

Aviation-weather Disaster Risk Reduction (ADRR)

Disasters related to meteorological and hydrological hazards often cause significant loss of life, and set back economic and social development. Between 1980 and 2005, nearly 7500 natural disasters worldwide took the lives of over 2 million people and produced economic losses estimated at over 1.2 trillion US dollars.

In 2003, the World Meteorological Organization (WMO) established a cross-cutting programme for National Disaster Risk Reduction for improving safety and well being of communities. Recognizing the role of the aviation meteorological community in contributing towards disaster risk reduction, the Commission for Aeronautical Meteorology (CAeM) established in 2006 a regional Pilot Project on Aviation-weather Disaster Risk Reduction (ADRR) under the lead of the Hong Kong Observatory.

Under the project, products beyond the current requirements of the International Civil Aviation Organization (ICAO), with particular focus on tropical cyclone and enhanced meteorological services for a wider terminal area, were developed and provided under the ADRR website (<http://adrr.caem.wmo.int>).

In line with the current effort being undertaken by WMO in close collaboration with ICAO to provide enhanced meteorological services for the wider terminal area under the Meteorological Service in the Terminal Area (MSTA) initiative, new value-added products using the Hong Kong International Airport (HKIA) as an example have been developed.

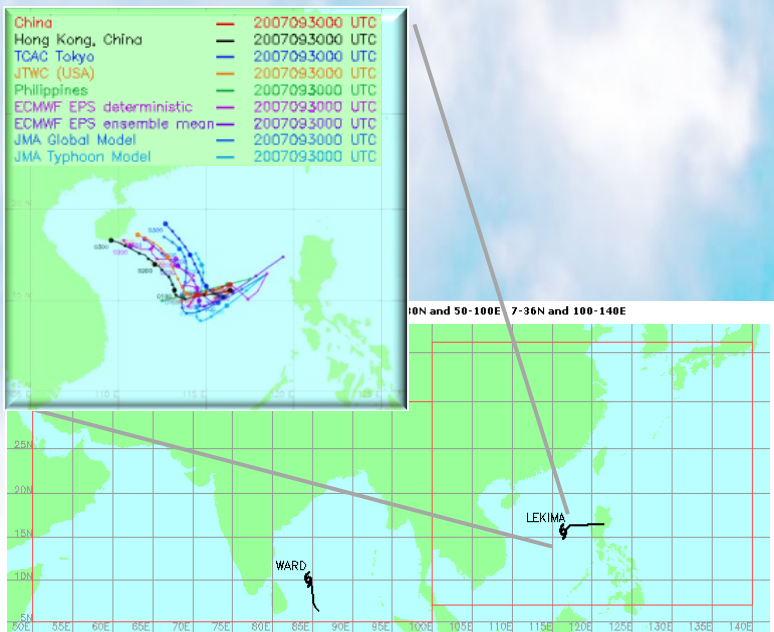
This project serves to demonstrate to aviation stakeholders (including airlines, pilots, air traffic management, airport authority, search and rescue units) the benefits of such information in the planning of airport operations and collaboration decision making (CDM) with common situational awareness, thereby enhancing aviation safety.

This booklet aims at providing the user with basic information on the products available under this ADRR website. The methodology and general principles to generate the forecast products are made available on the website to facilitate the development of similar products by other aeronautical meteorological service providers (AEMSP).

Tropical Cyclone Forecasts

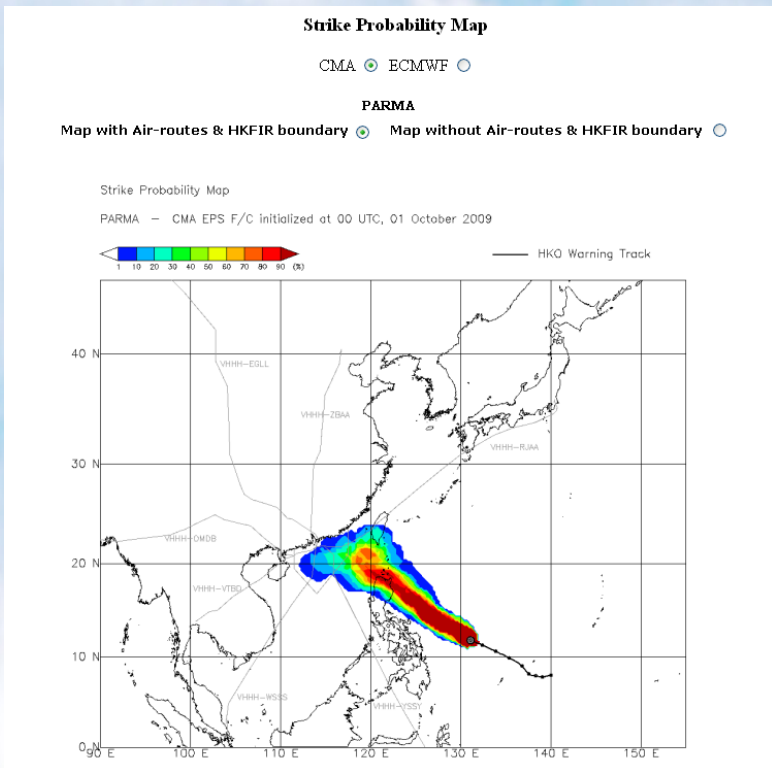
Tropical Cyclone Forecast Track

Official tropical cyclone forecasts and numerical weather prediction products from China; Hong Kong, China; India; Japan; and the Philippines, as well as advisories and forecasts issued by the Tropical Cyclone Advisory Centre (TCAC) New Delhi and Tokyo, Joint Typhoon Warning Centre (JTWC) of the USA, European Centre for Medium-Range Weather Forecasts (ECMWF) are consolidated and displayed on the ADRR website. The forecast track and intensity forecasts up to 48 hours and beyond are useful for planning of flight diversions or cancellation by the air traffic management authorities and airlines.



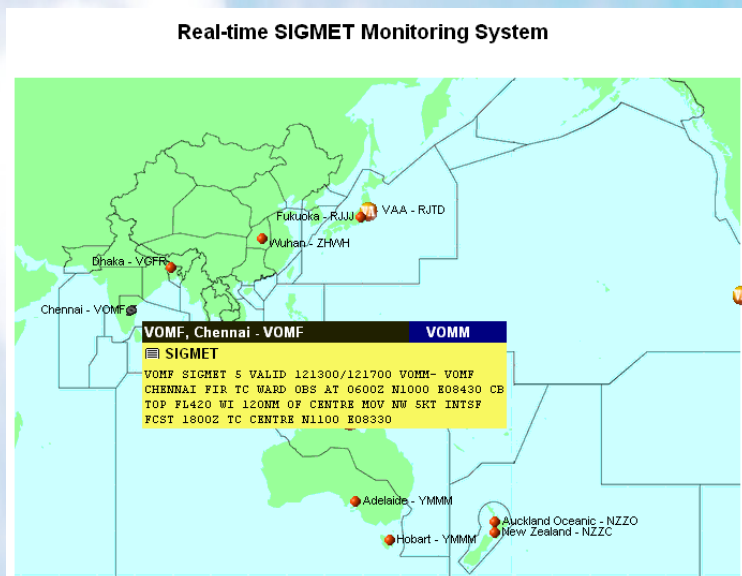
Strike Probability Map

The tropical cyclone (TC) strike probability map is generated based on numerical model output selectable from the China Meteorological Administration (CMA) and ECMWF Ensemble Prediction System (EPS). The probability indicates the chance, from the automatic model outputs, that a TC will pass within a 120 km radius from a location at anytime during the next 120 hours. The wider the spread of strike probability, the larger the uncertainty of the forecast.



Severe Weather Information

Real-time SIGMET Monitoring

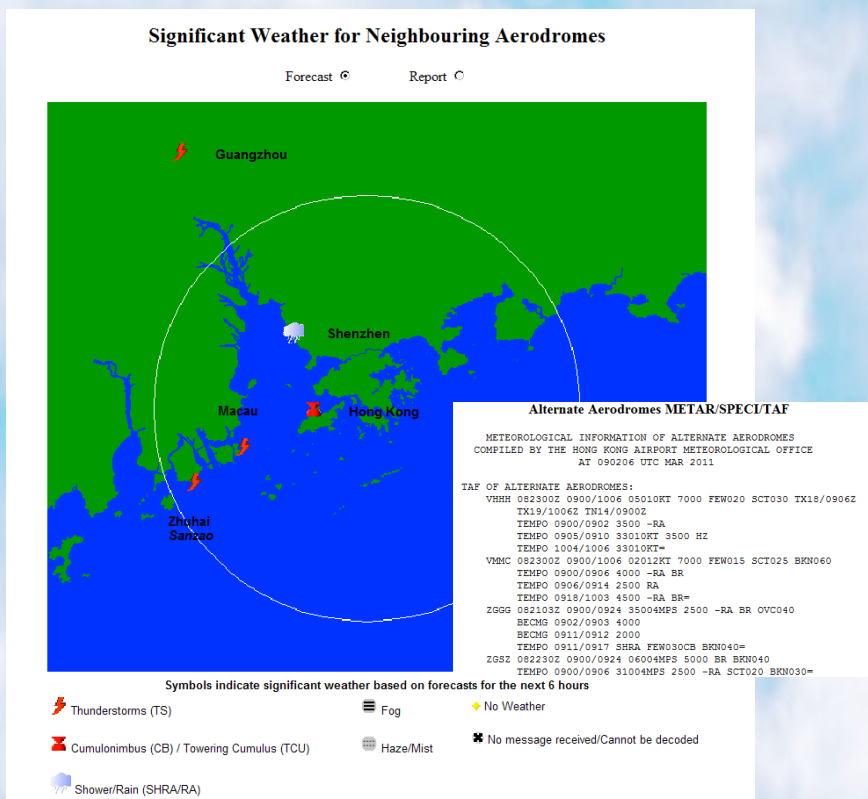


The Real-time SIGMET Monitoring page developed in collaboration with ICAO provides real-time information on valid SIGMET, including SIGMET for volcanic ash, tropical cyclones and other weather phenomena, as well as Advisories to indicate those regions affected by significant weather. The page serves to provide a full picture of the regions affected by severe weather at a glance.

Location Specific Products

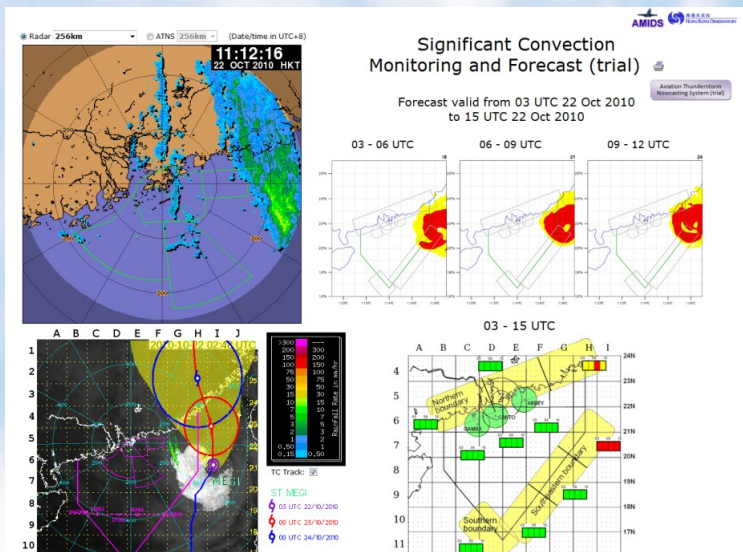
Neighbouring Aerodromes of HKIA

To support tactical decision in case of flight diversion due to inclement weather, METAR / SPECI / TAF for destination alternate aerodromes and significant weather for neighbouring aerodromes are available in graphical and symbolic presentation to facilitate easy viewing.



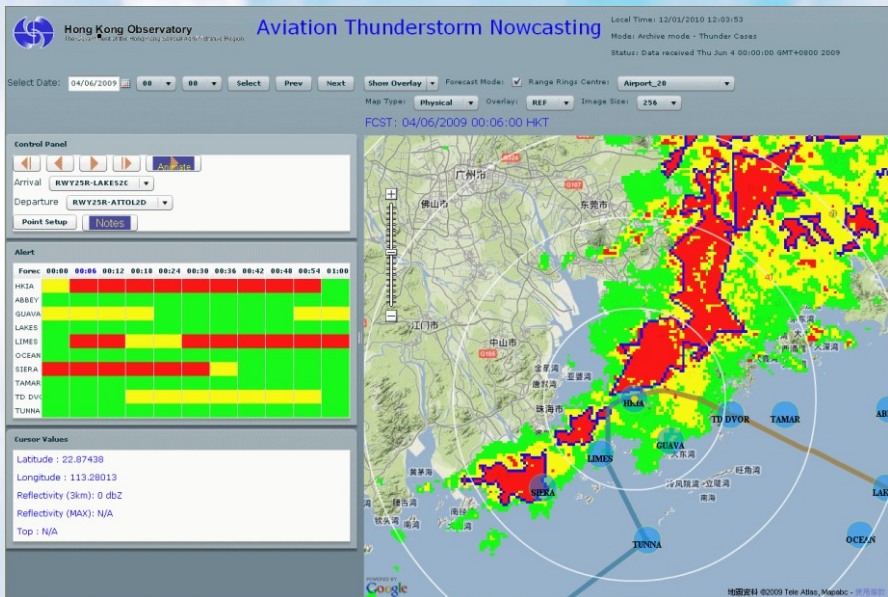
Significant Convection Monitoring and Forecast

The chance of significant convection over key air traffic control areas such as the holding areas for arrival flights over Hong Kong Flight Information Region (HKFIR) is delineated by three levels, viz. low, medium, high, respectively in green, yellow and red colors. The 12-hour forecast is generated based on objective guidance, including model outputs from ECMWF. To align with the forecaster's assessment based on meteorological observations and analysis including radar and satellite observations, manual adjustment may be applied to the automatically generated forecast for the first few hours of forecast.



Significant convection forecast for the next 12 hours

Aviation Thunderstorm Nowcasting System



To support air traffic management of the terminal area of HKIA, the Aviation Thunderstorm Nowcasting System provides forecast of thunderstorms (pictorial and tabular form) in the next hour by extrapolating the movement of radar echoes using artificial intelligence.

The product provides users with information on the location of inclement weather elements and helps anticipate the impact on air traffic flow.

HKIA Weather Summary

HKIA Weather Summary is a product presenting the aviation forecaster's assessment of the latest weather situation at HKIA. This product supplements the TAF by providing synoptic weather background, other likely alternative scenarios and an outlook up to 48 hours ahead.

Weather Summary for HKIA

SYNOPSIS

HKIA FORECAST

TAF

OUTLOOK

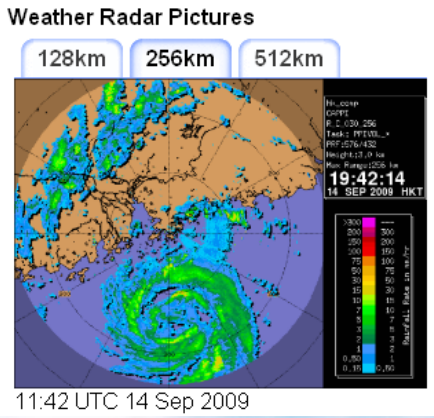
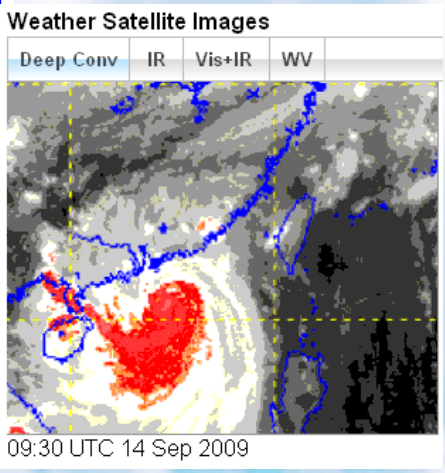
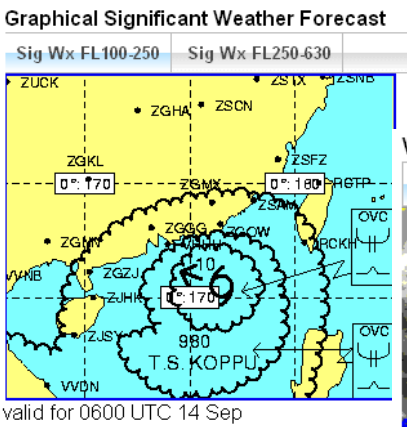
ALTERNATIVE

Severe Tropical Storm Koppu is located to the south-southeast of Hong Kong. It is forecast to move west-northwest at about 9 knots towards the coast of western Guangdong and intensify further. Koppu is expected to pass within 200 kilometres southwest of Hong Kong sometime between tonight and early tomorrow (15 September) morning. Bands of embedded cumulonimbus clouds associated with Koppu are affecting the HONG KONG FIR. Southerly **crosswind** of around 20 to 25 knots are expected and the chance of significant **windshear** and **turbulence** at low level will be medium to high during the day tomorrow.

Outlook:

Cloudy with rain, heavy at times. Visibility may fall below 2000m in heavy showers. Winds will be south to southeasterly at about 20 to 25 knots with a medium to high chance of southerly crosswind reaching 20 to 25 knots.

Forecasts of other weather conditions that may affect aviation safety, such as windshear, crosswind and turbulence which are not available in TAF, will be included as necessary (see the highlights in the above example). This information will be useful for the planning of airport operations and large-scale diversions in inclement weather such as tropical cyclone situations. Other weather products including significant weather forecast chart, meteorological satellite and weather radar imageries are also provided to facilitate assimilation of pertinent information by the users.



Extended Hourly Take-off Forecast

Extended hourly take-off forecast of winds, temperatures, QNH and crosswind forecasts and any significant weather for the next 18 hours is provided to aid airline users' flight planning. In particular, crosswind and headwind forecasts (which are not explicitly mentioned in TAF) will be given and highlighted if the thresholds, which have impact to operations, are reached.

Take-off Forecast for Hong Kong International Airport

Issue Time - 23:33 UTC 14 September 2009

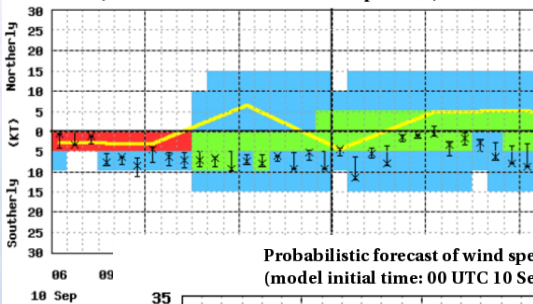
Runway 07 | [Runway 25](#)

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	

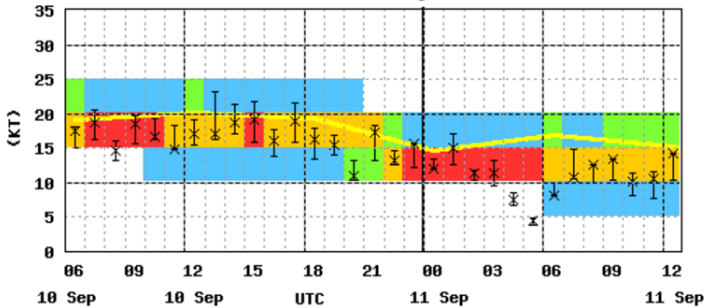
Probabilistic Forecasts

Based on ECMWF EPS, wind speed and crosswind probabilistic forecasts for HKIA up to 36 hours ahead are generated automatically using the wind forecast at the model grid point closest to HKIA. Probability forecast is useful in risk assessment for flight planning under tropical cyclone situation.

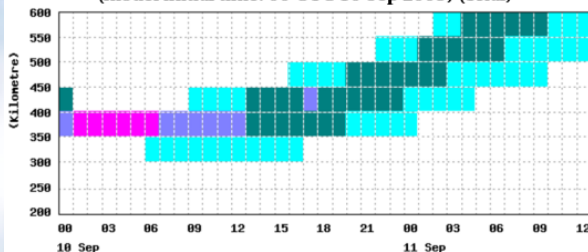
Probabilistic forecast of crosswind for HKIA
(model initial time: 00 UTC 10 Sep 2009) (Trial)



Probabilistic forecast of wind speed for HKIA
(model initial time: 00 UTC 10 Sep 2009) (Trial)

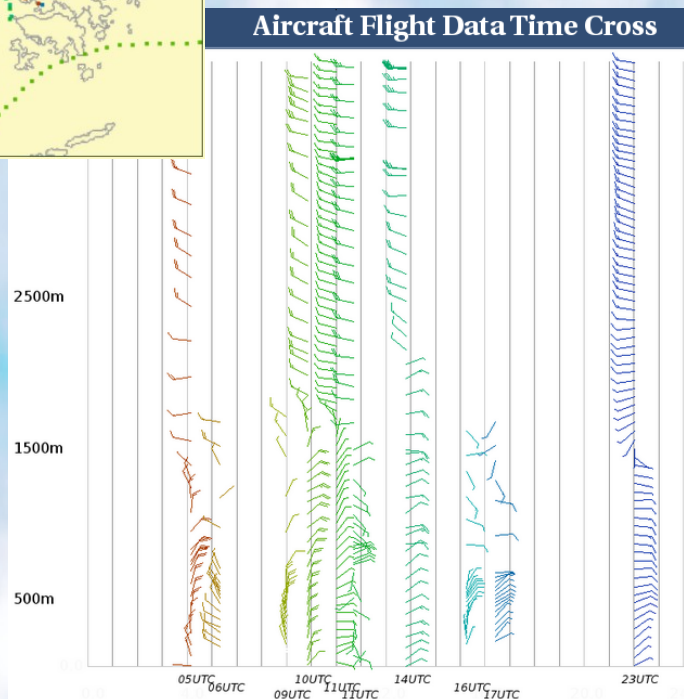


Probabilistic forecast of TC distance from HKIA
(model initial time: 00 UTC 10 Sep 2009) (Trial)



Aircraft Flight Data for HKIA

The high resolution wind and temperature data measured onboard the aircraft for the past 24 hours are presented in the form of time-height plot. These high resolution data, obtained from Cathay Pacific Airways and the Hong Kong Government Flying Service aircraft, provides the users with information on how the winds vary along the flight path(s). This is particularly useful for flight operations during tropical cyclone situations.



User Feedback

- With very positive feedback from users, the ADRR website was officially launched on 18 April 2011.
- If you wish to access the ADRR website or give feedback, please send an email to adrr@hko.gov.hk
- For more information on WMO Disaster Risk Reduction Programme, please visit website at :
http://www.wmo.int/pages/prog/drr/index_en.html

Published by the Hong Kong Observatory, Hong Kong Special Administrative Region Government.

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