

# WEATHER ON WINGS



香港天文台  
HONG KONG OBSERVATORY

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## Celebrating 130th Anniversary

Editorial Board

On 2 March 1883, Dr William Doberck was appointed the first Director of the Hong Kong Observatory. This year, the Observatory launched a series of activities to celebrate its 130th anniversary.

Mr SHUN Chi-ming, the Director of the Observatory, celebrated the 130th anniversary of the Observatory and World Meteorological Day on 23 March with more than 100 guests, including Mr David Grimes, the President of the World Meteorological Organization (WMO); Mr SHEN Xiaonong, the Deputy Administrator of the China Meteorological Administration (CMA); Mr Andrew WONG, the Permanent Secretary for Commerce and Economic Development (Commerce, Industry and Tourism); all five retired Chinese Directors of the Observatory; and collaborators and partners.

Delivering his speech at the ceremony, Mr Grimes said, "With over a century of service activities behind them, the Observatory has matured into a world-class establishment. The organisation typifies the entrepreneurial spirit I felt everywhere. I note that the Observatory has contributed greatly to the growth of the WMO, including the World Weather Watch Programme in recent decades. Looking ahead, I am confident that the Observatory will continue to deliver meteorological services that meet the needs of the community. In the face of challenges arising from emerging service requirements, closer partnerships shall be formed among institutes and advantages of new technologies shall be better utilised. No doubt, the Observatory will serve as a model of excellence in protecting lives and building a better society through science."

Mr SHEN echoed Mr Grimes' point on partnerships and cited the win-win co-operation and common development between the



▲ The Director (4th left) together with the officiating guests and all five retired Chinese Directors raised their glasses in a toast.

Mainland and Hong Kong as an example. He said, "The improved meteorological monitoring networks in both the Mainland and Hong Kong have laid a solid foundation for disaster preparedness and mitigation, as well as response to climate change. We will continue to pursue all-round and multi-level exchange and co-operation, jointly making an even greater contribution to China and the global meteorological community at large."

Recalling the achievements of the Observatory in the past 130 years, Mr SHUN shared several stories through which one could see the ideals, culture and core values shared by Observatory staff, past and present. He pointed out that all the stories mentioned have been included in a newly launched book entitled "Under the Same Sky". Mr SHUN also expressed his heartfelt appreciation to all of the Observatory's partners. He said, "Without the close collaboration and partnership that we have enjoyed in the past years, the Observatory alone could not have reached its current level of development and sophistication."

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"Under the Same Sky" contains 50 Chinese and English articles written by six directors of different generations, serving and retired staff of the Observatory, stakeholders, scholars and counterparts. Through the authors' real-life stories, and more than 150 precious pictures, the evolution of the Observatory and Hong Kong society over the decades is vividly portrayed. In addition, natural disasters affecting Hong Kong in the past are recollected in the book, so as to increase public awareness in disaster prevention and mitigation, in preparation for more frequent extreme weather as a result of climate change.



▲ "Under the Same Sky", a collection of articles to commemorate the 130th anniversary of the Hong Kong Observatory, is highly recommended for those interested in weather as well as the history of the Observatory.

A series of public activities celebrating the Observatory's 130th anniversary commenced after the ceremony. First among them is the Observatory's Open Day on 23-24 March. Through texts, pictures and exhibits, various services including weather, climate, aviation meteorology, geophysical science and radiation monitoring were introduced to the public. State-of-the-art equipment was displayed, game booths, guided eco-tour and photo backdrop for posing as a member of Weather Family were also set up for the public.



▲ The Director autographed the new book "Under the Same Sky" for celebrating the 130th anniversary of the Observatory during the Open Day. Many people welcomed this opportunity and posed with him for a picture.



▲ Observatory staff sheltering the public from showers.

The Open Day was well received by the visitors. They praised the Observatory staff's friendly and helpful attitude, and the care they showed in sheltering the visitors (especially children who had not brought umbrellas) from showers that occurred in the afternoon on 24 March. They also appreciated the knowledge gained from the well-presented exhibits and interesting games.



▲ Apart from the Observatory staff, more than 60 members of "Friends of the Observatory" volunteered to man the Open Day and enjoyed a happy weekend with the visitors offering a strong support behind the scene.

# Meeting the Media – Review and Outlook



▲ The Director (center) briefed the media on the department's latest developments.



▲ The Director exchanged views with reporters at luncheon.

Every year around the World Meteorological Day on 23 March, the Director of the Observatory meets the media to review the work of the Observatory in the past year and highlight developments in the coming year. This year the press conference with the theme "Watching the Weather to Protect Life and Property" was held on the afternoon of 18 March, attended by around 30 reporters.

Mr SHUN Chi-ming, the Director, reported that while 2012 was drier than usual with only about 80% of the normal rainfall, we had a fair share of tropical cyclone passages, with five tropical cyclones necessitating the issuance of warnings, including the highest signal No.10 for Vicente in July, the first No.10 Signal in Hong Kong since Typhoon York in September 1999. Overall, we continued to deliver new services with satisfactory results. In the latest survey conducted by an independent market survey company, members of the public are generally satisfied with our tropical cyclone warning performance and assessed that nearly 80% of our weather forecasts were considered accurate, a high score maintained since 2006.

"The Observatory spared no efforts to enhance weather information provision, in particular over the increasingly popular channels of the internet, mobile platforms and social networks. Both the HKO website and the mobile app 'MyObservatory' attained record-breaking figures in visitor statistics, reaching 30 billion and 9.2 billion page views respectively in 2012. They both amounted to almost five times of the corresponding figures in 2011," Mr SHUN said.

He noted that the new weather services introduced last year were well received by public. These included 'special weather tips' and 'two weather icons' to indicate weather changes; location-specific rainfall forecast for the coming two hours on mobile devices; and the revamped "Weather Information for Senior Citizens" webpage for the elderly.

To enhance the coverage and quality of weather observations which are crucial to weather forecasts, the Observatory continued to collaborate with local and regional partners, including reconnaissance flights of the Government Flying Service into tropical cyclones to collect weather data; extending the Guangdong-Hong Kong-Macao lightning location network to double the spatial coverage of lightning detection; testing of the first automatic weather station onboard one of the Hong Kong voluntary observing ships to provide more frequent weather observations at sea.

On public education, the Community Weather Information Network (Co-WIN) jointly promoted by HKO in co-operation with the Hong Kong Polytechnic University has registered a total of 125 institute members, including two latest new stations set up in Guam

and the Philippines, co-ordinated under the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)/World Meteorological Organization (WMO) Typhoon Committee. This signifies that the Observatory's public education efforts have reached a regional level and is recognized internationally. To further promote weather observation with the general public, especially the younger generation, a new educational book set entitled "The Changeable Clouds" has been published.

Mr SHUN saw the future direction of providing more personalized and specific weather information. He announced the launch of new services - a new 'Hong Kong Observatory Personalized website' with customizable contents by users; and a regional weather webpage based on the Geographical Information System integrating different weather information on the same map. Other new services such as a new digital regional weather forecast are in the pipeline. The mobile app 'MyWorldWeather', launched by the Observatory on behalf of the WMO, has been further developed and will be released in 7 languages. We plan to further enhance the 'Digital Weather Forecast' service by extending the digital concept to develop a new 'Digital Regional Weather Forecast' webpage. The forecast period will be lengthened from 3 days to 7 days, with finer details for each day. We will also introduce probabilistic rainfall forecast in the 'Digital Weather Forecast' on a trial basis, and will gauge the public feedback on such provision of weather forecast with uncertainty information. At the same time, we will also do more in enhancing the public's understanding of weather information, such as the nature of having varying degrees of forecast uncertainties for different weather scenarios.

On the annual weather outlook this year, noting that the sea surface temperature over the central and eastern equatorial Pacific is within the normal range, the coming typhoon season is expected to be near normal, with four to seven tropical cyclones coming within 500 km of Hong Kong, against the long-term average of about six. For considering tropical cyclone warnings, the Wetland Park anemometer reference station will be replaced by the Lau Fau Shan station commencing this typhoon season. This replacement is essential as wind measurements at Wetland Park have persistently shown a decreasing trend, probably as a result of urban development in its surroundings. On the annual rainfall outlook, it is expected to be normal to below-normal, ranging between 1,900 and 2,500 mm.

As the rainy season approaches, Mr SHUN reminded the public to remain vigilant against the threat of inclement weather, especially under the probable global trend of increasing frequency of extreme weather associated with global warming.

# The 45th Session of the UNESCAP / WMO Typhoon Committee

MOK Hing-yim



▲ (From left) Dr Nathaniel Servando, Administrator of the Philippine Atmospheric, Geophysical and Astronomical Services Administration; Mr Olavo Rasquinho, the Secretary of the Typhoon Committee; Mr SHUN Chi-ming, the Director of the Observatory; Mr Gregory SO, the Secretary for Commerce and Economic Development; Ms JIAO Meiyuan, the Chairperson of the Typhoon Committee for 2012 and the Deputy Administrator of the China Meteorological Administration; Dr ONG Chung-wo, Associate Professor of Department of Applied Physics, Hong Kong Polytechnic University; and Mr Jeff LaDouce, Regional Director of National Oceanic and Atmospheric Administration, USA, officiating at the launching ceremony of Typhoon Committee CoWIN project in the Philippines and Guam.



▲ Leading the discussion at the 45th Session of the Typhoon Committee on 29 January 2013 are (from left) Mr Olavo Rasquinho, the Secretary of the Typhoon Committee; Mr Nokeo Ratanavong, Officer-in-Charge of Disaster Risk Reduction Section of UNESCAP; Mr SHUN Chi-ming, the Chairman of the Typhoon Committee for 2013 and the Director of the HKO; and Mr Koji Kuroiwa, the Chief of the Tropical Cyclone Programme Division of the World Meteorological Organization.

Around 90 meteorological, hydrological and disaster reduction experts in the region gathered in Hong Kong to take part in the 45th Session of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) / World Meteorological Organization (WMO) Typhoon Committee from 29 January to 1 February, to review and discuss collaboration on regional activities in reducing loss of lives and damages caused by tropical cyclones.

The Typhoon Committee comprises 14 Members: Cambodia; China; Democratic People's Republic of Korea; Hong Kong, China; Japan; Lao People's Democratic Republic; Macao, China; Malaysia; the Philippines; Republic of Korea; Singapore; Thailand; Socialist Republic of Viet Nam; and the USA. The Committee aims to integrate and enhance regional activities among Members within an international framework to reduce the loss of lives and damages caused by tropical cyclones.

Hong Kong last hosted the annual Session in 1997. Mr SHUN Chi-ming, Director of the Observatory, was elected the Chairperson of the Typhoon Committee for 2013 in the Session, succeeding Ms JIAO Meiyuan, the Chairperson of the Typhoon Committee for 2012 and the Deputy Administrator of the China Meteorological Administration. Mr SHUN delivered his speech in the opening ceremony, "Hosting this important international conference in Hong Kong in 2013 has special meaning to the Observatory as it kicks off a series of celebration activities of the 130th anniversary of the Observatory. Established in 1883, the Observatory has a long history in regional and international cooperation in relation to tropical cyclones. As early as 1930, the Observatory hosted the first Conference of Directors of Far Eastern Meteorological Services which concluded with a set of signals and symbols for use in issuing tropical cyclone warnings. Then in 1934, the Director of the then Royal Observatory of Hong Kong, together with the Director of the Shanghai Xujiahui Observatory, went to the Philippines and, in collaboration with the meteorological department in Manila, established regional standard procedures for issuance of tropical cyclone warnings. To inherit this historical mission, standardization of tropical cyclone warnings remains one of the initiatives being actively promoted internationally by the Observatory today."

Mr SHUN and Ms JIAO were instrumental in driving for reform in the effective governance of the Committee in the past couple of

years, with fruitful results already evident at the Hong Kong Session. Mr Edwin LAI, Assistant Director of the Observatory, was elected as the Chairperson of the Advisory Working Group of the Committee to coordinate the implementation and action plans of the projects of the four working groups of the Committee.

With a concentration of rapid economic and population growth in coastal areas, vulnerability to tropical cyclone related hazards such as extreme winds, torrential rain, flash flooding and storm surge had substantially increased. The Committee noted with appreciation the timely publication of "The Second Assessment Report on the Influence of Climate Change on Tropical Cyclones in the Typhoon Committee Region", and suggested that the Assessment Report be forwarded to the United Nations Intergovernmental Panel on Climate Change as a reference for its latest assessment work. The Assessment Report summarizes the results and findings from researches conducted by Typhoon Committee experts on the long-term trends of tropical cyclone activities in the region. Dr LEE Tsz-cheung, Senior Scientific Officer of the Observatory, contributed to the Second Assessment Report as one of the authors.

The Government Flying Service (GFS) was awarded the Dr Roman L Kintanar Award at the Session. This award was presented annually to institutes or organizations in recognition of their dedicated effort in mitigating the impact and risks of disasters caused by tropical cyclones. The award was presented to the GFS to recognize its commitment and outstanding work in collecting crucial meteorological data in the vicinity of tropical cyclones over the South China Sea. Considering the operational and research values of this initiative led by the Observatory, the Committee will co-operate with the WMO World Weather Research Programme to explore the feasibility of organizing a purposely planned field experiment over the region in the next couple of years.

# Memories of a Director - Graham Heywood



► Group photo of colleagues on retirement of Mr Heywood (6th from left, front row).

Mr Graham Scudamore Percival Heywood is the first Director of the Observatory after the Second World War. One of the first things that I learnt from Mr John Peacock when I visited him in November 2012 was that Mr Heywood came from a very eminent family - a descendant from William the Conqueror, the first Norman King of England!

History also told us that Mr Heywood was captured by Japanese soldiers on 8 December 1941, together with his colleague Leonard Starbuck, when carrying out duties at Au Tau in the New Territories near the border to dismantle the Observatory's magnetic station and collect the instruments there. They were probably the first batch of Hong Kong civil servants captured by the Japanese during the Second World War! After being held in various places in the New Territories, on 8 January 1942, they were taken by lorry to Sham Shui Po, where they were to spend the next three and a half years in the military Prisoner-of-War (POW) camp. The then Director of the Royal Observatory, Mr Benjamin Evans, was incarcerated in Stanley Internment Camp on Hong Kong Island, but the Japanese refused to allow Heywood and Starbuck to join the civilians there. They were not to meet Mr Evans again until 29 August 1945, at Stanley.

After the War ended, Mr Evans retired from the Observatory and returned to England. Mr Heywood took up the post of Director of the Royal Observatory on 18 May 1946. Together with Mr Starbuck and other colleagues joining the Observatory after the War, Mr Heywood re-built the Observatory operations and further developed its services for the public, until he retired in 1956.

When I visited Mr Peacock again in January 2013, he showed me a manuscript written by Mr Heywood about his days at the Sham Shui Po POW camp. The title of the manuscript is "It Won't Be Long Now - the story of a Japanese prison camp". Mr Peacock also introduced me to Ms Veronica Heywood, second daughter of Mr Heywood, who told me a lot about her father. For example, during his tenure at the Observatory, apart from having scientific publications on typhoon, he was also author of the book "Rambles in Hong Kong" and had a passion in hiking around the rural areas of Hong Kong. He liked to take his family to spend holidays in the heat of the summer at cooler altitudes underneath Sunset Peak on Lantau Island and lead plant-hunting and bird-watching expeditions into the Hong Kong hills together with his botanist friend Dr Geoffrey Herclots. After retirement to England, Mr Heywood never lost his scientific curiosity - when everyone else was complaining about freezing taps and burst pipes, he was excited at the recording of all time low temperatures. He always thoroughly enjoyed visits from his old Observatory colleagues: his face would light up when, on a visit, Mr Gordon Bell, whom Mr Heywood had preceded as Director, told him of the satellite receiving equipment Mr Bell had invented for the use of the Observatory shortly after the first weather satellite was launched by the USA in the early 1960s.

Mr Heywood passed away peacefully at home in Lockerley, Hampshire on 23 January 1985. Tributes sent at Mr Heywood's funeral from fellow Sham Shui Po POW internees told of how he had kept everyone's spirits up with his kindnesses and encouragement. Indeed, the following extracts from his manuscript clearly reflect his highly positive attitudes of life, and perhaps also his enlightenment from the internment, despite the prolonged hardships and adversities that he experienced:



*"Then again, we were not going to ask too much of life. When the war was over, we told ourselves, we would never again sigh for the moon. We had discovered that we could do perfectly well without luxuries, and we could be content with the simple things of life ... good food, decent living conditions, and the companionship of our families. We began to realize that happiness depended very little on material possessions; the loss of all our worldly goods counted for nothing compared with the loss of freedom, home life and useful employment. Life had been getting too complicated; we would surely be more grateful for the simple things."*

*"It did not do to take too much thought for the morrow; better to try to live a good life each day for its own sake, and not for any vague rewards in some future existence ... anyway rather an unworthy motive, I had always thought. There was a meaning to life, here and now, ... 'love thy neighbor as thyself' ... and there was one stronghold sure which would not fail me, the love of dear ones waiting for me at home. Perhaps we were unlucky to be born into this era of upheaval; perhaps though, our generation would have outstanding opportunities of shaping a better world."*

*"Accounts of life in the internment camp differed widely. One friend, an enthusiastic biologist, was full of his doings; he had grown champion vegetables, had seen all sort of rare birds (including vultures, after the corpses) and had run a successful yeast brewery. Altogether, he said, it had been a great experience ... a bit too long, perhaps, but not bad fun at all. Another ended up her account by saying 'Oh, Mr Heywood, it was hell on earth'. It all depended on their point of view."*

These are indeed words of wisdom. Here in Hong Kong, we have enjoyed freedom, peaceful times and abundance in material wealth since the War, but perhaps, we may not have recognized the fortunate environment we are in, and could choose to be content with the simple things of life. Heywood's words are truly food for thought for all of us today - in the midst of global warming, increasing consumerism, but decreasing spiritual satisfaction.

# "Changeable Clouds"

## Educational Booklets

LAM Ching-chi



▲ "Changeable Clouds" booklets.

"Changeable Clouds" is a set of four booklets published by the Observatory, all with lively designs that appeal to students and children. They contain cloud and weather photographs with brief explanatory notes in both Chinese and English. Books 1, 2 and 3 give a general introduction of different species of low, medium and high clouds, while Book 4 shows some special phenomena and cloud shapes that can be seen in Hong Kong. The photographs capture the beauty of nature under different weather conditions, and allow readers to have a deeper understanding of the atmospheric phenomena observed. The booklets are also available for sale at the Hong Kong Observatory Resource Centre, the Publications Sales Unit of the Information Services Department and the Map Publications Centre, Kowloon. They can also be ordered through the online Government Bookstore at [www.bookstore.gov.hk](http://www.bookstore.gov.hk).

## Quick Earthquake Messages Service for Worldwide Earthquakes of Magnitude 5.0 or Above on Twitter Launched for Trial Operation

LEUNG Yin-kong

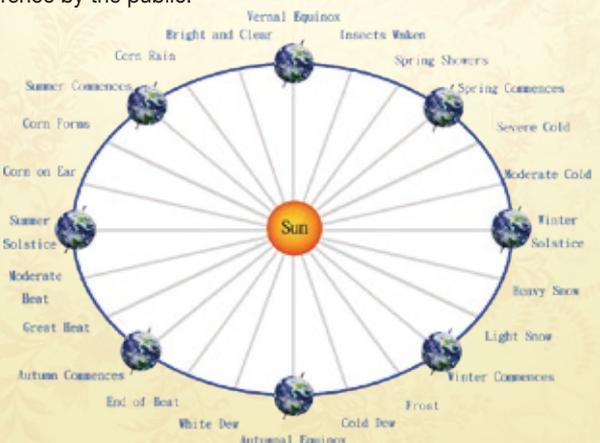


According to past records, there were on average around 2,000 and 200 earthquakes of magnitude 5.0 or above and 6.0 or above respectively every year globally. From April, users can obtain quick notification of the occurrence of global earthquakes of magnitude 5.0 or above via the Twitter account "Global Quake Messages 5.0+" at <http://twitter.com/HKOQEME5>. The information provided will include origin date and time of the earthquake, magnitude and epicenter location in latitude and longitude, a short description about the reference region for the epicenter location and an URL to Google map indicating the epicenter location. These Twitter messages are compiled and posted by the Observatory's automatic seismic information system without human intervention so as to expedite information release. The QEM5.0+ service is an extension of a similar service for global earthquakes of magnitude 6.0 or above, and will be disseminated in different accounts on Twitter. Users can receive notification at accounts of their own choice. More information about QEM5.0+ can be found at <http://www.hko.gov.hk/gts/quake/hkoqeme5.htm>.

## "Climatology for the 24 Solar Terms" Webpage

LI Kin-wai

The Chinese calendar's 24 Solar Terms, which are believed to originate from the Yellow River region, is a special calendar system invented by the ancient Chinese based on knowledge in astronomy, climatology and agricultural meteorology. Although Solar Terms have become less used in modern living and agriculture, they still constitute an important part of the Chinese calendar. The precious information contained in Solar Terms can help modern people realize the connections between seasonal changes and the growth of living things on earth. To offer an easy access to the climatological information in Hong Kong for the Solar Terms, the Observatory launched a new Climatology for the 24 Solar Terms webpage ([http://www.hko.gov.hk/cis/statistic/24\\_solar\\_term\\_e.htm](http://www.hko.gov.hk/cis/statistic/24_solar_term_e.htm)). The climatological records on temperatures, relative humidity, rainfall and cloud amount taken at the Hong Kong Observatory for each of the 24 Solar Terms since 1947 are available in the new webpage for reference by the public.



# MyWorldWeather Mobile App

## Supporting 7 Languages

Ben OR

Developed by the Observatory under the auspices of the World Meteorological Organization, the mobile app "MyWorldWeather" is now available on iPhone and Android platforms in seven language versions including Chinese, English, German, Korean, Polish, Portuguese and Spanish providing users with official weather forecast of more than 1,600 cities. The following links can be used for download:



▲ iPhone: <https://itunes.apple.com/hk/app/myweather/id453654229?mt=8>



▲ Android: [https://play.google.com/store/apps/details?id=hko.my\\_world\\_weather&hl=en](https://play.google.com/store/apps/details?id=hko.my_world_weather&hl=en)



▲ "MyWorldWeather" mobile app functions (from left): city forecast information, the choice of seven languages and bookmarking for favourite cities.

# The Observatory Mascot

LAM Ching-chi



The Observatory mascot was born in celebration of the Observatory's 130th anniversary. As an ambassador for public education activities, its first task is to promulgate the Observatory's Vision, Mission and Values, recently refreshed since the last update in 2004. In particular, it has features that reflect all the elements of the Observatory's Values based on the word SCIENCE (Serve • Care • Innovate • Enthuse • Nurture • Collaborate • Excel). For details, please refer to [http://www.weather.gov.hk/130thAnniversary/mascot\\_design\\_e.htm](http://www.weather.gov.hk/130thAnniversary/mascot_design_e.htm).

The mascot design is inspired by concepts and ingredients from the winning designs of the Weather Mascot Competition, organized by the Hong Kong Meteorological Society with the Hong Kong Society for Education in Art and the Observatory, for primary school students in late 2012. Dressed like a super-hero, it has an aura of authority and power that conveys the assurance of safeguard against the potential threat of hazardous perils. But it also strikes a friendly pose that is both open and welcoming, signifying a people-oriented approach in meeting new challenges.

# Real-time Weather Photos Launched at Kowloon City and Weather Photo Quality Enhanced at All Observing Sites

The Observatory has enhanced its regional weather information service by adding real-time weather photos at Kowloon City to its website. New weather photos can monitor weather conditions over Kowloon City District, eastern Kowloon, eastern Victoria Harbour and their surrounding areas. The Observatory has also enhanced the quality of weather photos at all observing sites for a clearer view of the weather conditions in various areas. Members of the public can access the weather photos through the Observatory's "Regional Weather in Hong Kong" webpage ([www.hko.gov.hk/wxinfo/ts/index\\_e\\_webcam.htm](http://www.hko.gov.hk/wxinfo/ts/index_e_webcam.htm)), mobile platform webpage ([m.hko.gov.hk/wxreport/wxphoto.htm](http://m.hko.gov.hk/wxreport/wxphoto.htm)) and "MyObservatory", a smartphone weather service application developed by the Observatory.

CHAN Ying-wa



▲ Weather photos taken at Kowloon City, looking towards the southeast on 19 February around noon which showed sea fog was affecting the waters near Lei Yue Mun.

# The Observatory Launched an Enhanced Version of the Regional Weather Webpage

MA Wai-man

To facilitate easier appreciation of the regional weather variations in Hong Kong, the Observatory has launched a new regional weather webpage in March, based on a geographic information system platform. The new webpage allows users to display different weather elements such as temperature, relative humidity, wind speed and direction, etc. over a detailed map. They can also overlay radar images and lightning locations on the map, as well as zoom in or out, or pan to specific areas of interest. In addition, observations recorded at a particular location can be collectively displayed simply by clicking over the relevant weather station.

Members of the public are welcome to browse the webpage at <http://maps.weather.gov.hk/>.



▲ Hong Kong Regional Weather Webpage (Geographic Information System Platform Version).

# Launching the Observatory's Personalized Website

TONG Yu-fai



To further enhance the weather services on the Internet, the Observatory launched a personalized website that enables users to customize the weather information to be displayed and the colour theme to be used according to their needs and preferences. The website also features a number of gadgets for users' selection. Contents and layouts of choice can be saved in three modes for later use. Users are welcome to visit <http://my.weather.gov.hk/myindex.htm> to customize their own weather website.

◀ The Observatory's personalized website showing various gadgets.

# The Observatory Website Adopts the Latest Web Accessibility Design Standard

TONG Yu-fai

To facilitate members of the public in browsing the Observatory website, the Observatory has enhanced its website to ensure that commonly used webpages on its website conform to the latest requirements of the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG) 2.0 Level AA. However, some less commonly used webpages with archive materials may not incorporate all the accessibility features. Users can contact the Observatory by email at [hkown@hko.gov.hk](mailto:hkown@hko.gov.hk) if they wish to acquire the information in a more accessible format.



## Observatory Supported an Integrated Wind Sensing Project at Dali Airport, Yunnan



CHAN Pak-wai

The Southwest Regional Civil Aviation Administration of China (CAAC) is planning to establish a wind sensing project at the Dali Airport, Yunnan to enhance alerting of low-level windshear and turbulence. Mr CHAN Pak-wai, Senior Scientific Officer of the Observatory, was invited to participate in the Technical Review Panel meeting of the project. The meeting was held between 28 February and 1 March 2013 at Chengdu, and Mr CHAN presented the Hong Kong experience in the alerting of windshear and turbulence, including the use of Doppler Light Detection and Ranging system. Other participants also

▲ Mr SUN Qi-yuan (4th from left), Director of Air Traffic Regulation Office of Aeronautical Meteorology Division, Ms LIU Xu-guang (3rd from left), Director of Aviation Meteorology Division of Southwest Regional CAAC and Mr CHAN Pak-wai (1st on the right) attending the meeting.

presented methods of windshear detection in use in the mainland, as well as the status and usage of wind field detection equipment at the airports of the Southwest Region. The meeting enhanced experience sharing on wind-sensing technology between the Observatory and our mainland counterparts, and laid the foundation for future cooperation in the development of low-level windshear and turbulence alerting system with the Southwest Regional CAAC.

## BRIEFING ON AVIATION WEATHER SERVICES BY THE OBSERVATORY



CHAN Pak-wai

▲ Observatory staff introducing the characteristics of low-level windshear in the vicinity of the Hong Kong International Airport to aviation users.

The Observatory organized the annual briefing on Aviation Weather Services on 4 March at the Cathay Pacific City, Chek Lap Kok, to familiarize pilots and airline representatives with the latest developments of aviation weather services. The briefing was enthusiastically received with about 70 participants from the local aviation industry. Contents included the latest developments of the Observatory's windshear and turbulence alerting service, new forecast products on significant convection at the airport, as well as new features of the Aviation Meteorological Information Dissemination System, a system dedicated to support aviation users. The event enhanced users' understanding of the Observatory's services and provided a good opportunity for direct contact between Observatory staff and specialized users.

# The Observatory Celebrating 20 Years of Close Collaboration with the Aviation Community and the Launching of New Layout for the "Aviation Meteorological Information Dissemination System"



CHOY Boon-leung

▲ Mr SHUN Chin-ming (6th from left, front row), Director of the Observatory together with members of the liaison group, at the launch of the "Aviation Meteorological Information Dissemination System" new layout.

The Observatory and representatives of airlines and pilot associations celebrated the 20th Anniversary of the Liaison Group on Aviation Weather Services and launched a new layout for the "Aviation Meteorological Information Dissemination System" (AMIDS) website on 5 February.

Speaking at the ceremony, the Mr SHUN Chi-ming, the Director of the Observatory, said, "The Liaison Group on Aviation Weather Services is the first liaison group that the Observatory set up with the users of our weather services. It provides a platform for direct exchange of views between the users and the Observatory, enabling the needs from the users to be better understood. The new layout for the AMIDS is a good example of the improvement in services through interaction with our users. With the current effort to optimize decision making through common situation awareness, there will be great changes to the way weather services are to be provided to the aviation community in the near future. We would work closely with the liaison group for continual improvement in our services to meet their needs."

AMIDS is a website for the dissemination of aviation weather information to the users. The new layout of AMIDS is specially designed for each user groups to suit their daily operational needs. Rather than arranging the information from a product perspective, the information is now arranged from the users' perspective. The user interface is streamlined, making it easier for the users to access the wide range of weather information.

Flight Dispatch Manager of Cathay Pacific Airways Limited, Mr Edwin WONG, indicated that the new layout suited their daily operational needs. By simply clicking a couple of buttons on the website, they can obtain with ease the required weather information.



▲ Mr SHUN (5th from left) celebrating the 20th Anniversary of the Liaison Group on Aviation Weather Services with founding and early members.

## Atmosphere & Environment

# Weather and Aedes albopictus

MOK Hing Yim

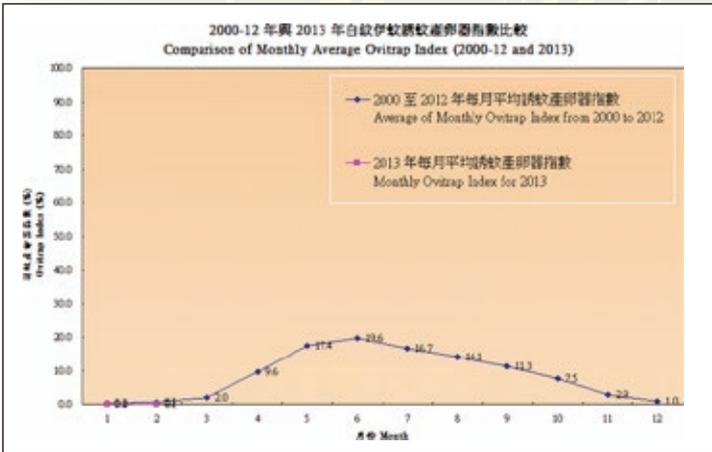


▲ Ovitrap.

In the past 30 years, there has been a worldwide surge of dengue fever in tropical and subtropical regions threatening over 100 countries and endangering the health of more than 2.5 billion people. It is estimated that dengue fever, and associated dengue haemorrhagic fevers are responsible for the loss of over 20,000 lives annually. In Southeast Asia, dengue fever is endemic in many countries including Thailand, Malaysia, Singapore, China, Indonesia, Vietnam and the Philippines. Dengue fever is an arboviral disease transmitted by *Aedes aegypti* and *Aedes albopictus*. The latter is one of the common mosquitoes in Hong Kong. A total of 44 ovitrap sites over Hong Kong have been set up by the Food and Environmental Hygiene Department (FEHD) to monitor the abundance of *Aedes albopictus* in Hong Kong. Ovitrap were firstly used in the United States in an *Aedes aegypti* education project in 1969, and then in Malaysia in 1979 to study the abundance and distribution of *Aedes* species in Penang Island. They have been commonly used in *Aedes aegypti* surveillance programmes in international airports worldwide.

For a particular ovitrap site, the percentage of the collected ovitraps found positive with breeding of *Aedes albopictus* is recorded as the Ovitrap Index and used to measure the abundance of *Aedes albopictus* in the region represented by the ovitrap site. The Hong Kong Government announces the recorded Ovitrap Indices to the public to promote their awareness on the abundance of *Aedes albopictus* and to encourage their participation in preventive and control measures.

The Observatory and FEHD worked together to develop a Climate *Aedes albopictus* Abundance Model based on the data collected at Ta Kwu Ling from July 2007 to June 2009. The model can be used to predict the level of Ovitrap Index for planning of preventive and control measures against *Aedes albopictus* in Hong Kong by making use of the total rainfall and the mean air temperature over a 15-day period prior to the setting up of ovitraps and the predicted mean air temperature of the 7-day period after setting up of ovitraps at the site. Furthermore, the effectiveness of the preventive and control measures against *Aedes albopictus* taken before setting up of ovitraps can be assessed by comparing the recorded and predicted Ovitrap Indices.



▲ Seasonal changes of Ovitrap Index.

# Hailstorms in March Put Southern China on Thin Ice

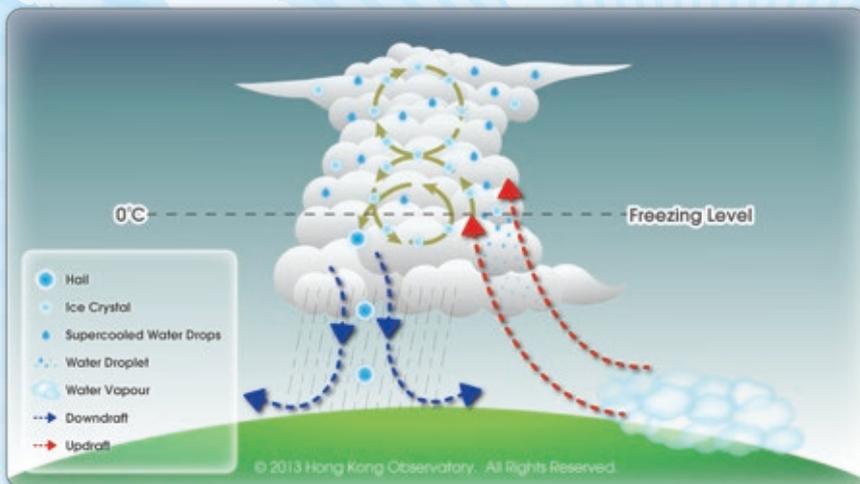
YEUNG Hon-yin

In mid to late March this year, many provinces in southern China experienced a spate of highly convective weather phenomena, including hailstones, lightning strikes and even tornadoes, resulting in a large number of injuries and casualties. According to the reports by the China Meteorological Administration, some hailstones were as large as a golf ball, about 50mm in diameter. Locally, intense thunderstorms also affected Hong Kong on 19 March. Small pea-size hails were reported at the Peak in Hong Kong Island and Clear Water Bay in Sai Kung. Generally speaking, southern China including Hong Kong is not too cold in spring. So, why did ice fall from heaven then?

In simple terms, hailstone is the kind of ice that forms inside a thunderstorm cloud and is able to reach the ground before complete melting. In environments that favour intense convective development, e.g. trough of low pressure or cold front, the updraft in a cumulus cloud can uplift warm and moist air near the ground to upper air. During this process, water vapour therein will condense into water droplets due to cooling by the environment. On overshooting the freezing level (the altitude at which the air temperature is at zero degree Celsius), the water droplets will either become super-cooled water or freeze into ice crystals. The latter type of hydrometeor will grow in size and weight through accretion of the former. Due to gravity, the ice crystals will tend to fall and melt into rain water when they fall below the freezing level.

However, the melting ice crystals can be uplifted back up above the freezing level if the updraft is sufficiently intense. Should this process be repeated, the ice crystals not only can grow steadily via accretion, but also merge into irregular big ice nuggets through collision with other ice crystals. Such a growth process will continue until the weight of the ice nuggets can no longer be supported by the thunderstorm updraft.

[ Interested readers are welcome to visit <http://www.facebook.com/weatherman.hongkong> for sharing and discussion with the Weather Man about weather phenomena.]



▲ Photograph on 23 March 2013 showing a hailstone observed that evening in Yi Zhou, Guangxi, China. (Courtesy of Mr Liao Jiawang, China Meteorological Press)

◀ Schematic diagram illustrating the hail formation process.

# Our Partners

LI Ping-wah

Miss Sharon LAU, Assistant Director of the Observatory, and Dr LI Ping-wah, Acting Senior Scientific Officer, attended the 3rd HKO-CAAC Workgroup Meeting on MSTA held in Shanghai from 4 to 5 December 2012. They reviewed the progress in the development of MSTA services and products, and made plans for co-operation in the coming years, in particular in preparing for the World Meteorological Organization and International Civil Aviation Organization Conjoint Meeting to be held in 2014. The annual meeting of the Working Group was also attended by representatives from the meteorological service department of the North China Regional Administration, the East China Regional Administration and the Central and Southern Regional Administration. The last meeting was held in Shenzhen.

## The Observatory and Civil Aviation Administration of China (CAAC) Jointly Advance the Meteorological Services for Terminal Area (MSTA)



## WMO Tropical Cyclone Forecaster Website

CHAN Sai-tick

The Tropical Cyclone Forecaster Website (<http://severe.worldweather.wmo.int/TCFW/>) of the World Meteorological Organization (WMO), developed and hosted by the Observatory on behalf of WMO, is in operation.

The main purpose of the website is to assist weather forecasters around the world in gaining access to a comprehensive source of tropical cyclone information useful for operational forecasting. The website serves as a portal of real-time information as well as forecast products concerning tropical cyclone development, movement, intensity and structure.



# Storm Expert from U.S. Hosted Workshop at the Observatory

WOO Wang-chun



▲ Mr. WEISS (1st on the right) led participants to practice mesoscale weather analysis.

The Observatory organized a training workshop on weather forecasting during 18-22 February 2013. Mr Steven J. WEISS, Chief of the Science Support Branch of the Storm Prediction Center (SPC) of the U.S. National Oceanic and Atmospheric Administration (NOAA), was invited to conduct the workshop for the Observatory staff. The workshop covered mesoscale weather observation and analysis, numerical weather prediction, as well as forecast techniques for various types of severe weather such as tornadoes, severe thunderstorms, squall lines and hails.

Being a highly experienced expert in the field, Mr WEISS gave vivid, detailed lectures and patiently led participants in the case analysis exercises. Through in-depth discussions and exchanges, all the participating forecasters and system developers said they had benefited tremendously from the workshop.

## Observatory Serving on the Academic Advisory Committee of the Regional Key Laboratory for Numerical Weather Prediction (NWP) of Guangdong Province

CHAN Pak-wai

▶ Mr ZENG Qingchuan (6th from right), Academician of the Chinese Academy of Sciences, chaired the meeting of the Academic Advisory Committee, attended by Miss Sharon LAU (4th from right), Assistant Director of the Observatory.



Miss Sharon LAU, Assistant Director of the Observatory, and Mr CHAN Pak-wai, Senior Scientific Officer, participated in the opening ceremony and the first meeting of the Academic Advisory Committee of the "Regional Key Laboratory for NWP of Guangdong Province" and "Regional Key Laboratory for NWP, China Meteorological Administration" ("Key Laboratory") on 24 December 2012. The Key Laboratory is founded with the aims of establishing within China first class regional NWP systems for the tropics, covering areas such as meso-scale NWP and tropical cyclone forecast systems, as well as improving forecast capabilities for tropical weather systems using high-performance computers.

In September 2012, the Observatory and the Guangdong Meteorological Bureau signed the "Long-term Co-operation Agreement in Numerical Weather Prediction Technology", part of which includes the establishment of the Key Laboratory. According to the Agreement, exchange of professional knowledge and techniques on NWP between both parties will be enhanced. A unified verification platform will also be developed to assess the performance of NWP model forecasts as well as the impact of various observations on model performance, thus promoting technical development and operational application on both sides.

# Meteorological Experts from the Philippines and Malaysia Received Training and Conducted Research at the Observatory

WOO Wang-chun



▲ (From left to right) Mr CHENG Tsz-lo, Experimental Officer of the Observatory; Mr Maqrun Fadzli and Mr YIP Weng Sang from Malaysian Meteorological Department; Mr Michael Bala from the Philippine Atmospheric, Geophysical & Astronomical Services Department; Mr CHAN Sai-tick, Senior Scientific Officer, and Mr WOO Wang-chun, Scientific Officer, of the Observatory.

From October to December 2012, three experts from the Philippines and Malaysia visited the Observatory to receive training on the application of SWIRLS, the nowcasting system of the Observatory. Two of them also participated in a research programme under the Typhoon Committee to experiment various methods dedicated for the nowcasting of rainfall brought by tropical cyclones. All of them were satisfied with the mission. Mr Maqrun Fadzli and Mr YIP Weng Sang from the Malaysia said the training enabled them to grasp the basic knowledge in operating SWIRLS. Mr Michael Bala from the Philippines said SWIRLS was neatly designed and easily comprehensible, making it possible for them to complete the research in just two months. He was particularly glad that the research was found to be useful in enhancing forecast skills.

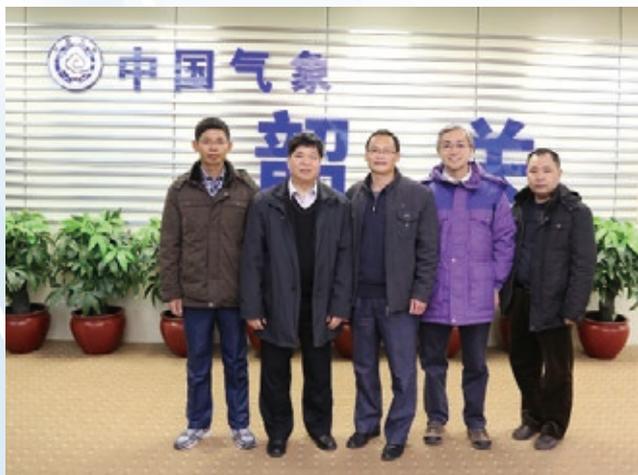
## Scaling New Heights in Co-operation among Meteorological Authorities of Guangdong, Hong Kong and Macao

Editorial Board

Mr SHUN Chi-ming, Director of the Observatory led a delegation of six colleagues to attend the 18th Guangdong-Hong Kong-Macao Meeting on Co-operation in Meteorological Operations at Shaoguan, Guangdong on 8 January. The annual meeting is hosted by Guangdong, Hong Kong and Macao in turn. This year's meeting reviewed the status of co-operation among the three parties in 2012. Notable items include the signing of the "Long-term Co-operation Agreement in Numerical Weather Prediction (NWP) Technology" at the Hong Kong/Guangdong Co-operation Joint Conference in September, and the subsequent establishment of the "Regional Key Laboratory

for NWP of Guangdong Province" within the year to take forward NWP developments jointly by the meteorological authorities from the two sides. Also, under the "Guangdong-Macao Co-operation Framework Agreement", Macao and Zhuhai embarked on the implementation of a new generation of weather radar to strengthen weather observation in the Pearl River Delta region.

Based on the current foundation in co-operation, Guangdong, Hong Kong and Macao jointly established collaboration items and work plans in the coming year. These include strengthening exchange in weather forecasting and warning techniques, enhancing NWP technique developments, advancing marine weather observations in the South China Sea, embarking on regional climate change studies, continuing exchange and cooperation among personnel of the three parties, etc.



◀ Mr SHUN Chi-ming (2nd from right) and Dr FONG Soi-kun (2nd from left), Director of the Macao Meteorological and Geophysical Bureau, visited the Shaoguan Meteorological Bureau.

# Visits • Courses • Talks • Meeting

17 January 2013



A delegation from Emergency Management Office of Shenzhen Municipal People's Government visited the Observatory.

4 February 2013



A delegation of 24 members from Sik Sik Yuen visited the Observatory to understand the operations of weather forecasters.

18 February 2013



Experienced Aviation Weather Forecaster Mr WONG Chi-fai (1st on the left) explained aviation meteorology to the visiting Hong Kong Air Cadet Corps.

23 February 2013



A total of 35 members from the Young Members Committee of the Hong Kong Institution of Engineers visited the Observatory.

5 to 7 March 2013



A group of six delegates from the Air Traffic Management Bureau, CAAC visited the Observatory. The visit was useful for experience sharing between the two organizations on the latest development of weather service.

15 March 2013



To support the implementation of the New Secondary School Geography Curriculum, the "Community Weather Information Network" collaborated with the Education Bureau to organize a seminar for sharing experience on weather observation and data collection for senior secondary school geography teachers.



Editorial Board

## Staff Promotion



▲ Mr LEE Sai-ming was promoted to Senior Scientific Officer on 17 March. He oversees the Climate Change and Climate Forecasting of Development, Research and Administration Branch, responsible for climate change research and climate forecasting service.

## Best TV Weather Programme Presenters 1st Quarter, 2013



Mr YEUNG Hon-yin

## Retirement:

## Mrs Hilda LAM, Mr SIN Kau-chuen, Mr WONG Chi-ping and Mr TSANG Leung-chiu

Mrs Hilda LAM (Assistant Director), Mr SIN Kau-chuen (Chief Scientific Assistant), Mr WONG Chi-ping (Senior Scientific Assistant) and Mr TSANG Leung-chiu (Clerical Assistant), started their pre-retirement leave in the early part of 2013. The Director together with other staff bade them farewell and presented them souvenirs to commend their contributions to the Observatory. We all wish them a happy retirement!

► Mr WONG Chi-ping (right), Senior Scientific Assistant, started his pre-retirement leave on 4 January.



▲ Mrs Hilda LAM (left), Assistant Director, started her pre-retirement leave on 14 March.

◀ Mr SIN Kau-chuen (left), Chief Scientific Assistant, started his pre-retirement leave on 4 February.

► Mr TSANG Leung-chiu (left), Clerical Assistant, started his pre-retirement leave on 24 April.



# Recognition of Work Done by Observatory Staff



▲ Mr CHAN Pak-wai (left panel) and Mr LEE Lap-shun (right panel), Senior Scientific Officers, were commended by the World Meteorological Organization in recognition of their dedicated services for the implementation of products in numerical weather prediction, particularly in Regional Association II (Asia).



▲ Mr. CHOW Lo-yin, a non-civil service contract programmer, received a letter of appreciation from WMO to thank him for his contribution to the development of Aviation XML (AvXML) – the future international standard for exchange of meteorological information in the aviation industry.



▲ (From left) Mr YEUNG Hon-yin (Scientific Officer), Dr Jeffrey LEE (Scientific Officer), Mr CHENG Tsz-lo (Experimental Officer) and Mr LEUNG Hong-wai (Programmer), were commended for their active contribution in academic articles or technical documents.



▲ Two Scientific Officers, Mr KONG Yu-chau (left panel) and Miss LEE Fung-ying (right panel), after completing satisfactorily the “Applied Meteorology Course for Forecasters” and meeting the WMO requirements of Basic Instruction Package for Meteorologists, received their certificates on 28 March.

## Observatory Staff Earning Praise

Staff of the Observatory who received words of thanks and commendation from the public or organizations from January to April 2013:

Dr CHENG Cho-ming (Assistant Director)  
 Ms Sandy SONG (Senior Scientific Officer)  
 Mr CHAN Ngo-hin (Experimental Officer)  
 Mr CHAU Chun-yuen (Experimental Officer)  
 Mr NG Chun-yuen (Scientific Assistant)  
 Mr CHOW Lo-yin (Analyst Programmer)

Mrs Hilda LAM (ex-Assistant Director)  
 Mr LEE Kwok-lun (Scientific Officer)  
 Ms CHAN Yuk-hing (Experimental Officer)  
 Miss CHEUNG Man-sze (Experimental Officer)  
 Mr NG Pui-man (Scientific Assistant)

## Management Forum - Exploring Antarctic Region

YEUNG Ho-kee



Dr Rebecca LEE, a renowned explorer of the Earth including the Antarctic region, Arctic region and Mount Everest, shared her expedition experiences and photos with Observatory staff on 21 November 2012. With a strong aptitude in arts and design, Dr LEE took many photos of the ecology in the polar regions, as well as the Chinese scientists she worked with. The photos demonstrate human perseverance in conducting scientific research under extremely harsh weather conditions, and also reveal the ecological and environmental changes in these regions due to global warming.

◀ Director of the Hong Kong Observatory presenting a souvenir to Dr LEE (left).

## Hong Kong Observatory Spring Picnic 2013

Staff Association

The "HKO Spring Picnic 2013" organised by the Observatory Staff Association was held on 6 April. About 60 current and former colleagues spent a relaxing and pleasant weekend with their family and friends. Departing from Tsim Sha Tsui, they visited an ecological organic farm in Sheung Shui that morning. They also had the experience of lamb-feeding too.

After enjoying a special feast "Deluxe Jiu Da Gui" at noon in Yuen Long, they went to a country club in Kam Tin for its wonderful scenery and stretched their muscles in the countryside. They also took the opportunity to visit the famous "Kam Tin Tree House" and learnt about the historical evolution of the area. The last stop was a museum in Yuen Long where we learnt the traditional noodle culture of Hong Kong before returning home with lots of souvenirs and good memories.

▶ Photo of the participants in the "HKO Spring Picnic 2013" at the ecological farm.



## Management Forum - "Hong Kong Benevolent City - The Relief from Catastrophe by the Tung Wah Hospital"

YEUNG Ho-kee



Dr Joseph TING, former Chief Curator of the Hong Kong Museum of History, delivered a talk entitled "Hong Kong Benevolent City - The Relief from Catastrophe by the Tung Wah Hospital" to the Observatory staff on 8 February. Dr TING gave an introduction on the history of Tung Wah Hospital, and reviewed its efforts in providing relief in some of the historical catastrophes in Hong Kong, including the disastrous typhoon in 1874, the plague in 1894, the fire in Happy Valley Racecourse in 1918, and Typhoon Wanda in 1962, etc. Through his sharing, Dr TING enriched us with valuable historical knowledge, and also reminded us of our mission to enhance the society's capacity in natural disaster prevention and response.

▲ Director of the Hong Kong Observatory presenting a souvenir to Dr TING (right).

# The Observatory Website Won the Ruby Award of the Web Care Award and ICT Awards

CHENG Yuen-chung and Ben OR

After 2006, 2008, 2009 and 2010, the Observatory website again won the Ruby Award of the Web Care Award 2011-2012 organised by the Internet Professional Association (iProA), in recognition of our efforts in building no-barrier website to ensure communities with different needs have equal opportunities in sharing the benefits brought about by the development of the Internet. The website has been enhanced with web accessibility design since its launch in 1996. To facilitate browsing of the website by all sectors of the community, the Observatory website has incorporated such features as audio webpages, alternative texts for images and banners, and sufficient colour contrast, etc.



▲ (From left) Prof Simpson POON, Vice President of iProA, presented the Web Care Ruby Award to Mr CHENG Yuen-chung, Senior Scientific Officer and Mr TONG Yu-fai, Scientific Officer.



▲ Dr Lawrence CHEUNG (2nd from right), Vice-chairman of the Hong Kong Wireless Technology Industry Association, presented the awards to Dr CHENG Cho-ming (2nd from left), Assistant Director, Mr CHENG Yuen-chung (1st on the right), Senior Scientific Officer and Mr Ben OR (1st on the left), Scientific Officer.

The "MyObservatory" mobile app won the Certificate of Merit and the Special Mention (Public Sector Information) prize in the Best Mobile Apps Award in the Hong Kong Information and Communication Technology (ICT) Award 2013. The Awards recognize, promote and commend the excellent achievements of ICT professionals and organisation. "MyObservatory" has been highly popular with more than 3.3 million copies downloaded. More information can be obtained from [http://www.hko.gov.hk/myobservatory\\_e.htm](http://www.hko.gov.hk/myobservatory_e.htm).

## Mailing Address

## Talk on "Guide Dog" by the Hong Kong Guide Dogs Association



### Staff Association

Members of the "Hong Kong Guide Dogs Association" visited the Observatory on January 17 to brief us on their work of introducing foreign guide dogs to provide service to the visually-impaired people living in Hong Kong.

The talk deepened our understanding of the social values of guide dogs. The visitors demonstrated the usage of various guide-dog equipment and ways of communication with guide dogs in daily life. While the Observatory has long been providing "barrier-free" public weather services, they showed us how such "barrier-free" concepts could also be extended to other aspects of life.

## Historians of Meteorology Visited the Observatory

Four historians of meteorology, including Prof Togo Tsukahara of Kobe University of Science, Prof Masumi Zaiki of Seikei University, Dr Ikumi Akasaka-Yanagisawa of Tokyo Metropolitan University, and Dr Marlon ZHU of Academia Sinica, visited the Hong Kong Observatory on 14 January 2013. During the visit, they shared their experience in the recovery, reconstruction and analysis of historical meteorological records in East and Southeast Asia. Over the years, by visiting meteorological institutes and libraries around the world, they have studied and translated many meteorological records and journals of the 19th century or earlier, providing valuable and important information for relevant historical climate and climate change studies.

► Mrs Hilda LAM, ex-Assistant Director of the Observatory (3rd from right) and Dr LEE Tsz-cheung, Senior Scientific Officer (1st on the left) photographed with Prof Togo Tsukahara (2nd from right), Prof Masumi Zaiki (2nd from left), Dr Ikumi Akasaka-Yanagisawa (3rd from left), and Dr Marlon ZHU (1st on the right).



### LEE Tsz-cheung