International Civil Aviation Organization

FOURTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP OF APANPIRG (CNS/MET SG/14)

Jakarta, Indonesia, 19 – 22 July 2010

Agenda Item 10: Regional Implementation of International Tropical Cyclone Watch (ITCW)

PILOT PROJECT ON AVIATION-WEATHER DISASTER RISK REDUCTION (ADRR)

(Presented by Hong Kong, China)

SUMMARY

This paper presents the latest development of a pilot project on "Aviation-weather Disaster Risk Reduction (ADRR)" for aviation users in the Asia and South-West Pacific regions.

This paper relates to:

Strategic Objectives:
A. Safety
D. Efficiency

Global Plan Initiatives:
GPI-18 Aeronautical Information
GPI-19 Meteorological Systems

1. Introduction

1.1 In 2006, the Commission for Aeronautical Meteorology (CAeM) of the World Meteorological Organization (WMO) recognized the need for improved communication and coordination between aeronautical meteorology service providers and emergency response, disaster relief and recovery agencies on a national, regional and international level, in order to improve all aspects of Disaster Risk Reduction (DRR) in the areas where aviation plays a crucial role. CAeM further noted that all operational aerodrome forecasts and warnings in the field of aeronautical meteorology as regulated in cooperation with the ICAO are currently generally limited to lead times of 24/30 hours or less. In the case of tropical cyclones, there is considerable potential skill in forecasts far beyond this limit. To facilitate aviation stakeholders in their operational planning, longer-range forecasts (beyond the current 24-hour or 30-hr limit of the TAF) will be needed.

1.2 In the light of the above, the 13th session of CAeM established a regional Pilot Project on Aviation-weather Disaster Risk Reduction (ADRR) in the Asia and South-West Pacific regions under the lead of the Hong Kong, China. The objective of the pilot project is to assess the usefulness of aviation weather forecasts and early warnings for tropical cyclones for 24-48 hours ahead, as well as to study the benefits to aviation, so as to assist in disaster risk reduction and to facilitate aviation stakeholders in their operational planning and decision-making.

2. ADRR website

2.1 Based on aviation users' feedback, a website (http://adrr.weather.gov.hk) has been set up by Hong Kong, China, in September 2007. The site features official tropical cyclone forecasts and numerical weather prediction products from China; Hong Kong, China; Japan; the Philippines; Tropical Cyclone Advisory Centre (TCAC) Tokyo, Joint Typhoon Warning Centre (JTWC) of the USA, and European Centre for Medium-Range Weather Forecasts (ECMWF) (Fig.1).

2.2 To demonstrate the usefulness of these products to decision-making by aviation users, added-value information on forecast weather conditions that might cause disruptions to the operation of the Hong Kong International Airport (HKIA) is also included on the website. For example, extended hourly take-off forecasts (Figure 2) of wind, temperature, QNH and any significant weathers up to the next 18 hours are provided to aid airline users' flight planning. Forecasts of cross wind and head wind, which are not explicitly mentioned in TAF, are also made available. In particular, those forecast cross wind and head wind would be highlighted if certain thresholds are reached to facilitate flight operations and planning. Another product presented in the ADRR webpage is "HKIA Weather Summary", which presents aviation forecaster's assessment of the latest weather situation at HKIA (Figure 3). This product supplements the TAF by providing synoptic background, other likely alternative scenario and an outlook up to 48 hours ahead. Forecasts of other weather conditions that may affect aviation safety such as windshear, cross winds and turbulence which are not available in TAF will be included as necessary. This is to demonstrate the benefits of such information to aviation stakeholders in the planning of airport operations and large-scale diversions due to such inclement weather as tropical cyclones.

3. Evaluation

3.1 In the third quarter of 2008, a survey was conducted jointly by Hong Kong, China and WMO through a web-based questionnaire to collect feedback from aviation users including airlines, airport management, civil aviation authority and search and rescue organization. The users' feedback are positive. They consider that the ADRR Pilot Project is beneficial to aviation and in general to the population in the regions affected by natural disasters. The skill of the tropical cyclone forecasts and warnings for 24-48 hours ahead available on the Pilot Project website is also considered good or acceptable. Other user's feedback pertains to enhancing the presentation of products, coverage, resolution and accuracy of the forecasts, as well as including products from other centres.

3.2 Based on users' suggestions from the survey, the website was further enhanced in 2009 to include tropical cyclone strike probability map generated from the NWP ensemble prediction system of the China Meteorological Administration (CMA), in addition to that of the ECMWF (Fig.4). The geographical coverage of the tropical cyclone forecast on the website was also extended eastward from 125°E to 140°E to cover a larger part of the Pacific Ocean in response to feedback from aviation users.

4. Further Work

4.1 Work is underway to further extend the coverage of tropical cyclone forecast to the Bay of Bengal and the Arabian Sea (see Fig.5) to include official tropical cyclone forecasts, advisories (TCAC New Delhi), numerical weather prediction products and satellite imageries of that area. Further work will be conducted to assess the performance of the products.

4.2 Noting the success of the pilot project, the ADRR website is tentatively planned to become operational in late-2010. Further extension to other regions will be explored in cooperation with other tropical cyclone programme.

5. Action by the Meeting

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

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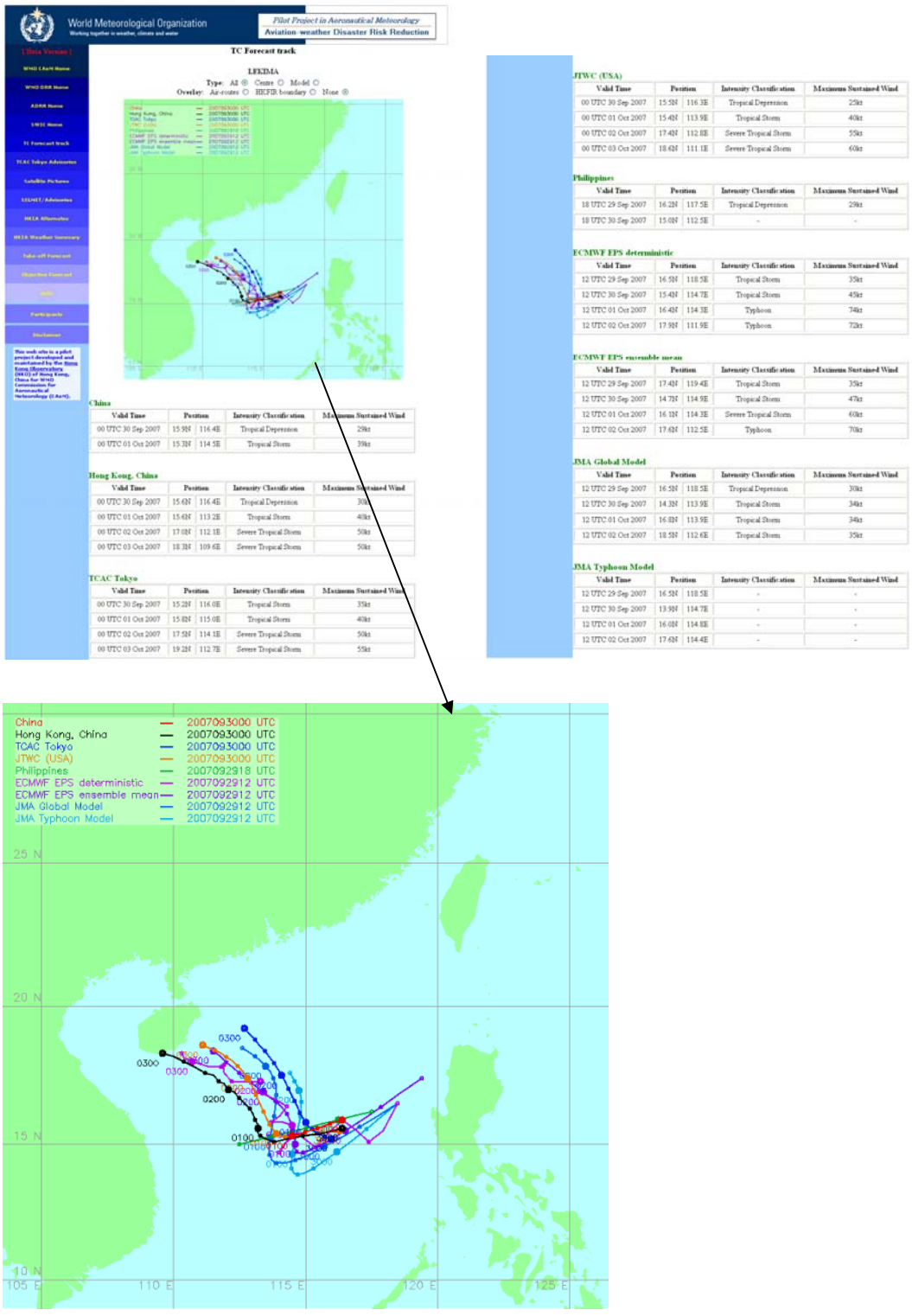
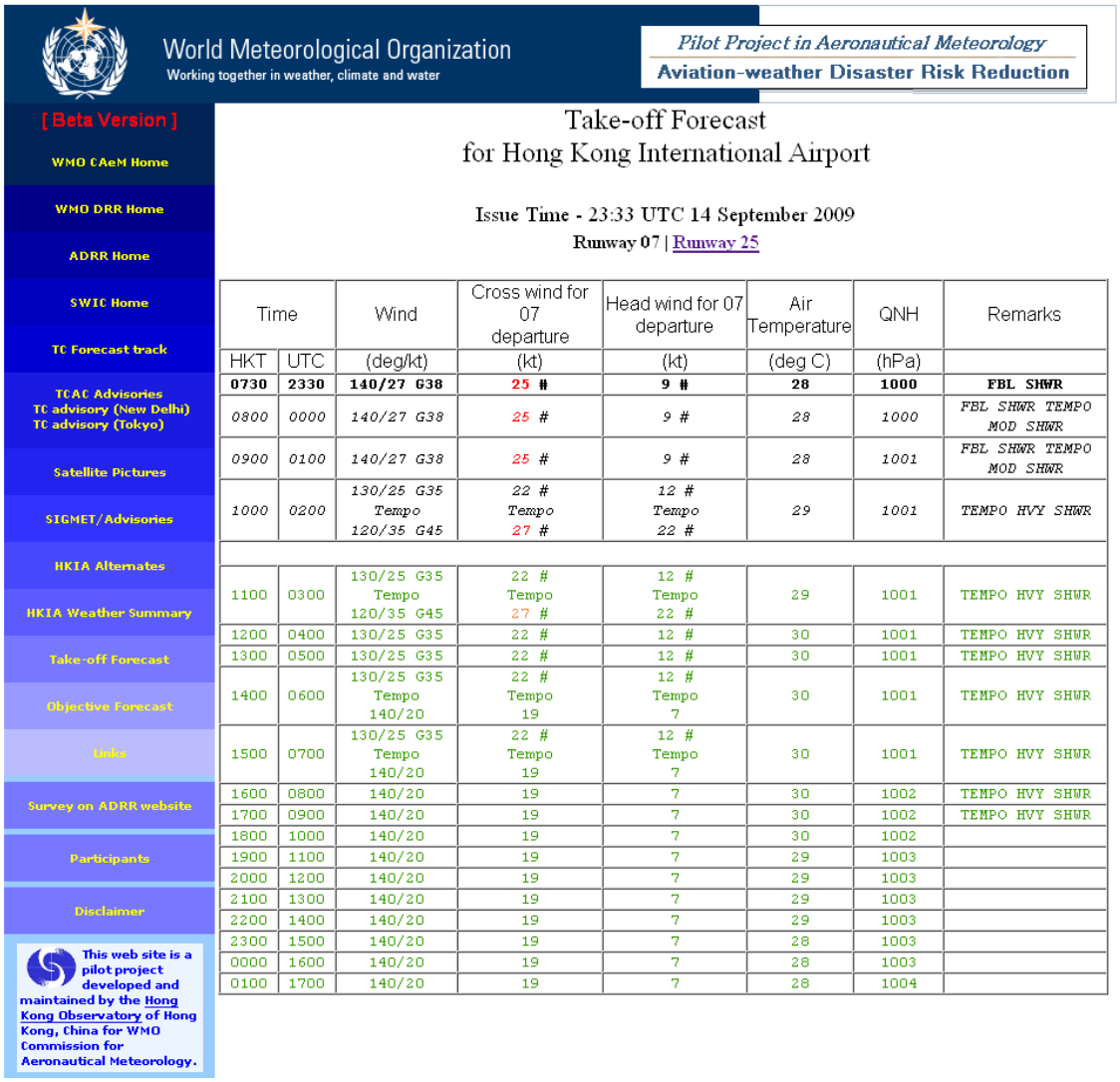


Figure 1. Tropical cyclone forecasts based on official warnings as well as advisories and numerical forecasts issued by the TCAC Tokyo of Japan, JTWC of the USA and ECMWF.



World Meteorological Organization
Working together in weather, climate and water

Pilot Project in Aeronautical Meteorology
Aviation-weather Disaster Risk Reduction

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Disclaimer

This web site is a pilot project developed and maintained by the Hong Kong Observatory of Hong Kong, China for WMO Commission for Aeronautical Meteorology.

Take-off Forecast for Hong Kong International Airport

Issue Time - 23:33 UTC 14 September 2009

Runway 07 | Runway 25

Time		Wind	Cross wind for 07 departure	Head wind for 07 departure	Air Temperature	QNH	Remarks
HKT	UTC	(deg/kt)	(kt)	(kt)	(deg C)	(hPa)	
0730	**2330**	**140/27 G38**	**25 #**	**9 #**	**28**	**1000**	**FBL SHWR**
0800	*0000*	*140/27 G38*	*25 #*	*9 #*	*28*	*1000*	*FBL SHWR TEMPO MOD SHWR*
0900	*0100*	*140/27 G38*	*25 #*	*9 #*	*28*	*1001*	*FBL SHWR TEMPO MOD SHWR*
1000	*0200*	*130/25 G35 Tempo 120/35 G45*	*22 # Tempo 27 #*	*12 # Tempo 22 #*	*29*	*1001*	*TEMPO HVY SHWR*
1100	0300	130/25 G35 Tempo 120/35 G45	22 # Tempo 27 #	12 # Tempo 22 #	29	1001	TEMPO HVY SHWR
1200	0400	130/25 G35	22 #	12 #	30	1001	TEMPO HVY SHWR
1300	0500	130/25 G35	22 #	12 #	30	1001	TEMPO HVY SHWR
1400	0600	130/25 G35 Tempo 140/20	22 # Tempo 19	12 # Tempo 7	30	1001	TEMPO HVY SHWR
1500	0700	130/25 G35 Tempo 140/20	22 # Tempo 19	12 # Tempo 7	30	1001	TEMPO HVY SHWR
1600	0800	140/20	19	7	30	1002	TEMPO HVY SHWR
1700	0900	140/20	19	7	30	1002	TEMPO HVY SHWR
1800	1000	140/20	19	7	30	1002	
1900	1100	140/20	19	7	29	1003	
2000	1200	140/20	19	7	29	1003	
2100	1300	140/20	19	7	29	1003	
2200	1400	140/20	19	7	29	1003	
2300	1500	140/20	19	7	28	1003	
0000	1600	140/20	19	7	28	1003	
0100	1700	140/20	19	7	28	1004	

Figure 2. Extended take-off forecast for HKIA.

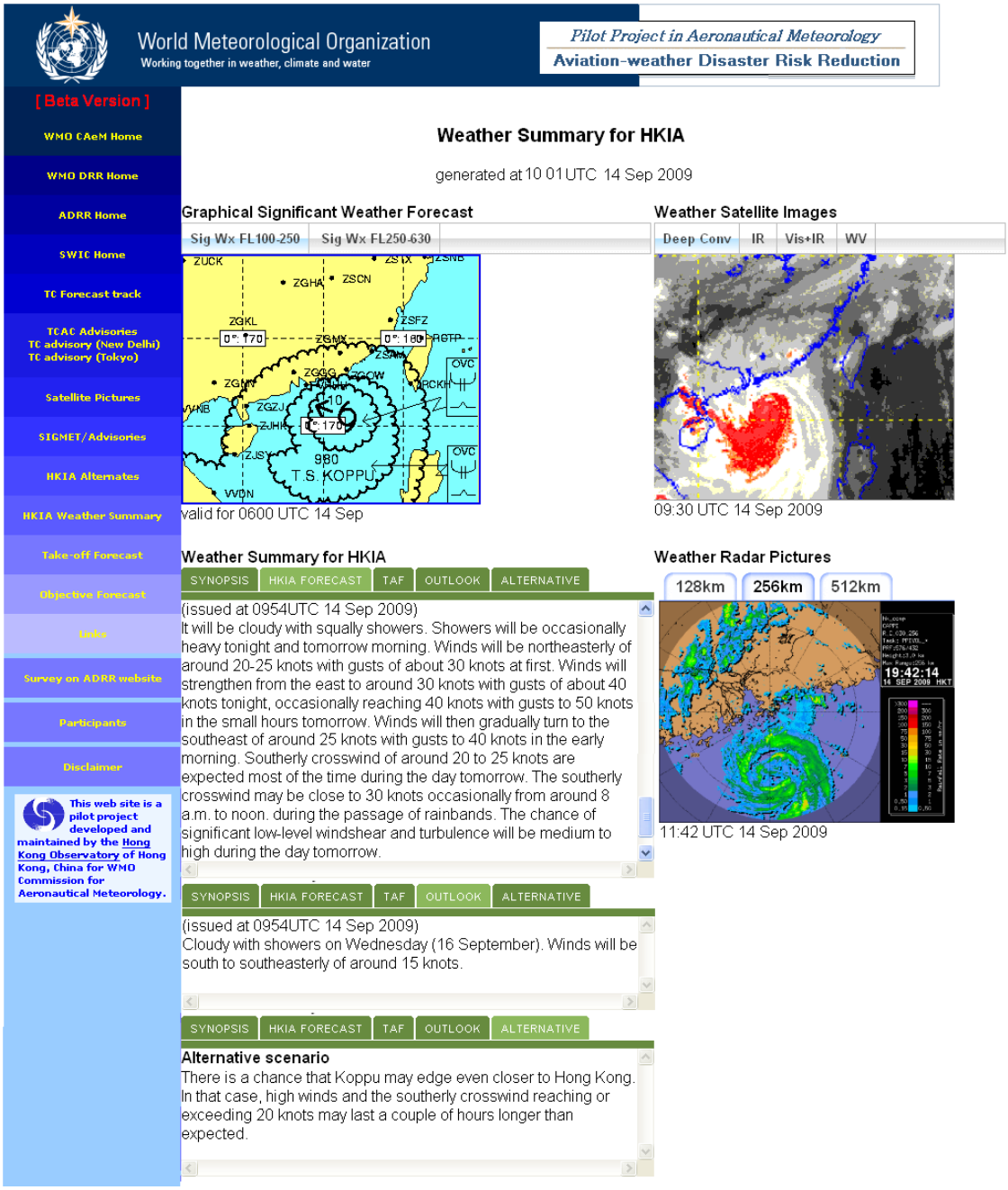

Figure 3. Weather summary for HKIA.

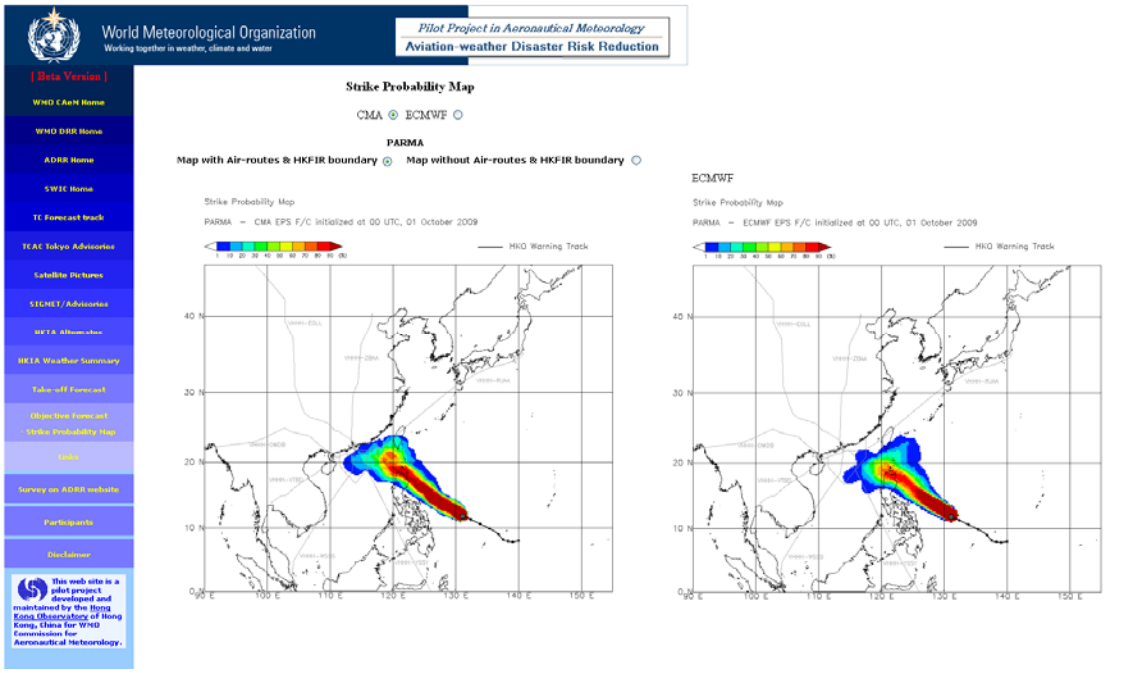

Figure 4. Strike probability of tropical cyclone Lupit (from CMA and ECMWF) shown on the ADRR pilot project website.

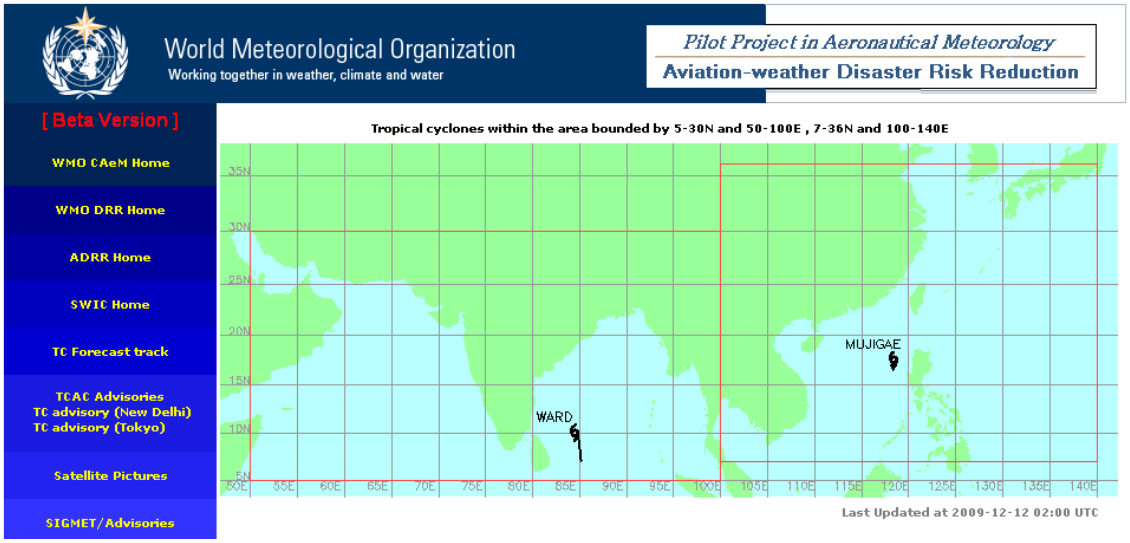

Figure 5. Coverage of ADRR website will be extended to the Bay of Bengal and the Arabian Sea.