

Head 168 — HONG KONG OBSERVATORY

Controlling officer: the Director of the Hong Kong Observatory will account for expenditure under this Head.

Estimate 2024–25 **\$463.9m**

Establishment ceiling 2024–25 (notional annual mid-point salary value) representing an estimated 367 non-directorate posts as at 31 March 2024 reducing by four posts to 363 posts as at 31 March 2025 **\$257.8m**

In addition, there will be an estimated five directorate posts as at 31 March 2024 and as at 31 March 2025.

Controlling Officer's Report

Programmes

Programme (1) Weather Services	This programme contributes to Policy Area 7: Public Safety (Secretary for Environment and Ecology).
Programme (2) Radiation Monitoring and Assessment	This programme contributes to Policy Area 9: Internal Security (Secretary for Security).
Programme (3) Time Standard and Geophysical Services	This programme contributes to Policy Area 7: Public Safety (Secretary for Environment and Ecology).

Detail

Programme (1): Weather Services

	2022–23 (Actual)	2023–24 (Original)	2023–24 (Revised)	2024–25 (Estimate)
Financial provision (\$m)	355.8	390.1	390.1 (—)	407.9 (+4.6%)
				(or +4.6% on 2023–24 Original)

Aim

2 The aim is to provide weather forecasts and issue warnings to the public, special users, the shipping community and aviation groups in order to reduce loss of life and damage to property, and minimise disruption to economic and social activities during hazardous weather.

Brief Description

3 The Central Forecasting Office and Airport Meteorological Office of the Hong Kong Observatory (HKO) are responsible for the preparation and issuance of weather information, forecasts and various warnings on hazardous weather to the public, special users, the shipping community and aviation groups. HKO also promotes public awareness of, and community preparedness for, natural disasters. The work involves:

- operating a network of mostly automated weather stations;
- carrying out real-time exchange of data with meteorological centres in the world;
- receiving meteorological satellite imageries, and operating weather radar systems and other meteorological instruments;
- analysing meteorological data and computing the future weather by numerical modelling, and application of artificial intelligence and big data;
- disseminating weather information by a diversity of means;
- issuing warnings and advisory messages on hazardous weather such as tropical cyclones, storm surges, rainstorms, landslips, flooding, thunderstorms, windshear, fire danger and extreme hot and cold conditions; and
- conducting public talks, interviews and training courses as well as producing TV weather programmes and educational materials on hazardous weather phenomena.

4 In 2023, HKO fulfilled its performance pledge of issuing at least one bulletin every hour of the day, disseminating 100 per cent of the bulletins within ten minutes after each hour, and attained a forecast accuracy (as verified by objective means) of 91 per cent. The mobile weather application “MyObservatory” and HKO website remained as popular channels for disseminating weather information to the public, recording about 163 billion total page views in the year.

5 To meet the needs of the public, HKO enhanced the provision of weather information in 2023–24 through:

- enhancing the Very Hot Weather Warning service with a revised set of precautionary actions and a new Special Weather Tips message to alert the general public of extremely hot weather through various channels including push notification via mobile weather application “MyObservatory”;
- enriching the “MyObservatory” with forecast traffic conditions of strategic/major roads in Hong Kong;
- enriching the “Earth Weather” on HKO website and “MyObservatory” by adding weather forecast products based on artificial intelligence-based prediction models and sea current forecasts, as well as extending forecast range up to 15 days; and
- further enhancing the “Automatic Regional Weather Forecast in Hong Kong & Pearl River Delta Region” service with observations and automatic weather forecasts at newly added urban-scale meteorological monitoring stations.

6 HKO maintains a close surveillance of the weather at and around the Hong Kong International Airport (HKIA) and provides the aviation community with the weather information needed for its operations. In 2023–24, HKO’s Aeronautical Meteorological Advisers provided weather consultation services as well as probabilistic forecast of significant weather elements to support the operation of the Integrated Airport Centre of the HKIA. As the Backup Centre of the Asian Aviation Meteorological Centre, HKO took over the role of the Main Centre from Beijing for one week every quarter to issue hazardous weather forecasts and warnings to aviation users in the Asian region.

7 Other noteworthy activities for 2023–24 include:

- installing and commissioning a replacement storm-detecting weather radar at Tai Mo Shan in support of HKO’s weather forecast and warning operations;
- providing assistance and technology supports to Labour Department in issuing the Heat Stress at Work Warning;
- developing a cloud-based platform to manage and process high-volume meteorological data in-situ, and to generate and disseminate forecast products in a more timely manner;
- implementing the numerical weather prediction models on the high performance computer system in support of weather forecast operation;
- further enhancing the electronic flight bag weather mobile application “MyFlightWx” to provide inflight weather information to flight crews electronically and promoting its use to airlines operating from the HKIA;
- promoting the innovative solution of estimating the water depth on airport runways in real time to facilitate the issuance of the Runway Condition Report with a view to enhancing air traffic safety. The service was awarded the Smart Mobility Award (Smart Transport) Bronze Award of the Hong Kong ICT Awards 2023;
- installing new equipment for improving the low-level windshear and turbulence warning service at the HKIA;
- organising a series of publicity activities in celebration of the 140th anniversary of HKO, including launching a thematic webpage, publishing a book “Stories under passing storms”, producing a special series of educational videos about the history, weather services, international and regional collaborations of HKO to promote HKO’s services and to raise public awareness on climate change;
- organising educational events and outreach activities to engage the public, in particular young people and students, through the “Science in Public Service Campaign”, the “Public Course on Weather Observation”, the “Community Weather Information Network”, and the “InnoCarnival 2023” organised by the Innovation and Technology Commission, which included workshops, scientific talks, practicals, day camp, quiz competition and guided tours to HKO facilities;
- launching a new set of TV and radio Announcements in the Public Interest (API) on threats posed by thunderstorms;
- organising online “Tropical Cyclone Name Collection Activity” to raise public awareness and knowledge of hazards caused by tropical cyclones;
- acquiring the Phased Array Doppler Weather Radar in Sha Lo Wan for detecting fast-changing and short-lived high impact weather systems such as hail and waterspout, thereby enhancing HKO’s work in monitoring and predicting high impact weather;
- upgrading HKO’s existing meteorological satellite reception systems to enable reception of the new Chinese Fengyun-4B (FY-4B) satellite data for enhancing weather monitoring;
- organising an international online workshop on forecasting aviation hazardous weather which was attended by more than 270 participants from 24 States/Administrations in the Asia and Pacific Region;

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- signing agreement with China Meteorological Administration to cover Belt and Road Initiative and to enhance Guangdong-Hong Kong-Macao Greater Bay Area co-operation;
 - signing agreements with overseas official meteorological services of Thailand, Republic of Indonesia and Papua New Guinea to strengthen meteorological co-operation on data exchange, technologies in weather forecasting as well as safety and efficiency of international civil air navigation;
 - achieving the International Organization for Standardization (ISO) 9001 certification for the provision of radar imagery services generated by the Tate’s Cairn Weather Radar System;
 - extending the quality management framework for critical information technology infrastructure services to cover computer server facilities; and
 - continuously supporting other weather services as a Regional Specialized Meteorological Centre (RSMC) for Nowcasting of the World Meteorological Organization in the provision of severe weather nowcasting products, sharing of nowcast software or technique development, and capacity building activities.
- 8 The key performance measures in respect of weather services are:

Targets

	Target	2022 (Actual)	2023 (Actual)	2024 (Plan)
forecasts perceived as accurate by the public (%)#	78	77	78	78
accurate public forecasts as verified by objective means (%)	88	92	91	90
accurate forecasts as assessed by ship captains (%)	96	96	100	98
accurate forecasts as assessed by airline operators (%)	96	99	100	98
hourly local weather reports disseminated within the first ten minutes of each hour (%)	99	100	100	99

Indicators

	2022 (Actual)	2023 (Actual)	2024 (Estimate)
calls answered by the Dial-a-Weather system (million)#	4.3	4.1	4.0
telephone enquiries answered manually#	12 895	15 140	12 000
visits to the HKO websites (billion)^	161	163	160
companies and organisations subscribing to special weather and warning services	85	80	81
total revenue from the above subscribers (\$m)	0.7	0.7	0.7
media interviews and public lectures/talks on weather#	740	810	750
meteorological documents for flights departing Hong Kong	71 000	142 000@	180 000
visits to the aviation weather information system (million)	265	303	320

The actual figures may vary depending on whether there are more weather changes of concern to the public in that particular year.

^ Figures measured in page views refer to the number of access to the HKO websites which include thematic websites, the Weather Wizard and the mobile application “MyObservatory”. The actual figures may vary depending on whether there are more weather changes of concern to the public in that particular year.

@ Figures increased sharply in 2023 due to a strong rebound of air traffic during the year.

Matters Requiring Special Attention in 2024–25

- 9 During 2024–25, HKO will:
- continue to provide weather forecasts, regional weather services and extended weather outlook, including multi-hazard and impact-based forecasts;
 - continue to develop and enhance nowcasting and forecasting services on high-impact weather for the public and special users;
 - enhance dissemination of weather information to the public by (i) conducting media briefing hourly with a video about the latest weather condition when Black Rainstorm Warning Signal is in force; and (ii) issuing “Special Weather Tips” to alert the public if the hourly rainfall is significantly higher than the threshold criteria (70 millimetres per hour) of the Black Rainstorm Warning;

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- explore better utilisation of technologies such as big data and artificial intelligence to further enhance the risk assessment capability of government departments on hazards such as flooding in the event of extreme weather conditions;
- continue to implement the aviation meteorological facilities in support of the full operation of the Three-Runway System project of the HKIA;
- procure and install more low-level windshear and turbulence detection equipment at the HKIA to support its future development;
- continue to enrich the content of the mobile weather application “MyObservatory” and HKO website, and enhance the HKO chatbot with voice function;
- continue to enhance marine meteorological observations through the deployment of buoys, both drifting and moored over the South China Sea, and installation of meteorological equipment onboard merchant and fishing vessels;
- continue to enhance the nowcast products and provide support for other weather services under the RSMC for Nowcasting;
- continue to enrich the “Earth Weather” webpage on HKO website with more weather forecast products based on prediction models;
- continue to implement the numerical weather prediction models on the high performance computer system in support of weather forecast operation;
- continue to develop the cloud-based platform for managing meteorological data and generating products; and
- establish a virtual training centre to strengthen co-operation on the provision of training for the meteorological personnel of the Belt and Road countries.

Programme (2): Radiation Monitoring and Assessment

	2022–23 (Actual)	2023–24 (Original)	2023–24 (Revised)	2024–25 (Estimate)
Financial provision (\$m)	30.7	37.6	37.6 (—)	36.7 (–2.4%)
				(or –2.4% on 2023–24 Original)

Aim

10 The aim is to provide information on environmental radiation levels in Hong Kong and advise government departments on the protective action that may be necessary during nuclear emergencies.

Brief Description

11 HKO monitors ambient radiation levels in Hong Kong and conducts radiological measurements on air, soil, water and food samples. In the event of a nuclear emergency, HKO will notify and advise government departments on the possible consequences in Hong Kong and recommend protective action. HKO organises training and exercises on radiation monitoring, assessment and protection for other government departments involved in the Hong Kong contingency plan for nuclear emergencies. The work involves:

- operating a network of radiation monitoring stations, an aerial radiation monitoring system, two radiological survey vehicles, a radiation laboratory and an emergency radiation data management system;
- keeping abreast of the latest development on the methodology for nuclear accident consequence assessment; and
- planning and participating in exercises and drills in response to nuclear emergencies.

12 In 2023–24, 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, assessment and protection were conducted. In response to the discharge of nuclear-contaminated water from Fukushima of Japan, the radiation monitoring of sea water samples in local waters was enhanced and the measurement results were disseminated to the public on a new webpage. Outreach activities such as public and school talks were conducted to enhance public education. The school community ambient radiation measurement programme named “Gamma-Go” continued to promote students’ understanding of radiation through STEM activities.

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13 The key performance measures in respect of radiation monitoring and assessment are:

Target

	Target	2022 (Actual)	2023 (Actual)	2024 (Plan)
data availability of radiation monitoring network (%)	99.0	99.9	99.9	99.7

Indicators

	2022 (Actual)	2023 (Actual)	2024 (Estimate)
exercises and drills	23	22	22
visits to HKO's webpage on radiation ϕ	4 343 476	8 434 318	5 000 000

ϕ The actual figures may vary from year to year depending on whether there are particular issues of concern to the public.

Matters Requiring Special Attention in 2024–25

14 During 2024–25, HKO will continue to:

- implement the agreed arrangements between Hong Kong and Guangdong on radiation monitoring and assessment;
- conduct drills, exercises and communication tests on emergency response in conjunction with other government departments as well as the relevant Guangdong counterparts;
- organise training on radiation monitoring and assessment;
- take forward the enhancement of radiation monitoring and assessment facilities; and
- further promote outreach activities and the Gamma-Go programme to enhance public education on radiation.

Programme (3): Time Standard and Geophysical Services

	2022–23 (Actual)	2023–24 (Original)	2023–24 (Revised)	2024–25 (Estimate)
Financial provision (\$m)	19.4	19.1	19.1 (—)	19.3 (+1.0%)
				(or +1.0% on 2023–24 Original)

Aim

15 The aim is to maintain the Hong Kong time standard and provide geophysical, oceanographic, astronomical and climatological information to the public.

Brief Description

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

- maintaining a network of caesium beam atomic clocks as the Hong Kong time standard and providing time signals for radio broadcasts, automatic telephone answering service and synchronisation of clocks via the Internet;
- operating seismological, tide and sea level monitoring networks and conducting related analyses;
- carrying out real-time exchange of seismic data with overseas centres and disseminating earthquake information by various means;
- compiling climatological and other related data;
- conducting studies on climate change in Hong Kong and promoting public understanding; and
- providing updates on the effects of El Niño, La Niña and other longer-term atmospheric phenomena on Hong Kong.

17 In 2023–24, the objectives and targets of this programme were generally met through the following:

- commencing the operation of the Backup South China Sea Tsunami Advisory Center (Hong Kong), as designated by the National Marine Environmental Forecasting Center, on 29 March 2023 and taking up scheduled operation for two weeks in December 2023;
- providing scientific support to studies by relevant government bureaux/departments on the mitigation, adaptation and resilience-building measures required in combatting climate change and its impacts including extreme weather events;
- monitoring climate change-related scientific studies, and providing the latest assessment of climate change and its impacts to support policy making and action planning of relevant government bureaux/departments;
- promoting public understanding and awareness of climate change and its impacts through conducting school talks, participating in public fora, launching online quiz games, producing educational videos, and publishing articles and latest international research findings on global climate change on the HKO website; and
- signing a co-operation framework agreement with the Guangdong Earthquake Agency to strengthen co-operation in earthquake monitoring and information service.

18 The key performance measures in respect of time standard and geophysical services are:

Targets

	Target	2022 (Actual)	2023 (Actual)	2024 (Plan)
time standard accuracy (microseconds per day)	0.01	0.01	0.01	0.01
geophysical, meteorological and oceanographic data capture rate (%)	99	100	100	99
climatological information (% of written requests responded to within ten working days)	99	100	100	99

Indicators

	2022 (Actual)	2023 (Actual)	2024 (Estimate)
visits to HKO's Internet time service (million).....	100 000	100 000	100 000
requests for geophysical, climatological and oceanographic information and advice Δ	646	559	600

Δ The actual figures may vary depending on whether there are relevant events of concern to the public in that particular year.

Matters Requiring Special Attention in 2024–25

19 During 2024–25, HKO will continue to:

- undertake and support monitoring and assessment of earthquake, tsunami risk and sea level in the region;
- enhance its earthquake monitoring and tsunami warning capability;
- enhance earthquake monitoring and information service by setting up a new network of earthquake intensity meters over the territory;
- strengthen the tide gauge network to better cope with extreme sea level conditions;
- monitor and study climate change issues, enhance climate projections, as well as provide relevant government bureaux/departments with latest information and assessment of climate change and its impacts to support their studies;
- engage various stakeholders to promote the effective use of climate data in support of the emerging needs of different sectors and government bureaux/departments; and
- conduct outreach activities to promote public understanding of measures required in combatting climate change.

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ANALYSIS OF FINANCIAL PROVISION

	2022–23 (Actual) (\$m)	2023–24 (Original) (\$m)	2023–24 (Revised) (\$m)	2024–25 (Estimate) (\$m)
Programme				
(1) Weather Services	355.8	390.1	390.1	407.9
(2) Radiation Monitoring and Assessment	30.7	37.6	37.6	36.7
(3) Time Standard and Geophysical Services.....	19.4	19.1	19.1	19.3
	405.9	446.8	446.8 (—)	463.9 (+3.8%)
				(or +3.8% on 2023–24 Original)

Analysis of Financial and Staffing Provision

Programme (1)

Provision for 2024–25 is \$17.8 million (4.6%) higher than the revised estimate for 2023–24. This is mainly due to the increased requirement for operating expenses. In addition, there will be a net decrease of four posts in 2024–25.

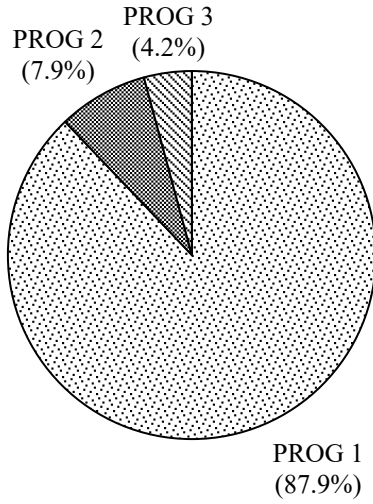
Programme (2)

Provision for 2024–25 is \$0.9 million (2.4%) lower than the revised estimate for 2023–24. This is mainly due to the decreased requirement for capital expenditure.

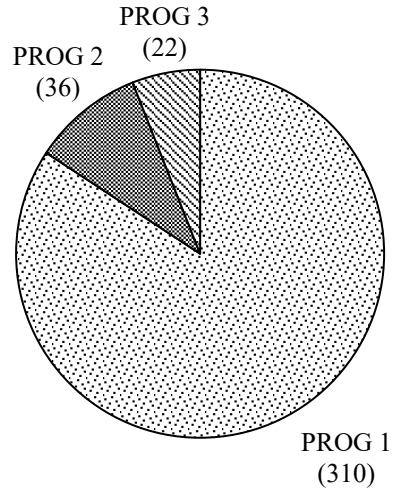
Programme (3)

Provision for 2024–25 is \$0.2 million (1.0%) higher than the revised estimate for 2023–24. This is mainly due to the increased requirement for operating expenses.

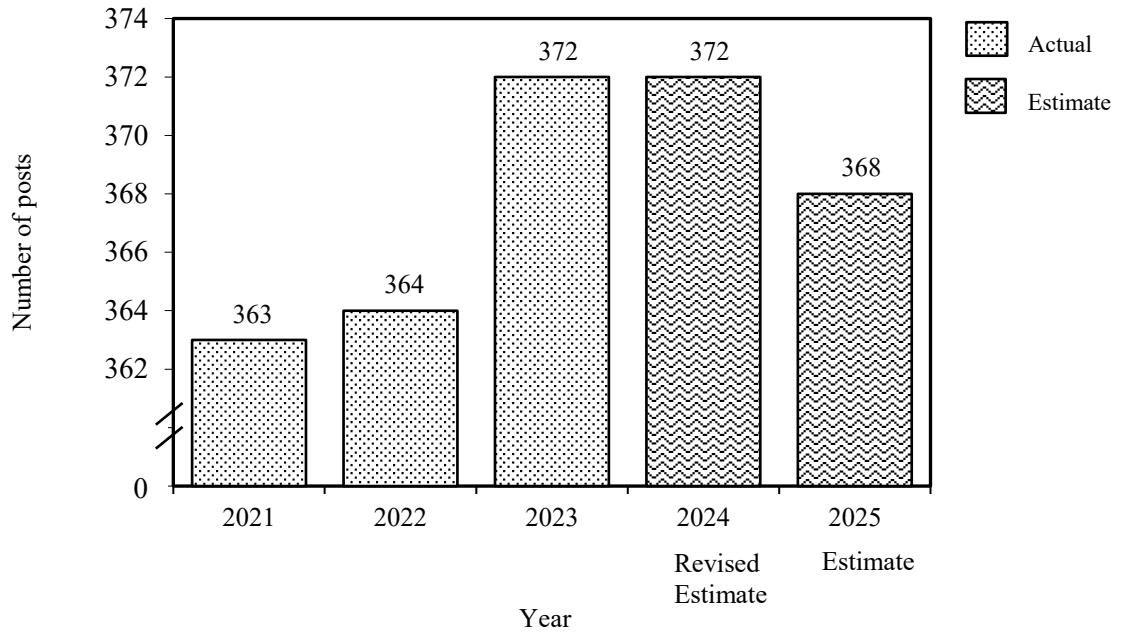
Allocation of provision to programmes (2024-25)



Staff by programme (as at 31 March 2025)



Changes in the size of the establishment (as at 31 March)



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Sub-head (Code)	Actual expenditure 2022–23	Approved estimate 2023–24	Revised estimate 2023–24	Estimate 2024–25	
	\$'000	\$'000	\$'000	\$'000	
Operating Account					
Recurrent					
000	Operational expenses	388,486	422,996	422,996	444,738
	Total, Recurrent.....	388,486	422,996	422,996	444,738
	Total, Operating Account	388,486	422,996	422,996	444,738
Capital Account					
Plant, Equipment and Works					
661	Minor plant, vehicles and equipment (block vote).....	17,437	23,810	23,810	19,115
	Total, Plant, Equipment and Works.....	17,437	23,810	23,810	19,115
	Total, Capital Account.....	17,437	23,810	23,810	19,115
	Total Expenditure	405,923	446,806	446,806	463,853

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Details of Expenditure by Subhead

The estimate of the amount required in 2024–25 for the salaries and expenses of the Hong Kong Observatory is \$463,853,000. This represents an increase of \$17,047,000 over the revised estimate for 2023–24 and \$57,930,000 over the actual expenditure in 2022–23.

Operating Account

Recurrent

2 Provision of \$444,738,000 under *Subhead 000 Operational expenses* is for the salaries, allowances and other operating expenses of the Hong Kong Observatory.

3 The establishment as at 31 March 2024 will be 372 posts. It is expected that there will be a net decrease of four posts in 2024–25. Subject to certain conditions, the controlling officer may under delegated power create or delete non-directorate posts during 2024–25, but the notional annual mid-point salary value of all such posts must not exceed \$257,808,000.

4 An analysis of the financial provision under *Subhead 000 Operational expenses* is as follows:

	2022–23 (Actual) (\$'000)	2023–24 (Original) (\$'000)	2023–24 (Revised) (\$'000)	2024–25 (Estimate) (\$'000)
Personal Emoluments				
- Salaries	240,593	264,439	258,576	271,404
- Allowances	3,976	4,555	4,025	4,025
- Job-related allowances.....	1,032	1,382	2,140	2,140
Personnel Related Expenses				
- Mandatory Provident Fund contribution	1,327	1,212	1,140	1,162
- Civil Service Provident Fund contribution	13,441	17,641	17,250	20,440
Departmental Expenses				
- General departmental expenses	128,001	133,651	139,743	145,445
Other Charges				
- World Meteorological Organization.....	116	116	122	122
	388,486	422,996	422,996	444,738

Capital Account

Plant, Equipment and Works

5 Provision of \$19,115,000 under *Subhead 661 Minor plant, vehicles and equipment (block vote)* represents a decrease of \$4,695,000 (19.7%) against the revised estimate for 2023–24. This is mainly due to the decreased requirement for capital expenditure.