Speech by Mr SHUN Chi-ming, Director of the Hong Kong Observatory
17 March 2014

I am glad to meet all of you today. Before reporting on the latest developments in the Hong Kong Observatory, let me first introduce my Assistant Directors. They are:

1. Dr CHENG Cho-ming, responsible for public weather services
2. Miss LAU Sum-yee, responsible for aviation weather services
3. Mr LAI Sau-tak, responsible for climate and geophysical matters
4. Mr TSUI Kit-chi, responsible for radiation monitoring and instruments

Let's review the Observatory's works during the past year.

2013 was the 130th anniversary of the Hong Kong Observatory, during which we conducted a series of activities, including an exhibition and public lectures jointly organized with the Hong Kong Museum of History. The eight-week exhibition was well received with more than 140 000 visitors. For those who missed the opportunity to visit the exhibition or those who would like to have chance to view again the exhibits, please join the virtual tour through the HKO website (Fig. 1).

As for the weather information service, we launched free TV weather service on 30 Dec 2013, including in-house produced high definition weather programmes "Weather-on-Air" and a weekly educational feature "Cool Met Stuff". The programmes are also available on YouTube. Members of the public can assess the programmes anytime and anywhere through the mobile app "MyObservatory" and HKO webpage (http://www.hko.gov.hk/video/weatheronair.htm).

In 2013, the Observatory enhanced its online weather information service continuously. Apart from launching the webpage of "Automatic Regional Weather Forecast", we enhanced the mobile app "MyObservatory" with new features such as "My Weather Report", "Aviation Weather", etc. In fact, the usage of the Observatory's online information service sets new record in recent years. The total visitor statistics in page views exceeded 65 billion, which doubled the figure in 2012 (Fig. 2). In early 2014, we launched the Windows Phone version of "MyObservatory". Currently, "MyObservatory" mobile app is available on iOS, Android and Windows Phone platforms with total number of downloads estimated at 3.9 million. In 2013, the usage for mobile app in page views exceeded that of the Observatory website for the first time (Fig. 2), showing the increasing public access to weather information through smart phones.

Over the past few years, the Observatory has been delivering new services with good results. I am pleased to report that the Observatory won four prizes under the Civil Service Outstanding Service Award Scheme 2013, including the Gold Prize of the Departmental Service Enhancement Award (Small Department Category). This is the fourth time the Observatory has won this

biennial award following previous successes in 2005, 2009 and 2011. These awards represent recognition of the Observatory's works. We will continue to strive for excellence and serve the public with heart.

Looking ahead, we plan to launch some new services and products:

To enable the public to plan their activities well ahead, the Observatory will extend the weather forecast period from 7 days to 9 days starting from April. The new 9-day weather forecast webpage will display the changes in temperature and humidity in chart form for easy viewing (Fig. 3). Outdoor enthusiasts told us that the new service can help them arrange their schedule ahead and select suitable equipment under different weather conditions. Subsequent to the launch of the 9-day weather forecast, the mobile app "MyObservatory" will also be enhanced with the service progressively. In addition, we will update the user interface of "MyObservatory" on iOS and Android platforms progressively later this year (2014) to improve user experience.

For night sky observations, the Observatory together with the Hong Kong Space Museum and the Department of Physics of the University of Hong Kong jointly developed the "Weather Information for Astronomical Observation" webpage (http://www.weather.gov.hk/gts/astronomy/astro_portal.html) which will be put into trial operation today (Fig. 4(a)). . The webpage content includes night sky brightness, weather observation information, digital weather forecast and all sky image (Fig. 4(a)) at Cape D'Aguilar, Shek Pik, Hong Kong Space Museum at Tsim Sha Tsui, Astropark and iObservatory at Sai Kung. The webpage also provides the latest star map and other useful astronomical information (Fig. 4(c)).

On weather observations, the Observatory will continue to enhance and optimize the automatic weather station observation network, and plans to progressively add more observation sites, including the Kai Tak Runway Park, the Yuen Long Park, Sheung Shui and the West Lamma Channel, to provide useful and timely weather information for the public (Fig. 5).

2014 marks the 50th anniversary of meteorological satellite reception at the Observatory. The Observatory will take the occasion to enhance its satellite information services, which would include redesigning the satellite imagery webpage to improve user experience, increasing the types (Fig. 6), updating frequency and retention time of satellite images on the web, and also presenting satellite images of significant weather to promote public interest and awareness. The revamped webpage will be launched before the end of the year.

The Observatory is also proactively working with partners to maximize synergy to achieve win-win results.

To further promote weather observation among the public, especially for the younger generation, the Observatory collaborates with the Department of Applied Physics of the Hong Kong Polytechnic University in implementing the "Community Weather Observing Scheme" (CWOS). The scheme encourages the public to undertake first-hand weather observations by uploading and sharing weather photos and observation reports through the website (co-win.org), mobile app (iCWeatherOS) and social network (www.facebook.com/icwos). (Fig. 7)

To help the public better understand the weather, the Observatory supports Hongkong Post in the launch of a set of special stamps with the theme of "Weather Phenomena", introducing common weather phenomena in Hong Kong. Joint press conference will be conducted on 25 March, on which further details will be announced.

This year, the World Meteorological Day's theme is "***Weather and Climate: Engaging Youth***". The Observatory will be open to public on 29 March (afternoon) and 30 March to celebrate the World Meteorological Day. Director's autographing session will also be arranged. I would like to request your help in publicizing the event and activities.

In recent years, abnormal weather events occur around the world more frequently, such as severe flooding in the United Kingdom, record heat wave in Australia, snowstorms in North America. These are clear signs that the impact of climate change has already been felt, and that we would expect more of the same. While 2013 was the sixth warmest year on instrumental records, local temperatures exhibited rather large fluctuations in the past few months. Part of the reasons could be attributed to the occurrence of atmospheric "blocking" situation (Fig. 8) which, according to some scientific studies, might be related to the melting of Arctic ice due to global warming. The forecasting of such fluctuating weather would inevitably become more challenging in the future.

Regarding the weather outlook for this year, there are indications of normal to below-normal annual rainfall i.e. between 1,700 and 2,300 mm (Fig. 9). The outlook is largely based on the statistical consequence of stronger than normal monsoon in the preceding winter, and the climate computer model outputs of major prediction centres that south China costal areas would see normal or below normal moisture this spring and summer. However, as abnormal weather, including rainstorms, might still occur from time to time, I would like to remind the public to remain vigilant against the threat of inclement weather and take appropriate precautionary measures.

For tropical cyclones, considering that sea surface temperature over the central and eastern equatorial Pacific would remain normal in spring, the Observatory expects the number of tropical cyclones coming within 500 km of Hong Kong to be near normal, i.e. between four and seven, and the typhoon season would start in June or later. (Fig. 9)

On climate change, the Observatory reviewed the impact to Hong Kong in the 21st century based on the Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change released last September, and comes up with the following estimated projections for Hong Kong under the high greenhouse gas emission scenario:

a) Average temperature projection : the temperature is expected to rise by 1.5-3°C and 3-6°C in mid-21st century (2051-2060) and late 21st century (2091-2100) respectively, when compared to the 1986-2005 average of 23.3°C (Fig. 10);
b) Rainfall projection : the number of extremely wet years is expected to increase from three in 1885-2005 to about 12 in 2006-2100, which is roughly the same as the previous projection, while the likelihood of drought episodes still remains (Table 1). Besides, the annual rainfall in late 21st century is expected to rise by about 150 mm when compared to the 1986-2005 average (Fig. 11);
c) Extreme sea level projection: assuming no change in storm characteristics, the return periods for various extreme sea levels in the Victoria Harbour will shorten as shown in Table 2, meaning that the frequency of occurrence of a particular extreme sea level will increase. Using the example of an extreme sea level of 3.53 m in the Victoria Harbour brought by Typhoon Hagupit in 2008, its return period will shorten from around 50 years at present to around 5 years in mid-21st century (2046-2065), and even every year by late 21st century (2081-2100) (Table 2).

Finally, I would like to emphasize that there is no doubt that impact of climate change is occurring. Although Hong Kong has developed rapidly with modernized city infrastructures and improved natural disaster mitigation measures, resulting in great reduction of human casualties and damages, the scientific community expects that extreme weather events, such as stronger typhoons, more intense rainstorms, hot spells etc. will become more frequent under the influence of global climate change. Therefore, we should not be complacent but raise public awareness on natural disaster preparedness and take appropriate measures to combat climate change. In this regard, the Observatory collaborates with RTHK to produce a new TV documentary series, the “Meteorology Series IV” which will be broadcast starting 26 April.

Director Shun and the Controller (TV) of Radio Television Hong Kong, Miss Chan Man-kuen, officiate at the launch ceremony of "Meteorology Series IV".

Fig. 1 Virtual tour of HKO's 130th anniversary exhibition
(Please visit the link below to access the virtual tour webpage.
http://www.weather.gov.hk/hko_virtualtour/vtour/vtour_e/index.html)

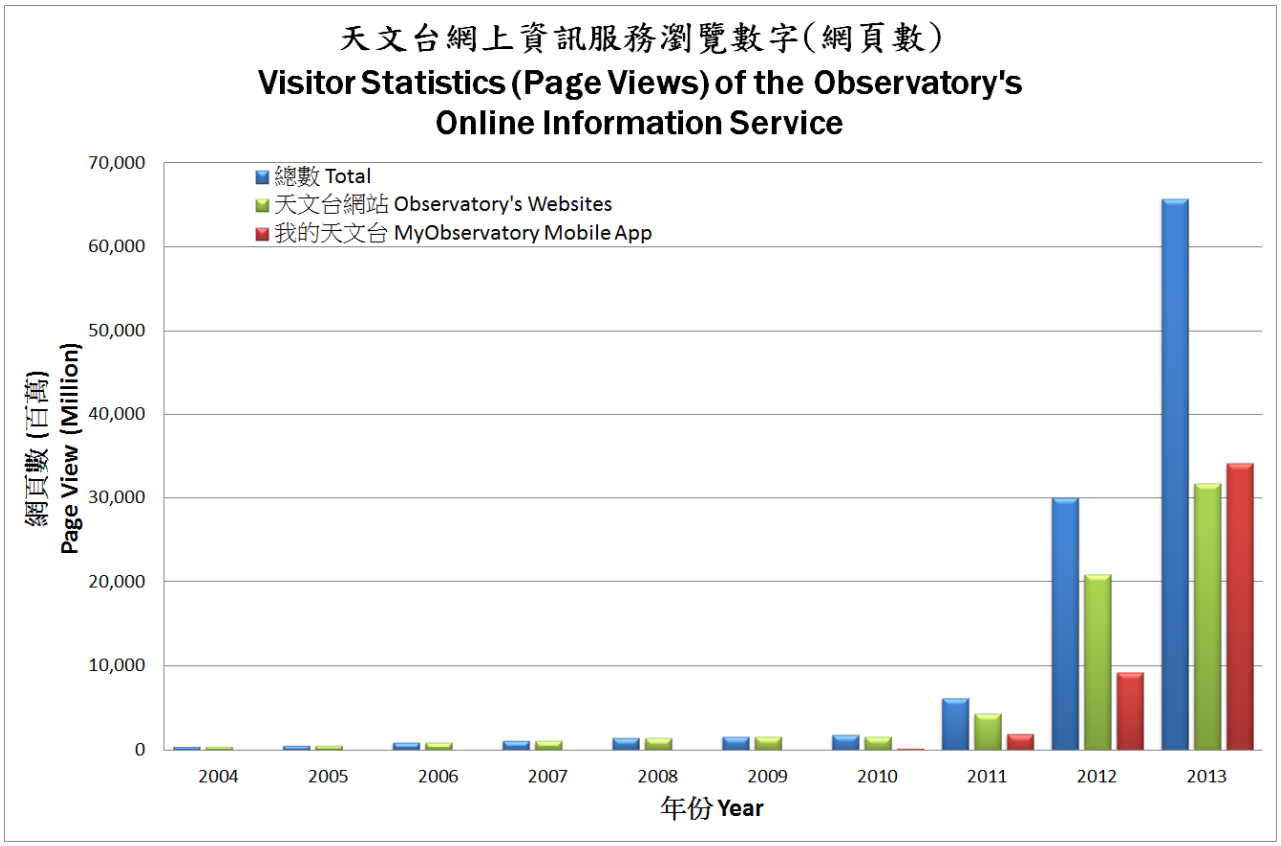


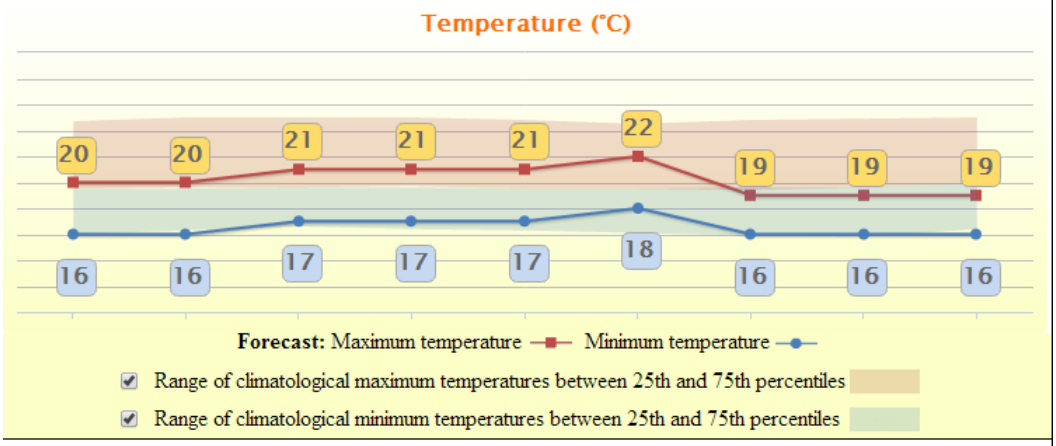
Fig. 2 Visitor Statistics (Page Views) of the Observatory's Online Information Service.

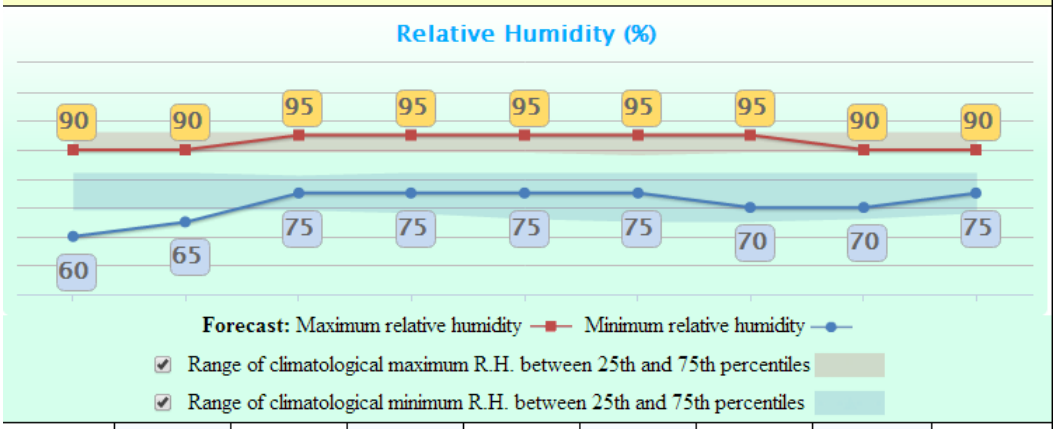
9-day Weather Forecast

General Situation:

The northeast monsoon will bring slightly cooler weather to the coastal areas of Guangdong today and tomorrow. The monsoon will be replaced by a maritime airstream early next week, and the temperatures over the region will rise.

14 Mar (FRI)	15 Mar (SAT)	16 Mar (SUN)	17 Mar (MON)	18 Mar (TUE)	19 Mar (WED)	20 Mar (THU)	21 Mar (FRI)	22 Mar (SAT)
Mainly cloudy with one or two rain patches.	Mainly cloudy. Bright periods during the day.	Sunny periods. Misty in the morning and at night.	Sunny periods. Misty in the morning and at night.	Sunny periods. Coastal fog in the morning and at night.	Sunny periods. Coastal fog in the morning and at night.	Mainly cloudy. Visibility relatively low.	Mainly cloudy.	Mainly cloudy.





14 Mar (FRI)	15 Mar (SAT)	16 Mar (SUN)	17 Mar (MON)	18 Mar (TUE)	19 Mar (WED)	20 Mar (THU)	21 Mar (FRI)	22 Mar (SAT)
Northeast force 4, occasionally force 5.	East force 4, force 5 at first.	East force 4.	East force 3 to 4.	East to southeast force 3.	Southeast force 3.	East force 4 to 5, occasionally force 6 offshore.	East force 4 to 5, occasionally force 6 offshore.	East force 4 to 5, occasionally force 6 offshore at first.

Fig. 3 9-day Weather Forecast.

Fig. 4a Weather Information for Astronomical Observation (Beta Version)

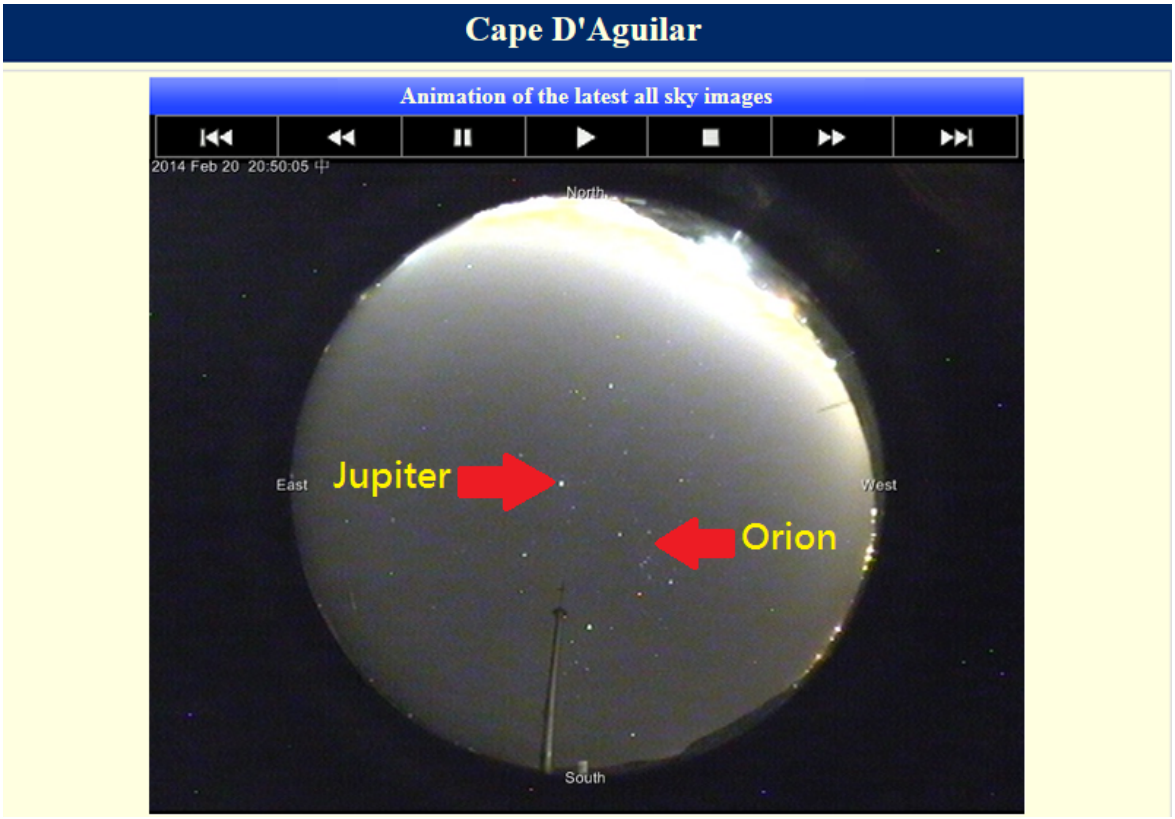


Fig. 4(b) & (c) All Sky Image and Star Map

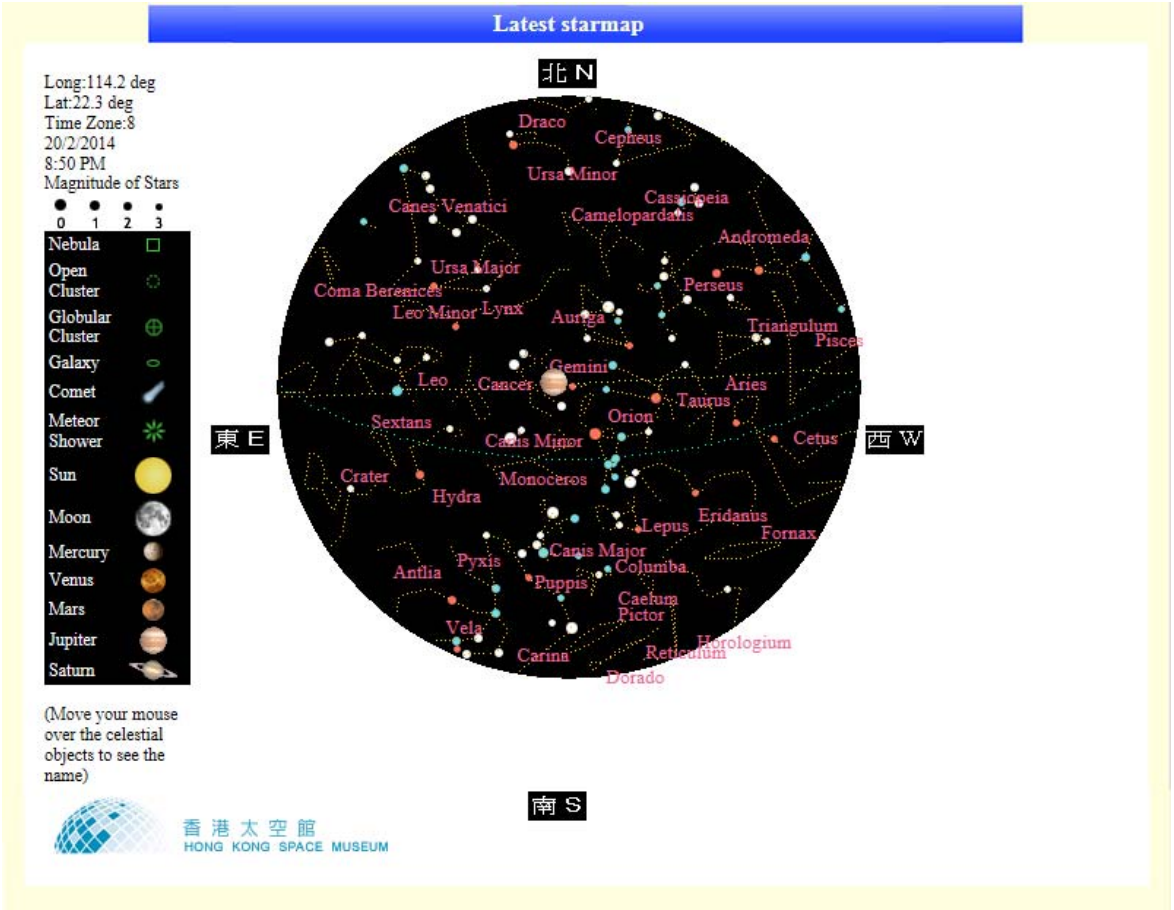


Fig. 4(c) Star Map

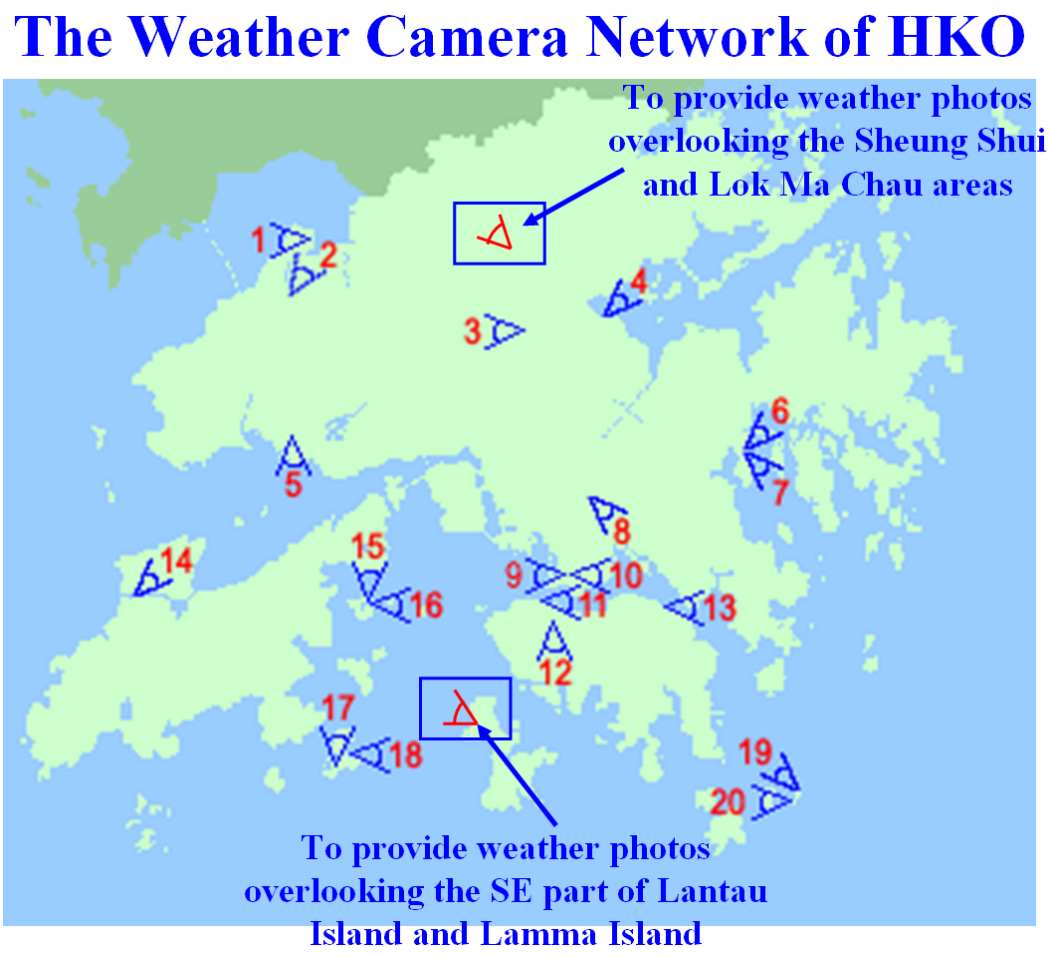


Fig. 5(a)

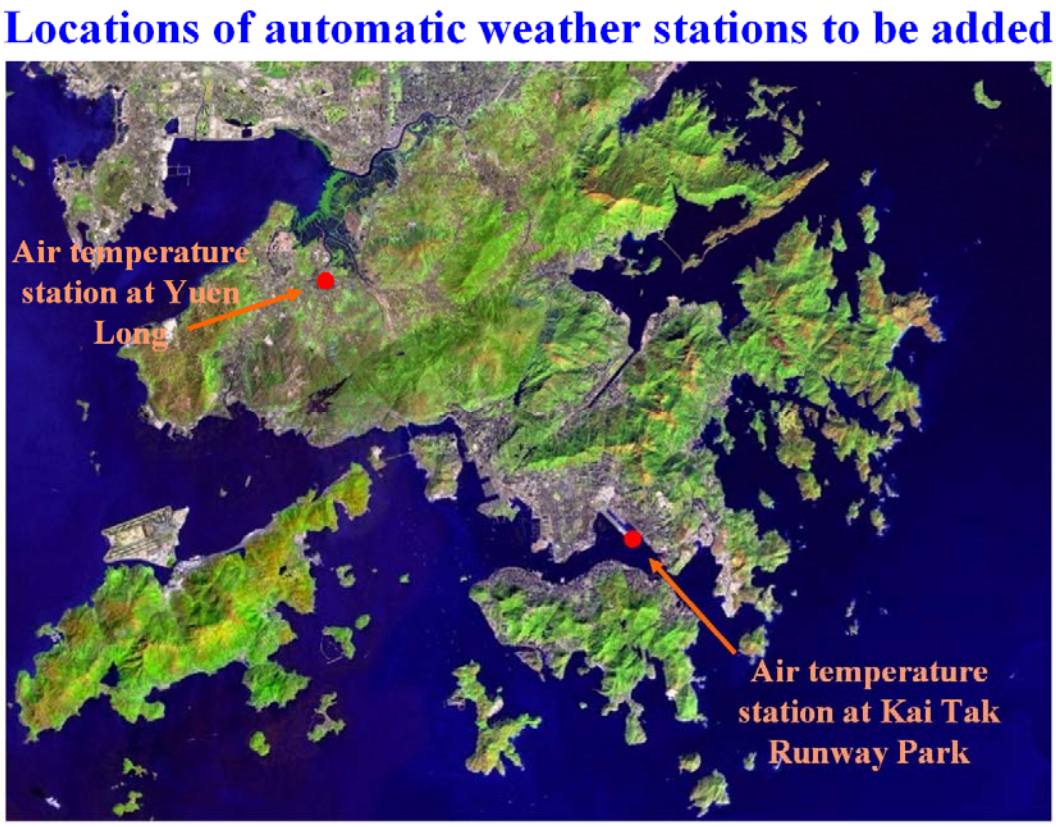


Fig. 5 Weather Camera network and Locations of automatic weather stations.Fig. 5(b)

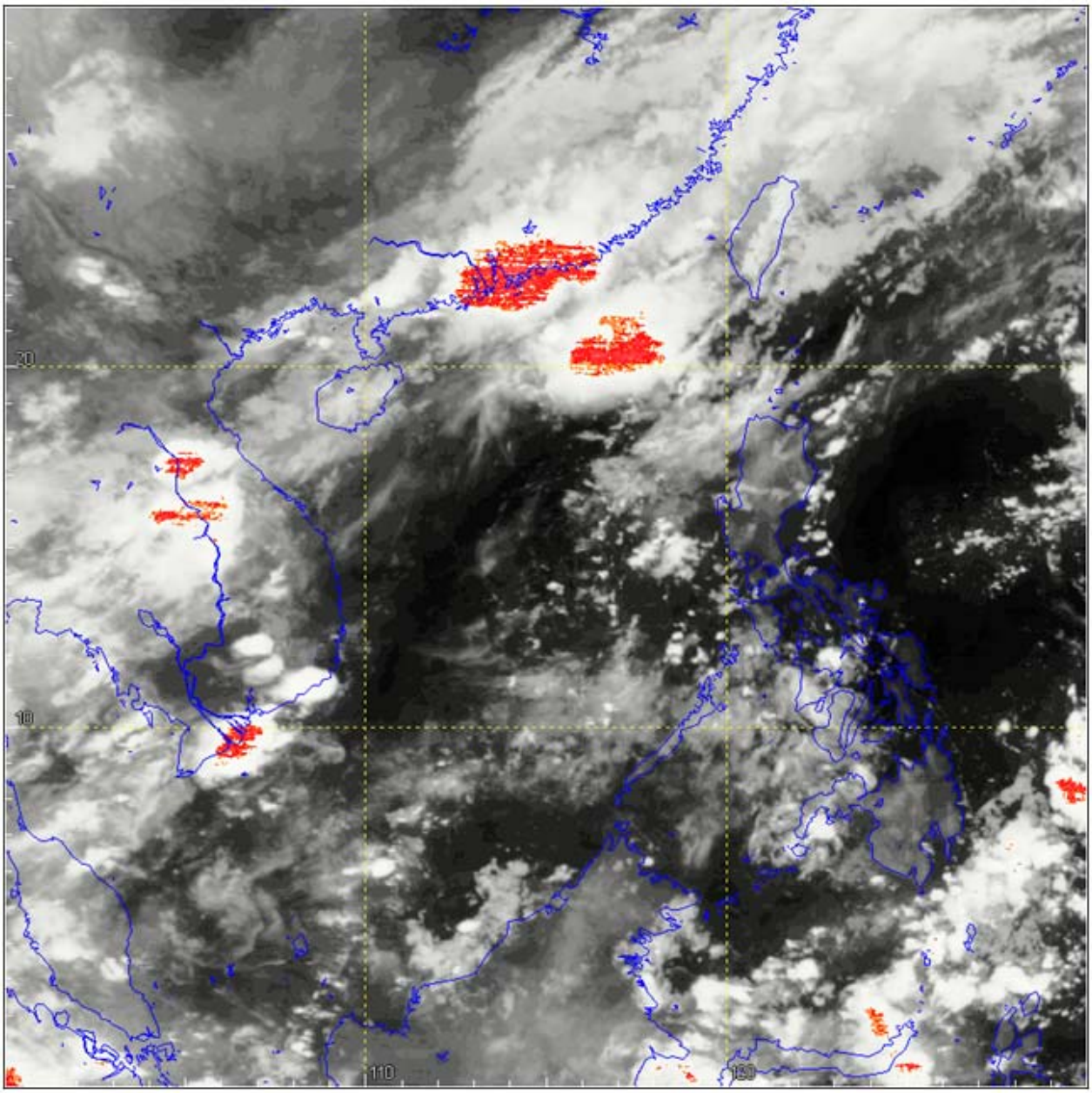


Fig. 6 Satellite picture on deep convection.
(Deep convection regions are highlighted in red)

Webpage: co-win.org

Social Network webpage:
www.facebook.com/icwos

iCWeatherOS

Fig. 7 Multi-channels to promote community weather observations

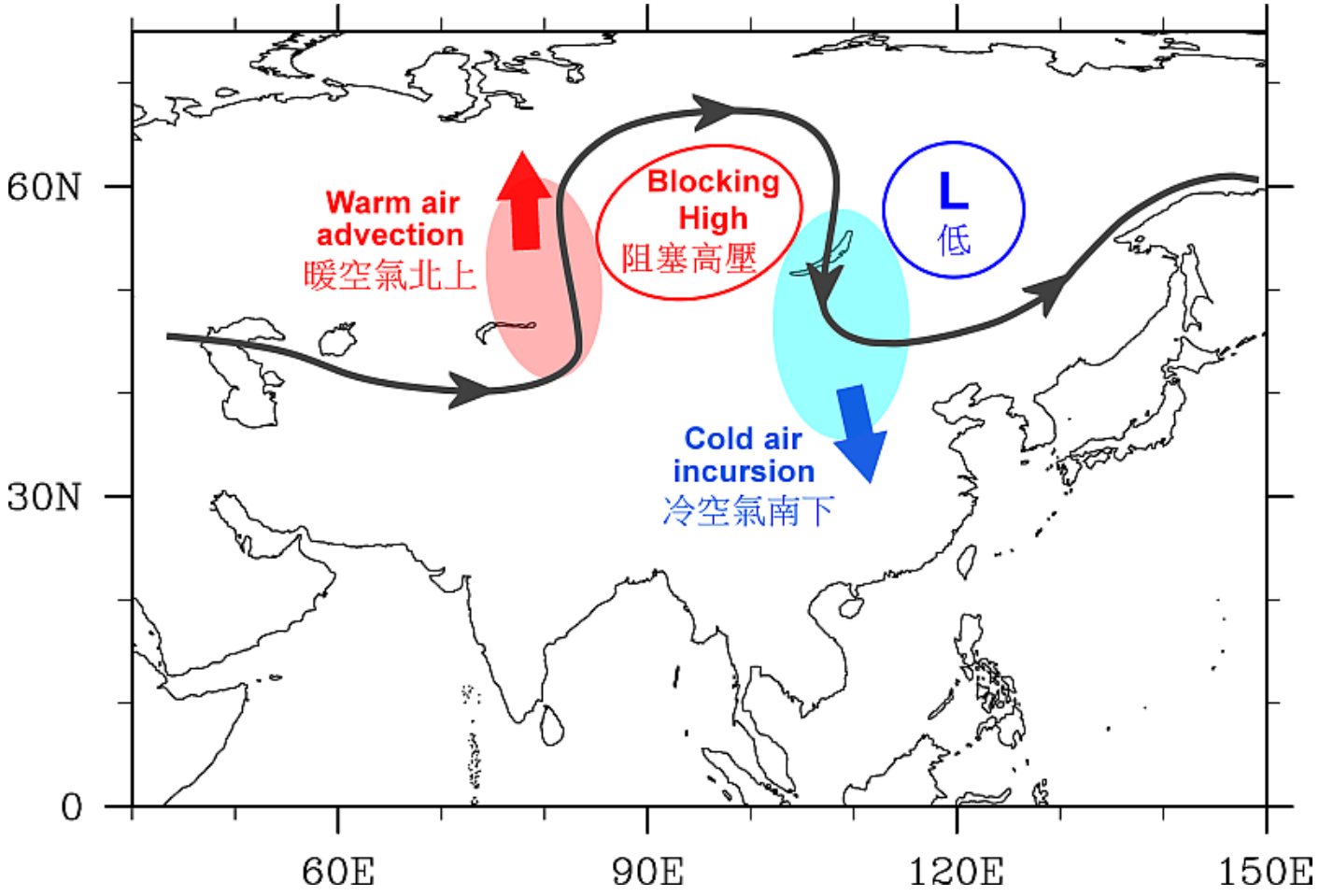


Fig. 8 “blocking” situation

Annual rainfall in Hong Kong	Normal to below normal （1700 - 2300 mm）
Number of tropical cyclones entering 500 km of Hong Kong	Near normal （4 - 7）

Fig. 9 2014 Annual outlook.

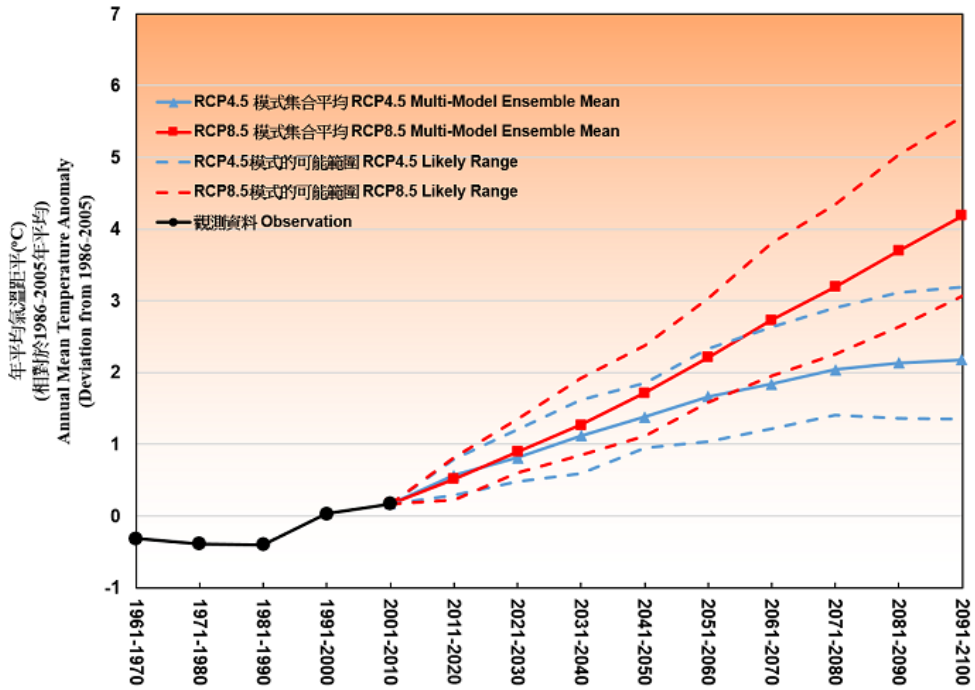


Fig. 10 Past and projected annual mean temperature anomaly for Hong Kong.
(The projection is based on IPCC AR5 computer model data. Likely range means the 5th to the 95th percentiles of the multi-model ensemble.)

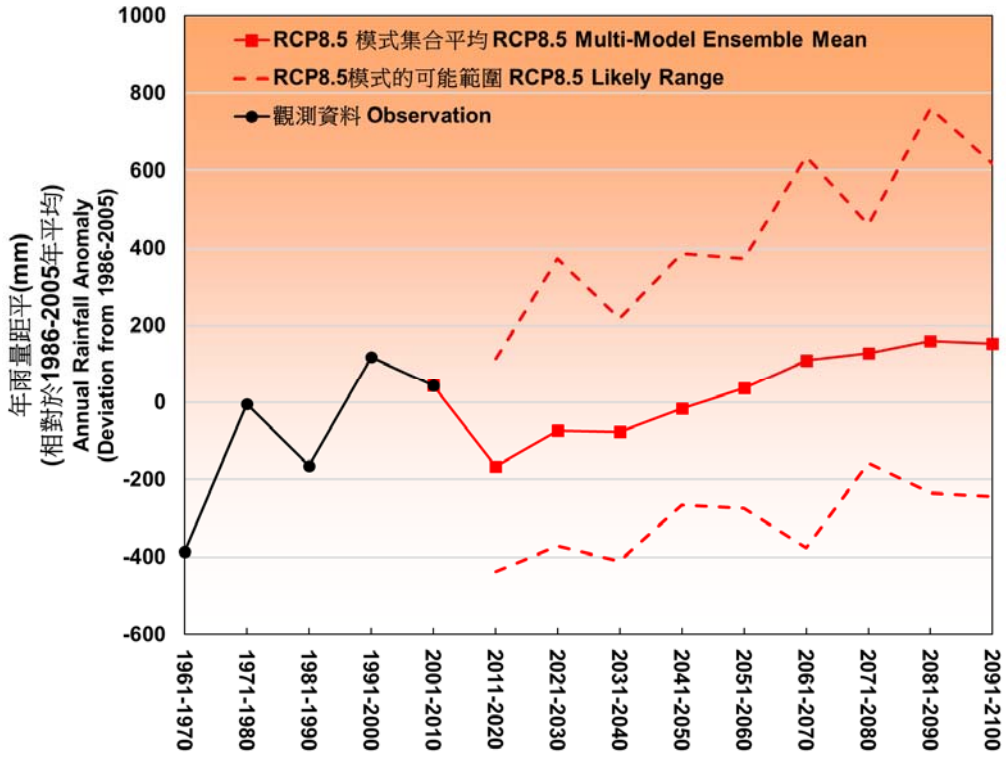


Fig. 11 Past and projected annual rainfall anomaly of Hong Kong.
(The projection is based on IPCC AR5 computer model data. Likely range means the 5th to the 95th percentiles of the multi-model ensemble.)

Table 1 Future changes in extremely wet and extremely dry years

	Observation in 1885-2005	Projection for 2006-2100
Extremely wet years (annual rainfall > 3168 mm)	3	12
Extremely dry years (annual rainfall <1289 mm)	2	2

Table 2 Changes in the return period of extreme sea level event in Victoria Harbour due to mean sea level rise

Return period (year)	Extreme sea level above Chart Datum# (m)		
	Current mean sea level	For a sea level rise of reaching 0.38 m	For a sea level rise of reaching 0.82m
1	2.7	3.1	3.5
2	2.9	3.3	3.7
5	3.1	3.5	3.9
10	3.3	3.6	4.1
20	3.4	3.8	4.2
50	3.5	3.9	4.4

Chart Datum is the level to which soundings or tide heights are referenced, and is approximately the level of lowest astronomical tide in the Victoria Harbour. Chart Datum is 0.146 m below the Hong Kong Principal Datum, the level to which land surveys in Hong Kong are referenced.