirements with respect to the World Area Forecast System (WAFS);

(c) Maintain awareness of the implementation of WAFS within the Asia and Pacific Regions and any deficiencies;

(d) Continually seek ways to improve the operational effectiveness of the WAFS and products generated from WAFS datasets; and

(e) Provide advice to the CNS/MET Sub-group on the above issues.

2. Work Programme

The work to be addressed by the ASIA/PAC WAFS Implementation Task Force (WAFS/I TF) includes:

(a) ~~Coordinating the outstanding implementation of SADIS 2G service in the Asia and Pacific Regions~~ Responding to the needs of States for guidance and information related to the implementation of WAFS within the Asia and Pacific Regions.

(b) ~~Coordinating the migration of ISCS G2 service to ISCS G3 service in the Asia and Pacific Regions~~ Monitoring the migration from ISCS-G2 service to other WAFS services in the Asia and Pacific Regions.

(c) Coordinating the arrangement of training and providing user's feedback on the utilization of gridded forecasts of icing, turbulence and cumulonimbus clouds.

(d) Coordinating the migration of GRIB1 to GRIB2 WAFS data.

(e) Coordinating the provision of assistance to States to ensure that WAFS can be effectively implemented in the Asia and Pacific Regions.

(f) Providing inputs (via the CNS/MET SG) to APANPIRG on the regional planning and development of WAFS for coordination with the WAFSOPSG.

(g) Keeping the ASIA/PAC WAFS Implementation Plan and Procedures up to date. The work is expected to be carried out primarily by correspondence.

3. Composition

The Task Force is composed by experts from:
Australia; Hong Kong, China (Chairman); India; Japan; New Zealand; Singapore; Thailand; United Kingdom (SADIS Provider State); United States (ISCS Provider State), and IATA.

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Appendix C

Extracted from ICAO Annex 3 Appendix 2

1.3.3 Items included in SIGWX forecasts
SIGWX forecasts shall include the following items:
…..
j) information on the location of an accidental release of radioactive materials into the atmosphere of significance to aircraft operations, comprising: the radioactivity symbol at the site of the accident and, at the side of the chart, the radioactivity symbol, latitude/longitude of the site of the accident, date and time of the accident and a reminder to users to check NOTAM for the area concerned.
…..

1.3.4 Criteria for including items in SIGWX forecasts
The following criteria shall be applied for SIGWX forecasts:
……
d) where a volcanic eruption or an accidental release of radioactive materials into the atmosphere warrants the inclusion of the volcanic activity symbol or the radioactivity symbol in SIGWX forecasts, the symbols shall be included on SIGWX forecasts irrespective of the height to which the ash column or radioactive material is reported or expected to reach; and
…..