香港天文台
HONG KONG OBSERVATORY

# Warning Communication Strategies –
## Hong Kong Experience

**WMO/ESCAP Typhoon Committee Roving Seminar 2014**

LEE Kwok-lun, Alan
Hong Kong Observatory
3 November 2014

香港天文台
HONG KONG OBSERVATORY

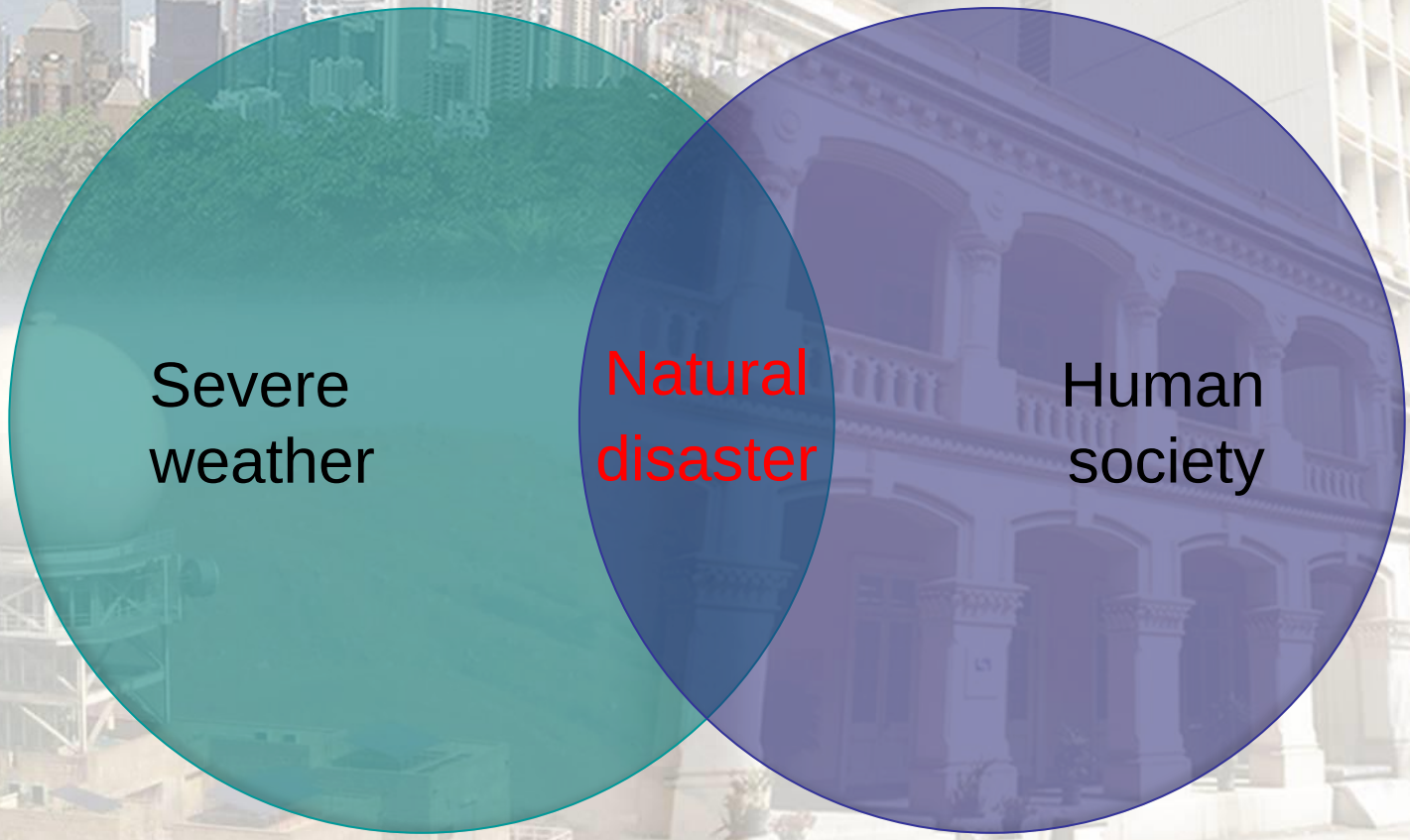
# Warning Communication-> Disaster Prevention and Mitigation

What is a disaster?

Severe Weather
=? Disaster

香港天文台
HONG KONG OBSERVATORY

# Severe weather + Human society => Natural disaster



香港天文台
HONG KONG OBSERVATORY

# Weather Services & Weather Warning

**Hong Kong Observatory Responsibilities**

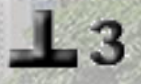
- 24 hours monitoring
- Issuing warnings to the public in time
- Supporting the emergency departments and organizations

香港天文台
HONG KONG OBSERVATORY

# Major Severe Weather Warnings

## Tropical Cyclone Warning Signals

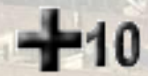

■ Standby Signal No.1




■ Strong Wind Signal No.3


■ Gale or Storm Signal No. 8


■ Increasing Gale or Storm Signal No. 9




■ Hurricane Signal No. 10

## Rainstorm Warning Signals


■ Amber Rainstorm Signal


■ Red Rainstorm Signal


■ Black Rainstorm Signal

香港天文台
HONG KONG OBSERVATORY

# Other Weather Warnings


- Thunderstorm Warning

- Landslip Warning


- Yellow Fire Danger Warning


- Cold Weather Warning


- Frost Warning

- Special Announcement on Flooding in the Northern New Territories


- Strong Monsoon Signal


- Red Fire Danger Warning


- Very Hot Weather Warning

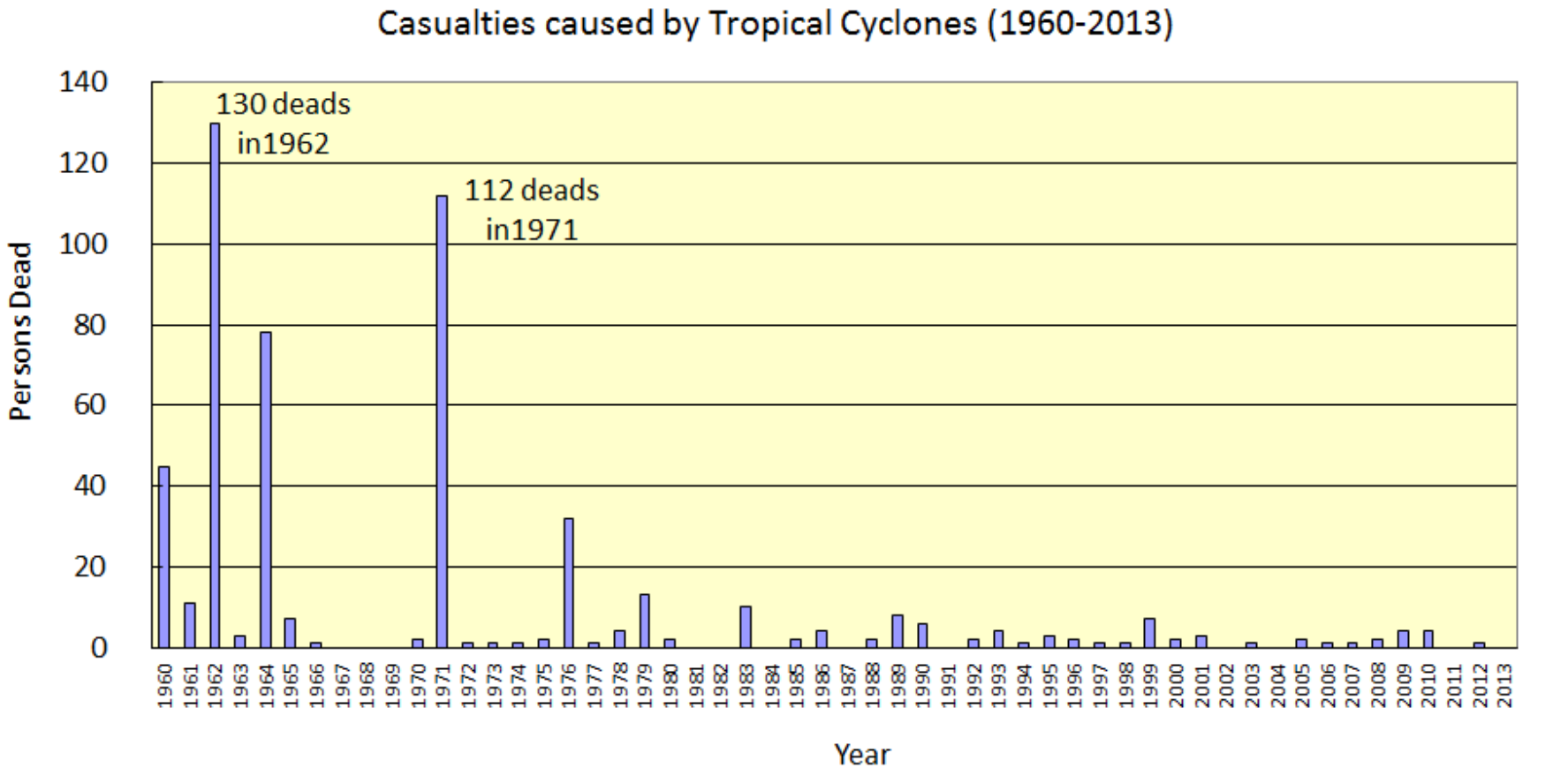

- Tsunami Warning

香港天文台
HONG KONG OBSERVATORY

香港天文台
HONG KONG OBSERVATORY

香港天文台
HONG KONG OBSERVATORY

# Disaster Prevention and Mitigation



香港天文台
HONG KONG OBSERVATORY

# Rainstorm Warning Systems


Heavy rain has fallen or is expected to fall generally over Hong Kong, exceeding ***30 millimetres*** in an hour, and is likely to continue.


Heavy rain has fallen or is expected to fall generally over Hong Kong, exceeding ***50 millimetres*** in an hour, and is likely to continue.


Very heavy rain has fallen or is expected to fall generally over Hong Kong, exceeding ***70 millimetres*** in an hour, and is likely to continue.

香港天文台
HONG KONG OBSERVATORY

# "Graded" Warning System

- Enable the community to build up its response commensurate with the risk involved
  - Rainstorm warning


possibility of rainstorm of significant impact


students should stay in save places (home or school)


all should stay put and outdoor workers seek shelter indoors

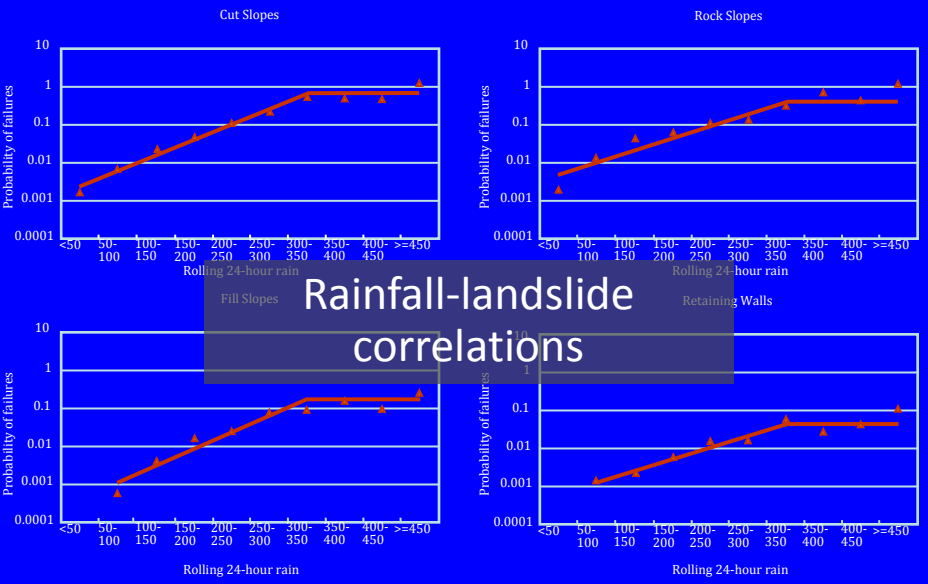
**Note: Be careful when selecting colours for a graded system**

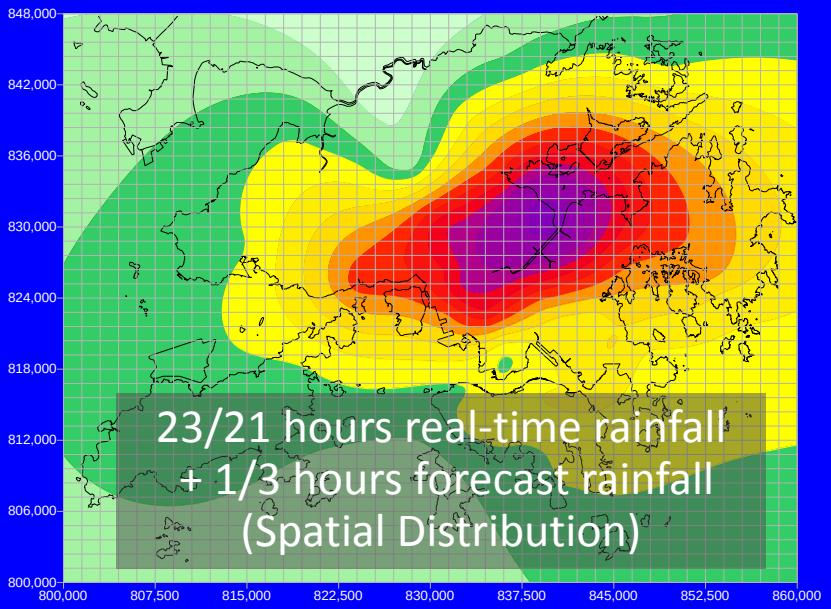
香港天文台
HONG

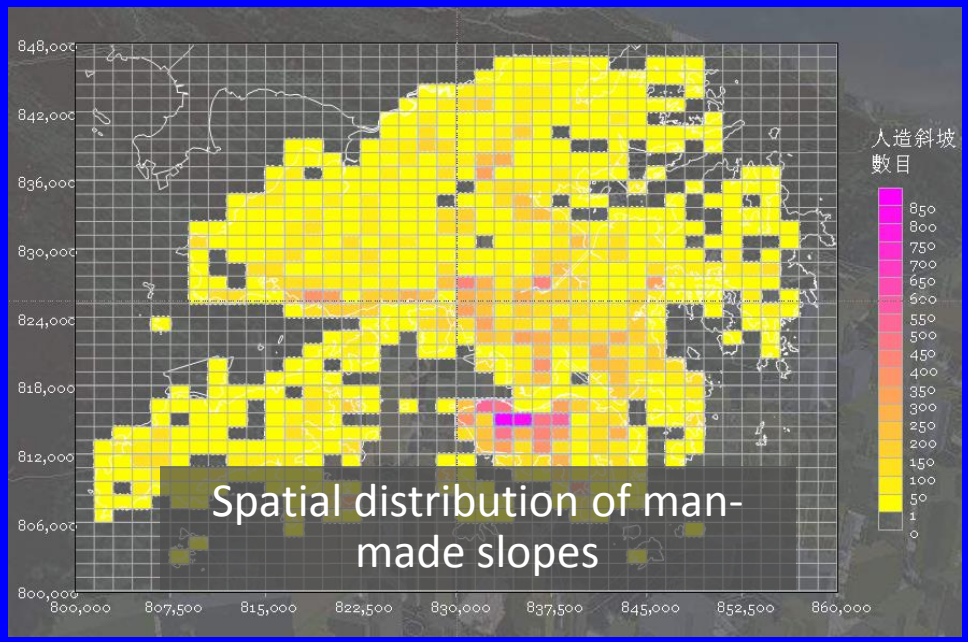
# Landslip Warning

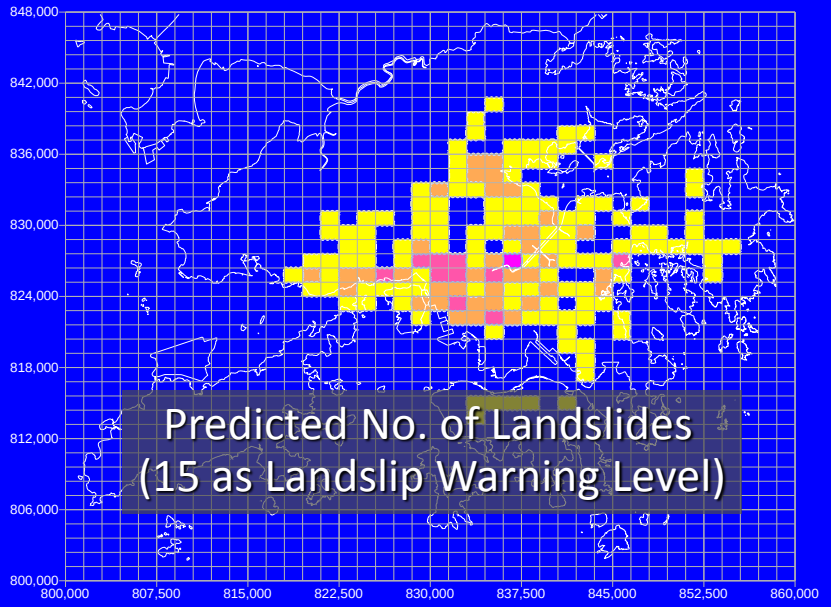
- Prompt the public to take precautionary measures to reduce their exposure to risk posed by landslips.
- A landslip warning will be issued by the Hong Kong Observatory in conjunction with Geotechnical Engineering Office when there is a high risk of many landslips as a result of persistent heavy rainfall.

# Work Flow of the Computation of Landslip Warning System



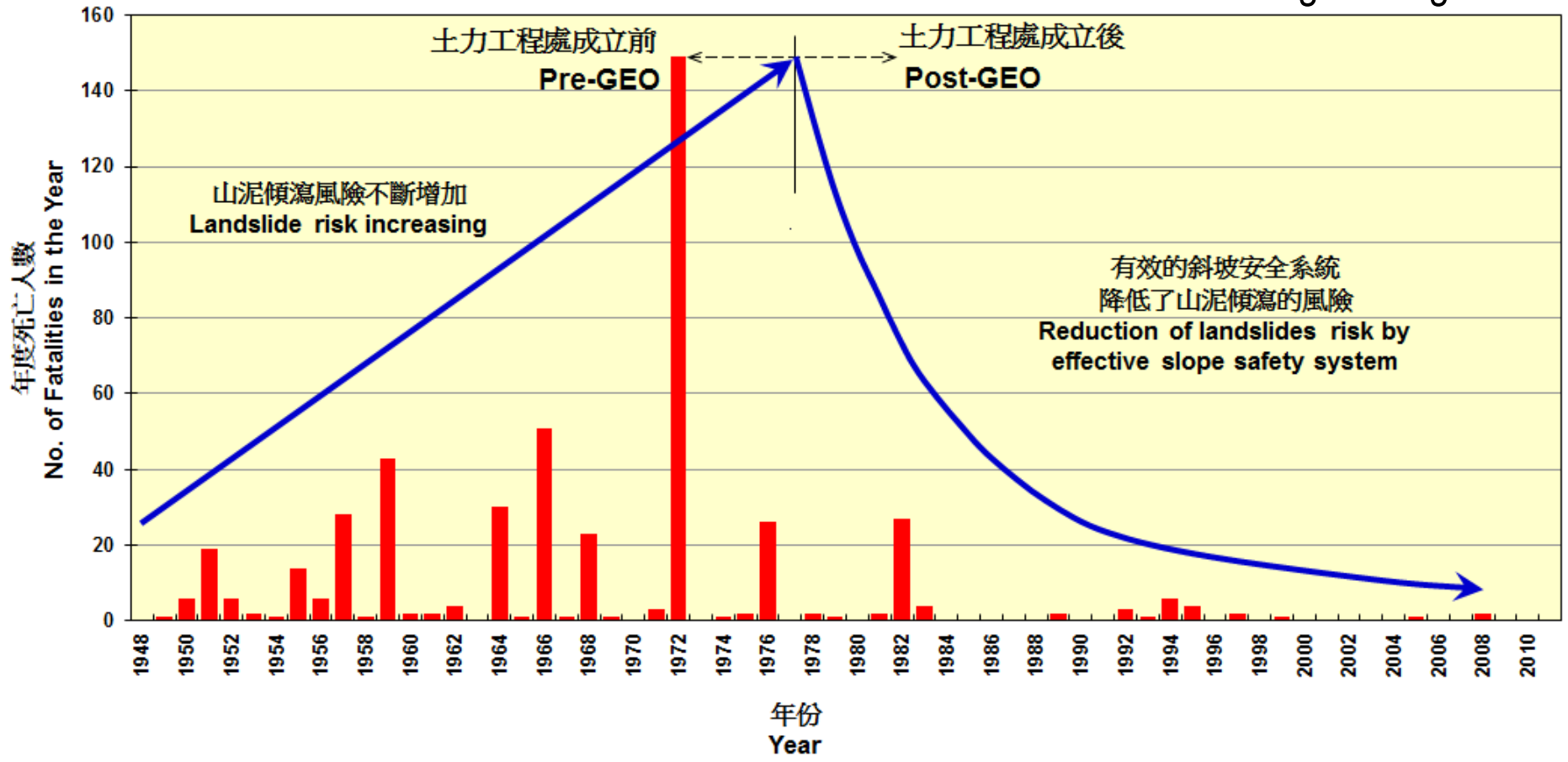



香港天文台
HONG KONG OBSERVATORY

# Disaster Prevention and Mitigation

GEO = Geotechnical Engineering Office



香港天文台
HONG KONG OBSERVATORY

# Deliver the warning message effectively

- Significance of warning = transmit + communicate
- Take care to the public

  <u>Disadvantaged groups</u>
  - Simplify
  - Visualize (symbol, number/color), trigger public actions

  <u>Intellectual clients</u>
  - Smartphones, internet
  - Real time observation for the individual risk assessment and decision making


香港天文台
HONG KONG OBSERVATORY

# Weather Information Dissemination to the General Public

Dial-a Weather (1878200)

**General Public**

Internet
(*webpage*、*twitter*、*youtube*)


TV, radio


Mobile phone
(iPhone/ Android/Windows phone/SMS)

Fax

香港天文台
HONG KONG OBSERVATORY

# Warnings in force : always shown on TV

香港天文台
HONG KONG OBSERVATORY

# Re-definition of service models

## Traditional

- Limited information
- Text/Audio format
- Spoon-fed with data

## Internet website

- Attractive and detailed
- Interactively “poll” the required information
- Multimedia
- Anytime and anywhere
- Personalized location service

## Mobile platform

香港天文台
HONG KONG OBSERVATORY

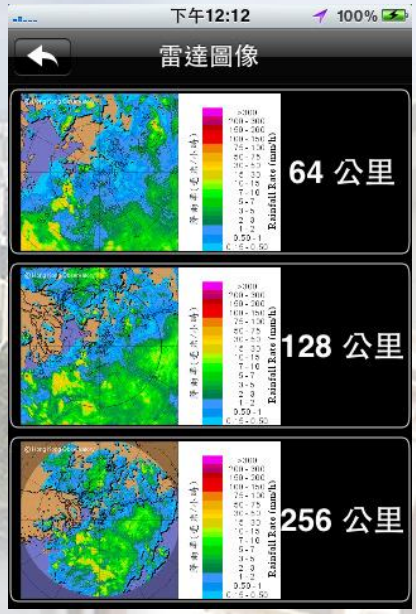
# Mobile App - MyObservatory

## A personalized location-based weather service

香港天文台
HONG KONG OBSERVATORY

# A complete suite of weather service via app

- Weather warning
- Forecast
- Observations
- Radar images
- Satellite images
- Lightning location
- Storm track
- UV Index
- Astronomy and tide information
- World major cities forecast
- HKO YouTube
- .....





香港天文台
HONG KONG OBSERVATORY

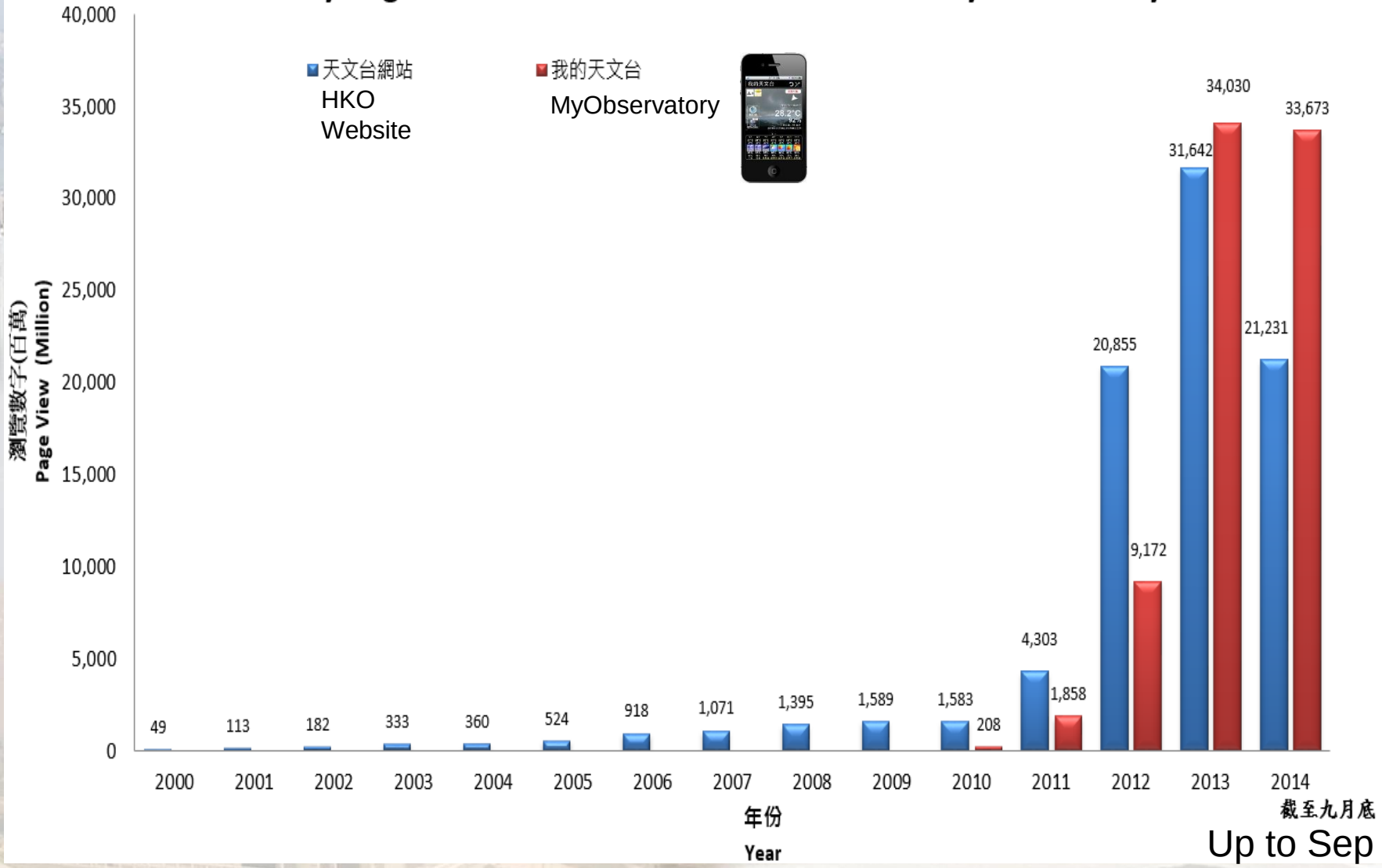
# Special Weather Tips (Web & App)

Content consists of:

- Heavy rain alert
- Gust forecast (extracted from thunderstorm warning)
- TC situation
- Other important messages related to significant change of weather situations

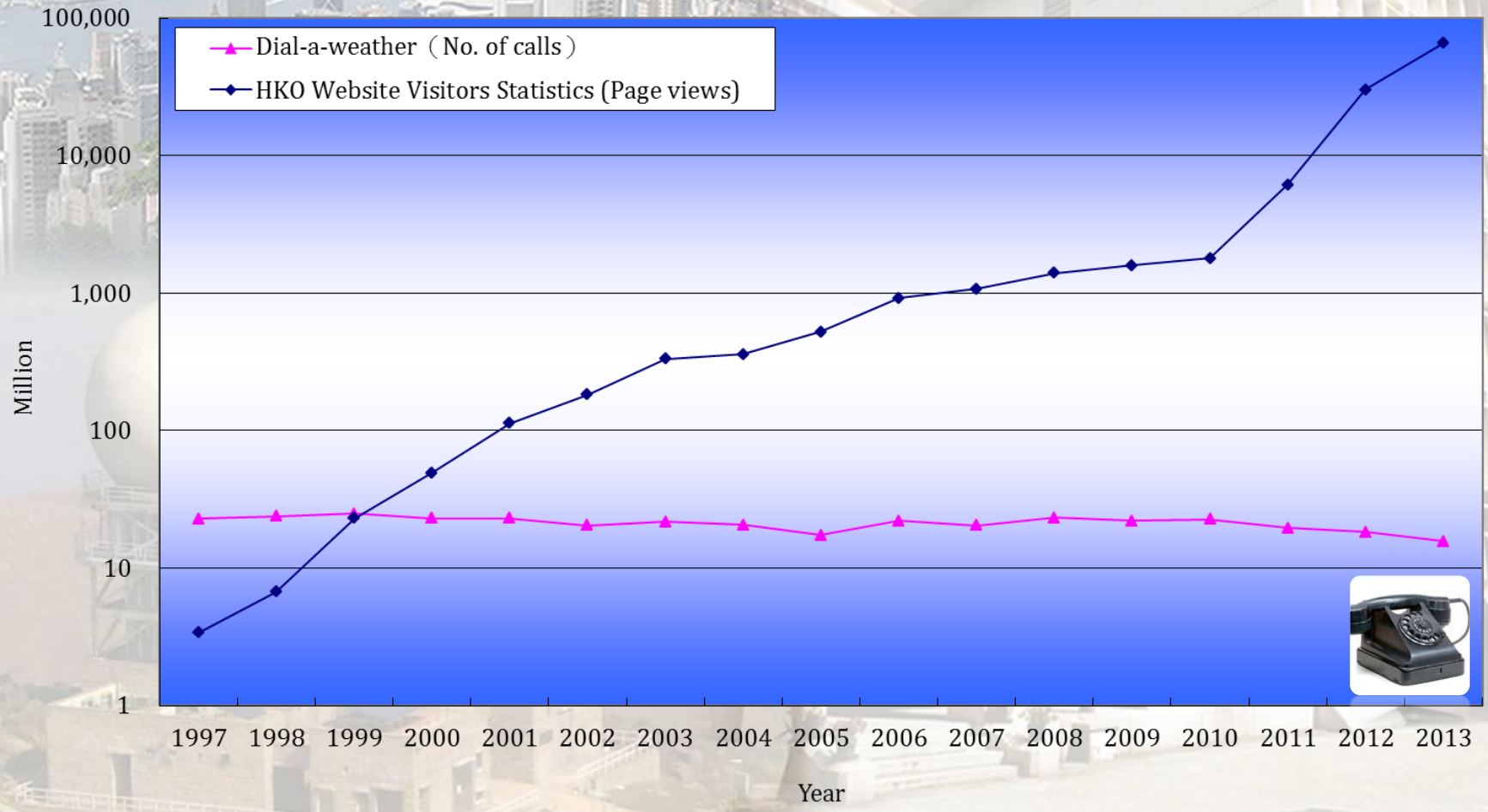
# 天文台網站及「我的天文台」瀏覽數字

## Yearly Page Views Statistics of HKO Website & MyObservatory



香港天文台
HONG KONG OBSERVATORY

# Usage of phone for weather information remained steady in spite of rise in internet usage



香港天文台
HONG KONG OBSERVATORY

# Engaging Stakeholders

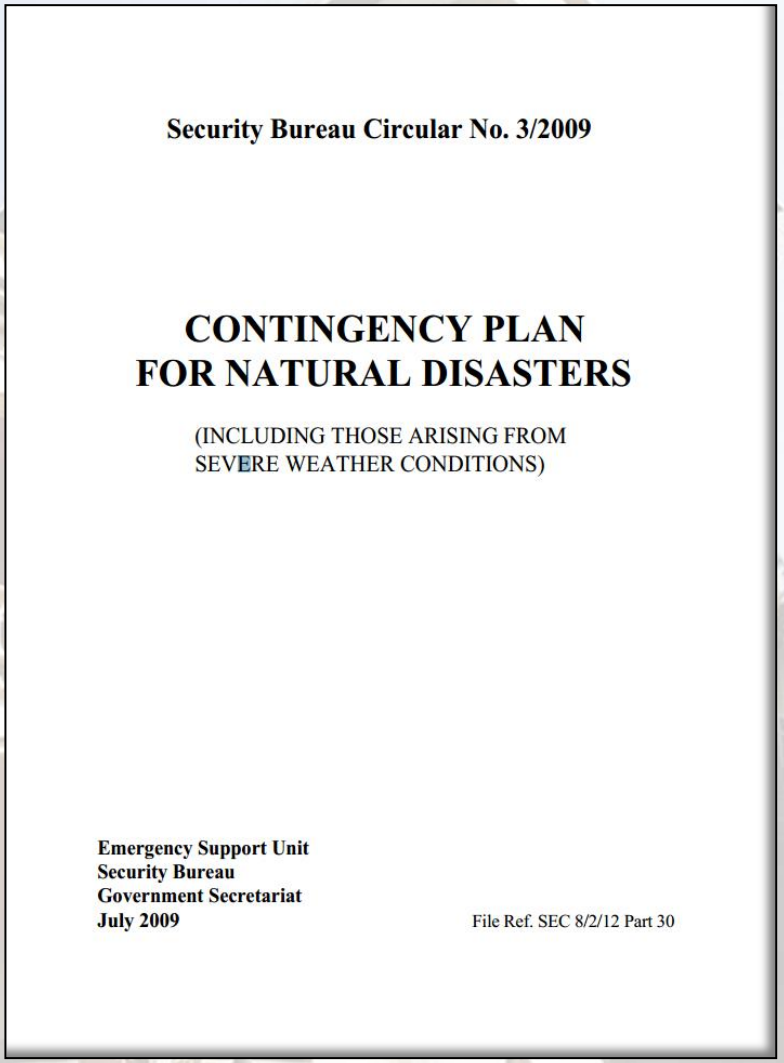
- Government Bureaux/Department
- Public utilities
- Media
- General publics

香港天文台
HONG KONG OBSERVATORY

# Contingency Plan for Natural Disasters for HK

## Emergency Support Unit, Security Bureau

- Manage the rainstorm, typhoon, tsunami etc. natural disasters
- Gather up and relate the duties and responsibilities to the government departments or other companies during natural disasters
  - *All departments already have the particular duties guideline*
- Flow of messages



Security Bureau Circular No. 3/2009

CONTINGENCY PLAN
FOR NATURAL DISASTERS

(INCLUDING THOSE ARISING FROM
SEVERE WEATHER CONDITIONS)

Emergency Support Unit
Security Bureau
Government Secretariat
July 2009

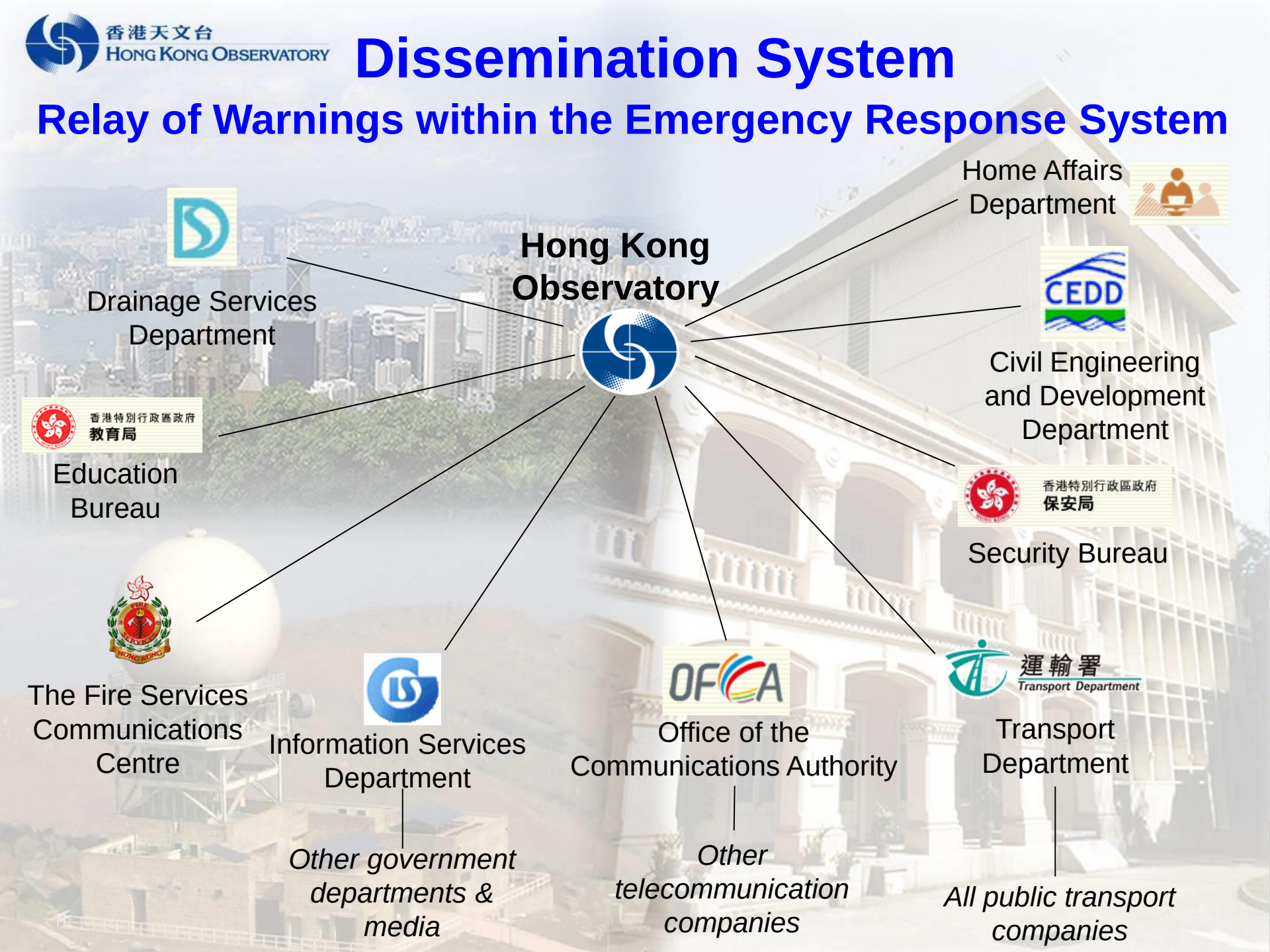
File Ref. SEC 8/2/12 Part 30

http://www.sb.gov.hk/eng/emergency/ndisaster/CPND%20with%20Tamar%20Address.pdf

香港天文台 HONG KONG OBSERVATORY

# Dissemination System

## Relay of Warnings within the Emergency Response System



香港天文台
HONG KONG OBSERVATORY

# Main Government Departments

- Security Bureau (Emergency Support Unit)
- Education Bureau (arrangement for the school suspension)
- Hong Kong Examinations and Assessment Authority (arrangement for Public Examinations cancellation)
- Transport Department (public transport arrangement)
- Civil Engineering and Development Department (landslip matters)
- Drainage Services Department (flooding management)
- Home Affairs Department (open up temporary shelters)
- The Fire Services (Rescue operations )
- Marine Department (Maritime Rescue)

香港天文台
HONG KONG OBSERVATORY

# Government Departments

- Liaison Meetings (usually annually)
- Communication Exercises
- Drills
- Pre-wet Season Seminars
- Interflow Visits

香港天文台
HONG KONG OBSERVATORY

# Liaison Meetings between Government Departments

## Well before the TC & Rain Season

- Liaison meetings with essential departments
  - Understand requirements, build up rapport, establish communication mechanism & content
  - Review procedures and revise operation manuals

- Pre-wet season seminars for all government depts
  - Review the content of warnings and relevant precautionary measures
  - Introduce new services
  - Collect opinions

香港天文台
HONG KONG OBSERVATORY

# Liaison Meetings between Government Departments

- Geotechincal Engineering Office
- Drainage Services Department
- Transport Department
- Home Affairs Department
- Education Bureau
- Hong Kong Examination & Assessment Authority
- Security Bureau

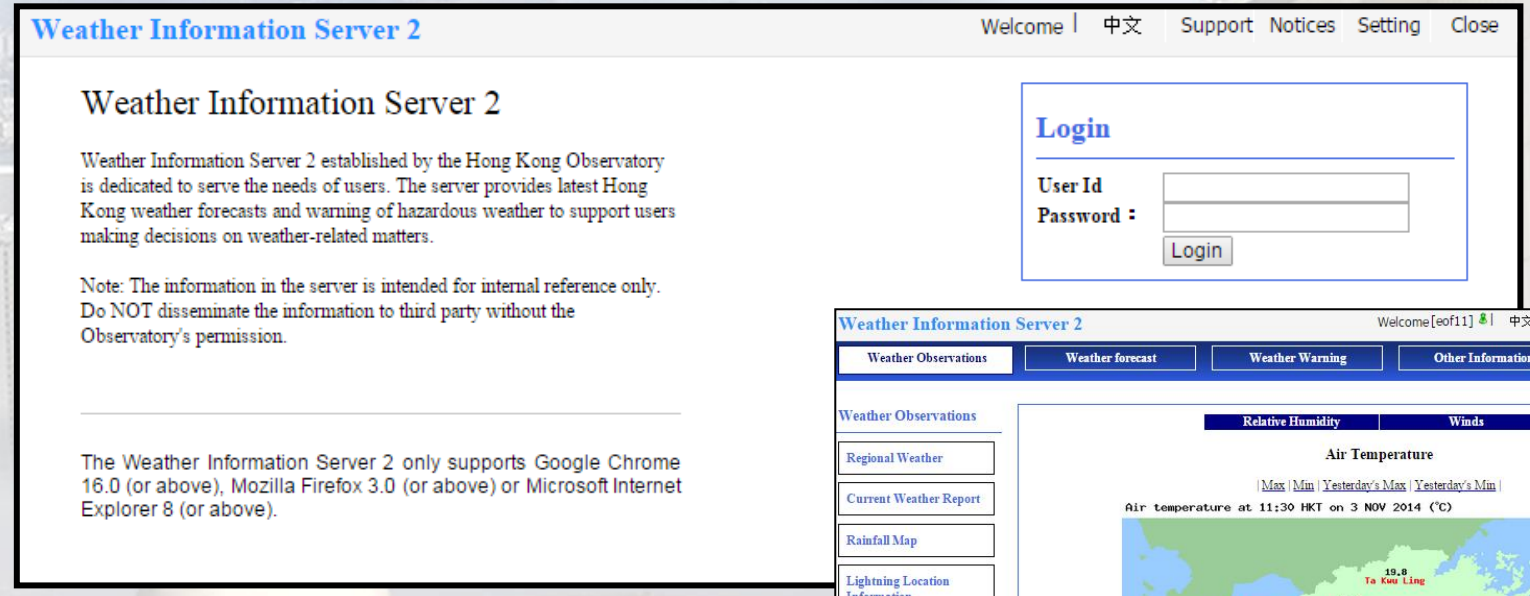
香港天文台
HONG KONG OBSERVATORY

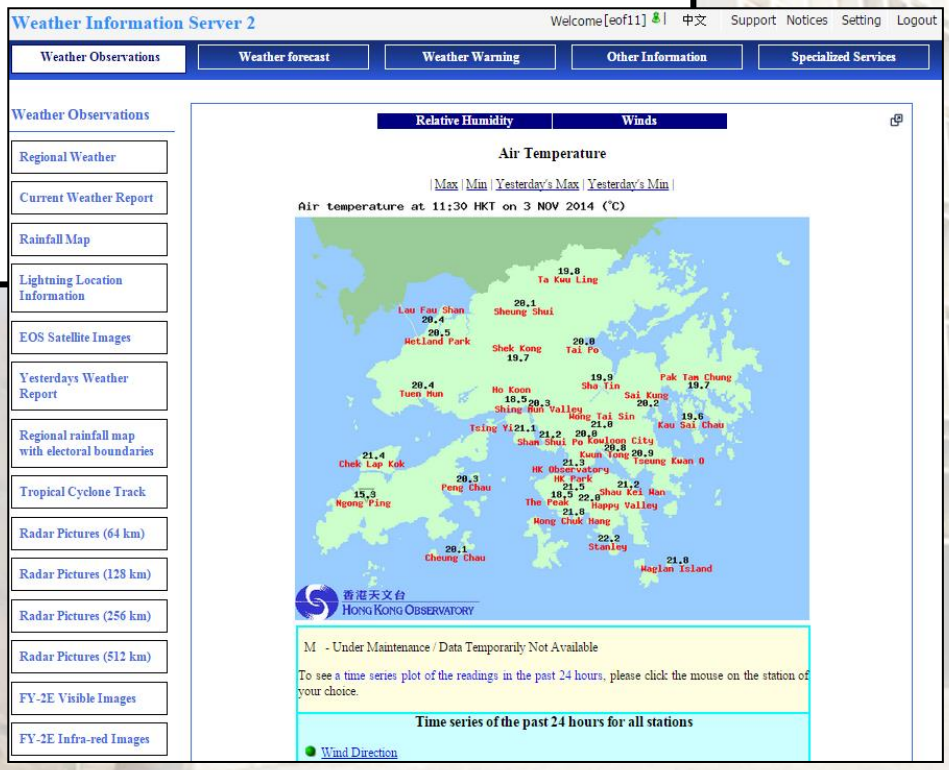
# Liaison Meetings between Government Departments

- Review existing procedures
- Propose new initiatives or requirements
- Update contact list
- Promote better working relationship
- Arranging Communication Exercise / Drill
- Outlook for the year: e.g. No. of TCs, annual rainfall, etc

香港天文台
HONG KONG OBSERVATORY

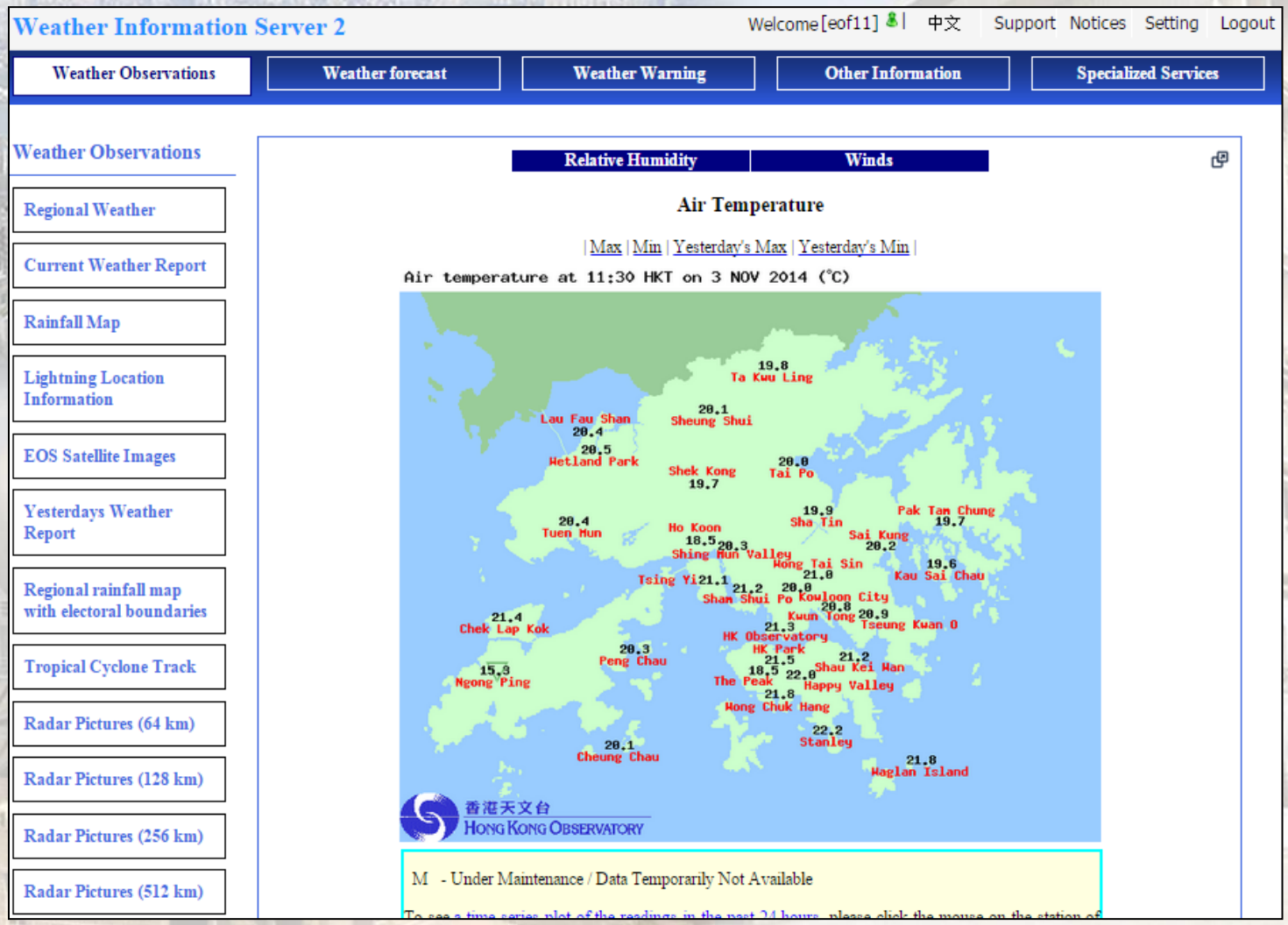
# Government Weather Information SErver (GOWISE)



香港天文台
HONG KONG OBSERVATORY

# Tailor-made weather service for government departments and relevant organizations



香港天文台
HONG KONG OBSERVATORY

# Radar Pictures

**Weather Information Server 2**

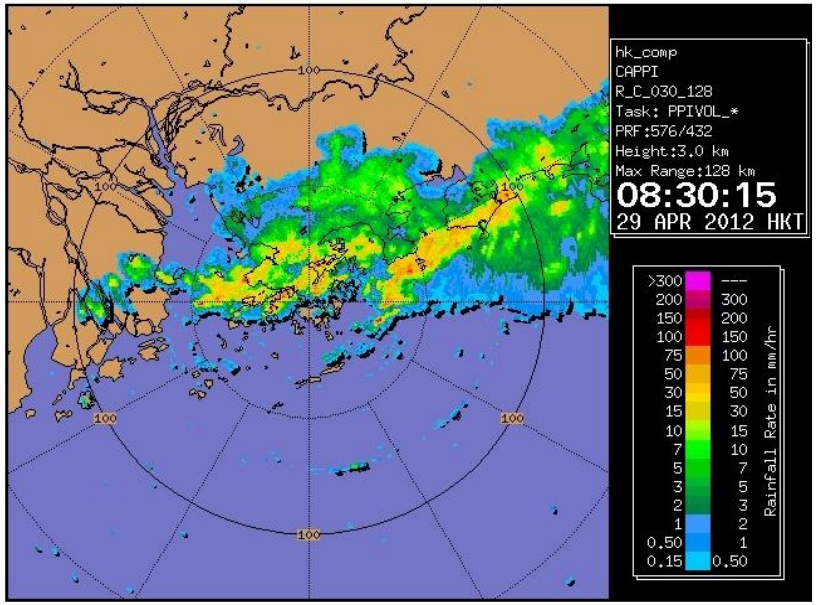
Welcome [eof11] | 中文 | Support | Notices | Setting | Logout

Weather Observations | Weather forecast | Weather Warning | Other Information | Specialized Services

**Weather Observations**

- Regional Weather
- Current Weather Report
- Rainfall Map
- Lightning Location Information
- EOS Satellite Images
- Yesterdays Weather Report
- Regional rainfall map with electoral boundaries
- Tropical Cyclone Track
- Radar Pictures (64 km)
- Radar Pictures (128 km)
- Radar Pictures (256 km)
- Radar Pictures (512 km)
- FY-2E Visible Images
- FY-2E Infra-red Images

## Radar Pictures




- Animation for the past 3 hours **(Interval between pictures: 6 minutes)**
- Animation for the past 6 hours **(Interval between pictures: 12 minutes)**

香港天文台
HONG KONG OBSERVATORY

1

# Weather Information Server 2

Welcome [eof11] | 中文 | Support | Notices | Setting | Logout

Alarm Setting
Test Alarm
Connection Status
[-] Zoom [+]

Weather Observations | Weather forecast | Weather Warning | Other Information | Special

Weather Obs

Regional Wea
Current Wea
Rainfall Map
Lightning Lo Information
EOS Satellite
Yesterdays W Report
Regional rain with electoral
Tropical Cycl
Radar Pictur
Radar Pictur

## Alarm Setup

| All | Warning Notification |
|---|---|
| ☑ | Tropical Cyclone Warning Signals |
| ☑ | Rainstorm Warning Signals |
| ☑ | Thunderstorm Warning |
| ☑ | Special Announcement of Flooding in Northern N.T. |
| ☑ | Landslip Warning |
| ☑ | Strong Monsoon Signal |
| ☑ | Frost Warning |
| ☑ | Fire Danger Warning |
| ☑ | Cold Weather Warning |
| ☑ | Very Hot Weather Warning |
| ☑ | Tsunami Warning |
| ☑ | Locally Felt Earthquake |

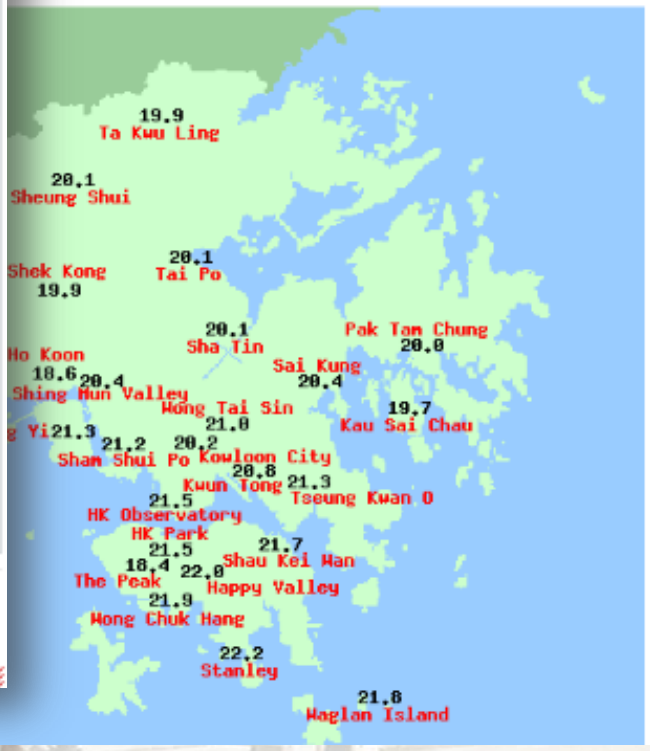
Confirm | Cancel

ity | Winds

Air Temperature

Yesterday's Max | Yesterday's Min |

on 3 NOV 2014 (°C)



香港天文台
HONG KONG OBSERVATORY

# For Transport Department

## Weather Information Server 2

Welcome [td_angelo] | 中文 Support Notices Setting Logout

Weather Observations | Weather forecast | Weather Warning | Other Information | Specialized Services

Warning In Force | Stop Alarm

[ 23-10-2013 06:00 ]
紅 RedFire Danger Warning
Red

### Specialized Services

- Gust Alarm
- Tropical Cyclone Signal Assessment Update
- Wind Distribution Map for Transport Department
- Regional Gust Alarm (New)
- **Wind and Sea Conditions over Hong Kong Waters**

### WIND AND SEA CONDITIONS OVER HONG KONG WATERS

**Date/time: 25-10-2013 at 11:00 HKT ( updated every 30 minutes )**

| STATIONS | Latest 10-minute Mean Wind | | Peak Gust in the Past Hour | State of Sea[2] |
|---|---|---|---|---|
| | FORCE[1] | DIRECTION | FORCE[1] | |
| TSIM SHA TSUI | 1 | EAST | 4 | CALM |
| SHA CHAU | 4 | NORTH | 5 | SLIGHT to MODERATE |
| TAI MO TO | 3 | NORTH | 4 | SLIGHT |
| CHEUNG CHAU | 4 | NORTH | 5 | SLIGHT to MODERATE |
| WAGLAN ISLAND[3] | 5 | NORTHEAST | 6 | MODERATE |
| TAP MUN | 3 | NORTH | 5 | SLIGHT |
| EAST PING CHAU | 2 | NORTH | 4 | SLIGHT |

Remarks

1. Beaufort Wind Scale.
2. Estimate based on wind information.
3. The anemometer at WAGLAN ISLAND is well above sea level. Thus the wind force reported at the station may be hig her than that near sea level.
4. 「N/A」 - - Data not available.

Locations of Stations

香港天文台
HONG KONG OBSERVATORY

# Wind and Sea Conditions over Hong Kong Waters

## Weather Information Server 2

香港特別行政區政府
香港天文台

WIND AND SEA CONDITIONS OVER HONG KONG WATERS

Date/time: 03-11-2014 at 12:00 HKT ( updated every 30 minutes )

| STATIONS | Latest 10-minute Mean Wind | | Peak Gust in the Past Hour | State of Sea[2] |
|---|---|---|---|---|
| | FORCE[1] | DIRECTION | FORCE[1] | |
| TSIM SHA TSUI | 2 | NORTHWEST | 3 | SLIGHT |
| SHA CHAU | 4 | NORTH | 5 | SLIGHT to MODERATE |
| TAI MO TO | 3 | NORTH | 5 | SLIGHT |
| CHEUNG CHAU | 4 | NORTH | 6 | SLIGHT to MODERATE |
| WAGLAN ISLAND [3] | 4 | NORTH | 5 | SLIGHT to MODERATE |
| TAP MUN | 3 | NORTH | 5 | SLIGHT |
| EAST PING CHAU | 2 | NORTHWEST | 4 | SLIGHT |

Remarks

1. Beaufort Wind Scale.
2. Estimate based on wind information.
3. The anemometer at WAGLAN ISLAND is well above sea level. Thus the wind force reported at the station may be hig her than that near sea level.
4. "N/A" - - Data not available.

### Locations of Stations

# Public Utilities

- Liaison Meetings
- Briefing Sessions
- Interflow Visits
- Lunch

香港天文台
HONG KONG OBSERVATORY

# Forecasters visiting the Hong Kong International Terminals (HIT)

香港天文台
HONG KONG OBSERVATORY

# HIT Newsletter



## Typhoon Precautions

### A Step-by-Step Overview

Containers lashed in readiness for adverse weather conditions

*Preparation for an incoming typhoon at a container terminal is no easy task and requires hours of work. HIT News speaks to those involved about the steps that are taken before, during and after a typhoon reaches Hong Kong*

Typhoons affect Hong Kong every year between the months of May and October, bringing with them excessive rain and high wind speeds that in some cases can be in excess of 185 kilometres an hour.

A container terminal operator such as HIT, has comprehensive and systematic precautionary measures in place for all adverse weather conditions including typhoons, strong winds, and heavy rainstorms.

At HIT, the process of dealing with a typhoon begin as one is forming near the 800km offshore boundary. The 800km boundary is the distance at which the Hong Kong Observatory (HKO) typically raises tropical cyclone warning signal number 1.

As a typhoon moves closer to the territory and warning signals are raised, the precautionary procedures at HIT pick up pace and the different parties involved intensify their activities.

These activities are usually kick-started by an internal meeting held by the Operations and Engineering Departments to discuss precautionary measures. These departments look at the latest weather updates and estimate the time the typhoon will make landfall in Hong Kong.

Working backwards from the estimated arrival time of the storm, an action plan is formulated, providing a timeline from which to co-ordinate activities, from securing containers and equipment to deciding when to close the terminal.

Throughout the entire process, the safety of HIT's staff and contracted workers is a priority, with every step closely supervised and decisive action taken in accordance to the prevailing weather conditions.

According to Perry Pang , HIT's Manager, Operations Planning Services, "Given the many different operational activities happening in the yard and the volume of containers we handle, it is simply not feasible for us to begin the preparations only after the HKO has hoisted the tropical cyclone warning signal number 1. There is no comprise on safety and we have to start early."

"We rely on the information from the HKO, which includes a three-day weather forecast for typhoons. As a supplement, we also check websites of other meteorological centres in the region that are in range of the typhoon," Perry said.

The precautionary measures at this early stage involve marshalling lashing materials around the terminals in preparation for the hoisting of signal number 1; ensuring that empty stack containers in the terminal and depots, as well as the outer rows of idle stacks, can be lashed without delay.

Wind pattern image

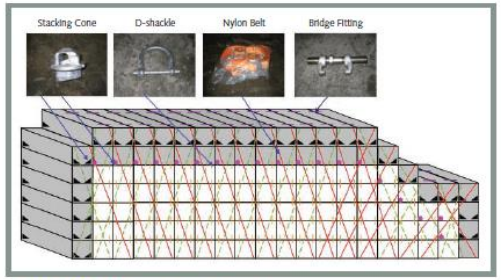
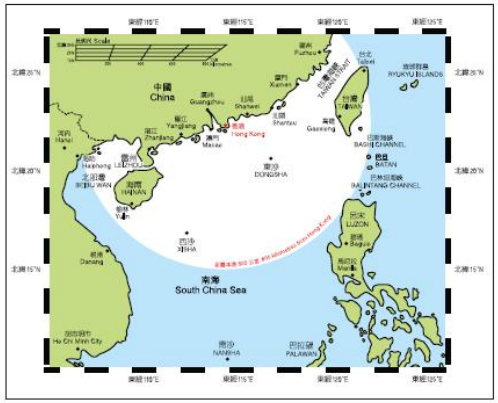



Illustration of full lashing pattern for container stacks




Tropical cyclone plotting map, showing the 800km offshore boundary

"The progress and scale of the precautionary works all depends on the likelihood of the typhoon signal being raised to a higher level, so we keep close contact with the HKO to determine if the possibility is fair or low," Perry said.

He added, "we would still look at securing empty stacks even if the possibility of raising the typhoon signal is low."

After signal number 1 has been hoisted, the lashing work intensifies, and the stevedores who are responsible for lashing activities – known as typhoon lashing gangs – spring into action. Each typhoon lashing gang comprises six people and the additional manpower needed for typhoon safety precautions typically numbers around 100 stevedores.



HIT News: http://www.hit.com.hk/3new/pub_news.asp

# HIT Newsletter


*Forecasters at HKO monitor weather in the region 24 hours a day, 365 days a year*

PARTNER FOCUS

**Hong Kong's Tropical Cyclone Warning Signals**

| | | | |
|---|---|---|---|
| 1 | Standby | 8 NE | NE'LY Gale or Storm |
| 3 | Strong Wind | 8 SE | SE'LY Gale or Storm |
| 8 NW | NW'LY Gale or Storm | 9 | Increasing Gale or Storm |
| 8 SW | SW'LY Gale or Storm | 10 | Hurricane |

# Eyeing the Storm

*With predictions that this year's typhoon season could bring an above-average six to nine storms, HIT News went to the HKO offices to find out just what goes into predicting storm movements*

Two forecasters look at cloud, rain, lightning and other weather patterns on a bank of monitors lining a wall in the control room at the Hong Kong Observatory (HKO).

This quiet room is the nerve-centre from which tropical cyclones are monitored and from where the important decision to raise or lower tropical cyclone warning signals number 1 (standby) through 10 (hurricane) is decided.

Located in a colonial-era building dating back to 1883 this control room, one of two forecasting offices run by the HKO, is responsible for local and marine forecasting. The other office located at the airport oversees aviation forecasting. The HKO has a staff count of about 300, most of them working regular hours, but the forecasting offices operate 24 hours a day, 365 days a year.

*Mrs Hilda Lam, Assistant Director of HKO*

"We always monitor the northwest Pacific area for possible tropical cyclone development," said Hilda Lam, Assistant Director at the HKO. "If the tropical cyclone is outside our warning area we still analyse its intensity, forecast its movement, and put out a forecast track twice a day on our website."

The HKO's warning area covers most of the South China Sea and extends to the longitude line 125 degrees east. "As soon as a tropical cyclone enters 125 degrees east we start our shipping warning, which is issued every three hours. It gives ships a three-day forecast, the position and intensity of the storm, as well as the radii of its influence in terms of wave and winds," Lam said.

At this early stage there are still many factors that can affect the strength and direction of a storm, but if it continues towards Hong Kong and enters within 800km of the territory, the HKO intensifies its monitoring and gradually adds staff to the forecasting office. The forecasting office is typically manned by two forecasters, three supporting staff, and a senior officer, but during a typhoon the number of staff is almost doubled and the Observatory director is also present.

Still, the decision to hoist signals number one, and subsequent signals is not automatic. "We don't necessarily put up signal number one when the storm comes within 800km, it depends on where it is heading. We may not even raise the signal, if it is not expected to affect Hong Kong," said Lam.

Every year around March the HKO issues an outlook for the year with the number of tropical cyclones expected to come within 500km of the city. "We arrive at these numbers using the computer to calculate the general weather patterns all through the summer and relating them to occurrence of tropical cyclones through statistical methods," said Lam. Using these techniques, the HKO predicted an early typhoon season with six to nine storms for 2011.

"The way that we forecast the start of the typhoon season is by looking at our climate records and analysing them against the phenomenon of El Niño and La Niña. During El Niño years the tropical cyclone season is going to start late, like last year, but for La Niña years it can start early. We are now still in the La Niña stage, though weakening."

*Hong Kong Observatory webpage and smartphone applications*

The HKO prepares for each year's typhoon season with seminars and drills, bringing various groups such as the Education and Transport departments up-to-date with the latest operational procedures. HIT participates in HKO seminars, as well as communications tests, to ensure that in the event of a typhoon there is a smooth flow of information.

Lam noted that providing weather information for the public and for industry bodies, such as HIT, follows the same general principles of giving timely and accurate information for the sake of safety. One noticeable difference she pointed to is the general public has diversified needs, but a company such as HIT has quite specific requirements.

Compare, for example, the HKO website and online/mobile applications, with the Gust Alarm developed by the HKO together with HIT and other terminal operators.

The HKO website is a comprehensive database of weather information, catering to users who want simple bulletins as well as those who have a more sophisticated understanding of weather systems and want to view raw data. The HKO uses Twitter, Weibo, YouTube, and recently launched the smartphone application MyObservatory. The HKO also runs two international weather websites: World Weather Information Service and Severe Weather Information Centre.

In contrast, the Gust Alarm, with its wind sensors stationed around the terminal, has the specific purpose of helping HIT to keep track of strong winds in the area that may affect operations.

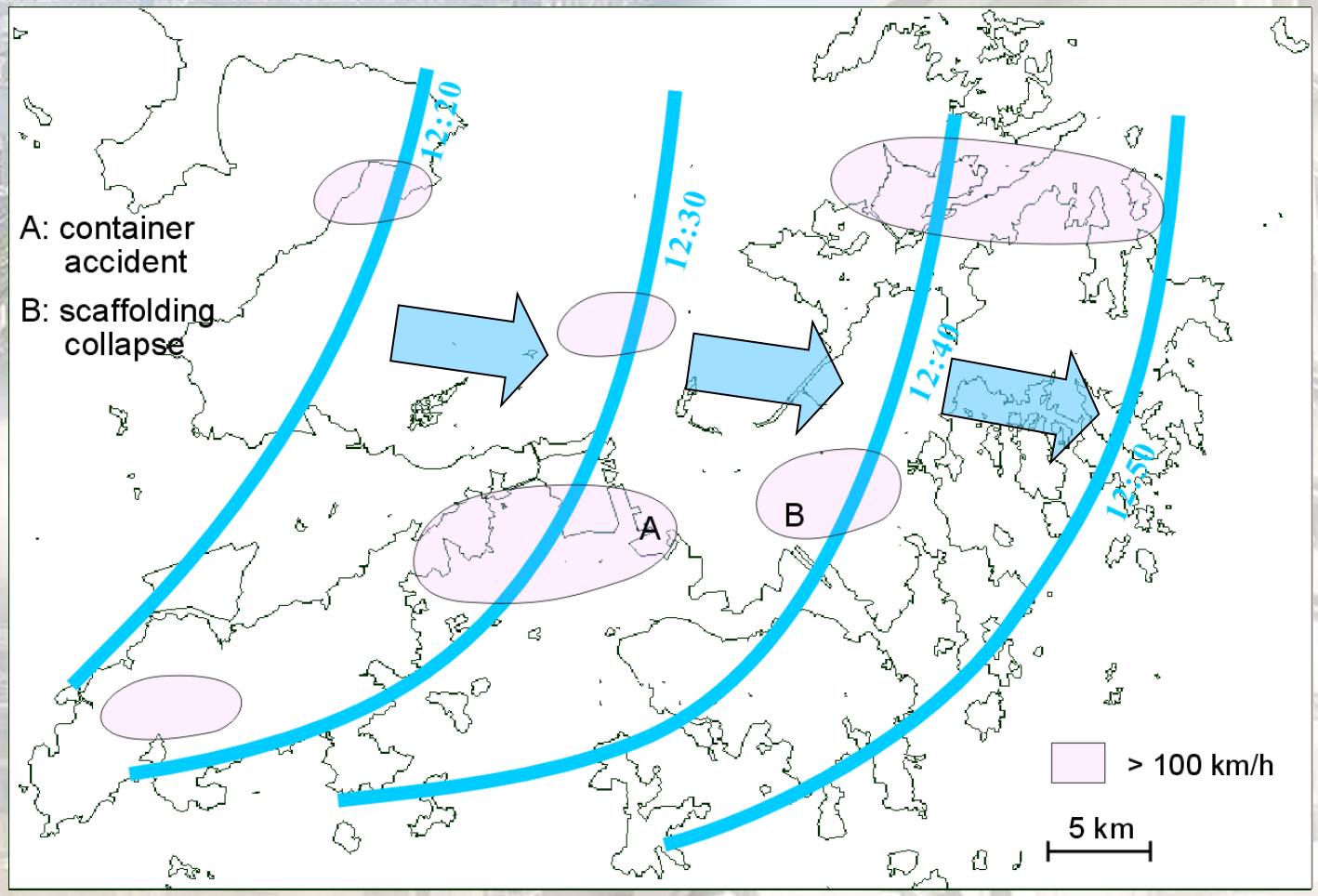
The two main tools used by the HKO to track tropical cyclones and forecast their movements are satellite, which looks at cloud patterns, and radar, which monitors rain.

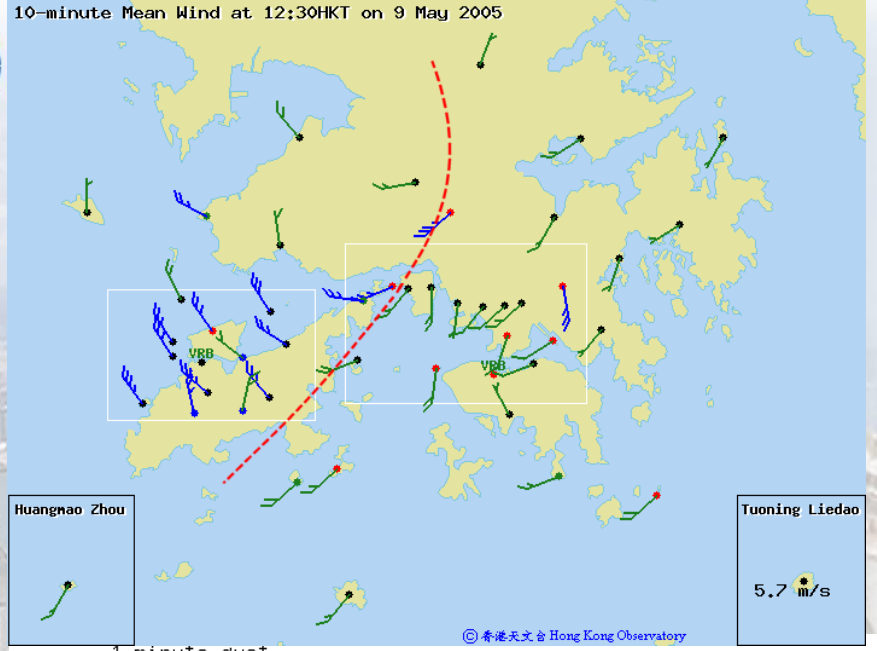


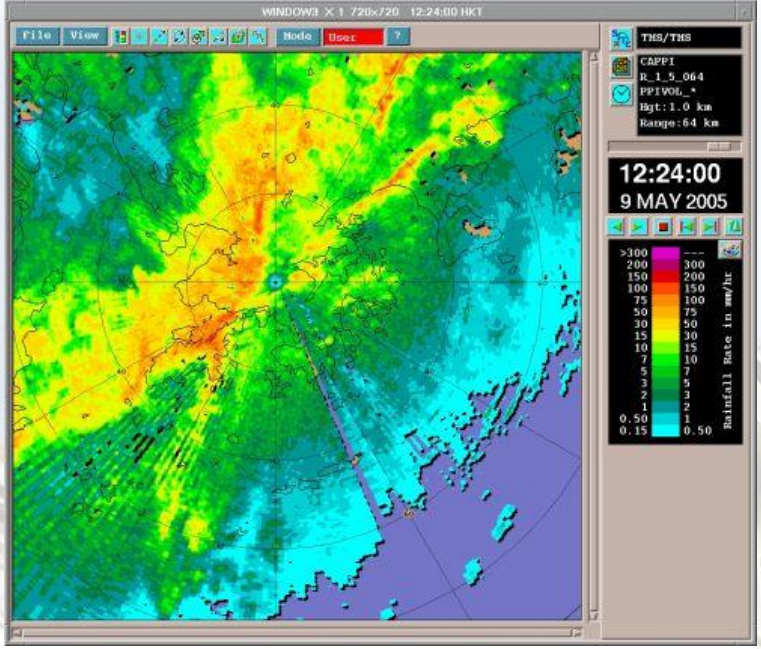
HIT News: http://www.hit.com.hk/3new/pub_news.asp

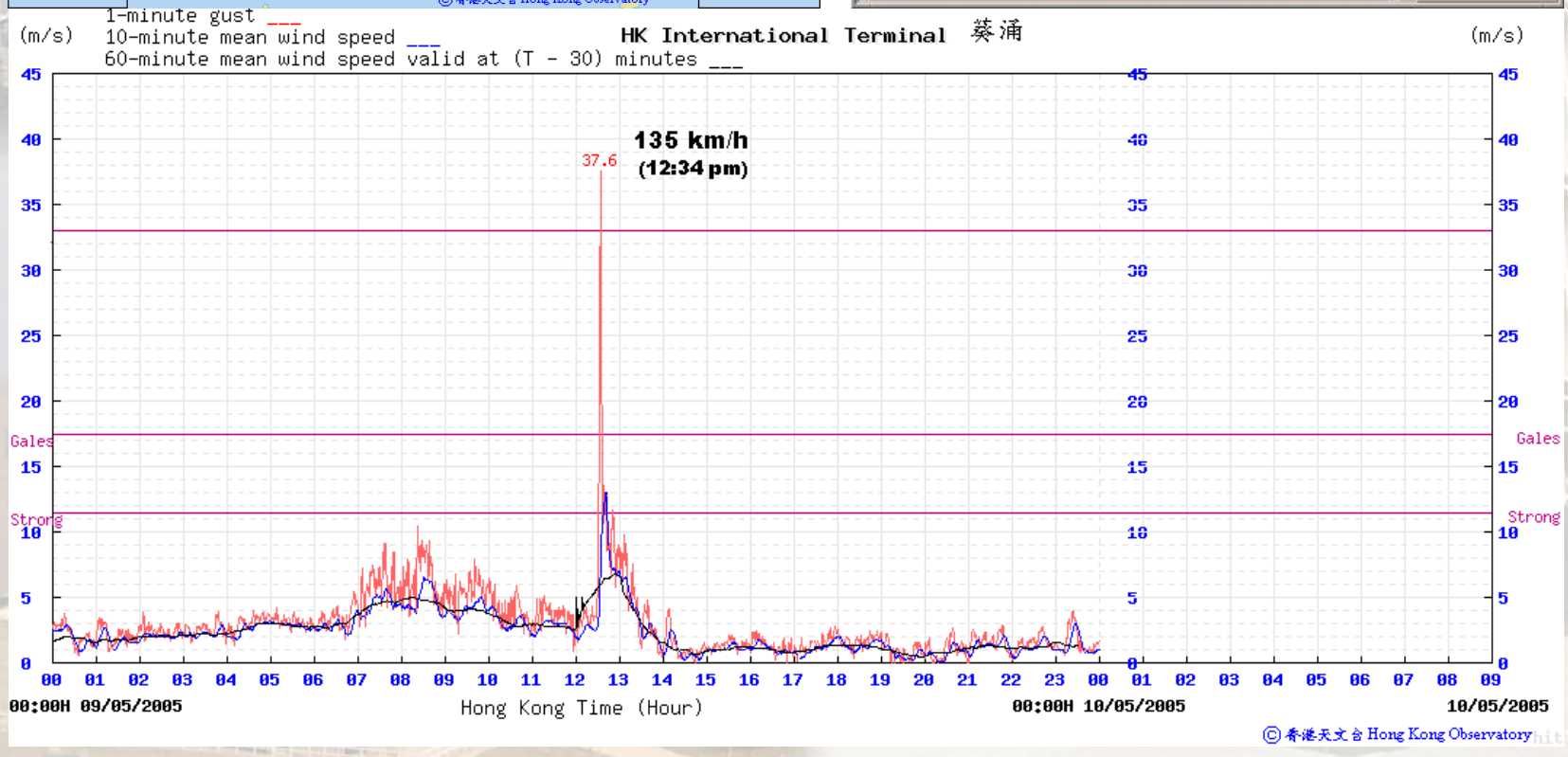
香港天文台
HONG KONG OBSERVATORY

# Gust front crossing Hong Kong in half an hour on 5 May 2005




10-minute Mean Wind at 12:30HKT on 9 May 2005
VRB
VRB
Huangmao Zhou
Tuoning Liedao
5.7 m/s
© 香港天文台 Hong Kong Observatory


WINDOW3 X 1 720x720 12:24:00 HKT
File
View
Mode
User
THS/THS
CAPPI
R_1_5_064
PPIVOL_*
Hgt:1.0 km
Range:64 km
12:24:00
9 MAY 2005
Rainfall Rate in mm/hr


1-minute gust ___
(m/s) 10-minute mean wind speed ___
60-minute mean wind speed valid at (T - 30) minutes ___
HK International Terminal 葵涌
(m/s)
135 km/h
(12:34 pm)
37.6
Gales
Strong
00:00H 09/05/2005
Hong Kong Time (Hour)
00:00H 10/05/2005
10/05/2005
© 香港天文台 Hong Kong Observatory

香港天文台
HONG KONG OBSERVATORY


Strong gusts associated with thunderstorms blew down stacks of containers on 9 May 2005

香港天文台
HONG KONG OBSERVATORY


## Media Reports

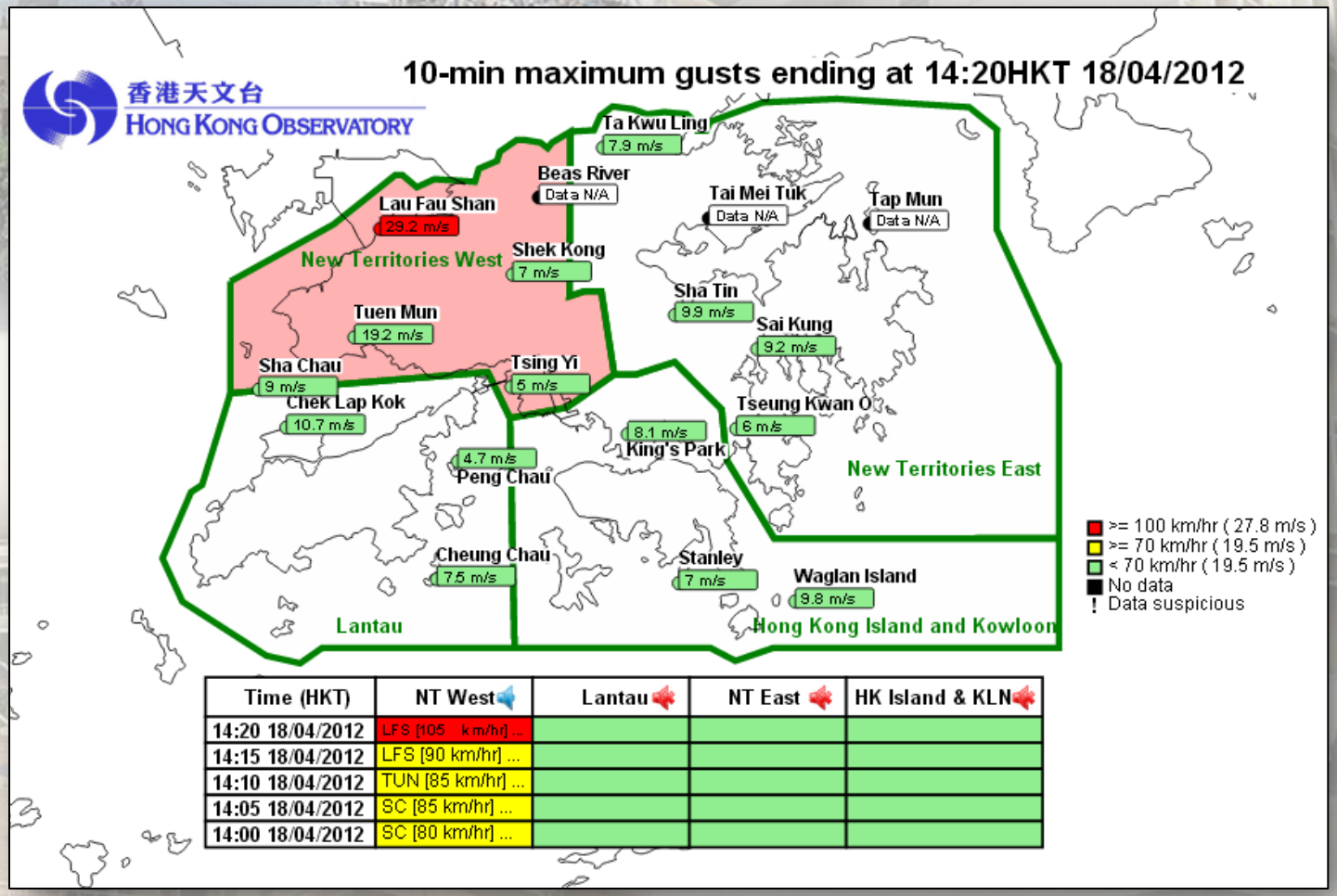
- Brought down trees and scaffoldings
- Severe traffic jam
- 0.5 million people affected
- 25 million USD economic loss

香港天文台
HONG KONG OBSERVATORY

# Specialized Service - New Gust Alarm

(Tailor-made for Container Terminal Operators & Related Government Departments)

- Four selectable regions for audio alert
- Table showing the max gust reaching the threshold values in the latest 20 minutes for easy reference




| Time (HKT) | NT West | Lantau | NT East | HK Island & KLN |
|---|---|---|---|---|
| 14:20 18/04/2012 | LFS [105 km/hr] ... | | | |
| 14:15 18/04/2012 | LFS [90 km/hr] ... | | | |
| 14:10 18/04/2012 | TUN [85 km/hr] ... | | | |
| 14:05 18/04/2012 | SC [85 km/hr] ... | | | |
| 14:00 18/04/2012 | SC [80 km/hr] ... | | | |

香港天文台
HONG KONG OBSERVATORY

# Pre - No. 8 Special Announcement (Sample)

**Pre - No. 8 Special Announcement**

The Hong Kong Observatory announces that the Tropical Cyclone Warning Signal Number 8 is expected to be issued at or before 6 p.m. today (23 Jul 2012). Winds locally will strengthen further.

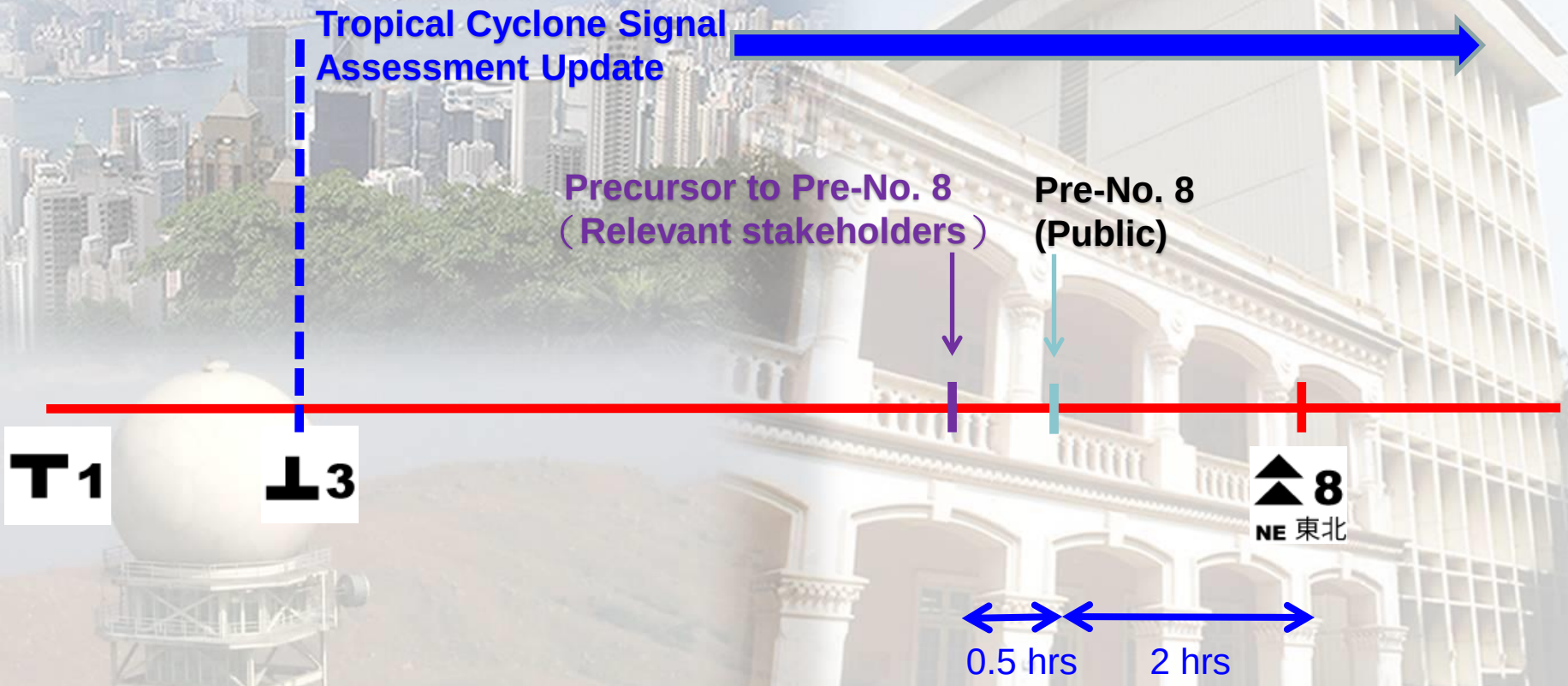
**The Government advises members of the public with long or difficult home journeys or having to return to outlying islands to begin their journeys now**. The Government is now making arrangements to release its employees accordingly.

Announcement by the Education Bureau (EDB): **The EDB announces that classes of all schools are suspended today.** Schools should implement contingency measures to ensure the safety of students. They should ensure that conditions are safe before allowing students to return home.

Dispatched by Hong Kong Observatory at 15:45 HKT on 23.07.2012

香港天文台
HONG KONG OBSERVATORY

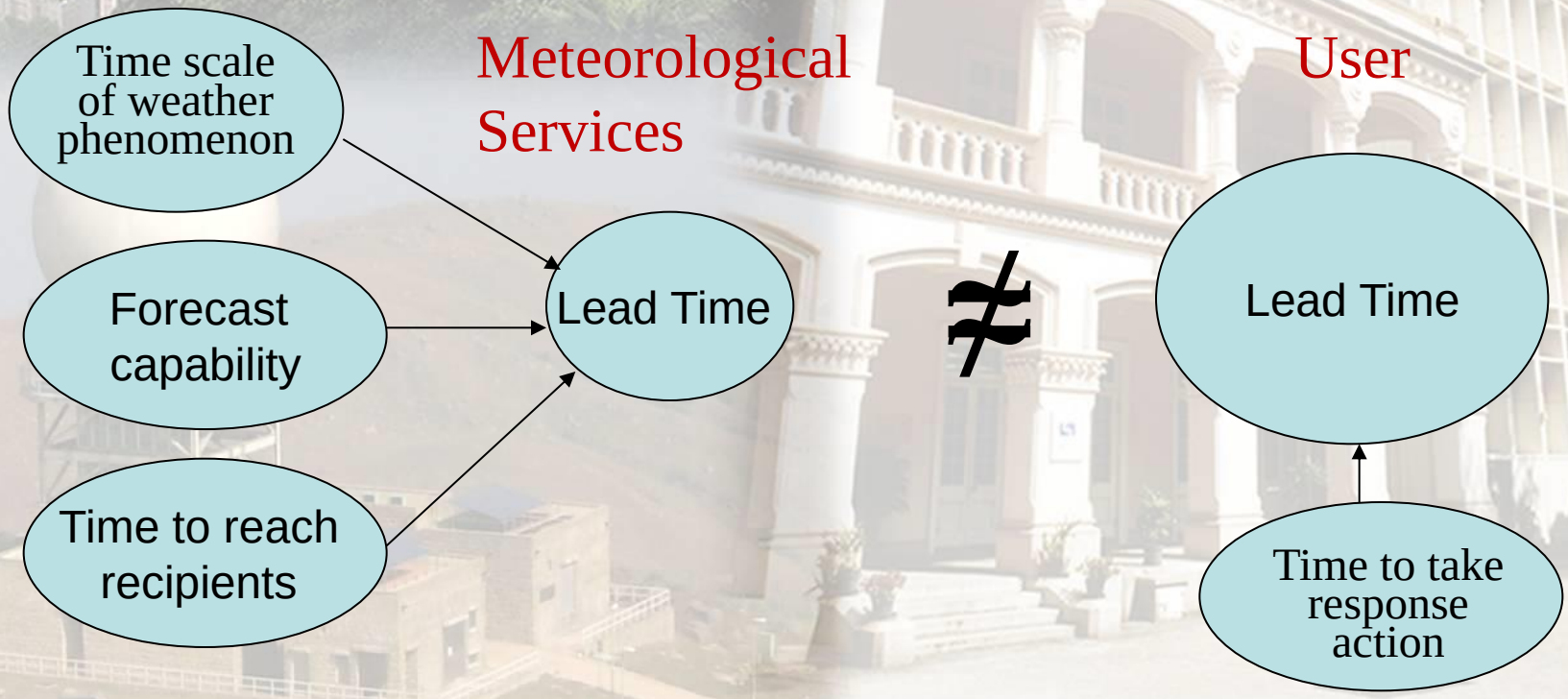
# Timeline



香港天文台
HONG KONG OBSERVATORY

# Warnings should be Timely

- Depend on how the recipient evaluates the product
- User expectation managed through education and outreach



香港天文台
HONG KONG OBSERVATORY

# Tropical Cyclone Signal Assessment Update (Probabilistic Concept)

- Scheduled time of issuance : **1:30 a.m., 4:30 a.m., 7:30 a.m., 10:30 a.m., 1:30p.m., 4:30 p.m., 7:30 p.m., 10:30 p.m.** unless an update already issued within an hour before.

- Forecast normally valid for the next 6 hours with an indication of the chance of signal change in two consecutive 3-hourly intervals, update when necessary.

- Five categories of probability forecast :
  - LOW ( < 30 % )
  - MEDIUM LOW (30 - 44 %)
  - MEDIUM (45 - 54 %)
  - MEDIUM HIGH (55 - 69 %)
  - HIGH ( >=70 % )

香港天文台
HONG KONG OBSERVATORY

Information on the chance of tropical cyclone signal change(issued by the Hong Kong Observatory at 1:30 p.m. on 22 September 2013).

Tropical Cyclone Signal now in force: Signal No. 3

Latest assessment on the chance of tropical cyclone signal change between 1:30 p.m. and 4:30 p.m. today :The chance of replacing the existing signal by No. 8 is MEDIUM HIGH (55-69%).

Latest assessment on the chance of tropical cyclone signal change between 4:30 p.m. and 7:30 p.m. today :The chance of replacing the existing signal by No. 8 is HIGH (>=70%).

Next update time: 4:30 p.m. on 22 September 2013.

**********
*  FOR INTERNAL USE ONLY  *
*  NOT FOR DISSEMINATION TO THE PUBLIC/MEDIA  *
**********

Dispatched by Hong Kong Observatory at 13:30 HKT on 22.09.2013

香港天文台
HONG KONG OBSERVATORY

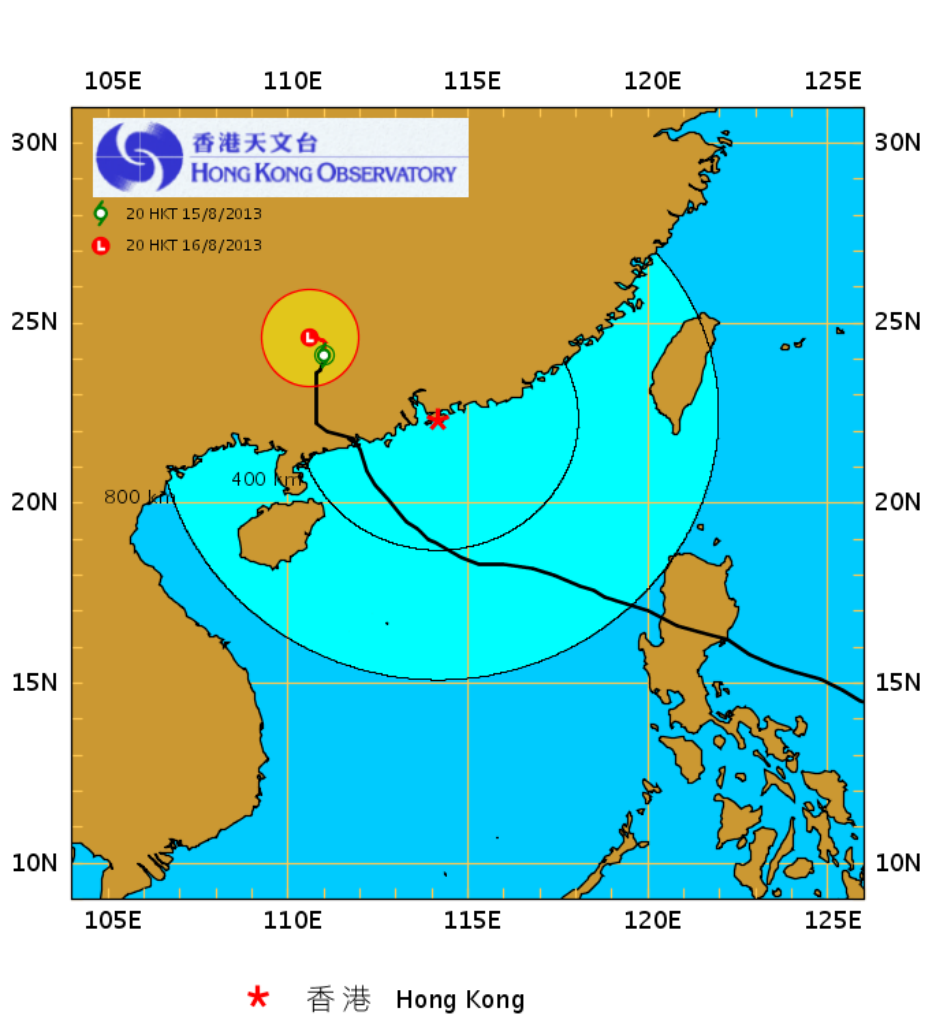
# GOWISE - Tropical Cyclone Signal Assessment Update

香港天文台
HONG KONG OBSERVATORY

# Case Studies

香港天文台
HONG KONG OBSERVATORY

# Super Typhoon Utor (in 2013)




| TC No. | Issue Time | Cancel Time | Duration |
|---|---|---|---|
| T1 | 16:05 12 Aug | 04:40 13 Aug | 12 35 |
| 3 | 04:40 13 Aug | 01:40 14 Aug | 21 00 |
| 8 SE 東南 | 01:40 14 Aug | 13:40 14 Aug | 12 00 |
| 3 | 13:40 14 Aug | 01:40 15 Aug | 12 00 |
| T1 | 01:40 15 Aug | 16:40 15 Aug | 15 00 |

香港天文台
HONG KONG OBSERVATORY

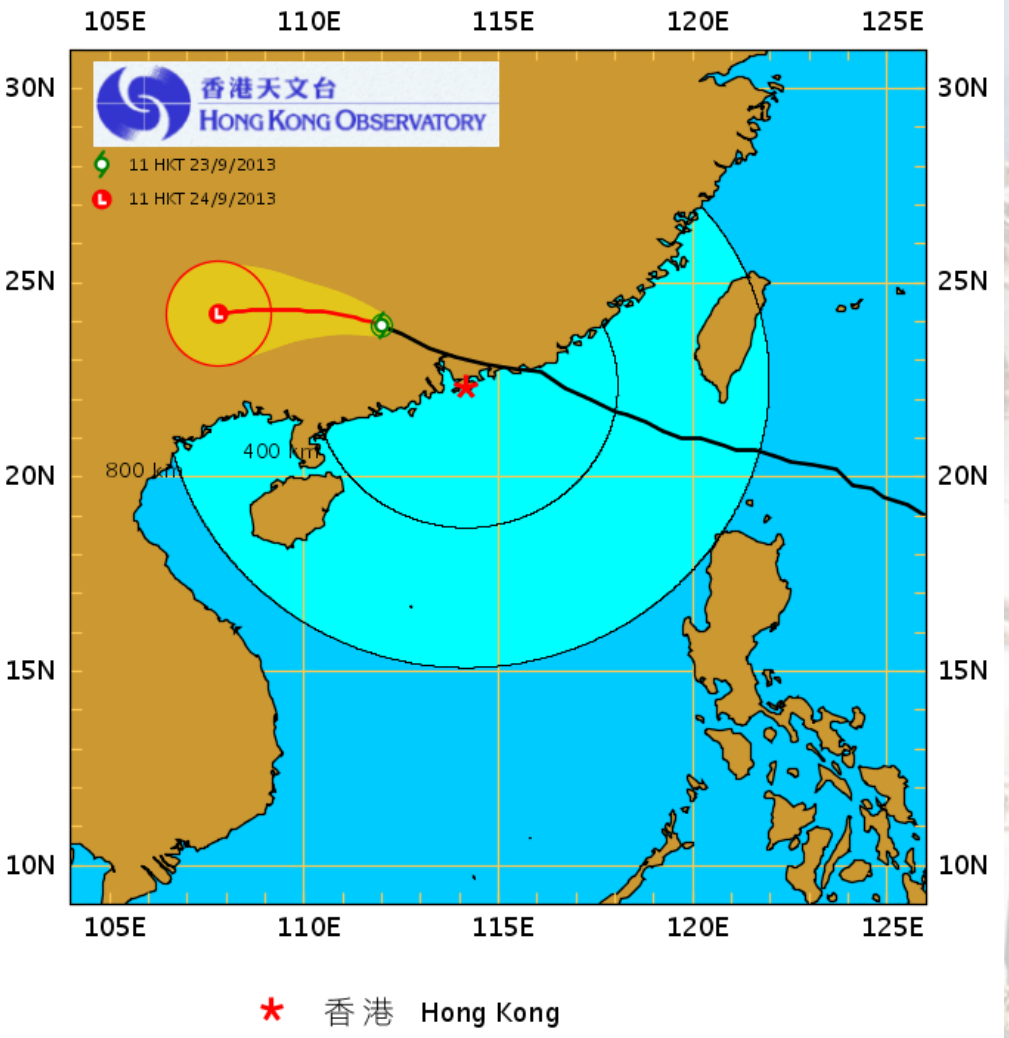
# TC Utor

| | Issue Time | Date | Cancel Time | Date | Duration |
|---|---|---|---|---|---|
| T1 | 16:05 | 12-Aug | 4:40 | 13-Aug | 12:35 |
| T3 | 4:40 | 13-Aug | 1:40 | 14-Aug | 21:00 |
| T8 | 1:40 | 14-Aug | 13:40 | 14-Aug | 12:00 |
| T3 | 13:40 | 14-Aug | 1:40 | 15-Aug | 12:00 |
| T1 | 1:40 | 15-Aug | 16:40 | 15-Aug | 15:00 |

| Signal Assessment: Chance of | | | T8 | | T9 | | T3 | |
|---|---|---|---|---|---|---|---|---|
| T3 | 4:40 | 13-Aug | | | | | | |
| | 4:45 | | LOW | LOW | | | | |
| | 7:30 | | LOW | LOW | | | | |
| | 10:30 | | LOW | MEDIUM LOW | | | | |
| | 13:30 | | LOW | MEDIUM LOW | | | | |
| | 16:30 | | MEIUM LOW | MEDIUM | | | | |
| | 19:30 | | MEDIUM | MEDIUM HIGH | | | | |
| | 22:30 | | MEDIUM HIGH | HIGH | | | | |
| Precursor | 23:10 | | | | | | | |
| Pre-No.8 | 23:40 | | | | | | | |
| T8 | 1:40 | 14-Aug | | | | | | |
| | 1:45 | | | | LOW | LOW | LOW | LOW |
| | 4:30 | | | | LOW | LOW | LOW | MEDIUM LOW |
| | 7:30 | | | | LOW | LOW | MEDIUM LOW | MEDIUM |
| | 10:30 | | | | LOW | LOW | MEDIUM | MEDIUM HIGH |
| | 11:00 | | | | LOW | LOW | MEDIUM HIGH | HIGH |
| T3 | 13:40 | | | | | | | |
| | 13:45 | | LOW | LOW | | | | |
| | 16:30 | | LOW | LOW | | | | |
| | 19:30 | | LOW | LOW | | | | |
| | 22:30 | | LOW | LOW | | | | |
| | 1:30 | 15-Aug | LOW | LOW | | | | |

香港天文台
HONG KONG OBSERVATORY

# Super Typhoon Usagi (in 2013)




| TC No. | Issue Time | Cancel Time | Duration |
|---|---|---|---|
| T1 | 10:40 21 Sep | 23:40 21 Sep | 13 00 |
| 3 | 23:40 21 Sep | 18:40 22 Sep | 19 00 |
| 8 NW西北 | 18:40 22 Sep | 00:25 23 Sep | 05 45 |
| 8 SW西南 | 00:25 23 Sep | 09:20 23 Sep | 08 55 |
| 3 | 09:20 23 Sep | 10:25 23 Sep | 01 05 |

香港天文台
HONG KONG OBSERVATORY

# TC Usagi

| | Issue Time | Date | Cancel Time | Date | Duration |
|---|---|---|---|---|---|
| T1 | 10:40 | 21-Sep | 23:40 | 21-Sep | 13:00 |
| T3 | 23:40 | 21-Sep | 18:40 | 22-Sep | 19:00 |
| T8 | 18:40 | 22-Sep | 9:20 | 23-Sep | 14:40 |
| T3 | 9:20 | 23-Sep | 10:25 | 23-Sep | 1:05 |

| Signal Assessment: Chance of | | | T8 | | T9 | | T3 | |
|---|---|---|---|---|---|---|---|---|
| T3 | 23:40 | 21-Sep | | | | | | |
| | 23:50 | | LOW | LOW | | | | |
| | 1:30 | 22-Sep | LOW | LOW | | | | |
| | 4:30 | | LOW | MEDIUM LOW | | | | |
| | 7:30 | | MEDIUM LOW | MEDIUM | | | | |
| | 10:30 | | MEIUM | MEDIUM HIGH | | | | |
| | 13:30 | | MEDIUM HIGH | HIGH | | | | |
| Precursor | 16:10 | | | | | | | |
| Pre-No. 8 | 16:40 | | | | | | | |
| | 16:58 | | HIGH | HIGH | | | | |
| T8 | 18:40 | | | | | | | |
| | 18:50 | | | | MEDIUM LOW | MEDIUM | LOW | LOW |
| | 19:30 | | | | MEDIUM LOW | MEDIUM | LOW | LOW |
| | 21:30 | | | | MEDIUM | MEDIUM HIGH | LOW | LOW |
| | 22:30 | | | | MEDIUM HIGH | MEDIUM | LOW | MEDIUM LOW |
| | 0:48 | 23-Sep | | | MEDIUM LOW | LOW | LOW | MEDIUM LOW |
| | 1:30 | | | | LOW | LOW | MEIDIUM LOW | MEDIUM |
| | 4:30 | | | | LOW | LOW | MEDIUM | MEDIUM HIGH |
| | 7:30 | | | | LOW | LOW | HIGH | HIGH |
| T3 | 9:20 | | | | | | | |
| | 9:25 | | LOW | LOW | | | | |

香港天文台
HONG KONG OBSERVATORY

# Liaison Meetings with Special Communities

- Aviation Community
- Shipping Community
- Fishermen Community
- Broadcast Media




香港天文台
HONG KONG OBSERVATORY

# Media / Journalists

- Liaison Meetings (usually annually)
- Luncheon - Informal gathering
- Training for Journalists

# Media

- Publicize success stories
- Create good relationships with media and develop media packages for media to publicize meteorological and hydrological knowledge

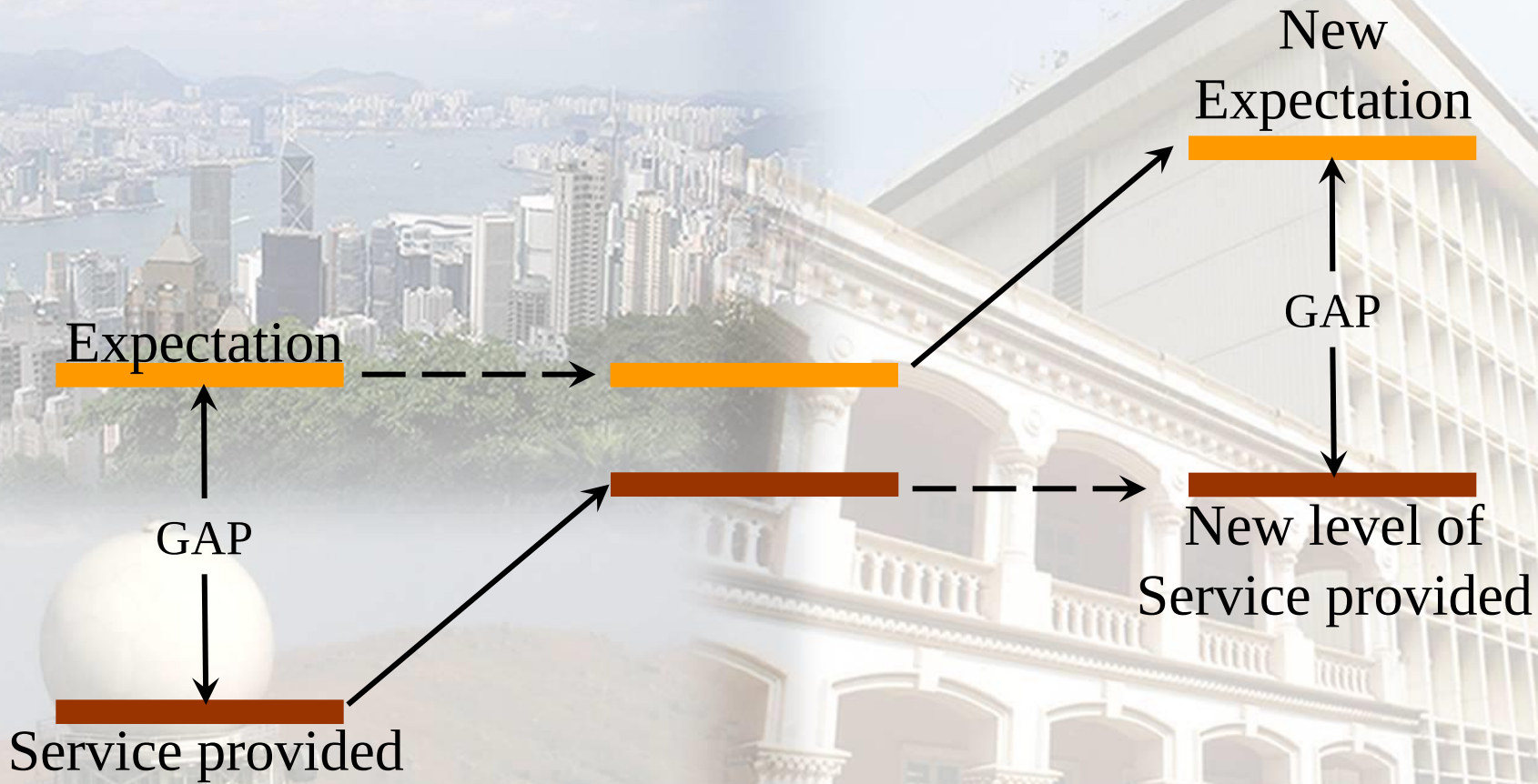
香港天文台
HONG KONG OBSERVATORY

# Luncheon with the journalists

香港天文台
HONG KONG OBSERVATORY

# Training courses for the journalists

香港天文台
HONG KONG OBSERVATORY



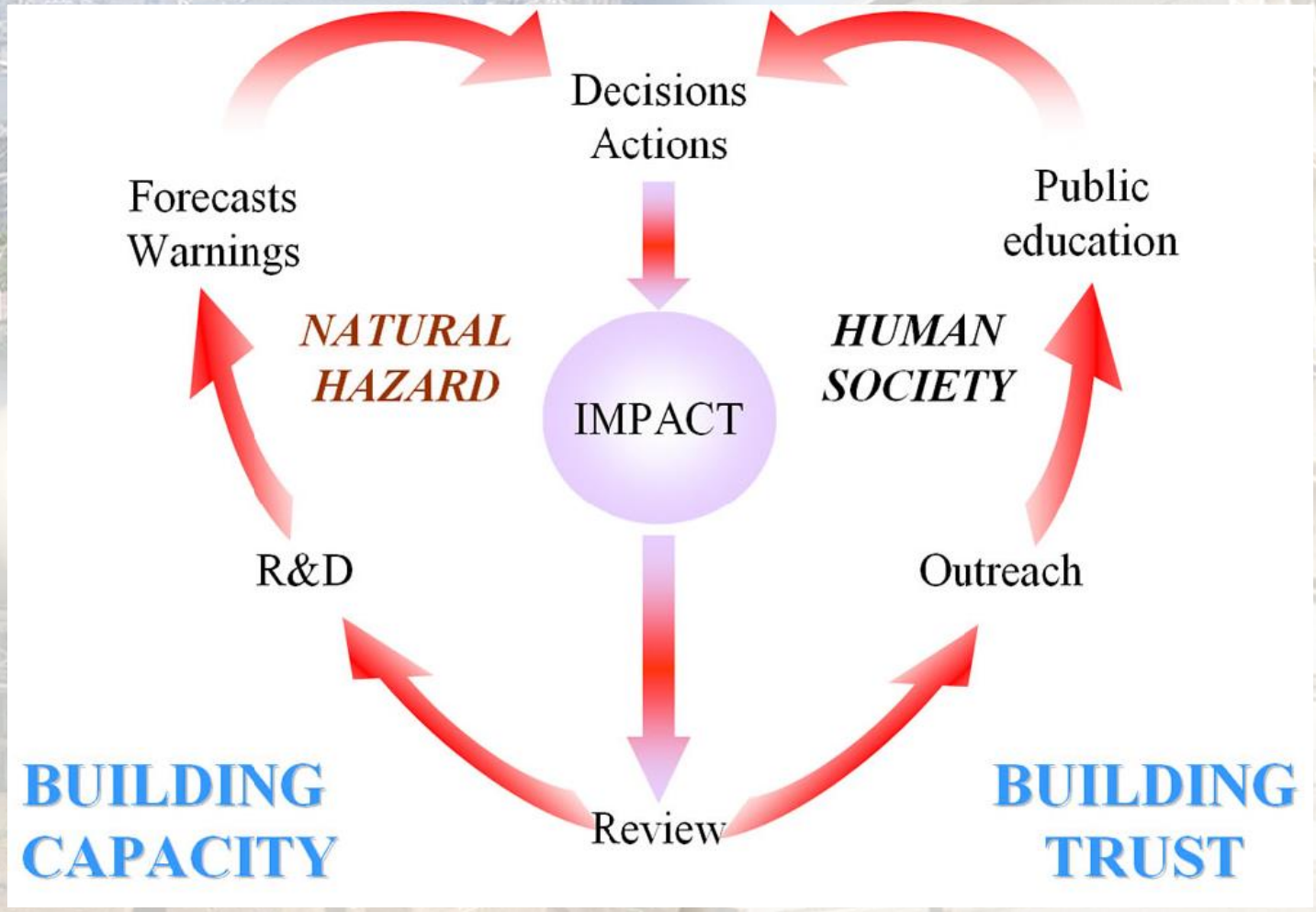

Rising expectation cancels the effect of a rising level of service, maintaining the gap

香港天文台
HONG KONG OBSERVATORY

香港天文台
HONG KONG OBSERVATORY

香港天文台
HONG KONG OBSERVATORY

# Meteorological Services have to work on both science and human aspects



香港天文台
HONG KONG OBSERVATORY

# ~ Thank you ~