



Sustainability Report

For Fiscal Year 2021/22



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Director's Message



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To achieve the target of Paris Agreement, we shall do our part and take prompt action on energy conservation.

Dr Cheng Cho-ming, JP

Director of the Hong Kong Observatory

The fiscal year 2021/22 was one of the most extraordinary years for Hong Kong Observatory (HKO). In face of climate change, epidemic and many other challenges, I would like to express my immense gratitude to our colleagues for providing continuous weather services with professionalism and perseverance. To stay ahead in these challenges, we will sustain our sterling effort to build a sustainable business.

Throughout the year, HKO continued to maintain high-quality work, including public weather services and online information services. Indeed, HKO website and the “My Observatory” mobile application have registered a total page views of more than 141 billion in 2021. In addition, HKO is moving towards more people-oriented services. New services such as “the personalized weather website”, “My Weather Observation”, “Map of earth tremors felt” and new “360 tour” have been rolled out during the year, offering new and more convenient experience to the public.

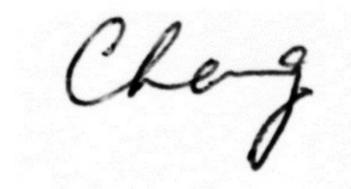
Besides maintaining the provision of public weather service, HKO also contributed great efforts in anti-epidemic work during the year. HKO led several restriction-testing declaration (RTD) operations to help reduce the spread of the epidemic in the community. Colleagues' efforts were highly appreciated.

The epidemic notwithstanding, HKO's pace of climate action has never been slowed down. HKO strived to foster a green culture within our offices and to cultivate an environmental-friendly culture with stakeholders. We have been implementing more green measures and adopted green designs in equipment through our innovations. We also reviewed our decarbonization achievement in past few years and further strengthened our reduction target for the coming five years. We were very pleased that our endeavours were recognised by the Environmental Campaign Committee with the award of Merits under the 2021 Hong Kong Awards for Environmental Excellence (HKAEE) and attained the title of "Hong Kong Green Organisation". The collaboration project on energy saving between HKO, Airport Authority Hong Kong (AAHK), and CLP Power Hong Kong (CLP) were also awarded the Asia Pacific Rim Region Energy Project of the Year Award for 2021 by the Association of Energy Engineers.

Amidst the COVID-19 epidemic situation, HKO has been keeping up with our engagement with the general public on the promotion of weather knowledge and understanding on climate change. Beyond our educational videos "Cool Met Stuff" and educational posts on social media platforms, we have actively participated in various broadcasting programmes to promote awareness of climate change. HKO also designed an e-book "A Tour of Tropical Cyclones" to enrich children's understanding of the extreme weather associated with tropical cyclones. HKO also planned to produce more educational videos to enhance public awareness and knowledge of different weather conditions.

HKO cherished ideas and feedback from the public, and we are grateful for your warm on-going support which certainly give us a strong impetus for providing our services at the next higher level.

It is always the core vision of HKO to build a better society through innovation in science and dedication in services. We shall maintain all-out effort to enhance our performance and boost sustainability in the years ahead. Your views are most welcome to help us identify areas for further improvement.



C M CHENG

Director of the Hong Kong Observatory

1 2021/22 Highlights

Key figures

Department Overview

- 4** | Manned Offices
- 195** | Weather stations
- 364**  Approved establishment as at 31 March 2022



Green Achievement

- 5.8%** | Electricity Consumption Reduction compared to FY18/19
- 19%** | Paper Consumption Reduction (reams per capita) compare to FY19/20

Training and Development

- 6.4**  man-days Average training time per employee
- 6** | Consecutive year recognised as a Manpower Developer

Media

- > 141** billions Views of HKO website and MyObservatory app in 2021

International and Regional Cooperations

- > 20** | World Meteorological Organization, International Civil Aviation Organization

Weather Services

- 100%** | Hourly local weather report dissemination with first 10 minutes of each hours
- >93%** | Accurate public forecasts as verified by objective means, ship captains, airline operators
- 77%** | Forecasts perceived as accurate by the public

Radiation Monitoring and Assessment

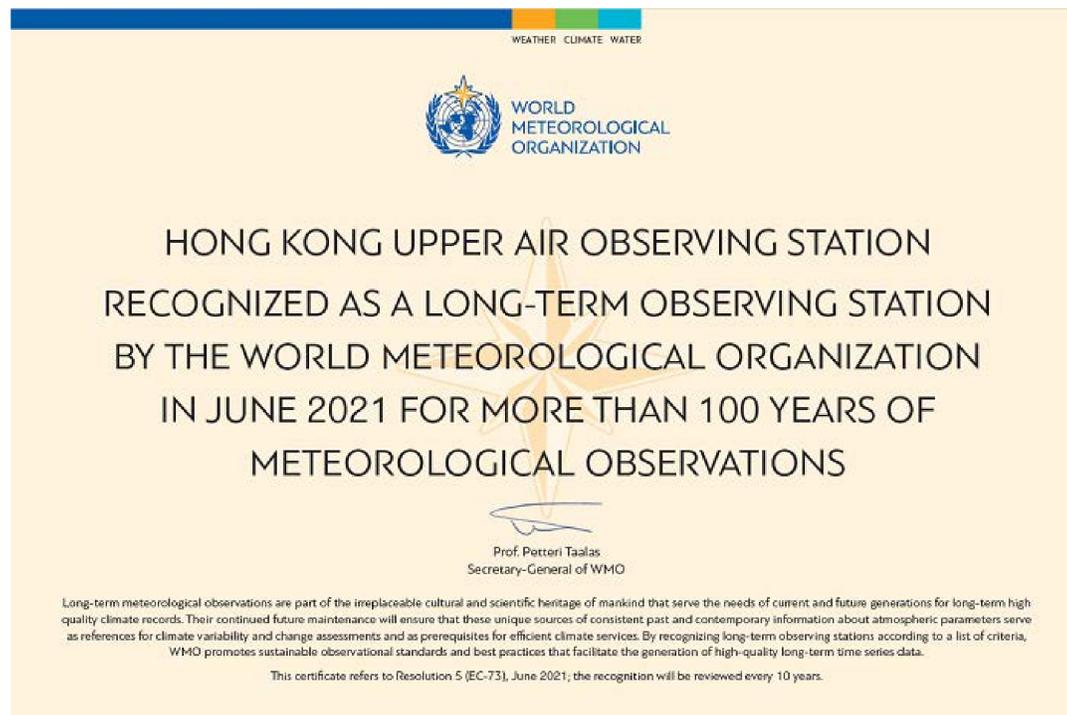
- 99%**  Data availability of environmental radiation monitoring network

Time Standard, Geophysical and Climatological Services

- 0.01**  mircosecond per day Time standard accuracy

2021/22 Performance Highlights

World's first accredited centennial upper air observing station



The centennial observing station accreditation certificate awarded by the World Meteorological Organization to the upper air observing station of the HKO.

In 2021, the upper air observing station of the Hong Kong Observatory (HKO) became the world's first centennial upper air observing station accredited by the World Meteorological Organization (WMO). The WMO began commending meteorological stations that maintain high-quality meteorological measurements as well as properly archive historical documents and long-term observation data in different parts of the world through an accreditation mechanism since 2017. Long-term meteorological observations are crucial for documenting and analysing the Earth's climate change, which help drive the development of climate research. So far, about 300 observing stations with 100 years of history or more have been accredited by the WMO. In 2017, the surface observing station at the HKO Headquarters was also accredited by the WMO as one of the first batch of centennial observing stations.



The Automatic Upper Air Sounding System at the upper-air observing station in King's Park

2021/22 Performance Highlights

New Chairperson for the Meteorology Sub-group of Asia Pacific Region of International Civil Aviation Organization

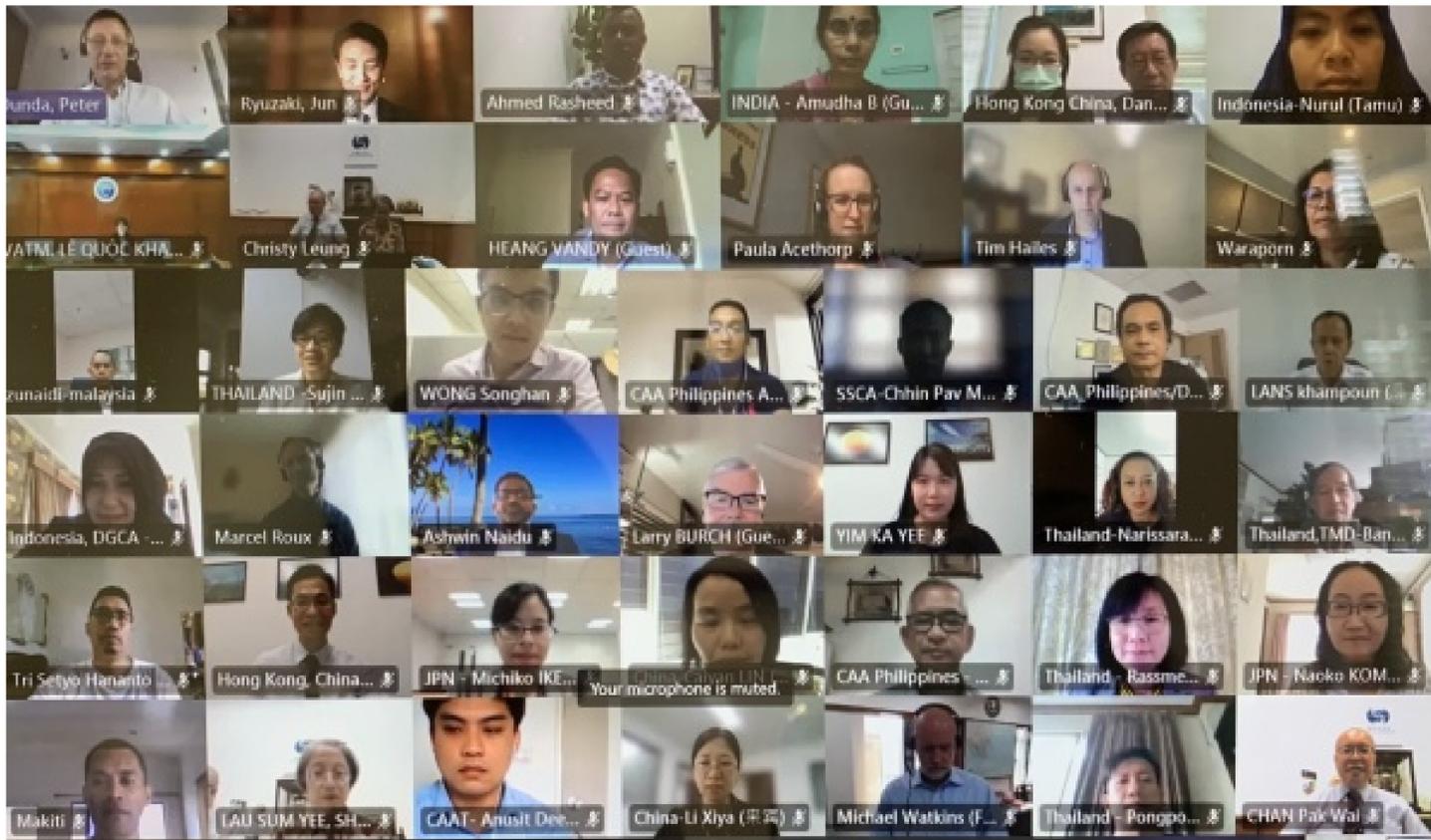
At the 25th meeting of the Meteorology Sub-group (MET SG) of Asia Pacific (APAC) region of International Civil Aviation Organization (ICAO), Mr. P.W. Chan, Assistant Director of the Hong Kong Observatory, was elected as the new Chairperson of MET SG. This was the fourth time that a colleague of the Observatory held the Chairperson/Vice-Chairperson pass of this Sub-group. At the same meeting, Ms. Nguyen Lan Oanh (Lana) from the Civil Aviation Authority of Viet Nam, was elected as the new Vice-Chairperson of the Sub-group.



*Mr. P.W. Chan (left), elected incoming Chairperson from 2021.
Ms. S.Y. Lau (right) was Vice-Chairperson for 2017-2021.*



This is recognition of the contributions of Hong Kong, China to the development of aeronautical meteorology and provision of aviation services in the region.



Members participated in the video conference for the 25th meeting of MET SG

Over 140 representatives from States within APAC region attended the MET SG meeting in October 2021. Mr. P.W. Chan, together with Ms. S.Y. Lau and other Chairpersons jointly presided at the 5-day video conference to review members' progresses and achievements since the past session and discuss various activities of the Working Groups under the auspices of the Sub-group. The meeting reached a number of Decisions and Conclusions for moving forward several significant aviation meteorological activities in the region.

The main objectives of MET SG of ICAO are to ensure the continuous and coherent development of meteorology in APAC, to facilitate the implementation of aeronautical meteorological services in the region, and to review and address deficiencies of the States. The former Director of Hong Kong Observatory, Mr. C.M. Shun, served as Chairperson from 2003 to 2009, the Director of Hong Kong Observatory, Dr. C.M. Cheng as co-Vice-Chairperson from 2010 to 2015, and the former Assistant Director of Hong Kong Observatory, Ms. S.Y. Lau as Vice-Chairperson from 2017 to 2021.



I'll endeavor to work with the Sub-group and other related groups under ICAO to further advance meteorological support to the new developments and initiatives for the benefits of the international aviation community.

(Mr. P.W. Chan)

2021/22 Performance Highlights

Anti-epidemic Efforts

To effectively reduce the spread of the epidemic in the community, the Observatory together with the Intellectual Property Department (IPD) and the Invest Hong Kong (InvestHK) mobilised their manpower to participate in anti-epidemic work. Over 200 staff from the three departments conducted restriction-testing declaration (RTD) operations at restricted areas in Wong Tai Sin, Kwun Tong and Chai Wan on 11-12 March, 21-22 March and 1-2 April 2022, respectively.

The Observatory took lead in the inter-departmental RTD operations in March 2022, including preparations, arrangement of necessary supplies, coordination, and supervision of onsite operational work. During the operations, staff of the Observatory, IPD and InvestHK worked seamlessly in arranging registration and testing for residents, distributing food packs and anti-epidemic kits, as well as arranging for admission of those who were tested positive to isolation facilities. The Observatory staff who participated in RTD operations included Scientific Officers, Experimental Officers, Scientific Assistants, Radar Specialist Mechanics and staff of other grades. They demonstrated strong unity and high esprit de corps in fighting the epidemic.



The Director of the Observatory, Dr Cheng Cho-ming (first from right) at the RTD operation site

2021/22 Performance Highlights

Anti-epidemic Efforts



Observatory staff distributing anti-epidemic kits to residents

Dr Cheng Cho-ming, the Director of the Observatory, supported and encouraged colleagues at the RTD operation site. He commended staff from different departments for collaborating smoothly and contributing to the anti-epidemic work.

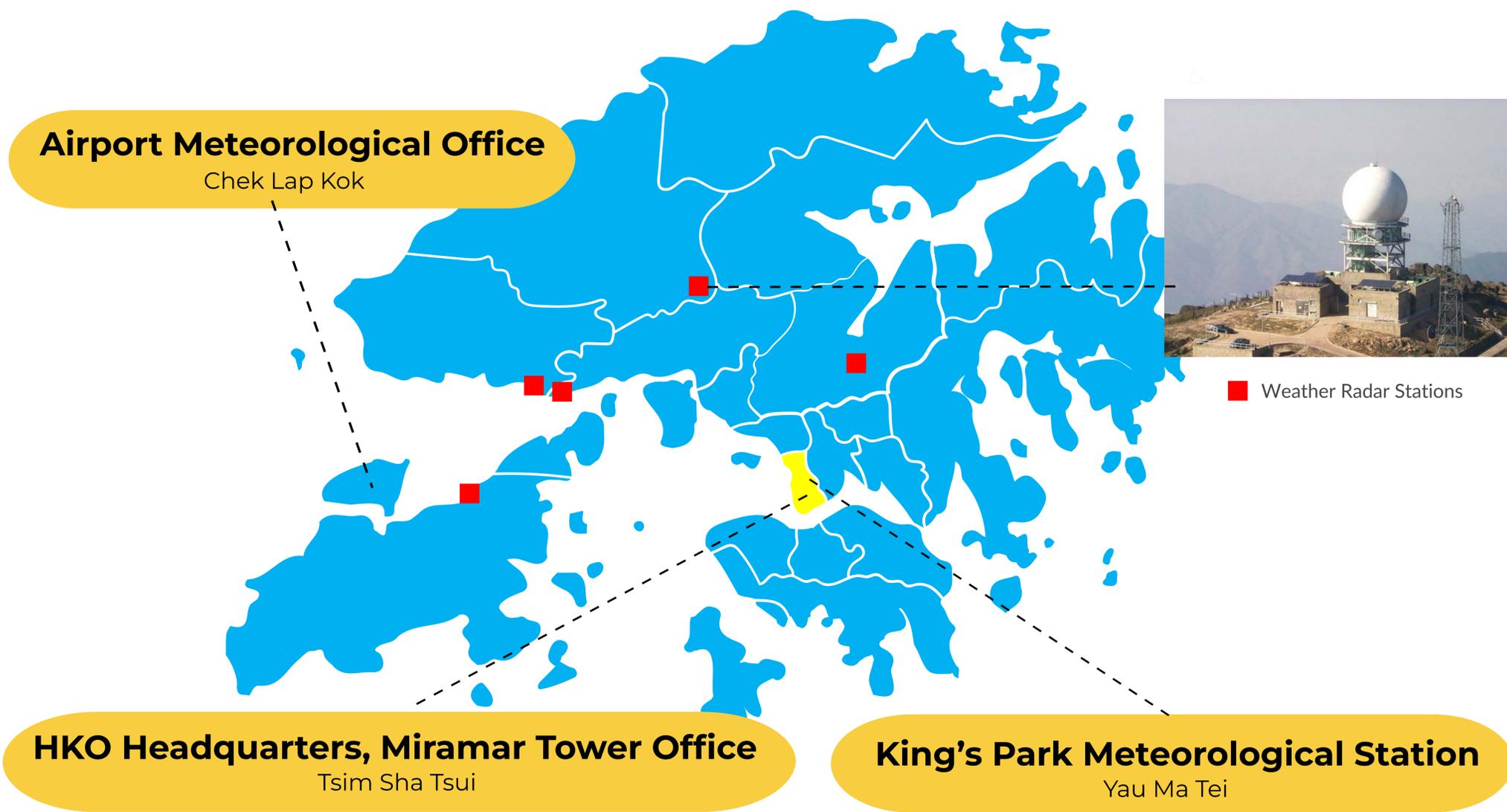
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Colleagues from the three departments are actively collaborating in the anti-epidemic work in addition to discharging their normal duties, helping to reduce the spread of the epidemic in the community, and enabling Hong Kong to soon emerge from the epidemic.

2 About the Department

Established in 1883, The Hong Kong Observatory (HKO) is a government department responsible for monitoring and forecasting weather, as well as issuing warnings on weather-related hazards. HKO also monitors and assesses radiation levels in Hong Kong, and provides other climate and geophysical services to meet the needs of the public and shipping, aviation, industrial and engineering sectors. With governance at international standard, HKO is one of the leading meteorological organisations in the world.

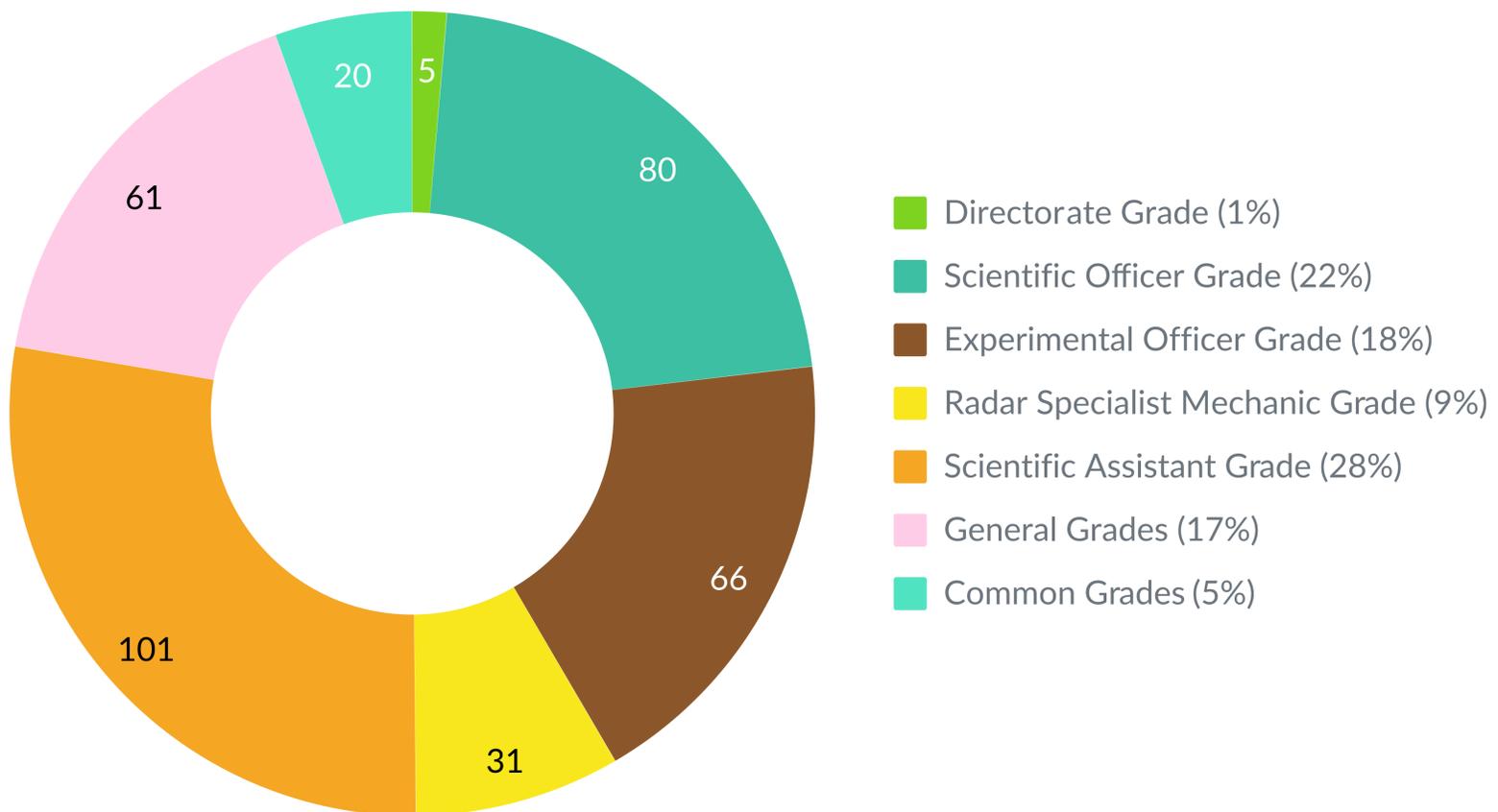
HKO has four manned offices, including the HKO Headquarters, Miramar Tower Office, King’s Park Meteorological Station and Airport Meteorological Office.



Besides, five weather radar stations are operated at Tai Mo Shan, Tate’s Cairn, Brothers Point, Tai Lam Chung and Siu Ho Wan. As at 31 March 2022, HKO operated a total of 195 weather stations including automatic weather stations, rain-gauges, anemometers and tide stations.

Staff Establishment

HKO had an approved establishment of 364 as at 31 March 2022, with details as shown below:



Vision, Mission and Values



Vision

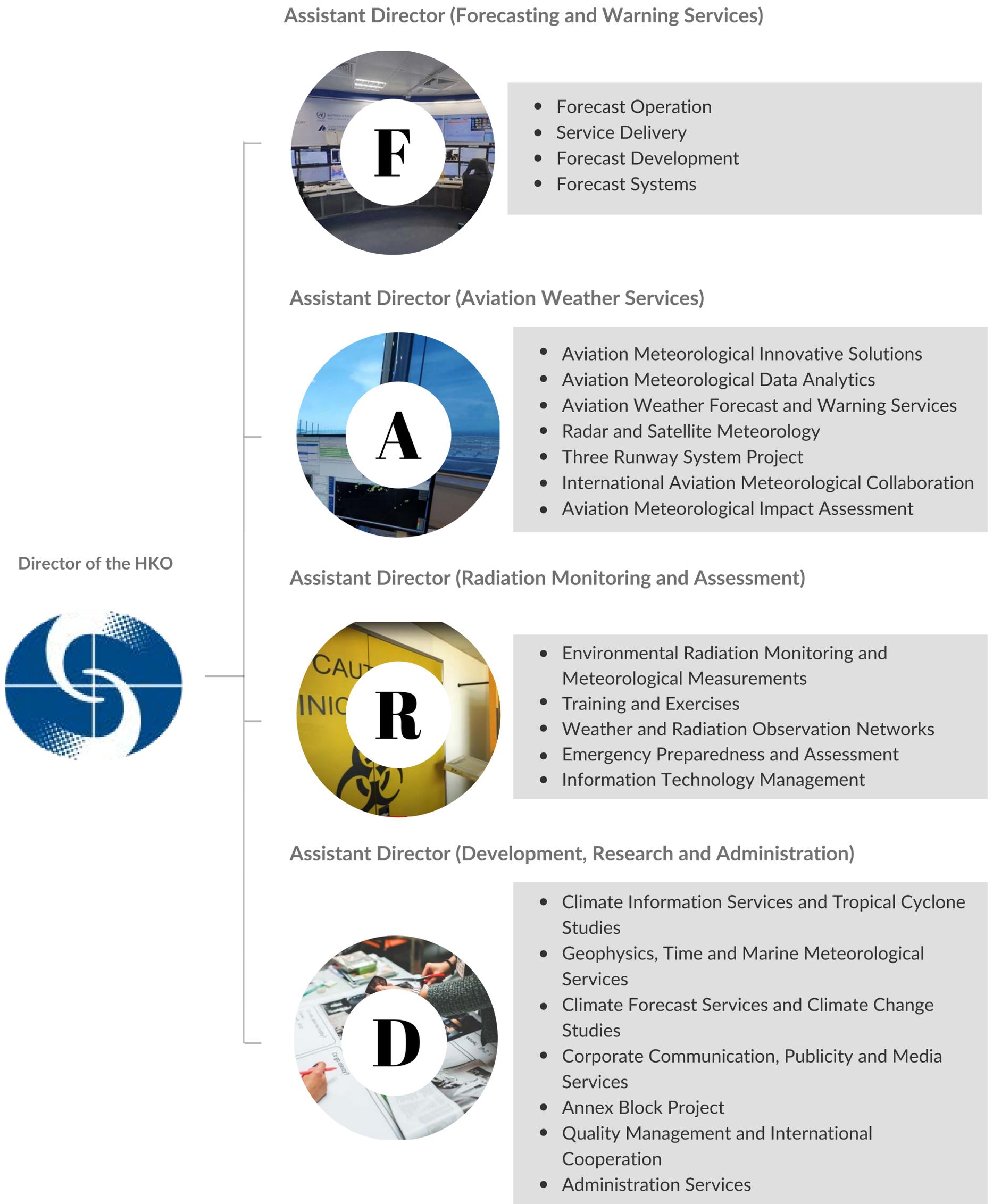
Be a model of excellence in protecting lives and building together a better society through science.

Mission

To provide people-oriented quality services in meteorology and related fields, and to enhance the society's capability in natural disaster prevention and response, through science, innovation and partnership.

Governance Structure

as at 31 March 2022



3 About the Report

The Sustainability Report for fiscal year 2021-22 of Hong Kong Observatory (HKO) summarises the efforts and achievement in sustainable development over the past year. The report was compiled with reference to the Global Reporting Initiative (GRI) Standards, covering information on material sustainability aspects of the Observatory. The period covered is from 1 April 2021 to 31 March 2022, unless otherwise specified.



This report is prepared annually to meet the needs of:

- the general public receiving HKO information via the media, telephone, mobile devices or by browsing HKO website;
- all Government Bureaux and Departments;
- visitors to HKO; and
- other users of HKO services including those from the aviation, shipping, business, industry, education, engineering, public utility and tourism sectors.

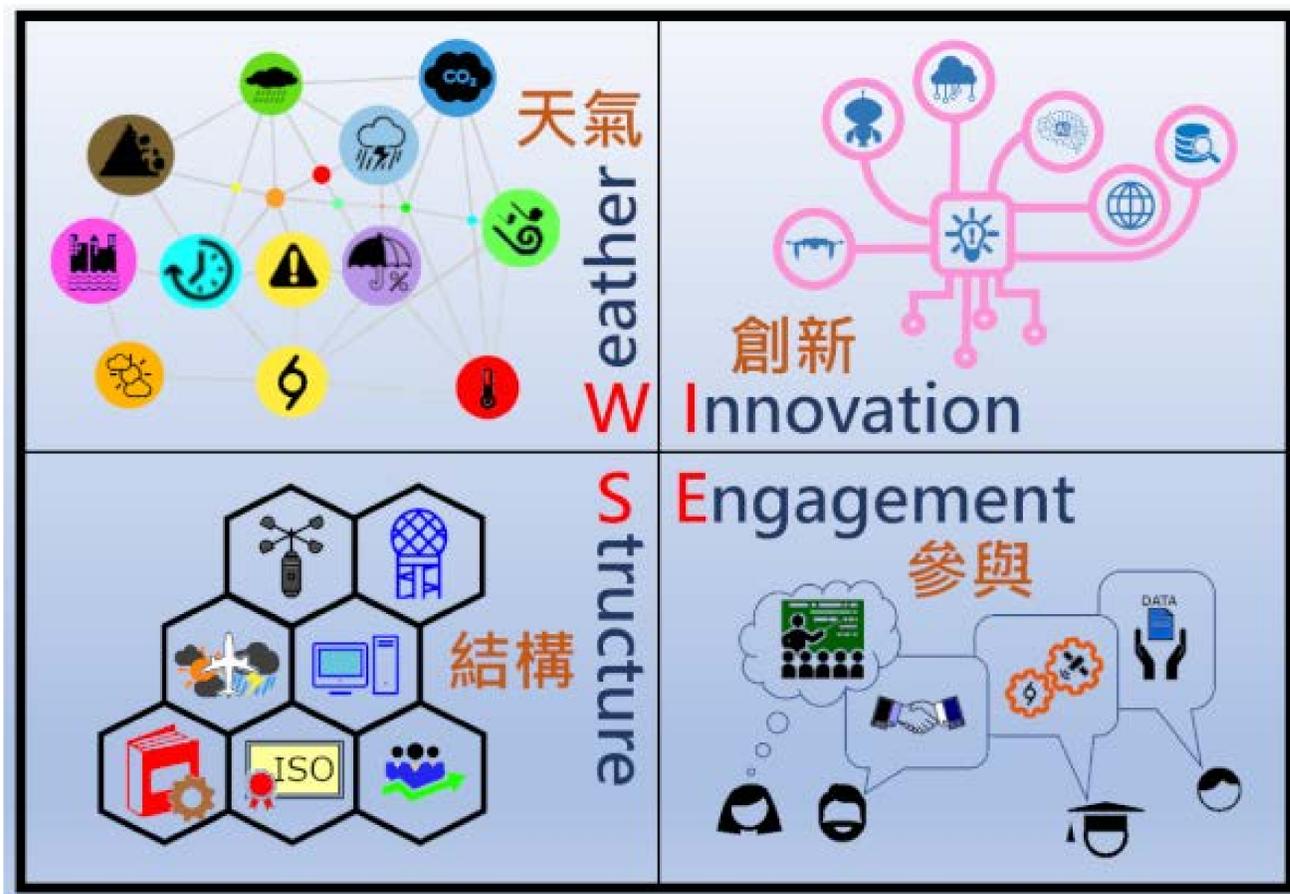
This report is divided into three main parts as follows:

- the first part (section 4) highlights the activities and initiatives of the Department during the fiscal year;
- the second part (section 5) introduces the environmental policies adopted by the Observatory and its achievement in support of sustainable development during the fiscal year; and
- the third part (section 6) presents the work done by HKO in the community, such as activities on the aspects of public education and communication.

4 Activities and Initiative

4.1. 5-year Strategic Plan

To keep pace with the ever-changing environment and increasing challenges, HKO has formulated a new 5-year strategic plan that sets out directions for development thrusts for the period 2022-2026.



The new plan comprises four main strategies. They are abbreviated by the word WISE, standing for Weather, Innovation, Structure and Engagement. Each strategy has two goals and corresponding tasks.

(W) Weather) Diversified weather and climate services

- Provide more accurate and timely weather forecast and warning to reduce the risk of natural disasters.
- Increase the society’s awareness and resilience to climate change.

(I) Innovation) Development and application of innovative technologies

- Employ innovative technologies to enhance the HKO's operational efficiency and develop new public services.
- Apply new technologies to enhance monitoring and forecasting capabilities.

(S) Structure) Facilities and talent structure

- Strengthen the Observatory’s systems and facilities to cope with new developments in the future.
- Enhance the team’s professionalism and service quality.

(E) Engagement) Partner engagement and public communication

- Develop new services through diversified partnership.
- Enhance public communication to raise awareness of disaster prevention and reduction.

4.2 Quality Management

In pursuit of quality services, HKO has been certified to the International Organization for Standardization ISO 9001 Quality Management Systems indicating international recognition of quality management of these services. The area of services includes public weather services, aviation weather services, radiation and meteorological measurement services, ambient gamma radiation monitoring service, automatic wind measurement services for the operation of the Tropical Cyclone Warning Services in Hong Kong, and automatic regional meteorological measurement services.

HKO has been devoted to continuously improving the quality management of the services provided. In late 2021, HKO extended the scope of ISO 9001:2015 certification for automatic regional temperature measurement services to cover additional measurements, including mean sea level pressure and relative humidity, reaffirming the high quality of automatic meteorological measurement services provided by the Observatory.

In addition, the Information Technology (IT) service management system supporting the Observatory's critical IT infrastructure received the International Organisation for Standardization/International Electrotechnical Commission (ISO/IEC) 20000-1:2018 certification in March 2022. This was the result of hard work beginning in mid-2021, through which the Observatory has strived to enhance the IT service management system, thus ensuring that its talent, workflows and technology could attain internationally recognised standard.



HKO's certifications of the ISO 9001:2015 and ISO/IEC 20000-1:2018

4.3 Staff Training and Development

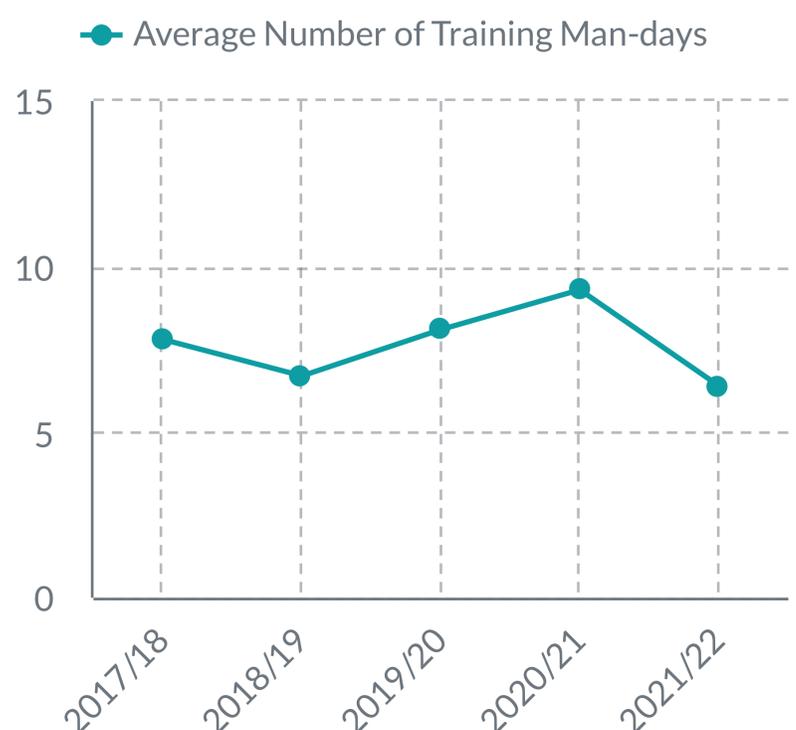
Training and development are vital to the assurance of professional, technical and core competency in support of the long-term sustainable development of HKO towards the vision of being a model of excellence in protecting lives and building a better society through science. To this end, HKO draws up its annual Departmental Training and Development Plan and promulgates to all staff the objectives, policies, specific training and development plans and opportunities for the years ahead.

In 2021/22, HKO has provided training to staff not only to cope with the global trends including international relations, machine learning, Internet of Things technologies and intelligent crowdsourcing for big data analytics; but also to strengthen staff's core competency such as leadership and provision of public services. Courses organised in 2021/22 are highlighted as follows:

- May 2021**
 - International Distance Training Course on The Basic Principles of Satellite Remote-Sensing (online)
 - Online Training Course on the Application of Radar Data in Nowcasting High Impact Weather
- Aug 2021**
 - International Distance Training Course on Installation and Maintenance of Meteorological Observing Instruments (online)
- Sep 2021**
 - Online Training Course on Climate Change and Agro-meteorology
- Nov 2021**
 - Seventh International workshop on Monsoons (online)
 - WMO/UKMO/MSS Aviation Meteorology Training Seminars (online)
 - In-house Workshop on Nuclear Emergency Preparedness and Response
 - Talk on Indian Ocean, ENSO and their Impacts on Regional Precipitation
 - Training on Preparedness and Response for Nuclear and Radiological Emergencies (online)
- JAN 2022**
 - ESCAP/WMO Typhoon Committee Online Attachment Training 2022

In 2021/22, the total number of training man-days was 2,416, and the average number of training man-days per person was 6.4.

The overall decrease, as compared with the previous year of 2020/21, was mainly due to cancellation of local and overseas trainings during the COVID-19 epidemic.



A voluntary mentorship programme has also been implemented since 2014 to facilitate the transfer of skills and knowledge and to nurture a learning culture within the Observatory. The programme currently covers three technical areas, namely: (i) weather observation, (ii) information technology, and (iii) instrumentation. Staff are encouraged to join the programme as mentors or mentees according to their needs and interests.

Knowledge Management measures in HKO

To preserve and manage the vast amount of knowledge acquired, a number of knowledge management measures have been put in place, which include but not limit to:

- (a) a Sharing Databank to facilitate the gathering and sharing of resources and materials under different subject areas;
- (b) a revamped Cyber Learning Centre to facilitate the management of continuous self-learning by colleagues, including in-house training course materials as well as online training modules from other meteorological centres or training institutions; and
- (c) regular Technical Forum, Weather Review Forum and Management Forum to facilitate sharing of knowledge among colleagues



Management Forum by Dr Li Ping Wah, Senior Scientific Officer and former Staff Welfare Officer

HKO continues winning the recognition as “Manpower Developer”

HKO has long attached great importance to staff training and development. In 2021, it successfully passed the assessment of the Employees Retraining Board (ERB) again, and was recognised as a Manpower Developer (MD) for the sixth consecutive year. This demonstrated the achievements and dedication of HKO in the promotion of learning culture, resources planning, nurturing and development of talents, and performance management. HKO will continue to actively recruit and nurture talents in face of the current and future challenges to fulfil the spirit of "Innovate with Science, Serve with Heart" and provide the public with people-oriented quality services.

4.4 Occupational Safety and Health

Assurance of Occupational Safety and Health (OSH) to staff is one of the major goals of HKO Business. HKO regularly nominates staff to attend OSH courses organised by relevant government Bureaux and Departments, such as the “General Training Course on OSH” organised by the Civil Service Bureau (CSB).

HKO also make strides in promoting OSH among civil servants by organising training courses on radiation protection. We also support the OSH Seminars organised by CSB to promote the use of general weather information as an important reference for undertaking outdoor work.

In 2021/22, HKO continued its effort to encourage staff to attend courses organised by various Bureaux and Departments, including CSB and the Labour Department, e.g. “Understanding and Responding to Verbal Violence”, “First Aid Care in the Workplace” and “Indoor Air Quality and Occupational Health”. Besides, circulation of online materials on OSH was regularly made to raise staff awareness as well.



Besides, HKO understands that a healthy workplace can improve staff morale and engagement, which results in improvement of operation efficiency and service quality. To achieve mental health friendly workplace, HKO signed up The Mental Health Workplace Charter implemented jointly by the Department of Health, the Labour Department and the Occupational Safety and Health Council, and attained the title “Mental Health Friendly Supreme Organisation” by completing designated action items to promote mental well-being at workplace, and create an inclusive and friendly workplace environment for colleagues with mental distress.

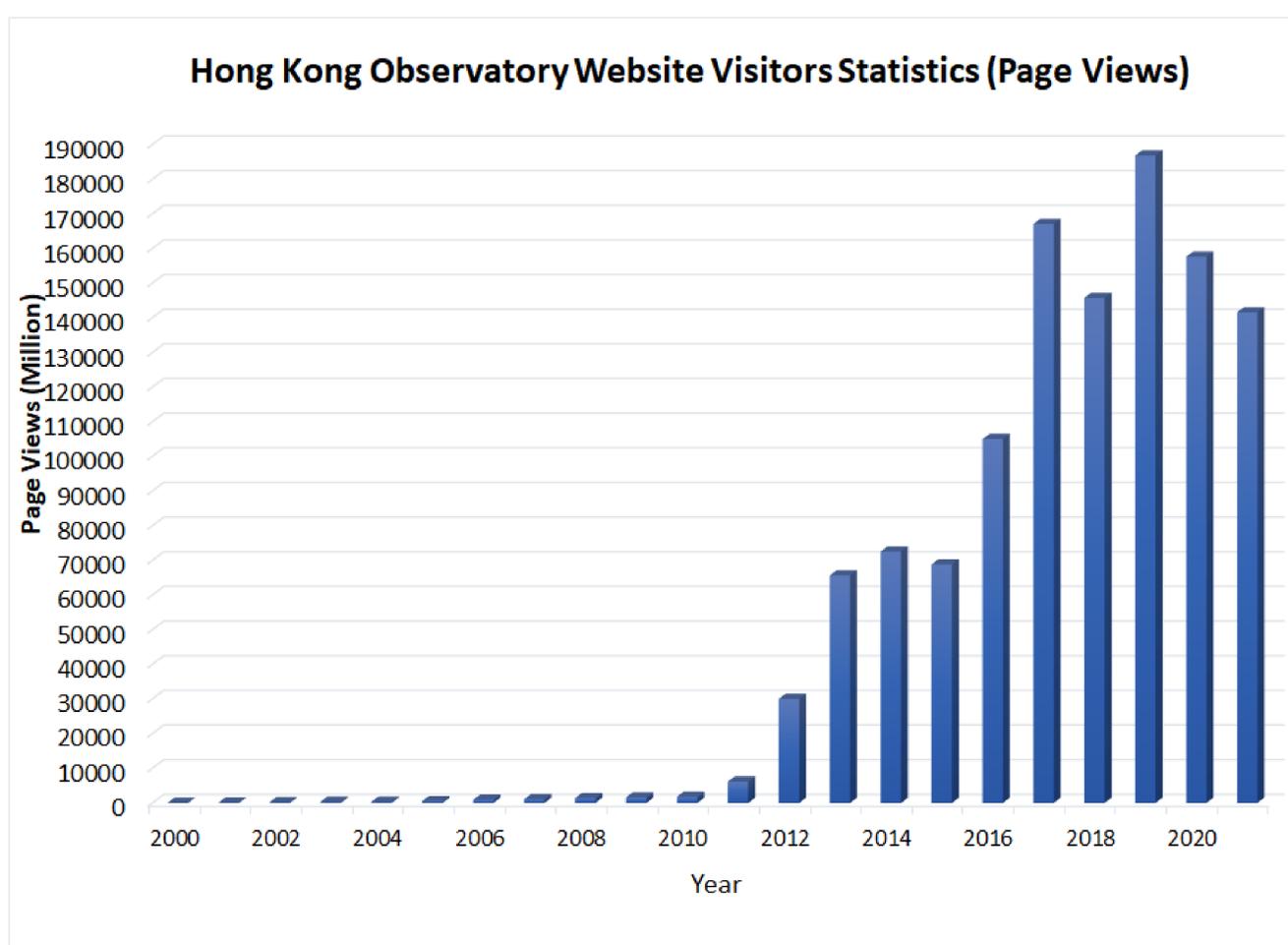
4.5 Highlights of Key Initiatives 2021/22

HKO is responsible for three main programme areas, namely public weather services, radiation monitoring and assessment, and time standard and geophysical services.

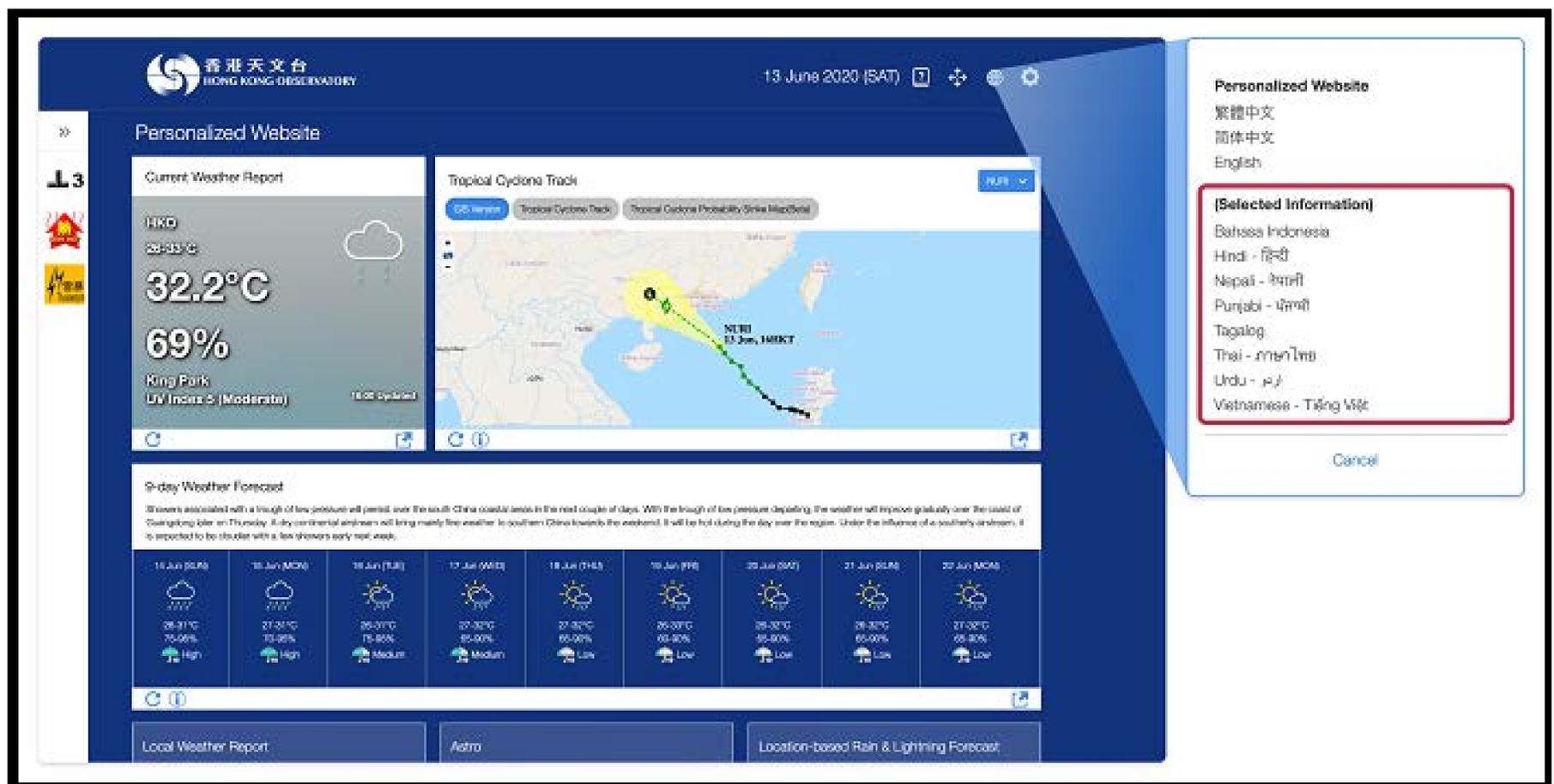
(A) Public Weather Services

Weather forecast and warning services have always been our top priority. HKO provides round-the-clock weather services to the general public, fishing, shipping and aviation sectors, as well as other special users. Such weather services are delivered in a timely manner, providing short to medium range weather forecasts and warnings. In support of such services, HKO operates a range of weather monitoring equipment, including a territory-wide network of automatic weather stations for measuring wind, pressure, temperature, humidity and rainfall, a network of cameras and visibility meters for providing real-time weather photos and visibility reading, a lightning location network for detecting lightning, two long range Doppler weather radars for detecting the intensity and movement of rain areas, as well as a network of sensors and equipment in the vicinity of the Hong Kong International Airport for monitoring windshear and turbulence in support of airport operation. HKO also exchanges real-time data with other meteorological centres worldwide and receives cloud imageries from a variety of weather satellites.

In 2021, HKO fulfilled its performance pledge of issuing at least one bulletin every hour of the day, disseminating 100% of the bulletins within ten minutes after each hour, and attained a forecast accuracy (as verified by objective means) of 93%. The total number of page views of HKO website and mobile weather application continued to reflect the high demand from public on the weather services provided by the Observatory, reaching more than 141 billion in 2021.



HKO launched new personalised weather website



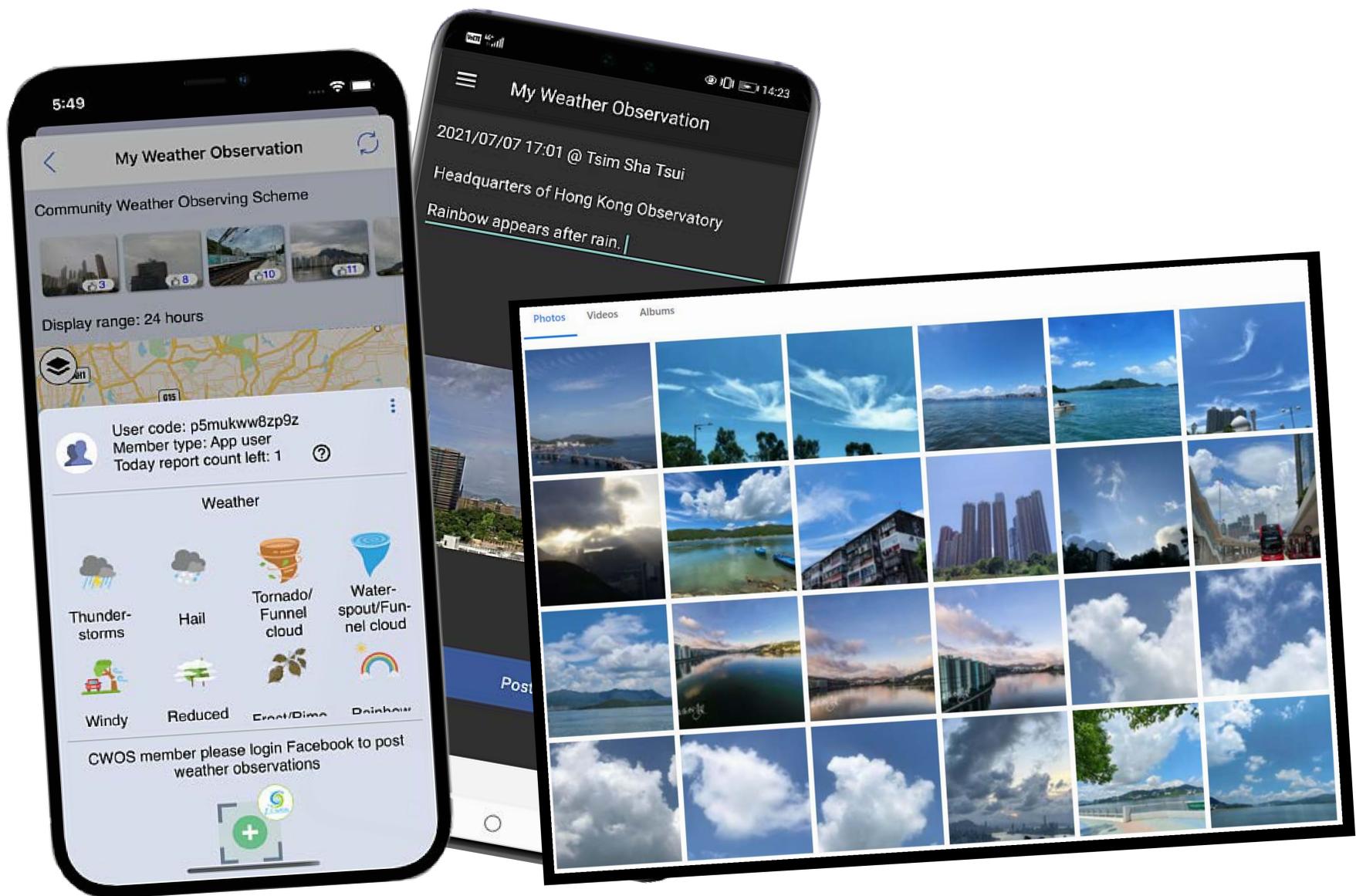
HKO attaches great importance to ensuring equal access to our services by all members of the public, irrespective of their ethnic background.

Having consulted relevant ethnic minority representatives and the Centre for Harmony and Enhancement of Ethnic Minority Residents (CHEER) funded by the Home Affairs Department, HKO launched a new personalised weather website on 21 May 2021, in order to facilitate ethnic minorities’ access to local weather information.

In addition to traditional Chinese, simplified Chinese and English, the new website will provide basic weather information, including latest weather reports, weather warnings, 9-day weather forecasts, tropical cyclone tracks, and weather radar, satellite and lightning imageries etc., in eight ethnic minority languages, namely Hindi, Bahasa Indonesia, Nepali, Urdu, Tagalog, Thai, Punjabi and Vietnamese. Ethnic minorities can gain access to weather information in their own languages through the new website, and such information will aid their planning of daily activities and advance preparation for weather changes.

Apart from the aforesaid element, the new personalised weather website adopts a responsive web design that automatically adjusts the layout for different devices, such as desktop computers or mobile devices, to provide a better user experience. The website also allows users to customise the information to be displayed according to their preferences.

The Observatory launched “My Weather Observation” feature



HKO launched a new feature of “My Weather Observation” for the mobile application “MyObservatory” in July 2021, allowing users to report and share weather information.

After simple registration, users can report weather phenomena including thunderstorm, hail, tornado, waterspout, windy condition, reduced visibility, frost/rime, rainbow, halo, and crepuscular rays through the use of “My Weather Observation”.

In addition, members of the Community Weather Observation Scheme (CWOS) Facebook group can share weather photos and video clips to CWOS Facebook group through the “My Weather Observation” function. “My Weather Observation” will also display weather photos or video clips shared by some CWOS users.

It is hoped that the new function of “My Weather Observation” can raise public’s awareness of getting prepared for the challenges of extreme weather.

Access for HKO's data and records from public sector

Hong Kong Observatory Open Data		
Name of Dataset	Frequency of Update (e.g. real-time; daily; weekly; monthly ...)	Description
Gridded rainfall nowcast in Hong Kong	Every 12 Minutes	Provide half-hourly gridded rainfall nowcast data in Hong Kong up to the next two hours
Daily total rainfall	Monthly	Data on daily total rainfall (Please visit the reference link for other climate information)

Webpage of the HKO Open Data



To facilitate wider use of its data, HKO has been releasing data in machine-readable format on HKO website since 2012. The data are also available on the PSI Portal. With a view to opening up more data for free use by the public and private sector, HKO released 6 more datasets since June 2021.



Evolution of the numbered tropical cyclone warning signal system in Hong Kong

Besides, HKO also launched a new webpage “Historical Records of Tropical Cyclone Warning Signals in Hong Kong during 1917-1941” in Nov 2021, to display these precious pre-World War II historical records.

The numbered tropical cyclone warning signals were first introduced in Hong Kong in 1917, and has been revised several times afterwards, in order to accurately reflect and warn the public as the impacts of winds from tropical cyclones.

As the signal records were scattered in different historical reports and newspaper, with the assistance of a group of enthusiastic retired colleagues and volunteers, HKO successfully recovered these valuable records for open access by the public.

(B) Radiation Monitoring and Assessment

HKO monitors ambient radiation levels in Hong Kong and conducts radiological measurements on samples of air, soil, water and food. Its radiation measurement services are certified to the standard of ISO 9001:2015 Quality Management Systems.

In the unlikely event of a nuclear emergency at the nuclear power stations in Guangdong, HKO will immediately step up radiation monitoring, assess radiological consequences and provide technical advice to the government regarding appropriate protective actions to take.

In 2021/22, all radiation monitoring and assessment work in this programme was carried out satisfactorily. All equipment was maintained in a state of readiness. Exercises, drills and training on radiation monitoring and assessment were conducted successfully. Replacement of the Liquid Scintillation Counting System at the King's Park Radiation Laboratory was completed and the communication facilities of the Monitoring and Assessment Centre were upgraded to enhance operational efficiency.



Radiological Protection Officers' Course organised by HKO in October 2021

Virtual tour experience on radiation monitoring facilities

To raise interests of the public on radiation-related knowledge and radiation monitoring, HKO has launched several new virtual tours in 2021/22. These virtual tours include the renovated exhibits of the exhibition hall, radiation related facilities and the radiation monitoring station at the King's Park Meteorological Station.



The revamped virtual exhibition hall for environmental radiation monitoring



Virtual tour of the radiation monitoring station at King's Park

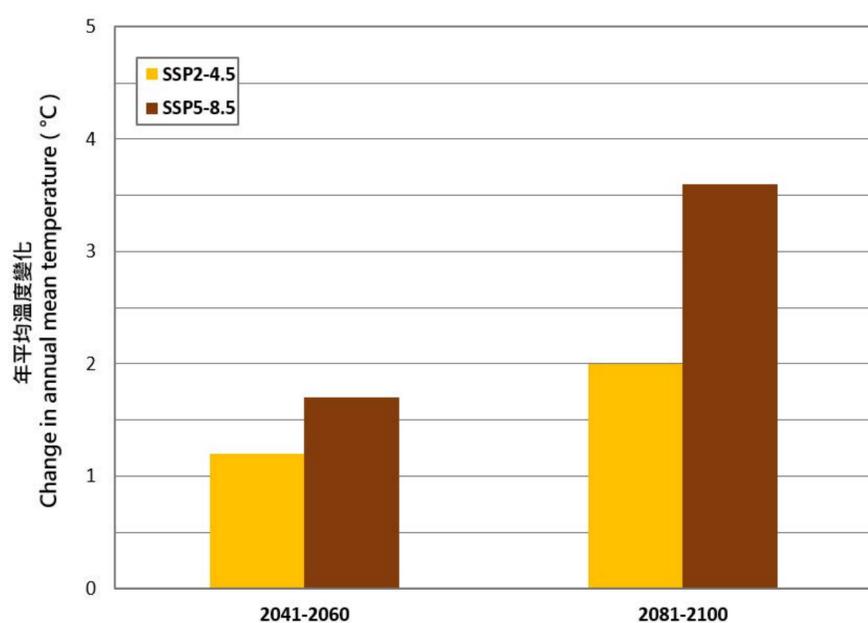


(C) Time Standard, Geophysical and Climatological Services

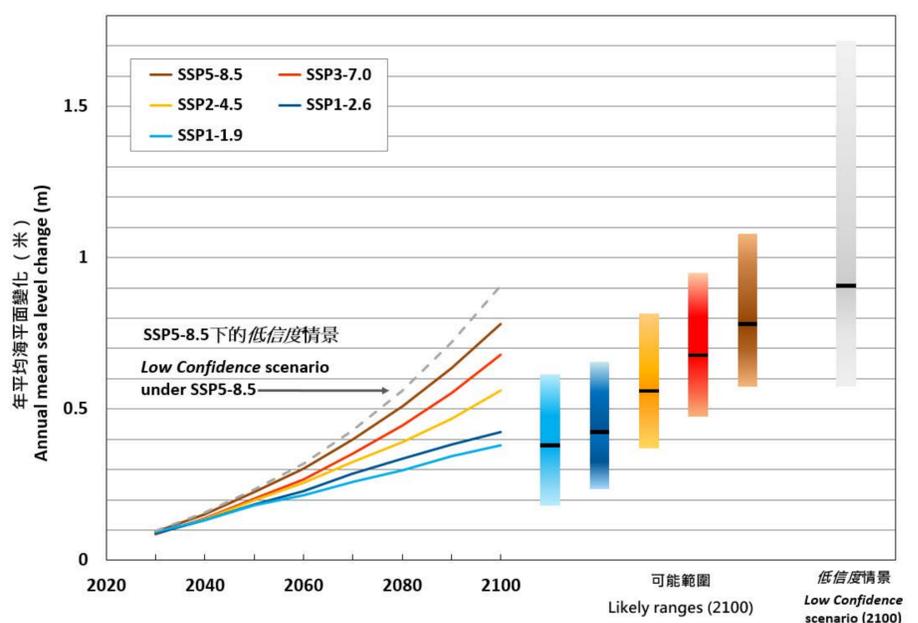
HKO maintains time standard, provides time signals for the public and contributes to the International Bureau of Weights and Measures for determination of the universal standard time. It monitors earthquakes and sea level, and releases related information to the public, including operation of tsunami warning system. It provides geophysical, oceanographic, astronomical and climatological information to meet the requirements for town planning, engineering design and environmental impact assessments. It also keeps abreast of research and development on international issues such as global climate change and advises the public and government departments on likely implications.

Update of Climate Change Projections

In 2021, HKO updated the Climate Change and Climate Projection webpages based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), and provided the updated Hong Kong climate change projection data to support policy making and action planning of relevant government bureaux and departments. HKO conducted a number of public seminars to promulgate the climate change reports and projections.



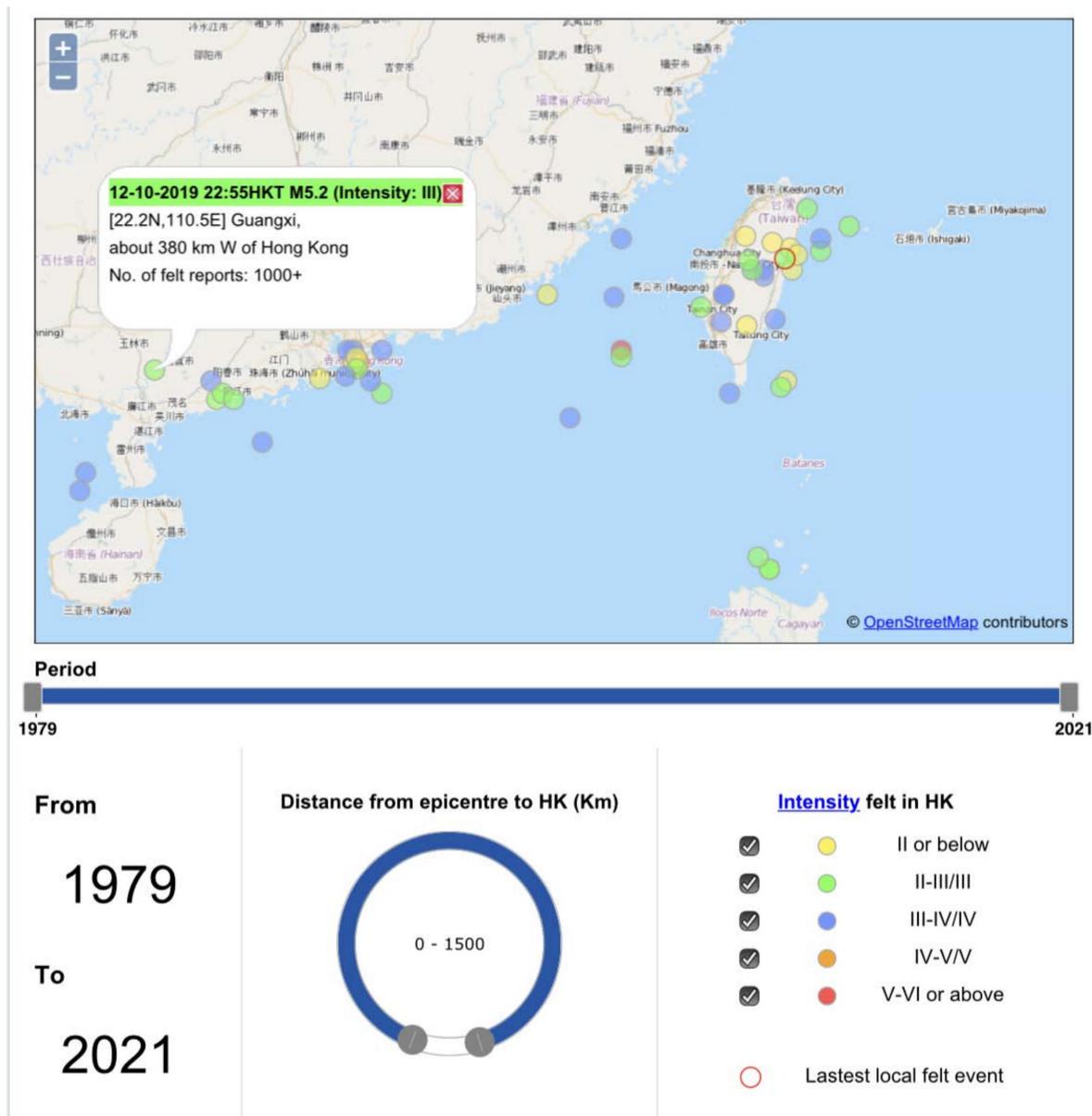
Projected change in annual mean temperature of Hong Kong relative to the average of 1995-2014



Projected changes in annual mean sea level in Hong Kong relative to the average of 1995-2014.

As a continuous effort, HKO promotes public understanding and awareness of climate change and its impacts through conducting school talks, producing educational videos "Cool Met Stuff" and publishing articles and latest international research findings on global climate change on the HKO website.

The Observatory launched Map of earth tremors felt



In Sep 2021, HKO introduced a newly-developed map “Map of Locally Felt Earth Tremors since 1979”, to allow public to obtain details of all historical cases of locally felt earth tremors since 1979.

Users can easily choose to display the required records by specifying filtering criteria such as year range, distance of earthquake event from Hong Kong and the intensity of the tremor.

5 Environmental Management

5.1 Environmental Policy

HKO has put in place a departmental environmental policy that meets the guidelines issued by Environmental Protection Department and other government departments, such as the Electrical and Mechanical Services Department and the Architectural Services Department. Our Sustainability Policy covers environmental, workplace well-being, health and safety, and community engagement issues. Moreover, we are committed to the Clean Air Charter, which aims at making sustained improvement to air quality by introducing clean and energy-efficient measures in daily operation; and the Green Bottle Charter, which seeks to minimise use of plastic bottles within the department. We strive to improve the environment by:

- ✓ conserving bio-diversity and preserving natural habitat within HKO Headquarters and its outstations;
- ✓ developing a culture of environmental conservation among staff;
- ✓ adopting the best practices in green housekeeping;
- ✓ complying with requirements of relevant environmental protection ordinances; and
- ✓ promoting public awareness of environmental issues.



HKO was awarded the Certificate of Merit under the 2020 Hong Kong Awards for Environmental Excellence in recognition of its continual and dedicated devotion in protecting the environment.



5.2 Green Management System

HKO has set up the following committees/working groups to formulate, monitor and implement environmental policy at HKO:

Working Group on Energy and Environment

The Working Group on Energy and Environment, established in 2006, aims to collect and implement green ideas from staff and promote green awareness among all levels in HKO. It is chaired by Assistant Director (Development, Research and Administration), with staff from different grades/ranks as members.

Examples on new measures and staff suggestions that were implemented during 2021/22:

- ✓ conserving bio-diversity and preserving natural habitat within HKO Headquarters and its outstations;
- ✓ developing a culture of environmental conservation among staff;

Buildings, Grounds and Accommodation Committee

The Buildings, Grounds and Accommodation Committee, chaired by Assistant Director (Development, Research and Administration), evaluates the utilisation of space and all major civil and building services works carried out at HKO premises and grounds to minimise the impact on the environment. Members include Departmental Secretary, who is also the Green Manager of HKO, and four Senior Scientific Officers from their respective branches.



5.3 Green Partner Synergy

HKO has been supporting and participating actively various green events organised by NGOs and other parties, including:



1 No Air Con Night

To promote the wise use of air conditioning



2 Earth Hour

To call attention to climate change



3 Green Low Carbon Day

To encourage participants to adopt a low-carbon lifestyle



4 Others

To support the initiative of Car Free Day by Friends of the Earth, a Car Free Policy is adopted at HKO to encourage colleagues to designate at least one working day per week as a Car Free Day, in order to reduce carbon emission from vehicles.



HKO also participated in HKIA 2050 Net Zero Carbon Pledge, in order to reduce carbon footprint in airport.

Other than participation in different green events, HKO also collaborates with the cooperated organisations on various energy saving projects.



One key achievement in last fiscal year is the collaboration project between the HKO, Hong Kong International Airport (HKIA), and CLP Power Hong Kong (CLP) on “Big Data Analytic for Energy Management at Hong Kong International Airport” that has been awarded the Asia Pacific Rim Region Energy Project of the Year Award for 2021 by the Association of Energy Engineers, in recognition of the dedication and excellent performance of the project in energy efficiency and saving. In this project, the three parties have collaborated to apply meteorological and airport-specific big data to develop a cooling load prediction model for the HKIA and integrated it with the airport’s chiller system for maximizing energy efficiency of the airport passenger terminal, thereby achieving energy saving.

Throughout the years, HKO has been actively developing various regional forecast services and collaborating with various stakeholders and partners to enhance the usage of such meteorological information in different areas. This project showcases the benefits of multidisciplinary collaboration in utilizing meteorological data, big data analytic and machine learning to enhance energy saving. It could also serve as an exemplary case for other similar energy conservation projects in Hong Kong, which is a timely response to the urgent need for climate change mitigation.

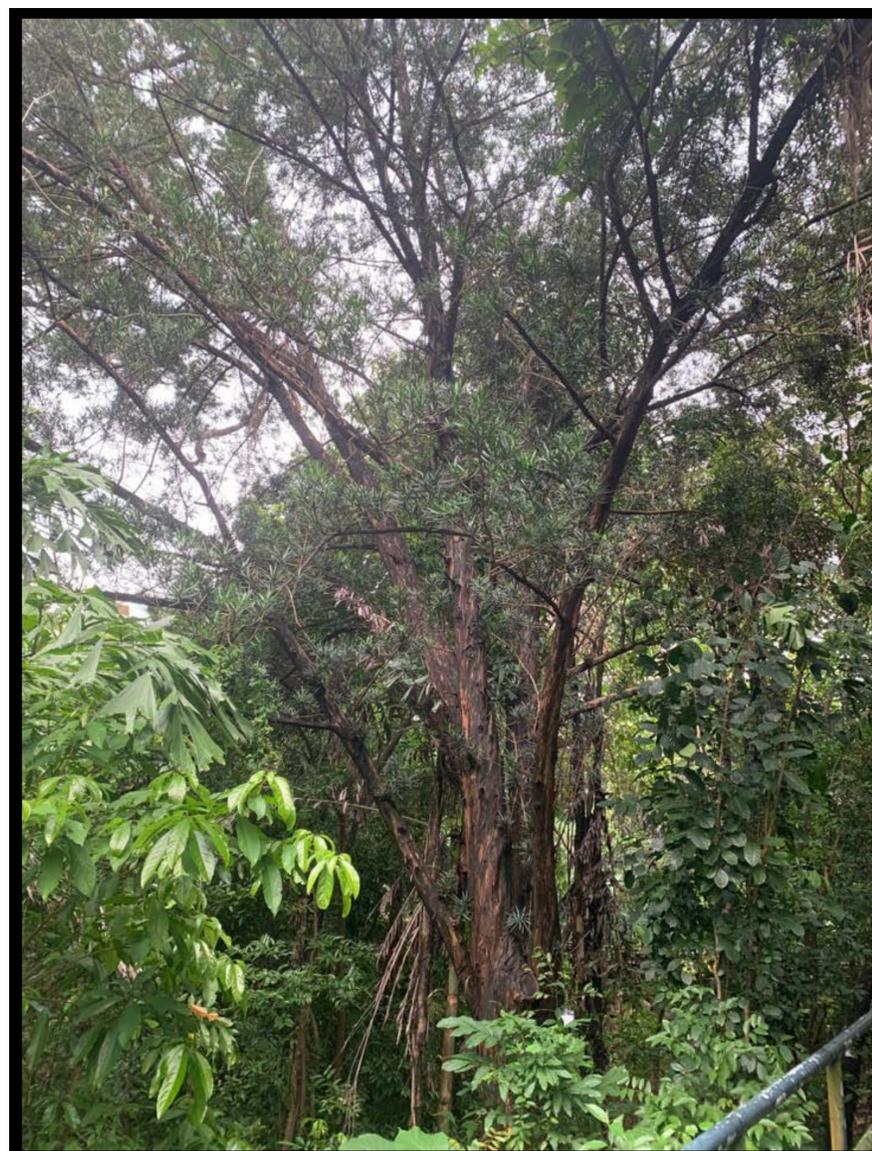
5.3 Environmental Measures and Performance

HKO has adopted multi-pronged environmental measures to support and implement the Government's green initiatives and promote low carbon living style and energy conservation awareness among staff.

Preservation of bio-diversity

HKO cherishes the bio-diversity of its site and works hard to preserve the natural habitat of trees and vegetation at HKO headquarters. Expert consultants/contractors are commissioned to help monitor and upkeep healthy condition of the plants.

There are currently more than 500 trees at HKO headquarters. The tree community at HKO headquarters is mature with exotic species (e.g. *Aleurites moluccana* 石栗, *Eucalyptus* spp. 桉 (屬) dominating the forest canopy, while there are native species (e.g. *Macaranga tanarius* var. *tomentosa* 血桐, *Cinnamomum burmannii* 陰香) regenerating and palms (e.g. *Livistona chinensis* 蒲葵) growing under it. One mature *Podocarpus macrophyllus* 羅漢松, which is uncommon in the wild with such size can also be found within HKO.



Apart from its historical and operational values, the woodland at HKO headquarters also serves as a natural shelter for local birds. It is one of the few remaining semi-natural woodlands in Kowloon. Avian species like Spotted Dove, Chinese Bulbul, Crested Bulbul, Magpie Robin, Black-necked Starling and White-eye are inhabitants of HKO woodland. The woodland is also of utmost importance as it serves as a stopover for migrating birds. Some birds, including Brown Flycatcher, Blackbird and Grey-backed Thrush, even stay for the whole winter. The woodland is also a habitat for other species.



Waste Management

Two approaches of waste management measures namely, source reduction of waste and promotion of recycling practice, have been adopted at HKO.

Source Reduction

1. Adoption of reusable tableware at departmental functions, refillable stationery at daily operation
2. Banning of sales of beverage drinks packed in plastic bottles and tetrapaks
3. Reduction of use of papers by electronic means
4. Setting up shared printers to reduce the purchases of printers and toner cartridges.

- 95,700 kg (▼ 33%)

Annual quantity of waste generated in 2021/22 compared to 2020/21

Recycling

1. Collecting empty toners and inkjet cartridges of computer printers for recycling.
2. Collecting paper wastes, plastic bottles and aluminum cans separately at source by recycle bins.



Recycling rate of metal in 2021/22 compared to 2020/21

Air-Quality Improvement

- Joining IAQ Certification Scheme with “Good” class awarded in 2020 and 2021 for 1883 Building and Centenary Building at HKO headquarters, and “Excellent” class awarded for Brothers Point Terminal Doppler Weather Radar Station.
- Conducting regular indoor air quality checks, and carrying out regular cleaning and repairing for air-conditioning systems.
- Maintaining a non-smoking environment in office premises and, designated area aside, smoking is prohibited at outdoor areas of HKO headquarters.

Energy Conservation

In accordance with the 2019 Policy Address, HKO has set a target of 6% saving in the total electricity consumption by 2024/25 when compared to the 2018/19 baseline. In 2021/22, the annual cumulative electricity consumption after normalisation against activity changes in the intervening years, was 5,075,714 units, a decrease of 4.8% as compared with the base year 2018/19 (5,331,128 units). HKO will keep up its effort to continue to achieve energy saving.

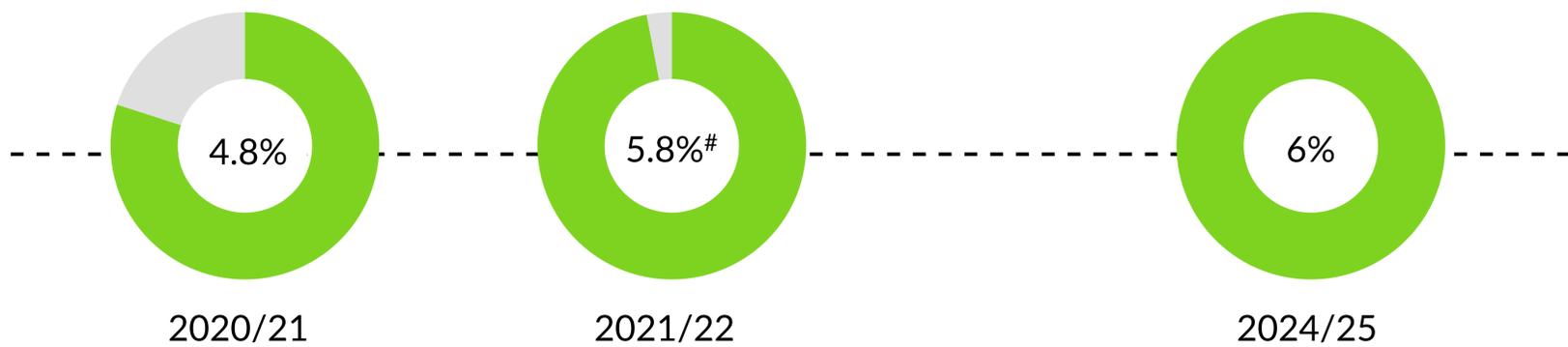


Figure for 2021/22 are subject to adjustment

To achieve the target, HKO has adopted several energy saving measures, which includes but not limited to:

- Using clean energy, such as solar power, wind power and self-produced Direct Methanol Fuel Cell, to support operation of automatic weather stations and radiation monitoring stations.



Use of Direct Methanol Fuel Cell at HKO outstations



New solar power panels stated operation in Cheung Chau Meteorological Station since April 2021.

- Using automatic circuit-break timers to switch off unnecessary electrical appliances after office hours.
- Using energy-saving T5 fluorescent tubes in all HKO premises to reduce energy consumption and installing motion sensors to reduce energy wastage.
- Segregating hot and cold air flow by arranging plastic screens in high-performance computer room to enhance cooling efficiency of air-conditioning system.
- Using auto-sensitised water taps in washrooms to reduce water consumption with flow controllers installed to reduce wastage.

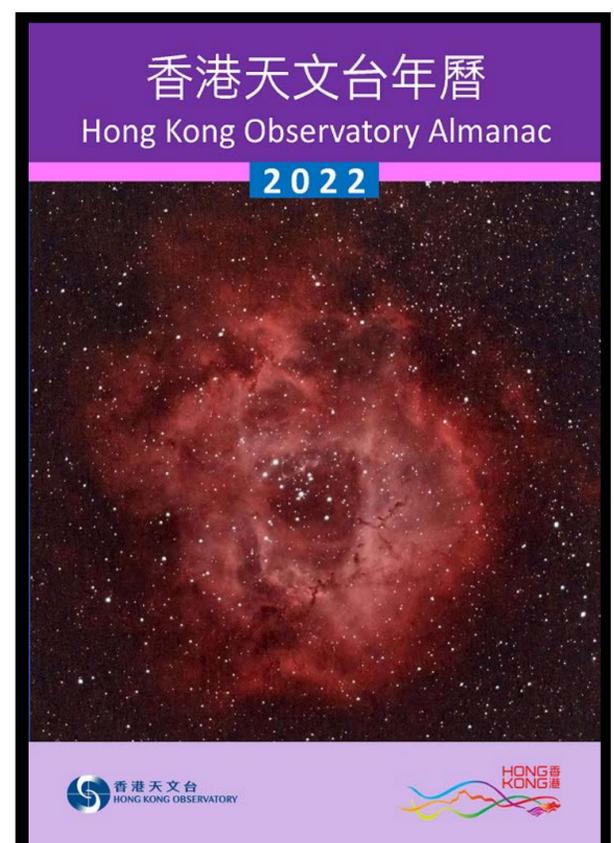
- Minimising the number of servicing lifts after normal office hours.
- Encouraging staff to use staircases instead of lifts for inter-floor movement.
- Conducting regular inspection to ensure that lights, computers and other electrical appliances in offices, conference rooms, corridors and common facilities are switched off during lunch breaks and after office hours.
- Switching off lights, air conditioners, photocopiers, computers and other electrical appliances when not in use.
- Using solar powered lighting devices.
- Setting the ambient office temperature to 25.5°C in summer months and switching off air-conditioning system in winter, wherever and whenever appropriate, by using electronic control panel.
- Encouraging staff to dress more casually to reduce air-conditioning consumption where appropriate.
- Installing solar films in departmental vehicles and security guard rooms.

Green Procurement

HKO was strictly complied with the government's regulations and guidelines regarding green procurement. For example, e-Procurement system was implemented in phases to reduce the use of papers when conducting supplies and procurement activities; and specifications related to green procurement were stipulated in tender documents, wherever appropriate. Currently, various environmental friendly products were adopted in HKO, such as:

- Photocopiers and printers capable of double-side and eco-printing
- Automatic sensor installed in water dispensers
- Water-saving type flush cisterns
- High efficiency water purifiers
- High pressure water gun for car-washing

Every year in December, HKO would publish the Hong Kong Observatory Almanac. To support green initiatives and reduce paper consumption, HKO has ceased making the printed version of the Hong Kong Observatory Almanac starting from the 2022 Almanac.



Carbon Audit

In line with prevailing international and local practices, HKO has started to report its carbon audit results commencing from 2016/17. The scope of carbon audit covers:

- Fuel consumption by departmental vehicles
- Electricity consumption at HKO Offices and outstations
- Greenery at HKO Headquarters
- Paper consumption
- Freshwater processing
- Sewage processing

As a result of the adoption of the aforesaid environmental friendly measures, the annual cumulative paper consumption for 2021/22 was 1,337 reams, which corresponds to a reduction of 19% as compared with the baseline figure in 2019/20. This in turn achieved 5% reduction target of paper consumption.

The water consumption of HKO in 2021 was 14,357m³, which is much higher than that of 2020. The increase is due to suspension of routine taking of meter reading during the epidemic, which resulted in turn a higher figure in the present case. On average, HKO consumes around 10,000m³ every year.

The carbon emission of HKO in 2021/22 was 1,833 tonnes of CO₂-equivalent, which has decreased by 23.5% when compared with that of 2020/21. This was mainly due to the all-round reduction of consumption during the epidemic.

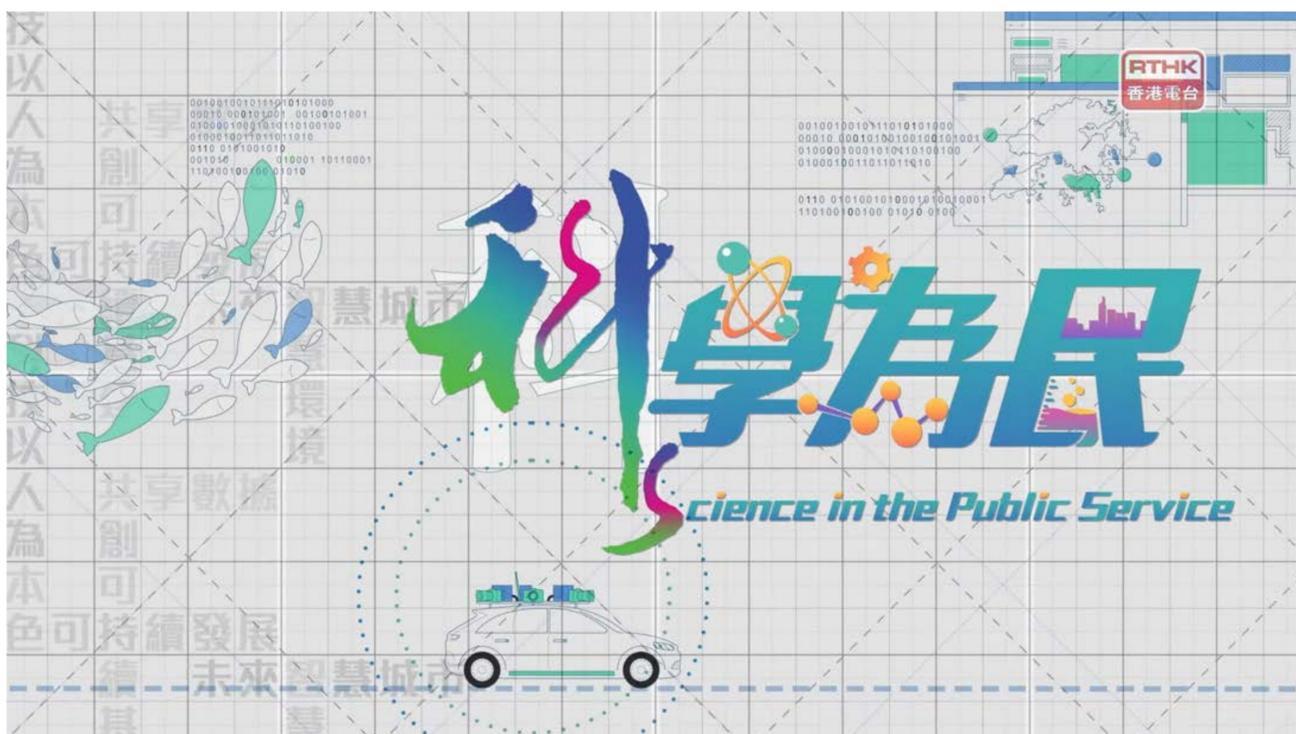
6 Engagement with the Community

6.1 Outreach Activities

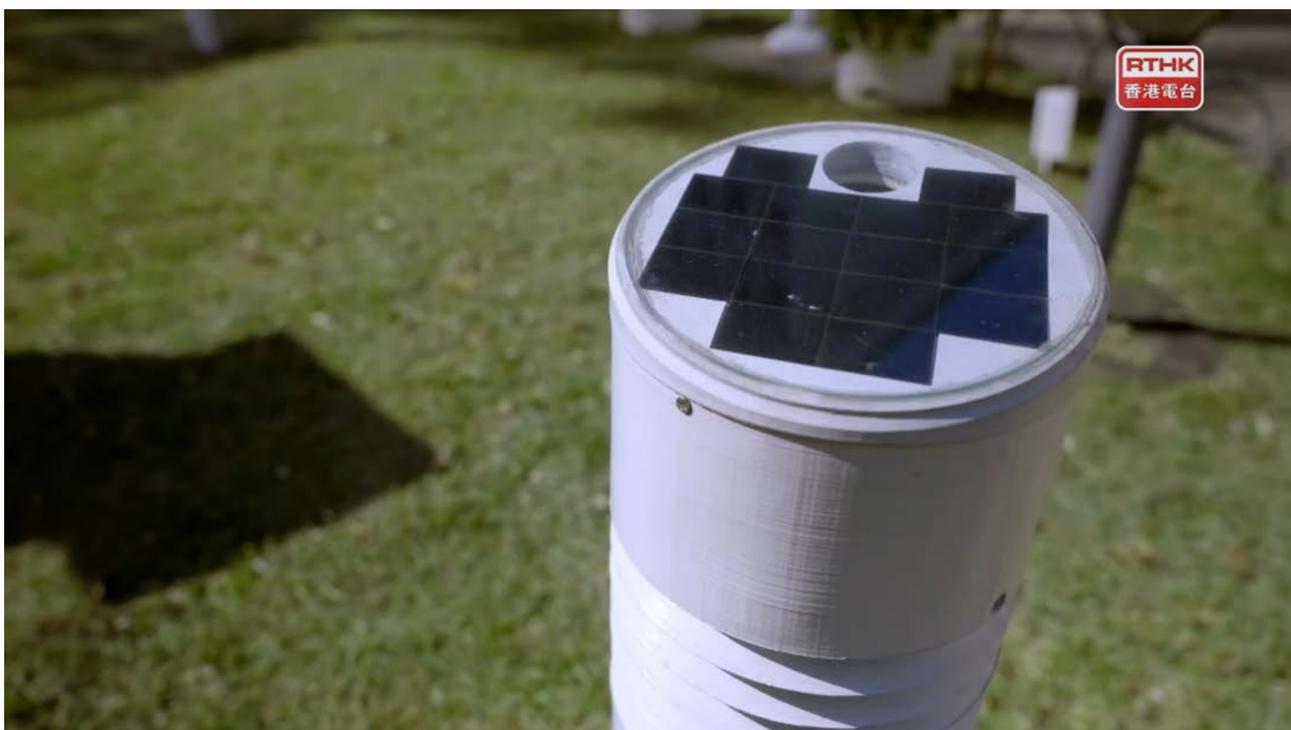
"Science in the Public Service" 15th Anniversary

"Science in the Public Service" (SIPS) is a joint campaign by government bureaux and departments, as well as other organizations to promote the scientific work and application of technology to the provision of services for the general public. In 2021, the SIPS Campaign enters its 15th anniversary.

Fifteen government departments including HKO, produced a SIPS TV documentary jointly with Radio Television Hong Kong (RTHK), with staff from respective departments introducing how the application of latest technology and research outcome has enhanced work efficiency and service quality. The documentary was broadcasted on both RTHK TV 31 and RTHK website on three consecutive Sundays starting from 26 December 2021.



In one of the episodes of the documentary, HKO introduced its development on microclimate measurement and highlighted its recent patented design of the automatic weather station.



Sharing at RTHK programme - "Climate Watcher"

To promote public understanding on climate change and its impact, and enhance preparedness to combat challenges of future weather and climate, HKO has collaborated with RTHK to produce a radio programme on climate change under the theme of "Climate Watcher".

Since launch of the programme in 2017, HKO colleagues including our Director have been continuously invited to the programme as guest speakers to share different meteorological knowledges.



As a guest speaker of the programme on 23 October 2021, our colleague, Mr. MOK Hing Yim shared the development of seismological monitoring in Hong Kong, and how to report seismological information as a member of general public.

Participation in InnoCarnival 2021

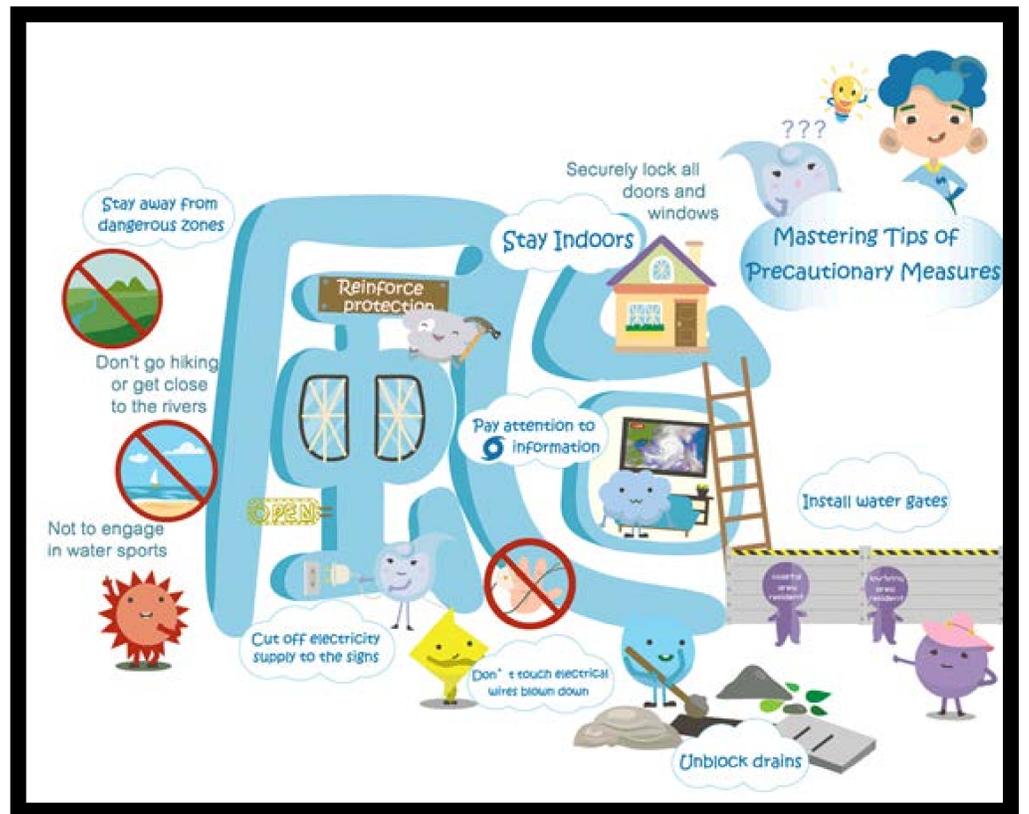


HKO has been actively participating in different events and forums to introduce our public weather services to the general public. With the relaxation of social distancing measure of in 2021/22, HKO gradually resumed participation in public events, such as the "InnoCarnival 2021" organised by the Innovation and Technology Commission.

"InnoCarnival 2021" featured various types of activities, including exhibitions and online seminars, for the members of public to gain fun-filled experience of the convenience and comfort brought by innovation and technology to their daily life.

The theme of the carnival is "Innovate for a Bright Future", which matches with the values of HKO, viz. "Innovate with Science, Serve with Heart". To better serve the public, HKO revamped the personalized weather website to support languages of 8 ethnic minorities in 2021; and launched "My weather Observation" on "MyObservatory" mobile app. These two new services were exhibited in the InnoCarnival 2021.

HKO launched "A Tour of Tropical Cyclones" e-book



HKO launched an e-book titled "A Tour of Tropical Cyclones" to deepen children’s understanding of tropical cyclones and to raise their awareness of disaster preparedness and response.

Chinese version of the e-book was well received with more than 30,000 page views since its launch in June 2021. To promote the understanding of tropical cyclones and raising the awareness of wider audience to disaster preparedness and response, an English version of the e-book was also developed.

Contents of the e-book include classification and naming of tropical cyclones, information on local historical typhoons, meaning of warning signals, storm structure, methods of monitoring and forecasting tropical cyclones, as well as the associated hazards and precautionary measures. In addition to multimedia information, the e-book is also linked to relevant online educational resources and "Cool Met Stuff" videos of HKO. The infographics in the e-book were jointly designed by HKO and its former intern for the first time. While the e-book’s main target audiences are children, its contents are also suitable for other readers.

The e-book is available in the HKO's website (Access through the QR code). With collaboration with the Hong Kong Education City, it is also available in their EdBOOKshelf.

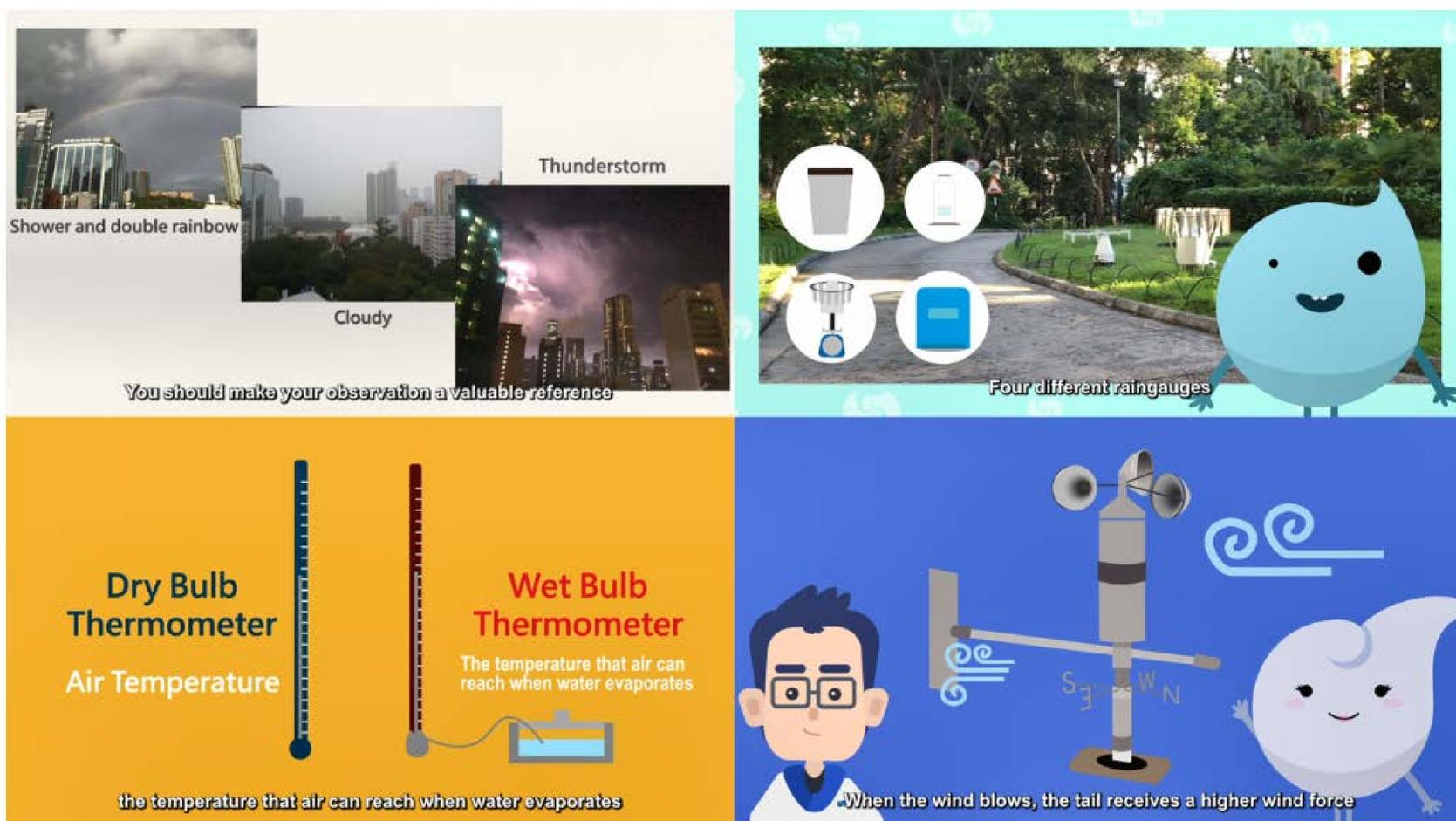


More "Online Video Course on Weather Observation"

The Public Course on Weather Observation organised by HKO has been well received over the years. There were more than 1,000 applicants in 2020, but only a hundred strong participants could be accommodated due to limited seats. In view of the popularity of online learning in recent years, HKO launched the first free "Online Video Course on Weather Observation" on 6 May 2020, and further enriched the course to a whole series in 2021/22.

As of the latest development of the series, a total of 13 episodes, each lasting about 5-15 minutes, have been published. The series explained concisely the basic weather observation methods and techniques, such as identification of different types of clouds, understanding of various weather phenomena and hazards, interpretation of weather charts, and the use of "MyObservatory" mobile app in rainy weather.

To further promote the video to non-Chinese speakers, seven videos on cloud observation of the "Online Video Course on Weather Observation" were translated in English version in February 2022, and the remaining translation was in progress.



More than 100,000 views registered for the "Online Video Course on Weather Observation"

6.2 Staff Activities

Good staff morale and well-being are vital to good governance and service provision. HKO sustains its efforts to develop initiatives to maintain and enhance mutual understanding and support between management and staff. An example of such initiatives is the activities organised under the “Happy Business” programme.

Due to the epidemic situation, activities organised under the “Happy Business” programme were suspended. HKO will closely monitor the latest development and resume the activities as and where appropriate.



Poster of “Happy Business” Programme of HKO

Apart from the “Happy Business” programme, HKO also strives to enhance the wellness and cohesiveness of staff through various means, including:

- Departmental Consultative Committee Meetings to serve as a platform to discuss staff related issues; and
- the HKO Staff Association (HKOSA) with activities fostering work relations and a spirit of mutual assistance among members



Film Appreciation Seminar organized by HKOSA



Basic class of Sign Language organized by HKOSA

7 Verification Statement

I have verified the information and data of the Sustainability Report for Fiscal Year 2021/22. I confirm that the data presented in the Sustainability Report for Fiscal Year 2021/ 22 are authentic and the methodology for the collection and analysis of data is appropriate. The report represents an accurate account of HKO's sustainability actions and performance in the fiscal year of 2021/22.



Jerry Siu
Green Manager
Hong Kong Observatory

8 Contact Information

This report is available on our homepage at the following link or QR code:

<https://www.hko.gov.hk/en/publica/publica.htm>

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If you wish to obtain further information or raise any suggestions about this report, please contact our Green Manager at telephone 2926 8227 or email to dsec@hko.gov.hk.

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