SEPTEMBER 2009

WEATHER ON WINGS

香港天文台
HONG KONG OBSERVATORY

Dial-a-Weather : 187 8200
Home page : http://www.hko.gov.hk, http://www.weather.gov.hk

Headline

New Director talks about past, present and future

Editorial broad

Weather On Wings recently interviewed Dr Lee Boon-ying, who assumed the Observatory directorship earlier this year. In the interview, the pragmatic and low-profile director shared his fond memories of the past 30 years with the Observatory, and discussed present challenges and future plans.

New Director of the Hong Kong Observatory Dr Lee Boon-ying (middle)

Reflecting on the Observatory's achievements, Dr Lee found the development of the World Weather Information Service (WWIS) website most memorable. The project was proposed to the World Meteorological Organization (WMO) in early 1990s and was started in 2000. As the website contributes to the world's good, the work required considerable time and active liaison with our counterparts all over the globe. "The success of WWIS would not have been possible without the untiring dedication and teamwork of Observatory staff," he noted. The website now provides the latest official forecasts for over 1300 cities in multiple languages, including English, Chinese, Arabic, Portuguese, Spanish, French, German and Italian.

On interesting tasks, the Heat Stress Monitoring System immediately came to his mind. The Observatory has just obtained a patent for it (see article on p.2). "The most amusing part of it is the frustration and fun in the search for a brass sphere to house a thermometer, which eventually turned out to be none other than the float in an old-fashioned toilet. This was hard to come by. The success of the project is a show of creative thinking on the part of our colleagues," Dr Lee said.

Dr Lee admitted that being the Director is stressful, especially under a typhoon situation. However, to him the most important thing is that the Observatory has a group of dedicated colleagues displaying good teamwork and positive thinking. "While our work should be based on science, we should also pay attention to feedback from the public and media." In his spare time Dr Lee finds ways to decompress, and these include exercises, music and reading.

Regarding short-term goals, Dr Lee said improving the forecasting of tropical cyclones and rainstorms remained a top priority. "We also hope to develop some useful heat-stress information in the next couple of years to help people mitigate the risk of heat stroke," he said.

For the longer term, given the existing resources Dr Lee looks forward to maintaining the Observatory's world-class services through further improving the performance of numerical weather prediction, strengthening international cooperation, upgrading the radar for the airport and further automation of routine work. "Automation not only helps increase efficiency, it also reduces the workload on our colleagues," Dr Lee said.

Last but not least, "global warming is an imminent issue," he said. "We must continue our work on climate change monitoring and studies. We should also step up public education and remind people to adopt a more world-friendly and energy-conscious lifestyle."

Contents

The Observatory's first patented invention

Director (2nd left) taking photo with the development team of the "Heat Stress Monitoring System"

TAM Kwong-hung

The Hong Kong Observatory has successfully registered a patent in Hong Kong for its in-house developed "Heat Stress Monitoring System" on 17 April. This is the first patented scientific invention of the Observatory, marking a milestone in its pursuit of scientific excellence. It is also a testimony to the team spirit, pro-activeness and innovation of the Observatory's staff.

The Observatory started the development of the "Heat Stress Monitoring System" in September 2005 for providing heat stress information for the 2008 Olympic and Paralympic Equestrian Events. Through the dedicated effort of its staff, the system has undergone phases of improvement during the development. The final product not only fully complies with the ISO 7243 standards for heat stress measurement, but also incorporates specially designed module so that it can operate in an outdoor environment round-the-clock. The system also includes a solar radiation measurement unit and applies real-time data quality monitoring technology to ensure the data quality. Furthermore, the system is environmentally friendly as it operates on solar energy. It also employs wireless communication technology and the Global Positioning System (GPS) such that it is able to provide real-time heat stress information in any places covered by the mobile telephone network.

The "Heat Stress Monitoring System"

Radiation Laboratory Received ISO Accreditation

LUI Chun-man LEE Chung-wo

The Observatory achieved a major milestone in environmental radiation monitoring this year. Its Radiation Laboratory received ISO 9001:2008 accreditation by the International Organization for Standardization for its radiation measurement services early this year.

In retrospect, the Observatory has started monitoring environmental radiation levels in Hong Kong since the 1960s. At that time, the Radiation Laboratory also took part in international programmes on environmental radiation monitoring organized by the International Atomic Energy Agency (IAEA) and the World Meteorological Organization (WMO), with the aspiration to monitor the dispersion of radioactive materials caused by nuclear weapon tests.

In the 1980s, in response to the construction of the nuclear power station at Daya Bay in Guangdong, the Observatory embarked on a comprehensive Environmental Radiation Monitoring Programme to monitor the radiation levels in Hong Kong before and after the commencement of operation of the power plant. Measurement results over the years indicate that there has been no significant change in the radiation levels in either the local environment or foodstuffs consumed by the citizens comparing with those before the operation of the nuclear power station.

Apart from continuously enhancing its measurement instruments and methods in almost five decades of environmental radiation monitoring, the Observatory has also participated in comparison exercises and proficiency tests regularly organised by international organisations and those in mainland China to assure the quality of the measurement results. The ISO 9001:2008 accreditation is recognition of our good quality management by the International Organisation for Standardization.

New-Products & New Services

Weather goes WiFi

LEUNG Ka-yan

It is relaxing to walk around outdoors in such a fine day. But how can I know the current UV index and temperature on the site?

Thanks to the GovWiFi Network at more than 300 government premises, the latest weather information is now at the fingertips. Simply connect your mobile devices to the GovWiFi captive portal and then press the link "Local Weather Information" under "Site Information", detailed weather information such as temperature, relative humidity, pressure, wind speed and direction at the site in the past 24 hours is instantly displayed. The Observatory's website can also be accessed directly via a shortcut icon under "Hot picks".

This new service is jointly provided by the Observatory and the Office of the Government Chief Information Officer. It is particularly convenient and useful for those who often stay outdoors or are engaged in outdoor activities.

Observatory goes YouTube

Editorial Board

The Observatory has set up its own YouTube channel (www.youtube.com/hkweather) to promote meteorological knowledge and introduce its services to the public. People may also access the webpage by simply clicking the 'HKO@YouTube' icon at the Observatory homepage (www.weather.gov.hk).

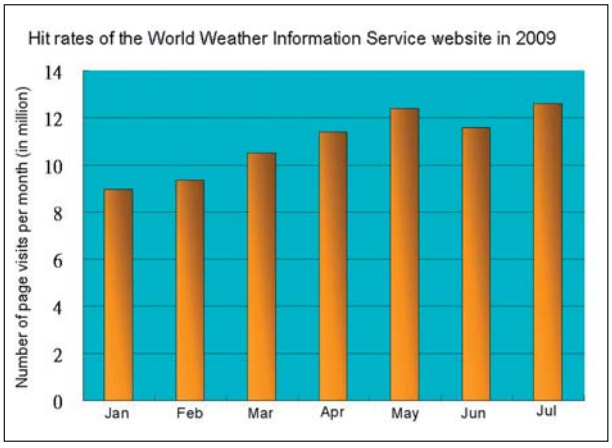
The following videos are now available on the Observatory's YouTube webpage:

- "Hong Kong Observatory - Weathering the Storms for a Century", which gives a general introduction to the work of the Observatory
- Short videos on tropical cyclones
- Videos on the Observatory's work for the 2008 Olympics (produced by the Civil Service Bureau)
- Video showing the course of the partial solar eclipse on 22 July 2009

More videos will be shown on YouTube. Stay tuned!

Italian-language version of WWIS

Alfred LI



The Italian-language version of the World Weather Information Service (WWIS) website was launched on 28 August. In addition to English, Arabic, Chinese, Portuguese, Spanish, French and German, the website is now presented in eight languages.

The WWIS website (http://worldweather.wmo.int) is the world's first and only website for official city forecasts. It is developed and operated by the Hong Kong Observatory on behalf of the World Meteorological Organization (WMO). Presently, 122 WMO members supply to the website official weather forecasts for more than 1,300 cities. The website also contains climatological data for the cities, which are useful for travel plan.

Visits to the WWIS website reached a historical high of 10 million per month since March 2009. With more WMO members joining and the setting up of more language versions, the WWIS has become a popular weather website for people around the world.

A New Meteorological Information Dissemination System

User interface of duty forecaster in the new MINDS system

A snapshot of duty forecaster using the new MINDS system

KWOK Yiu-keung

The Observatory's forecasting office is operated round the clock. The forecasters keep close watch on the changing weather situations and issue weather warnings as required.

To cope with the ever increasing demands from the public and different sectors of the society, a new Meteorological Information Dissemination System (MINDS) that incorporates the idea of Work Flow Management was developed. The system allocates work assignments to the workstations of different members in the forecasting team according to prescribed schedules. After the assignments are completed by the respective officers, the system will automatically compose and disseminate the weather bulletins to the end users via different channels.

The new system helps the forecasting team to deliver weather information to the public and special users in a timely manner even under heavy workload in inclement weather situations.

Weather photos of northern Lantau

LAM Ching-chi

The Observatory recently installed a camera at the Tai Lam Chung Terminal Doppler Weather Radar Station to capture weather photos overlooking northern Lantau. The real-time weather photos are shown at the Observatory's "Regional Weather in Hong Kong" webpage (http://www.weather.gov.hk/wxinfo/ts/webcam/TLC_e_realtime.htm) and PDA webpage (http://pda.hko.gov.hk/wxphotoe_tlc.htm) to facilitate the public and tourists to better plan their journey to Lantau.

Hong Kong's main hub in land, sea and air traffic is just next to northern Lantau. For instance, the sea route connecting Kap Shui Mun, Ma Wan Channel and Urmston Road is a vital waterway between Hong Kong and the Mainland. The North Lantau Highway is the main route to the Hong Kong International Airport on land. In the air, there are busy flights in and out of the airport. General aviation users such as helicopter pilots and vessel navigators will also find the weather photos useful for real-time monitoring the weather conditions such as the cloud amount, cloud base height and visibility in the area to aid the safe operation of helicopters and vessels.

Senior Scientific Officer Ms Lam Ching-chi explaining to the media the use of weather photos captured by the webcam (in red circle on the left) at the Terminal Doppler Weather Radar Station.

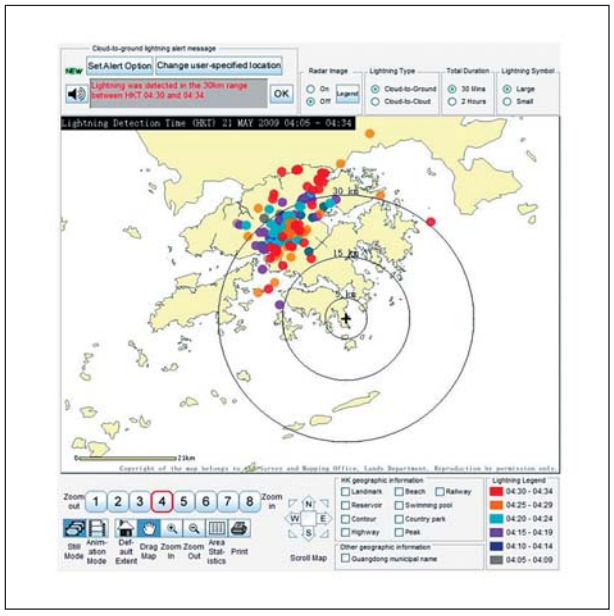
New temperature station in Stanley

The new automatic temperature station in Stanley.

CHOW Siu-wing

The Observatory launched a new automatic temperature station in Stanley on 12 June to replace the one at Bluff Head. Located inside Stanley Prison and closer to the Stanley town centre than the old station, the new station's data can better reflect the temperature variations felt by the residents and visitors in Stanley.

People can access the information from the Observatory's "Regional Weather" webpage (http://www.hko.gov.hk/wxinfo/ts/display_graph_e.htm?sty&menu=otherwxi&rwx&addbar) or PDA webpage (http://pda.hko.gov.hk/regione_s.htm), or through the "Dial-a-Weather" hotline at 187 8200.



Observatory enhances lightning alert service

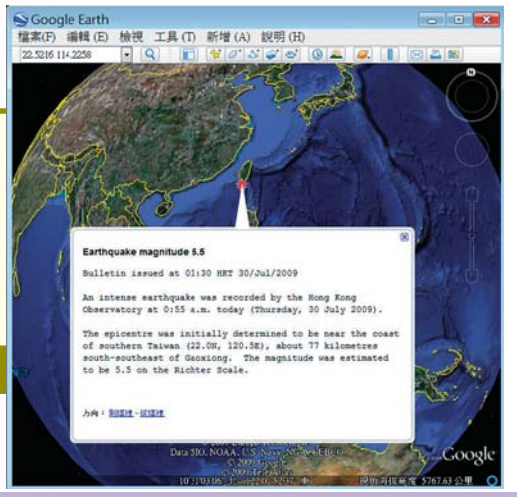
LEUNG Wai-hung

The Observatory enhanced the location-specific lightning alert webpage in June to enable users to select up to three alert circles of different sizes from a minimum of 5 kilometres to a maximum of 50 kilometres. This allows more flexibility as compared to only one alert circle in the past. The webpage provides different levels of alert depending on the distance of lightning. This helps people engaging in outdoor activities or managing outdoor facilities to escalate the response level and take appropriate preventive measures as the lightning approaches. Please try it out at: www.weather.gov.hk/wxinfo/llis/alert_index.htm.

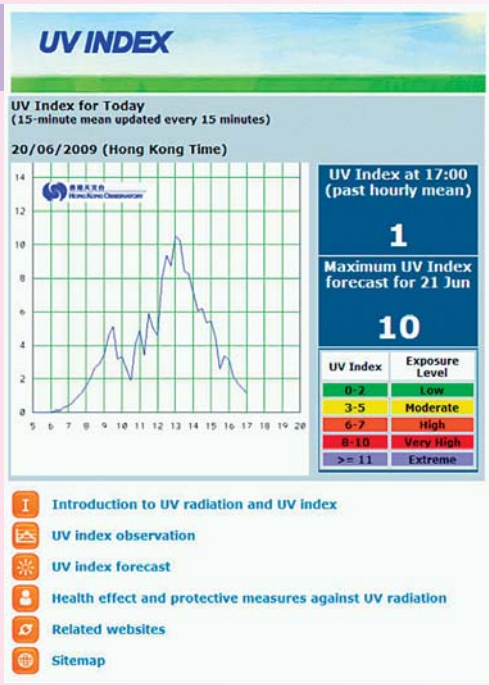
Earthquake Webpage Enhanced with Geographical Information

WOO Wang-chun

Press Releases on Earthquake (http://www.weather.gov.hk/gts/equake/neqpress_e.htm) shown on the Observatory website now come with Keyhole Markup Language (KML) files. People can use KML-supported Geographical Information System display software (such as "Google Earth") to view, drag and zoom on the map bearing the location of the epicentre, magnitude and other information of the earthquake.



Screen with KML file opened with Google Earth



Facelift for Observatory's ultraviolet information webpage

LEUNG Man-yee

In order to raise people's awareness of sun protection on hot summer days, the Observatory recently launched a new webpage on UV radiation. In addition to providing more convenient means for people to access real-time and forecast UV indices, the webpage was also enriched with other useful information, such as statistics of past UV indices, health effects of different UV radiation like UVA and UVB, effectiveness of sunscreen lotion and clothing in protection against UV, common misconceptions about sun protection and applications of UV in daily life. Please visit the webpage at www.weather.gov.hk/wxinfo/uvindex/english/euvindex.htm.

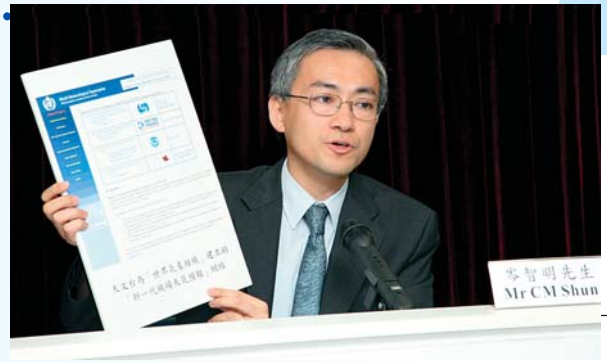
Aviation Meteorology

CHOY Boon-leung

Assistant Director publicized the importance of meteorology to aviation

Mr. C.M. Shun, Assistant Director of the Hong Kong Observatory, in collaboration with Dr. Herbert Pümpel, Chief of Aeronautical Meteorology of the World Meteorological Organization (WMO), prepared a WMO Fact Sheet on "Recent Developments in Weather Services to Aviation" (http://www.wmo.int/pages/mediacentre/factsheet/plane_en.html) which was issued in July 2009. Highlighting the significance of weather impact on aviation, the Fact sheet pointed out that "43% of aircraft accidents occur during operations in adverse weather, three quarters of air traffic delays in high density regions are related to weather".

This Fact Sheet is a sequel to a related article by Mr. Shun on the topic of Meteorological Services to Aviation. which was published in the April 2009 issue of the WMO Bulletin, the official publication of WMO. The article highlighted the importance of customer-focus, described the different varieties of services currently delivered and the new opportunities and challenges for the next decade. It made reference to numerous examples of aviation meteorological service provided by the Observatory, including the web-based Aviation Meteorological Information Dissemination System (AMIDS) for airlines and pilots, the user liaison groups, and the pioneering work in using the LIght Detection and Ranging (LIDAR) technology for windshear alerting.



Mr. Shun Chi-ming, Assistant Director of the Hong Kong Observatory

Mr. Shun was also interviewed on 10 June by the China Meteorological News on the topic of "Meteorology and Aviation Safety" (http://www.cma.gov.cn/live/200906/t20090615_36257.html). This is the first time an Observatory staff was interviewed by the China Meteorological News on the subject of aviation meteorology. The interview focused on the significance of weather services to aviation safety, including weather conditions affecting aviation safety, differences between aviation weather forecast and public weather forecast, the methodology, accuracy and challenges in aviation weather forecasting.

10th anniversary of signing of memorandum of cooperation between Hong Kong Observatory and Civil Aviation Administration of China

Mr. Lam Chiu-ying, ex-Director of HKO (first row, second from the left), and Mr. Shun Chi-ming, Assistant Director (first row, second from the right), photographed with ATMB representatives before the senior management meeting in Beijing this March.

SHUN Chi-ming

The Hong Kong Observatory (HKO) and the Air Traffic Management Bureau (ATMB) of the Civil Aviation Administration of China (CAAC) signed a "Memorandum on Long Term Technical Cooperation in Aviation Meteorological Services" ten years ago (21 April 1999).

The cooperation between HKO and CAAC has been ongoing for many years. The memorandum enhances closer liaison between the two parties and promotes development and technological exchanges in aviation meteorology. In the past decade, the senior management from both sides met biennially to review and plan for cooperation.

The senior management meeting was recently held in Beijing on 5 March 2009. Both sides agreed to strengthen meteorological data sharing and technological exchanges. A working group was also established to collaborate on research in aviation meteorology in the Pearl River Delta. On the invitation of CAAC, HKO would render support to ATMB in establishing low-level windshear alerting systems and numerical weather prediction systems in the Mainland.

Operational staff from both sides have regular exchanges on technical matters. A recent example is the "Seminar on low-level windshear alerting technology" organized by ATMB during 20-23 October 2008. Experts from HKO were invited to lecture at the seminar, presenting HKO's experience in providing windshear and turbulence alerting services for the Hong Kong International Airport.

Pearl River Delta Aviation Meteorology Working Group Meeting

CHENG Cho-ming

The Air Traffic Management Bureau of the General Administration of Civil Aviation of China and the Hong Kong Observatory held a Senior Management Meeting in Beijing this March. The meeting established a long-term "Pearl River Delta Aviation Meteorology Working Group" to jointly study issues of aviation meteorology in the Pearl River Delta.

The Observatory and the Air Traffic Management Bureau of Central-South China convened the first meeting of the Working Group in Shenzhen on 10 July. In the meeting, both parties introduced their respective working plans and explored collaborative projects. The two parties will embark on cooperation in respect of weather detection, weather forecasting and alerting, exchange and sharing of meteorological data, development and application of products, and client services. The meeting set a good foundation for cooperation, bringing aviation weather services in the Pearl River Delta to a new height.

Assistant Director of the Observatory Mr Shun chi-ming (front row, 4th left) and Mr Suijun Chen, Director of MET Division, Air Traffic Management Bureau of Middle-South China (front row, 3rd right) in the first meeting of the Pearl River Delta Aviation Meteorology Working Group

Fostering development in international aviation meteorology

SONG Man-kuen

In a meeting of the International Civil Aviation Organization (ICAO) in July 2009, the Hong Kong Observatory (HKO) promoted the development in various international aviation meteorological services, including the World Area Forecast System (WAFS) and the SIGnificant METeorological information (SIGMET). WAFS is a satellite broadcasting system deployed jointly by the ICAO and the World Meteorological Organization (WMO), in which the two World Area Forecast Centres (WAFCs) at the United Kingdom and the United States broadcast global upper-level wind, temperature, significant weather and other information to meteorological services of the member States. Since 2006, the two WAFCs started to provide trial gridded forecasts of icing, turbulence and cumulonimbus clouds generated directly from numerical weather prediction models. There is likelihood that the gridded forecasts will replace the significant weather charts currently prepared by aviation forecasters. The aviation community, however, showed concern about this significant but rapid move.

In this connection, the Observatory made available selected forecast products from the two WAFCs on a dedicated aviation weather website (http://wafs-grid-fc.weather.gov.hk/main/index.phtml) for users' reference and comparison. At the same time, the Observatory solicited users' comments on the products through questionnaires.

Mr. Mokhtar A. Awan (left), Regional Director of ICAO Asia and Pacific (APAC) Office, presented a souvenir to Mr. Shun Chi-ming, Assistant Director of the Hong Kong Observatory, after the meeting of the Asia Pacific Communications, Navigation and Surveillance / Meteorology (CNS/MET) Sub-Group to thank him for his contribution as the chairman of the MET working group since 2003.

During the meeting of the Asia Pacific Communications, Navigation and Surveillance / Meteorology Sub-Group of ICAO held in Bangkok in July 2009, the Observatory proposed that the two WAFCs perform further systematic verification of their forecast products, and offered suggestions to enhance visualization of the products. The sub-group supported these proposals and appreciated the Observatory's contributions.

With regard to SIGMET, under the coordination of ICAO and the Observatory and with the support from China, Kunming meteorological watch office was entrusted with the task to provide SIGMET service for the Flight Information Region of Cambodia starting from June 2009. This is the first time for a State in Asia Pacific to provide SIGMET service for its neighboring State. This arrangement solves the prolonged issue of the lack of SIGMET service in certain geographical region for the aviation community. ICAO appreciated this new development and thanked the efforts made by all relevant parties.

Windshear Briefing for Aviation Community

LI Ping-wah

Dr Li Ping-wah of the Observatory briefed GFS staff at their headquarters the Observatory's windshear and other aviation weather services.

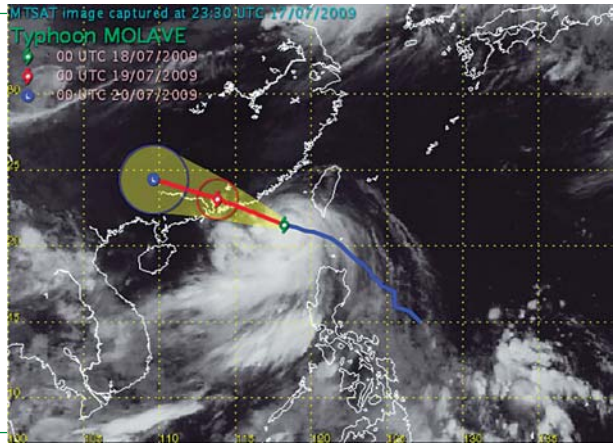
Through organizing briefing sessions and visits, the Observatory keeps local airlines and relevant government departments posted on the latest development in its windshear alerting services. At the same time, it also collects feedback from the users in order to enhance the relevant services. This year, apart from the annual windshear briefing, the Observatory was also invited by the Government Flying Service (GFS) and the airline Metrojet to visit their headquarters to deliver tailor-made briefings on the Observatory's windshear and other aviation weather services. The briefings were well-received by the participants. Mr. Roger Lee, Group Safety Management System Manager of Metrojet, said in his letter to the Observatory after the windshear briefing in June, "a quick note to express our deepest thanks to you both in delivering an extremely informative presentation on windshear and other weather hazards around Hong Kong. Everyone attended was very impressed by your expertise and research HKO had conducted to enhance aviation safety. We all had learnt a lot."

New satellite product to aid tracking of tropical cyclones

SO Chi-kuen

Tropical cyclones not only bring heavy rain and squalls but also windshear and turbulence, which pose threats to aircraft in flight and often lead to cancellation or delay of flights. For example, some 400 flights were cancelled or delayed at the Hong Kong International Airport during Typhoon Hagupit on 24 September 2008.

In view of this, the Observatory launched a new satellite product on 26 June that features a satellite image overlaid with tropical cyclone track. This provides air pilots with a clearer view of the latest situation of the tropical cyclone, including its past locations and forecast track for the next 24 to 72 hours, facilitating the planning of flight routes and minimizing the impact of the tropical cyclone on the flight. It also helps airline companies and airport management personnel to get prepared for the tropical cyclone.



New satellite imagery showing the past track and future movement of Typhoon Molave in July 2009

Upgrading meteorological instruments on board a GFS fixed-wing aircraft

CHAN Pak-wai

The meteorological measuring system installed on the fixed-wing aircraft. The inset shows the air data probe.

The Observatory collaborated with the Government Flying Service (GFS) to upgrade the meteorological measuring system of a fixed-wing aircraft. The new system, including an air data probe below the wing tip, two Global Positioning System (GPS) antennae and a data processor within the cabin,was successfully installed in July.

The new system provides meteorological data in high temporal resolution, including wind, temperature, humidity and pressure. The data output rate reaches 20 Hz. Among the measured data, the vertical wind velocity is of high precision and could be used to calculate turbulence intensity for improving the airport's turbulence alerting services.

Enhancement of terminal weather information

HONG Chi-yuen

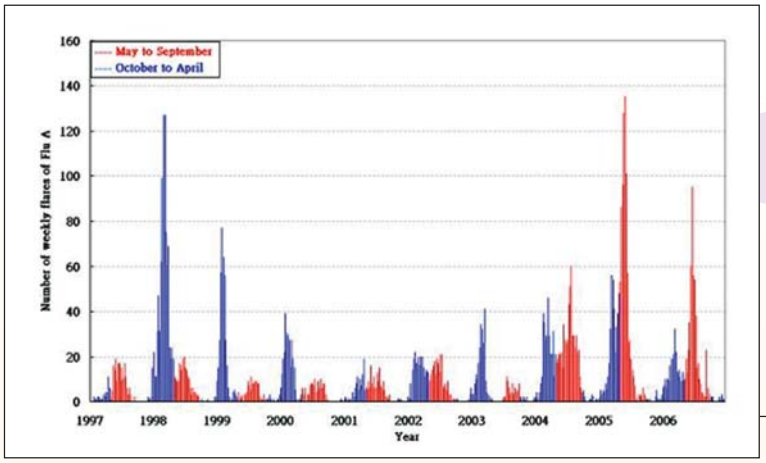
A TERMET display.

The Hong Kong Observatory was launched a new TERminal METeorological (TERMET) information service, which provides the Air Traffic Control Centre of the Civil Aviation Department with observations and short term forecasts of head wind, tail wind, cross wind, visibility and cloud-base height. Unlike conventional aviation meteorological reports and forecasts, TERMET information is presented in tables of numbers and simple texts for easy perusal of the users. This new product is more user-friendly, allowing the users to provide timely response to weather changes.

Atmosphere & Environment

Weather and Influenza

MOK Hing-yim



Number of weekly admissions associated with influenza A to the Prince of Wales Hospital from 1997 to 2006

Influenza epidemics, which can mainly be classified into A type and B type, occur throughout the world. The activity of influenza has a clear and consistent seasonal distribution in the temperate regions with annual winter peaks. In contrast, the temporal pattern of influenza is more variable in the tropical and subtropical regions, where multiple peaks can occur at different periods within a year. To understand the seasonal variation of influenza activity in Hong Kong, the Observatory collaborated with the Microbiology Department of the Chinese University of Hong Kong to conduct a study on the relationship between weather and influenza activity in Hong Kong. The study analysed the information of the laboratory-confirmed influenza A and B cases admitted to the Prince of Wales Hospital and the Observatory's weather data recorded at Sha Tin from 1997 to 2006.

The study found that in general there were more influenza A-than influenza B-associated admissions in Hong Kong. The two types of influenza showed a different relationship with weather conditions. Influenza A had two seasonal peaks in Hong Kong which occurred respectively in winter/spring months (February to March) and summer months (June to July). This observation is in contrast with the situation in temperate regions where only a single winter peak is observed annually. Influenza B also had a clear winter/spring peak, but its activity during the summer months was more variable.

It was also found that cold and humid conditions were associated with a higher level of activity of both influenza A and B in winter/spring months. In contrast, hot and humid conditions in summer months were associated with a higher level of activity of influenza A, but the association was not obvious for influenza B.

Furthermore, for influenza A, a shift in the relative magnitude of the two seasonal peaks was observed. In the early part of the study period (1998-2000), the magnitude of the winter/spring peak of Influenza A was higher than the summer peak. Towards the latter part of the study period (2004-2006), the magnitude of the summer peak had become larger than the winter/spring peak (see figure).

"Clouds in Hong Kong" series - Cumulus congestus cloud

HUI Tai-wai

Hong Kong has distinct seasons and changeable weather, giving rise to a variety of clouds. Starting this issue, we will introduce clouds commonly observed in Hong Kong, their structures, causes of formation, relation with weather etc.

The rain season of Hong Kong normally spans from April to September, during which cumulus clouds are most frequently observed. A cumulus cloud looks like a cotton-ball with noticeable thickness and clearly defined edges, and can be associated with a wide range of weather. When the cloud is small and isolated, the weather is usually fine and sunny. If it develops into a "cumulus congestus cloud" with large vertical extent, there is a good chance of showers.

Figure 1

Cumulus congestus cloud, commonly known as "towering cumulus", looks like a great castle and is usually in dazzling white against a background of deep blue sky. Towering cumulus, with a thickness of a few kilometers, can block most sunshine from reaching the ground, and may deliver showers to the areas underneath. Towering cumulus clouds are formed when humid air rises to a certain height, where moisture is cooled to form water droplets or ice crystals. The upward motion can be triggered by strong solar heating, convergence of air near the surface, or forced up-slope flow against hill-sides.

Figure 1 shows a towering cumulus cloud taken on the morning of 7 July 2003. Its cloud base i.e. the height of the lowest visible portion, was estimated at around 600 m above the ground. One can see that the base of the towering cumulus cloud is rather flat. Meteorologically speaking, the cloud base corresponds to a height called the "convective condensation level" at which moisture in a convective up-current condenses into water droplets. In the case under study, the observed cloud base was largely consistent with the convective condensation level (CCL) of about 600 m determined from the surface air temperature of 29℃ and the tephigram (figure 2) recorded on that morning.

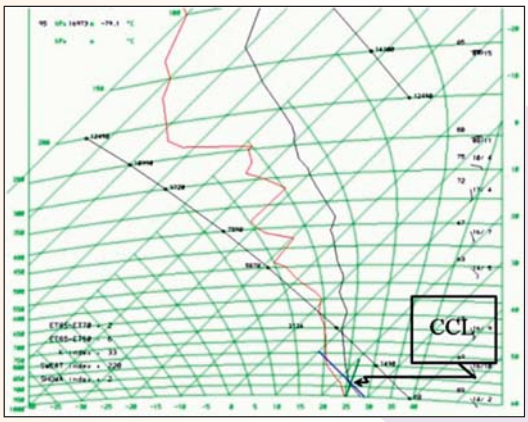


Figure 2

Climate Change FAQs

LEE Tsz-cheung

Through Qs and As, this new section explains the basic facts of climate change in layman terms, including its causes, impacts and what we can do to mitigate its effects.

Q: What is the difference between weather and climate?

A: Although both "Weather" and "Climate" are used to describe the condition of the atmosphere, they are very different in terms of the time scale considered. "Weather" describes the combined atmospheric situation in a place at the time or within a very short time (several hours to a few days), such as wind speed, temperature, cloud amount, rainfall, pressure, etc. "Climate" refers to the average of the meteorological condition and pattern in a place over a longer period of time. In other words, "Climate" can be described as the "Average Weather". According to the definition of the World Meteorological Organization (WMO), the reference period for compiling the climate statistics should be at least 30 years. More information on the climate of Hong Kong is available from the Observatory's "Climatological Information Services" webpage: http://www.weather.gov.hk/cis/climat_e.htm

Q: What is climate change?

A: According to the Intergovernmental Panel on Climate Change (IPCC), climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity.

More Q&As in coming issues, stay tuned!

An Introduction to Heat Stress

TAM Kwong-hung

Summer in Hong Kong is very hot and humid, and there are frequent reports of people suffering from heat strokes. When working or engaging in activities in very hot outdoor or indoor environment, people need to adopt adequate preventive measures to avoid heat strokes. Then what are the factors which contribute to "heat stress" on humans?

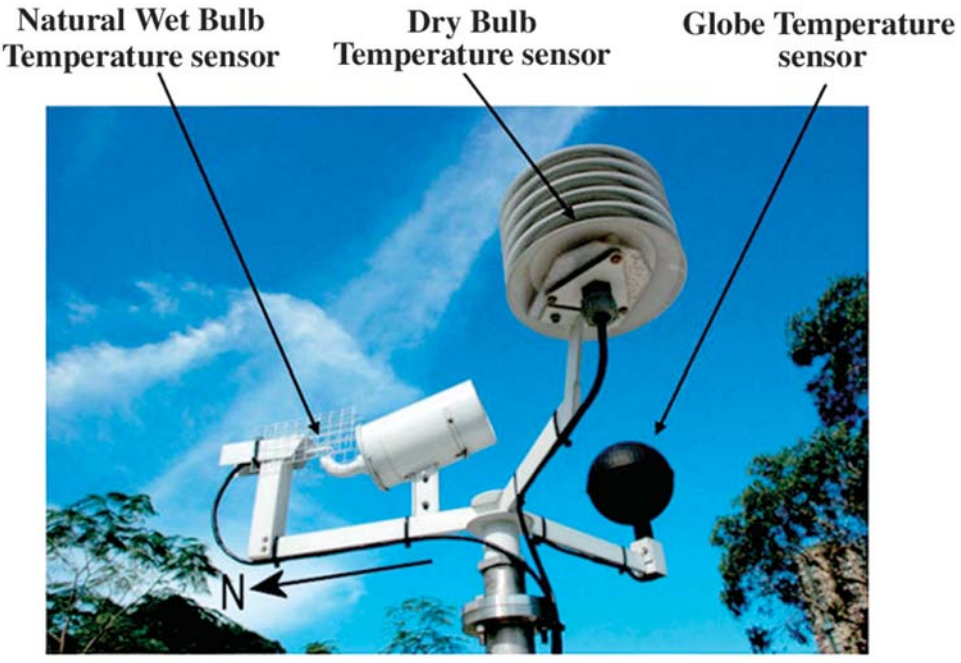
"Heat stress" refers to the effect of heat that would generate pressure or discomfort on the human body. Metabolism in the human body would continuously generate heat energy, which is lost through direct radiation, air conduction and sweating. When people are engaged in vigorous physical activities or sports, more heat energy will be generated and the human body would maintain a healthy body temperature by sweating more to increase heat loss by evaporation through the skin. If the heat energy cannot be dissipated in time, the body temperature will continue to rise until the automatic temperature adjustment mechanism of the human body fails, giving rise to heat strokes.

The "heat stress" perceived by humans depends on many factors and the four relevant meteorological factors are air temperature, relative humidity, wind speed and solar radiation. High temperature would make it difficult for the body to lose heat by direction radiation. The higher the relative humidity, the more difficult it will be for heat loss by sweating. On the contrary, higher wind speed would facilitate evaporation of sweat and heat removal from the skin. Under direct sunshine, the body temperature would rise. While wind speed and solar radiation depend very much on the immediate surroundings and short term variation of localised phenomena such as the cloud amount, temperature and relative humidity are less variable. In order to assess the risk of heat stroke, all the above-mentioned meteorological factors should be taken into account. The "Heat Stress Monitoring System" developed by the Observatory uses three types of temperature, viz **Natural Wet Bulb Temperature (t_{nw}), Globe Temperature (T_g)** and **Dry Bulb temperature (T_a)**, to calculate a combined temperature index called Wet Bulb Globe Temperature (WBGT) according to the following formula:

$$WBGT = 0.7t_{nw} + 0.2t_g + 0.1t_a$$

"Natural Wet Bulb Temperature" is measured by a temperature sensor which is covered with a wetted wick and is directly exposed to sunshine. The measured temperature depends on solar radiation, wind and humidity. The "Dry Bulb Temperature" is the ordinary air temperature. The "Globe Temperature" is the temperature measured by a temperature sensor installed inside a black, thin hollow globe made of copper. It measures the combined effects of solar radiation and wind.

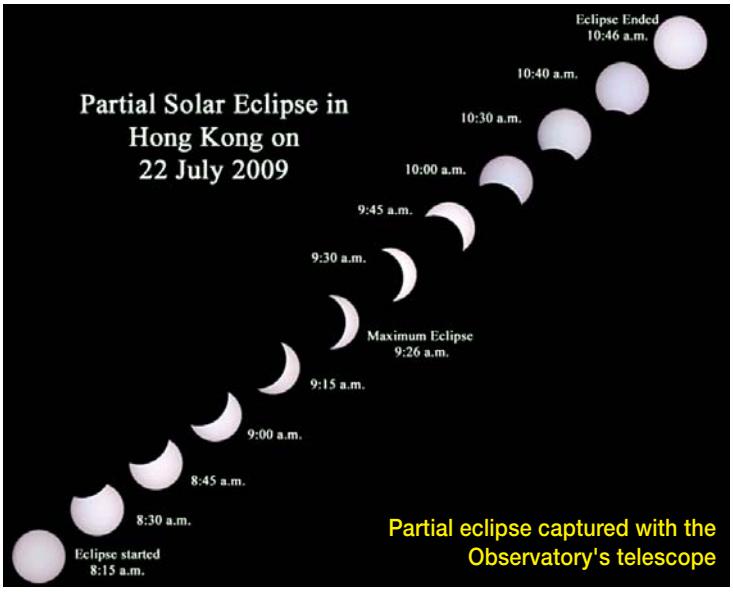
The occupational safety and health organizations from many countries have already established WBGT thresholds for reference by people working or carrying out outdoor activities in a hot environment. In general, appropriate preventive measures should be taken when WBGT reaches 28℃. When WBGT reaches 31 ℃ or more, it will cause more serious health effect.



The Observatory's in-house developed "Heat Stress Monitoring System"

Observation of Solar Eclipse

WOO Wang-chun

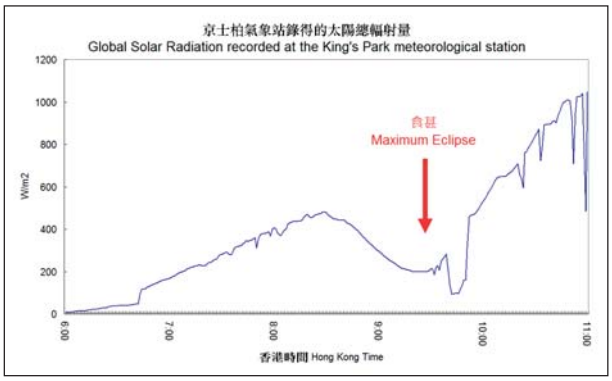


Partial eclipse captured with the Observatory's telescope

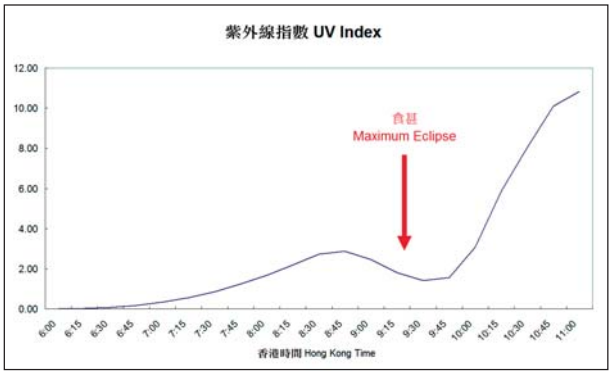
A total solar eclipse occurred on 22 July 2009 with a relatively long totality of more than 6 minutes at some places. As the path of totality spanned across many cities in the Mainland and a few Asian countries, hundreds of millions of people could watch the phenomenon and experience the brief environmental changes so caused without leaving their cities of residence. These made the event particularly conspicuous.

Although Hong Kong was not on the path of totality, partial eclipse was still visible here. The eclipse began at 8:15 am and ended at 10:46 am, with the maximum eclipse occurring at 9:26 am. This partial eclipse had a magnitude of 0.748, meaning that 74.8% of the sun's diameter was obscured by the moon at maximum eclipse, which was the largest seen in Hong Kong since 1958.

During eclipse, the weather was mainly fine in Hong Kong. Although the sun was occasionally blocked by clouds, the eclipse was still visible for a long period from many places in Hong Kong. Under the influence of the solar eclipse and also some clouds, the King's Park meteorological station recorded a decrease in the ultra-violet index, solar radiation and temperature. Temperatures over the territory generally also fell slightly, and were lower than those at the same time the day before (21 July). The maximum fall was close to 3 degrees Celsius.



The global solar radiation recorded at the King's Park meteorological station dropped by some 400W/m2 during the eclipse.



The ultra-violet index fell by about 2 during the solar eclipse.

More background information and observations are available from the following webpages:

Largest eclipse of the sun seen in Hong Kong for more than 50 years: http://www.hko.gov.hk/press/D4/pre20090710e.htm

Observations made by Hong Kong Observatory during partial solar eclipse today: http://www.hko.gov.hk/press/SP/pre20090722e.htm

Partial Eclipse on YouTube: http://www.hko.gov.hk/whatsnew/d4/pre20090812e.htm

Please refer to the Observatory's website for the explanation of solar eclipse, different stages in solar eclipse, past and next solar eclipse visible in Hong Kong, and observation of solar eclipse: http://www.hko.gov.hk/gts/event/event-solar-eclps1_e.htm

Staff of the Observatory watched the solar eclipse on the roof of the Observatory Headquarters

What You Need to Know about Ultraviolet (UV) Radiation
Episode One:
Harmful and Beneficial Effects of UV Radiation

LEUNG Wai-hung

On hot summer days, people are inevitably exposed to UV radiation when engaging in outdoor activities. Starting this issue, we will publish a series of articles on "What You Need to Know about UV Radiation" to increase people's awareness on UV radiation.

The sun emits electromagnetic radiation of different wavelengths. Some of the radiation, such as that making up the colours of rainbow, is visible to our eyes. The part of radiation beyond the violet end of visible light is called Ultra-violet (or UV) radiation which our eyes cannot see. Based on the wavelength, UV radiation can be broadly subdivided into UVA, UVB and UVC.

A moderate exposure to the sun helps our body produce vitamin D which could bring increased absorption and better utilization of calcium and phosphorus required for healthy bones and minimize the risk of bone fracture. However, excessive exposure to UV radiation may be harmful to the health. Studies suggest that UVA is responsible for ageing and immediate tanning effects of the skin, and may also enhance the development of skin cancer; UVB causes tanning of our skin slowly but significantly promotes the development of skin cancer. The World Health Organization estimates that about 80% of skin cancer and near 20% of cataracts may be due to UV overexposure. Therefore, one must not underestimate the potential harm UV overexposure may bring.

UV lamp for picking out counterfeit banknotes

A bug zapper using UV light

UV radiation has many applications in our daily life, for example, disinfection of drinking water and sterilization of apparatus, picking out counterfeit banknotes by illuminating the fluorescent marks, hardening of inks and coatings, attracting insects which are then killed by electric shock in bug zappers, and treatment of skin disease such as psoriasis. Although there are many applications of UV radiation in our daily life, it sometimes brings us problems. For instance, many polymers used in plastic products are degradable by UV radiation. When exposed to sunlight for a prolonged period, discoloration or even cracking of the product may occur. Many dyes and pigments may change colour after exposure to UV radiation. Therefore, paintings will be damaged after prolonged exposure to sunlight. For the same reason, taking photos of paintings with flash, which emits UV radiation, is normally prohibited in art galleries.

Our Partners

Director Brainstorms with Volunteers on Observatory's Future

The Friends of Observatory volunteers photographed with Dr Lee Boon-ying (middle of front row)

Editorial Board

The Friends of Observatory (FoOb) are important partners of the Observatory. More than two hundreds of them also registered as volunteers to help the Observatory in organizing outreach activities. These core members were invited to a gathering with the new Director, Dr Lee Boon-ying, and to brainstorm on the Observatory's way forward for the next ten years on 24 July.

More than 40 FoOb volunteers attended the gathering. Most of them were well prepared and actively offered suggestions on the future development of the Observatory. Dr Lee listened carefully and requested his colleagues to note down the main points. The one-hour formal session quickly elapsed and discussions continued during the following light buffet.

Unlimited creativity - Eco-anemometers designed by schoolchildren

YEUNG Siu-wai

Director (3rd right) picturing with the junior champion team, Ho Ming Primary School (Sponsored by Sik Sik Yuen), and their award-winning design.

The award presentation ceremony of the anemometer design competition jointly organized by the Observatory and the Faculty of Engineering, University of Hong Kong was held in July. It successfully concluded all the activities related to the competition.

More than 20 entries were received in the competition. Many of them took the concept of environmental protection and were made up of recycled materials such as cases of capsule toys, plastic water bottles and old CDs. Some even tied into the theme of nature and looked like a tree house or a wood. Some students applied the principle of wind power generation and measured wind speeds by recording the electricity generated by the rotating wind cups under the wind with a small meter. Some applied the principle of magnetic induction or information optics to digitize the rotational speed of the wind cup and the direction of the wind vane. The digitized wind speed and direction can then be displayed and recorded by a computer automatically.

The students worked hard to study, design and assemble their anemometers in the competition. In the presentation session, they explained the difficulties encountered in designing the anemometer and shared their pains and joys in overcoming them. They said they had learned a lot and became more interested in meteorological instruments, physics and electronic engineering. What is more, they realized the importance of team work through the competition.

The merit-winning team of the junior category demonstrating their design.

Young School Reporters visit the Observatory

Editorial Board

The Director warmly discussed with school reporters

On the afternoon of 5 May, twelve primary school children joining the Young School Reporters competition and their teachers visited the Observatory. They first interviewed the new Director, Dr Lee Boon-ying. A student asked Dr Lee whether he had any unforgettable moments during his years in the Observatory. Dr Lee recalled pleasantly the achievements he made through perseverance, conscientious analyses and cooperation with colleagues. When asked whether he felt a lot of pressure as the Director, Dr Lee said pressure also had its positive side, but the key was to manage the time and emotion well. He encouraged the students to keep an inquisitive and scientific mind during the course of learning. He then brought the students outdoor and introduced to them the instruments on the front lawn of the Observatory Headquarters.

The young reporters then visited the heart of the Observatory - the forecasting office. A forecaster, Mr Tong Yu-fai, and a weather observer, Mr Lo Chin-ming explained how to forecast the weather and make weather observations. The students were impressively attentive throughout, actively raising questions, recording and taking photos, demonstrating good potential to become true reporters.

Mr Lo Chin-ming explained the weather observation skill

Mr Tong Yu-fai explained the duties of forecasters

Scientific Advisor Visited the Observatory

CHAN Pak-wai

Dr. Fung Kee-ying, Scientific Advisor of the Observatory and former Professor of Department of Mechanical Engineering, Hong Kong Polytechnic University, visited the Observatory on 29 May and exchanged views with colleagues on aviation meteorology. Dr. Fung is an expert in aerodynamics and computational fluid mechanics, and had served on the Hong Kong Aviation Advisory Board for many years. He was invited to be one of the Scientific Advisors of the Observatory (http://www.hko.gov.hk/abouthko/advisor/scientific_advisor.htm) in 2008.

Dr. Fung had a fruitful discussion with colleagues on the latest developments of windshear and turbulence alerting, particularly sharing his expertise on the low-level wind effects of airport buildings being studied by the Observatory. This is the first time Dr. Fung visited the Observatory and he was particularly interested in the sophisticated weather monitoring network in Hong Kong and the provision of weather services for the public and other users.

Dr. Fung (middle) photographed with Mr. C.M. Shun, Assistant Director (right), and the author at the Observatory's headquarters

Comparison of solar radiation instruments in Lijiang, Yunnan

CHAN Kai-wing, YIP Choi-hung

Two officers of the Observatory, Mr. Chan Kai-wing and Mr. Yip Choi-hung, participated in a comparison exercise for solar radiation instruments organized by the China Meteorological Administration on 14-23 March.

This is a biannual event to compare solar radiation equipment from the different provinces of China with the Chinese National Standard. This year, the comparison took place at Lijiang, a town in northern Yunnan. Solar instruments from eight provinces were compared in addition to those of the Observatory.

The Observatory regularly participates in international comparisons to ensure the calibration of its solar equipment is traceable to the World Standard Group (WSG).

Photo taken in Lijiang, Yunan with the participants

World renowned expert on chimpanzees, Dr Jane Goodall, visited the Observatory

CHIU Hung-yu

The world-renowned expert on wildlife and chimpanzees, Dr Jane Goodall, visited the Observatory on 11 June. Besides wildlife research, Dr Goodall is famous for her untiring effort in protecting the environment and endangered species.

One highlight of the visit was Dr Goodall speaking to Observatory staff of her interest in African wildlife since childhood. She touched and inspired the audience with her perseverance in scientific research and her love for wildlife, in particular chimpanzees. Dr Goodall continues to promote awareness of the threats facing chimpanzees and other environmental issues. We wish her work would bring nice changes to the world.

The Observatory has been actively promoting public awareness of climate change in recent years and shares a common vision with Dr Goodall on preserving the environment.

Dr Jane Goodall speaking to Observatory staff

The Director (right) talked earnestly with Dr Jane Goodall (middle) and her team

The 2nd "Wetlands in My Eyes" Inter-school News Reporting Contest

Carrie MA (Wetland Park Manager / Education and Community Services)

The Hong Kong Wetland Park of the Agriculture, Fisheries and Conservation Department partners with the Hong Kong Observatory, Hong Kong Professional Teachers' Union, Ming Pao Daily News and life.mingpao.com to organize "The 2nd 'Wetlands in My Eyes' Inter-school News Reporting Contest". The contest echoes the theme "Wetlands, Biodiversity, and Climate Change" of World Wetlands Day 2010. It encourages students to learn about the effects of climate change on biodiversity and wetlands. In addition, students are required to conduct an educational or propagandistic activity in their schools for at least one week using the information collected, and present the result in form of a "news report" using articles with pictures, or multi-media. Details of the competition and application form are now available for download at :

http://www.wetlandpark.com/en/whatsnew/detail.asp?newsRcID=487

Hong Kong Observatory Contributes to the Determination of the Coordinated Universal Time

WOO Wang-chun

Coordinated Universal Time (UTC) is the time standard for civilian use derived from the weighted-average of the time kept by some 300 atomic clocks in national time institutes and laboratories around the world. The Bureau International des Poids et Mesures (BIPM) collects data from participating atomic clocks, including the one in the Hong Kong Observatory, and determines UTC based on an average weighted for each clock's stability. This guarantees the continuity and reliability of the world time standard as it would not be affected by the breakdown or failure of one or a few of the participating clocks.

In the first quarter of 2009, weighting of the Hong Kong Observatory's caesium-beam atomic clock in the determination of UTC was up to 0.8%, a high value amongst the three hundred plus contributing clocks.

The Observatory is responsible for keeping the Hong Kong Standard Time, which is UTC plus 8 hours. People may obtain the Hong Kong Standard Time through the Observatory's network time service, Dial-a-weather System, or 6-pip time signals broadcast by Radio Television Hong Kong.

Meteorological courses "Dragonair Aviation Certificate Programme" by the Observatory

CHOY Boon-leung

Observatory staff C.Y. Hong (first on left) and B.L. Choy (first on right) delivered basic meteorological lectures and provided on-job-training at the Airport Meteorological Office on 9 and 10 July to 14 members of the Hong Kong Air Cadet who participated in the 2009 Dragonair Aviation Certificate Programme.

The First TRCG Technical Forum

LI Yuet-sim

The first Typhoon Committee's Training and Research Coordination Group (TRCG) Technical Forum was successfully held in Jeju Island, Republic of Korea on 12 - 15 May. The Forum was generously hosted and sponsored by the Korea Meteorological Administration (KMA) with funding support from the World Meteorological Organization and the Typhoon Committee Trust Fund. Mr Edwin Lai Sau-tak, Senior Scientific Officer of the Hong Kong Observatory and Chairperson of TRCG, took the lead in organizing the Forum. More than 30 participants from 13 Typhoon Committee Members gathered at Jeju for the event. From the Observatory, Ms Li Yuet-sim, Scientific Officer, and Mr Wong Chau-ping, Experimental Officer, took part in the Forum as a system developer and operational forecaster respectively.

Ms. Li Yuet-sim and Mr. Wong Chau-ping (seated) working with KMA instructor during a demonstration session at the Korean National Typhoon Center in Jeju Island.

The Forum focused on the development and application of ensemble prediction systems and multi-model information in the formulation of deterministic consensus and probabilistic forecasts for tropical cyclones. Through lectures and practical sessions, the Forum provided a unique platform for operational forecasters and system developers to interact and share experience. Automated operational tools that are becoming widely used such as the Observatory's Typhoon Information Processing Systems (TIPS) were also introduced.

Korea National Typhoon Center in Jeju Island

VISITS COURSES TALKS SEMINARS

Mr. Wang Yu-bin (2nd left), the Deputy Director of the Shanghai Meteorological Bureau, led a delegation to the Observatory in late April to exchange views on business development

About 60 colleagues from various government departments involved in the "Daya Bay Contingency Plan" attended the "Radiological Protection Officers' Course" organized by the Observatory on 8 and 15 May.

The Director (left) introduced the work of the Observatory to Mr Lan Hong-ping, head of the delegation from Shenzhen Meteorological Bureau on 20 May.

The delegation of Shenzhen Meteorological Bureau visited the Observatory from 20 to 24 April.

Mr. Yeung Kwong-yu, the Chairman of the Hong Kong Astronomical Society, presented a talk about asteroid at the Observatory on 29 June.

Mr. Tai Sai-choi, Scientific Officer of the Observatory conducted two identical seminars entitled "Weather and Outdoor Activities" to the instructors of the Hong Kong Award for Young People on 7 May and 5 June. The seminars covered basic meteorological knowledge, the types of weather that may affect outdoor activities and how to use meteorological information provided by the Observatory. Around 80 instructors attended the seminars.

VISITS COURSES TALKS SEMINARS

Mr. Leung Wing-mo, Assistant Director made use of the sinking of the Titanic to explain climate change in his talk to students. (Photo by Pooi To Middle School)

Mr. Hui Tai-wai (standing), Scientific Officer conducted a free public talk on "Weather and Everyday Life" to promote disaster preparedness on 30 May

In a public seminar on "Airport Lightning" on 25 July, Scientific Officer Mr. Li Ping-wah explained the importance of lightning for the safety of aviation and introduced the Hong Kong International Airport Advanced Lightning System developed by the Observatory

Delivering a public talk on "Nowcasting at a glance" on 27 June, Scientific Officer Mr Yeung Hon-yin introduced an in-house developed nowcasting system and new products.

The 32nd meeting of the Liaison Group on Aviation Weather Services was held on 7 July at the Hong Kong Observatory headquarters. Twenty representatives from airlines, pilots' association and other sectors of the aviation community participated in the meeting. Apart from operational matters, the meeting also discussed the future development of aviation weather services.

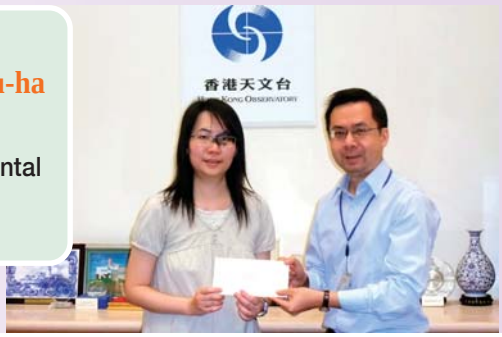
Staff Promotion:

Mr. LEUNG Wing-mo, Mr. LEE Lap-shun and Ms WONG Shau-ha

Mr. Leung Wing-mo was promoted to Assistant Director of the Observatory on 6 April. Before promotion, Mr. Leung was a Senior Scientific Officer responsible for corporate image promotion, tropical cyclone research. He was also the spokesman of the Observatory for a long time. Mr. Leung heads the Radiation Monitoring and Assessment Branch. He oversees meteorological training, public education and meteorological observation network.

Mr. Lee Lap-shun promoted to Senior Scientific Officer

Ms. Wong Shau-ha promoted to Senior Experimental Officer



Observatory Staff given Honours

In the 2009 Honours List, the Chief Executive has accorded awards to four Observatory staff.

Mr. Lam Chiu-ying was awarded the Silver Bauhinia Star for his dedicated and meritorious service to the Government and the Hong Kong community. Under his leadership, the Observatory contributed significantly to the work of the World Meteorological Organization and cooperated closely with neighbouring meteorological parties. Mr. Lam retired as the Director of Hong Kong Observatory after serving 35 years with the Government.

Mr. Leung Wing-mo, Mrs Hilda Lam and Dr Yeung Kwok-chung were awarded the Chief Executive's Commendation for Government/ Public Service for their contribution in the provision of meteorological service in support of the 2008 Olympic Equestrian Event.

Best TV Weather Programme Presenter - 2nd Quarter, 2009

Mr. LAU Dick-shum

The Observatory was in the 2008 "Hong Kong Awards for Environmental Excellence" Competition

Editorial board

The Hong Kong Observatory was awarded a Certificate of Merit in the Public Sector and NGOs Sectoral Awards Competition on 27 March 2009. Organized by the Hong Kong Awards for Environmental Excellence (HKAEE), this award is a recognition of the Observatory's good performance in green management and commitment towards environmental protection. The HKAEE is a merger of three former government initiated schemes, namely the Hong Kong Eco-Business Awards, the Wastewise Scheme and the Hong Kong Energy Efficiency Awards. There were 366 entries in the 2008 Sectoral Awards Scheme competition.

New colleagues completed the "Forecaster Course"

Four new colleagues (from left) Chan Ngo-hin, Tong Hang-wai, Chan Siu-wai and Chau Chun-yuen received certificates from the Director (centre) after completed the Applied Meteorology Course for Forecasters and passed the examination. They have commenced shift duties in the central forecasting office.

Observatory Staff Receiving Praise

Staff of the Observatory who received words of thanks and commendation from the public or organizations during May-August 2009:

Mr GINN Wing-lui, Edwin (Senior Scientific Officer)	Ms LAM Ching-chi (Senior Scientific Officer)
Mr TAI Sai-choi (Scientific Officer)	Dr LEE Tsz-cheung (Scientific Officer)
Mr WOO Wang-chun (Scientific Officer)	Mr LAU Dick-shum, Dickson (Experimental Officer)

Happy Business

CHIU Hung-yu

Elites shared managerial experience with Observatory staff

The Observatory holds a management forum every month to invite elites from different sectors to share their insight and experience in management with Observatory staff.

The following experts were invited to the forum in the past few months:

(1) Professor Cheng Kai Ming, Chair of Education, University of Hong Kong;

(2) Mrs Patricia Lau, Deputy Head of Efficiency Unit;

(3) Mr William Yeung, Chief Executive Officer of the Hong Kong Broadband Ltd; and

(4) Mr. Robin Shu-chun Tse, Assistant Commissioner of Hong Kong Police.

Their presentations were enlightening and informative, covering key areas in educational changes, customer management, entrepreneurship as well as leadership and personal development. They provided much food for thought on management, training and future developments of the Observatory.

Mr. Robin Shu-chun Tse, Assistant Commissioner of Hong Kong Police.

The Director (right) and Mr. Shun Chi-ming, Assistant Director (middle) warmly discussed with Professor Cheng Kai-ming (left) in the management forum

Mrs Patricia Lau, the Deputy Head of Efficiency Unit

Mr. William Chu-kwong Yeung (left)

Hong Kong Observatory received the Customer Relationship Excellence Award

Mr Leung Wing-mo (right), Assistant Director of the Observatory, receiving the award in the prize presentation ceremony.

Editorial board

The Hong Kong Observatory was recognized for its customer-centric service and was awarded 2008 customer relationship excellence under the category "Public Service of the Year (Government)" by the Asia Pacific Customer Service Consortium in 26 June 2009. The Director Dr Lee Boon-ying said, " 'Care about the community and colleagues' is one of the Observatory's core values. We strongly believe that good customer relationship is achieved through compassionately understanding the needs of the end users. We are fortunate to have a team of committed colleagues who are sensitive to the changing societal environment and are eager to make a difference."

The Observatory won the Community Chest Award again

Editorial board

In the Community Chest and Corporate and Employee Contribution Programme 2008/2009, the Observatory has won Bronze Award and the Highest Per Capita Contribution Award, Civil Service Category of the Community Chest Community Assistant Raised by the Employees (CARE) Scheme. The latter award has been won by the Observatory for seven consecutive years. It testifies not only the strong commitment of our staff in caring for the needy through charitable activities, but also their enthusiasm in serving the public.

Visiting Yuanwang-6

The Chinese space tracking ship, Yuanwang-6, visited Hong Kong on 4 May. Observatory colleagues paid a visit to the vessel and took a photo on the deck.

Mailing Address

Environmental protection fighters

Planting Day

LEI Chi-lap

On the morning of 9 May (Saturday), around 20 colleagues and their family joined the yearly Planting Day and helped flourish the 'mini-forest' at the Observatory Headquarters.

The amateur planters gave their best efforts to plant a number of Gordonia, Rhaphiolepis , Rhododendron and L. Chinese hibiscus around the northwest corner of the Headquarters and the car park. Every new plant is attached with a number plate so that the planters can trace and recognize those planted by them in future.