

How best to develop and receive impact service

Sandy Song

Hong Kong Observatory

Different levels

- Threshold of weather warnings (still weather elements) correlated to “impact” (floodings, closure of schools, releasing staff to return home due to high winds)
- Forecast “impacts” (e.g. number of landslides)
- Precautionary announcement of warnings (actions) related to “impact” (consolidated impact into warning announcements)
- Probability forecast (chance of occurrence) vs impact → Risk-based → action does not need to wait until “high” chance of occurrence
- Sophisticated : include “impact” into Weather warnings explicitly (may need to issue jointly with partners?)

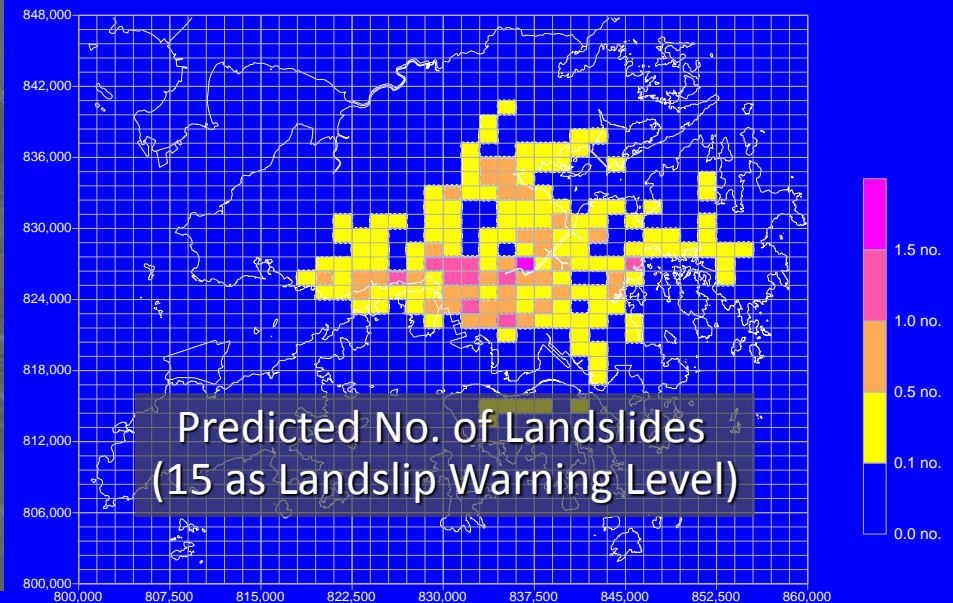
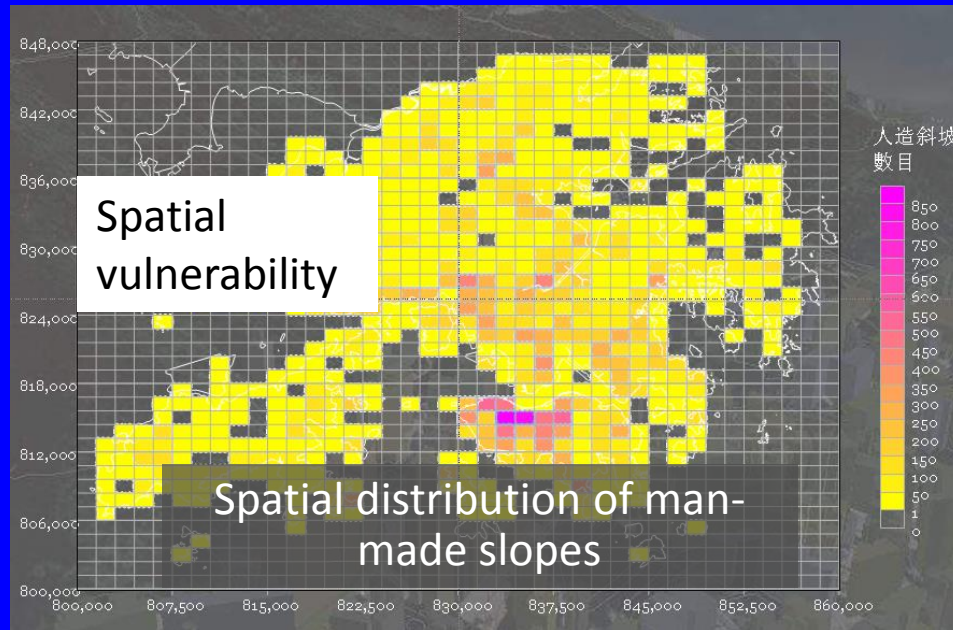
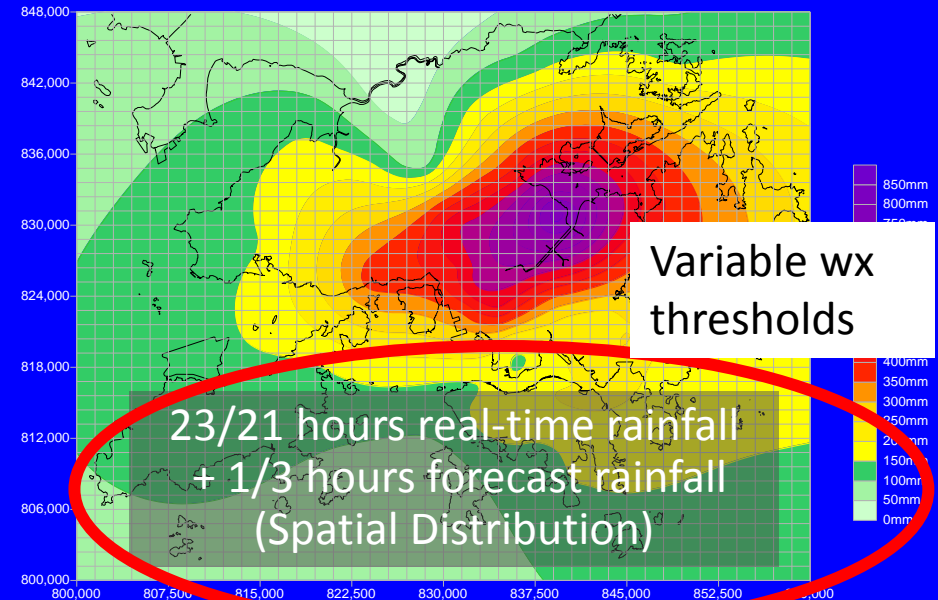
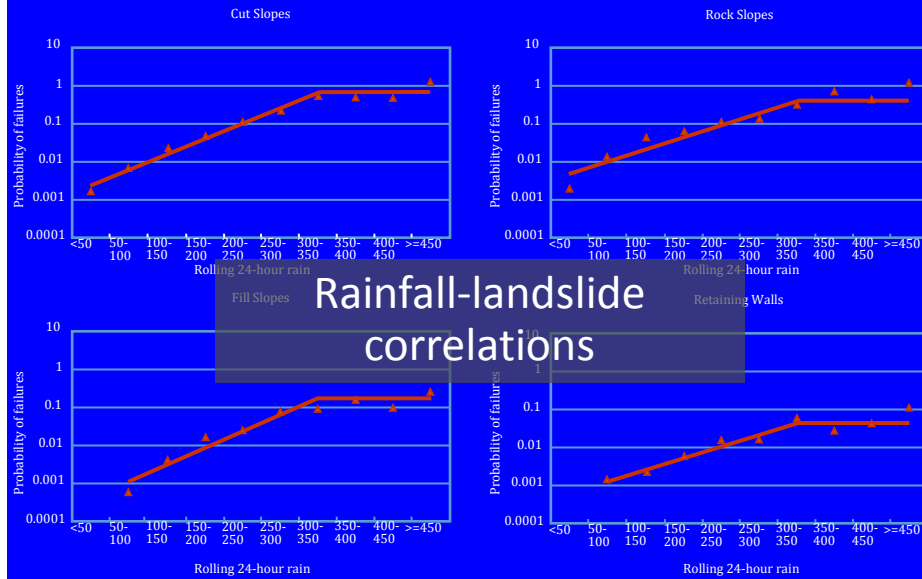


Landslip Warning

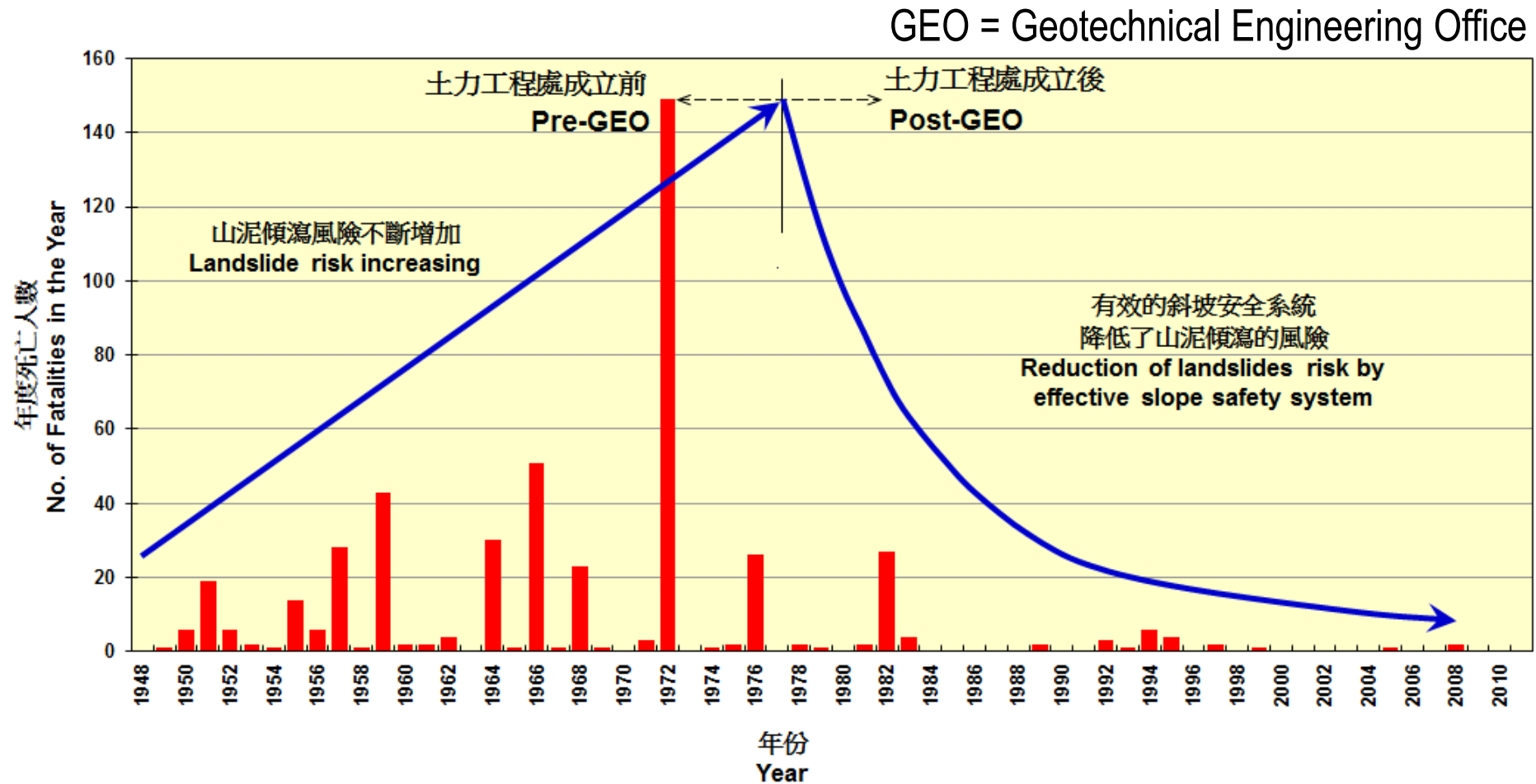
- A landslip warning will be issued by the Hong Kong Observatory in conjunction with Geotechnical Engineering Office when there is a high risk of many landslips as a result of persistent heavy rainfall.
- Prompt the public to take precautionary measures to reduce their exposure to risk posed by landslips.



Work Flow of the Computation of Landslip Warning System



Disaster Prevention and Mitigation







Fire Danger Warning

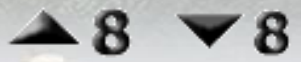
- The HKO operates the fire danger warning to alert the public of conditions when fire risk is high, in the interest of protecting lives and property.
- Besides taking weather factors and vegetation conditions into account when considering the issue of warnings, the HKO also considers exposure factors related to social activities.
- Past records show that there were more fires during **public holiday** and **some festivals** such as the one in autumn when Chinese people traditionally went to the hills or cemeteries and paid tribute to their ancestors. Hence the threshold of issuing warning will be lower during such high risk period (**temporal variation of thresholds**)
- The operation of fire danger warning is effective in saving lives and rescuing the precious trees by considering whether there will be more people engaging in activities in the countryside.

Major Severe Weather Warnings

Tropical Cyclone Warning Signals

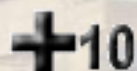
 1 ■ Standby Signal No.1

 3 ■ Strong Wind Signal No.3

 8
NW 西北 SW 西南 ■ Gale or Storm Signal No. 8

 8
NE 東北 SE 東南

 9 ■ Increasing Gale or Storm Signal No. 9

 10 ■ Hurricane Signal No. 10

Rainstorm Warning Signals

 ■ Amber Rainstorm Signal
Amber 黃

 ■ Red Rainstorm Signal
Red 紅

 ■ Black Rainstorm Signal
Black 黑

Tropical Cyclone Warning

- The HKO operates a graded tropical cyclone signal system to warn the public of the threat of winds associated with a tropical cyclone.
- The system consists of numbers representing increasing levels of local wind strength. Number '1' indicates general alert, '3' means primary school and kindergarten students having no school, and '8' means all schools closed and most organizations releasing their staff to return home. (Signal relates directly to social activities)
- In an effort to reduce traffic disruption when millions of people hurry home at the same time when number 8 signal is issued, the HKO keeps close liaison with relevant government department and transport operators to ensure a state of readiness.
- When number 3 signal is in force, the HKO will provide them with updates on the probability of number 8 signal, with enhanced consultation prior to peak/busy/school hours (temporal variation of operational mode). The provision of risk assessment (though not yet developed into a warning) on higher impact weather, with mutual understanding between HKO and users on the interpretation of the probabilistic terms, can help avoid traffic chaos in tropical cyclone situations.

Tropical Cyclone Warning

- During the passage of tropical cyclone near Hong Kong, the HKO will provide alert to the public to take precautionary measures against possible flooding due to storm surges.
- Besides this territory-wide alert, the HKO also issues specific alerts for certain low-lying areas vulnerable to flooding, so that mitigation measures based on local need can be arranged to alleviate the impact of flooding to local residents.
- Considering the local conditions, the HKO adopts different thresholds of water level **(spatial variation of thresholds depending on vulnerability variation)** for issuing the storm surge alerts for different flood vulnerable areas.



Rainstorm Warning

- Rainstorm warning signal criteria generally based on hourly rainfall.
- However, if prolonged heavy rain occurs, the threshold of hourly rainfall will be lower



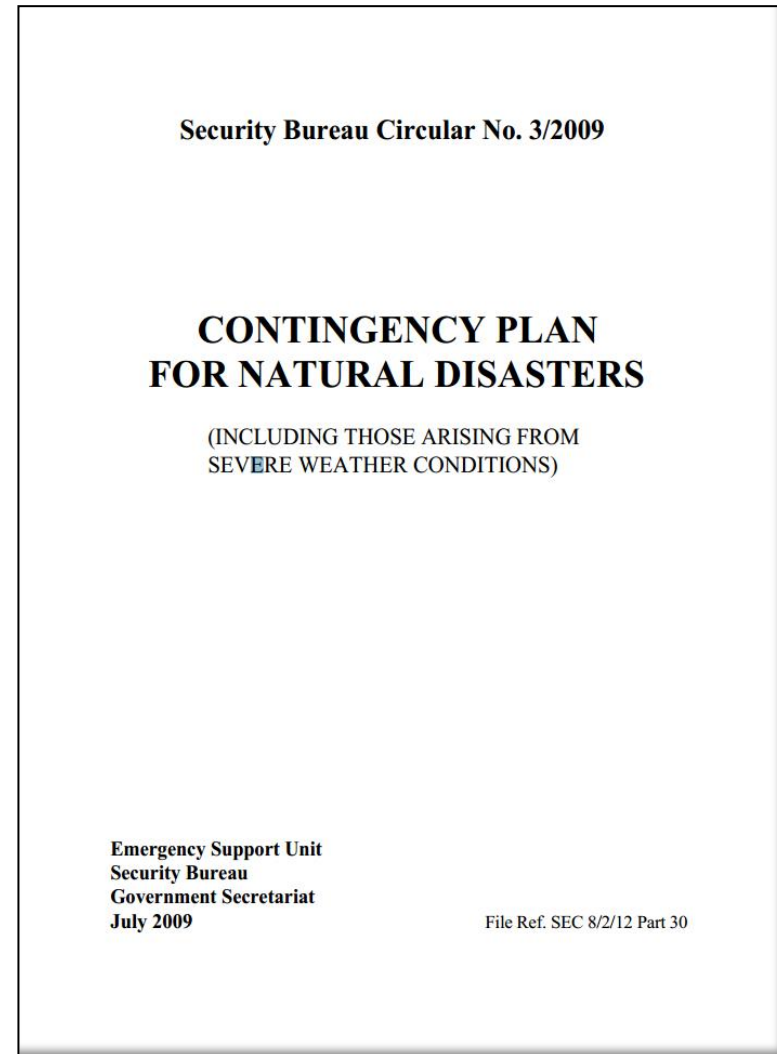
Cold and Very Hot Warning

- Apart from temperature, also takes into consideration wind speed and RH.

Contingency Plan for Natural Disasters for HK

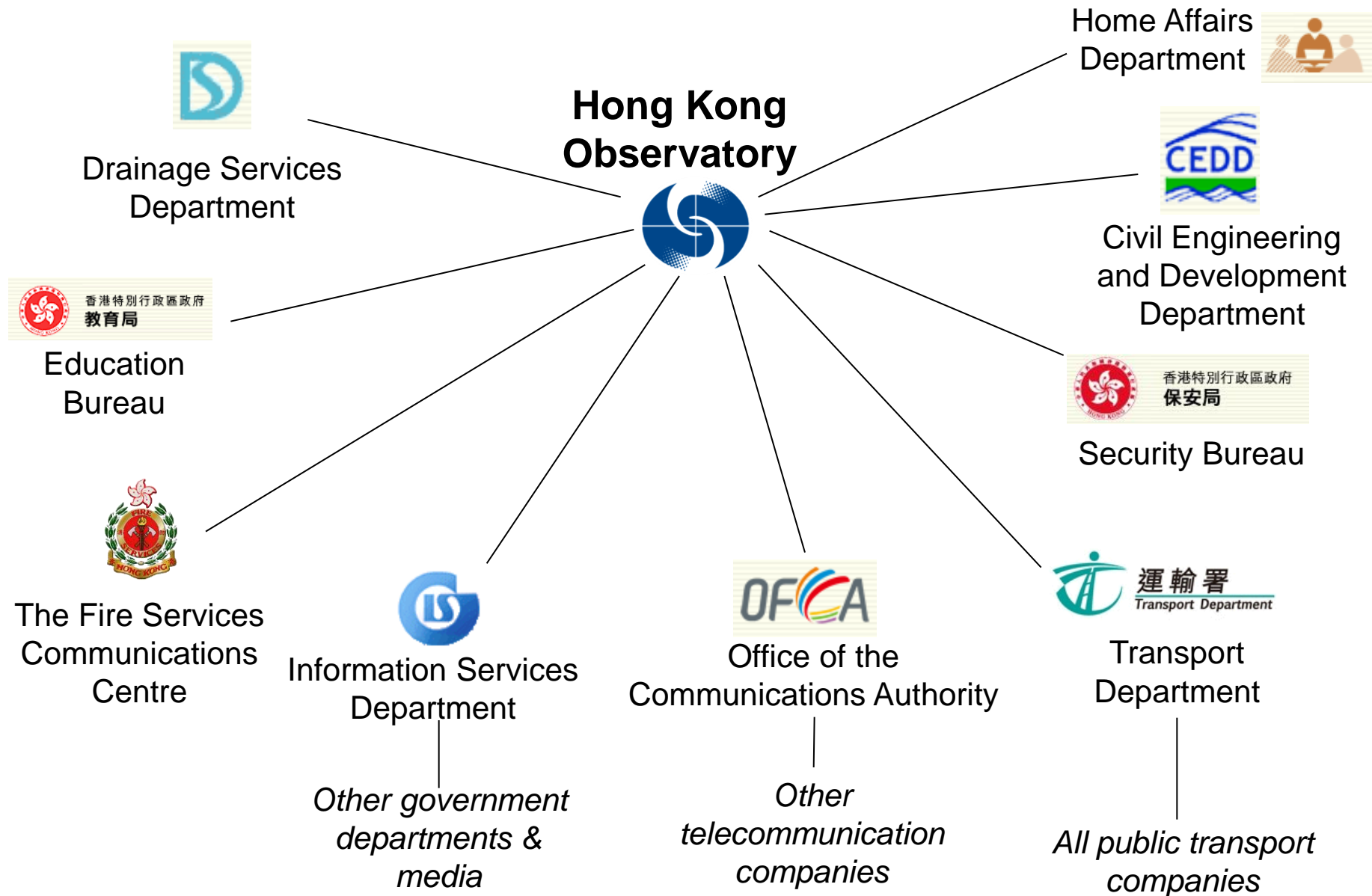
Emergency Support Unit, Security Bureau

- 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



Dissemination System

Relay of Warnings within the Emergency Response System



Youtube here: <https://www.youtube.com/watch?v=8aBMgzNNrpg>

<https://www.youtube.com/watch?v=8aBMgzNNrpg>

Now on dropbox: <https://www.dropbox.com/s/yribeld3bqu2se6/Typhoon-warnings-combinedrevrev.mp4?dl=0>

Suggestions

- development of partnership
- sharing of data (from other sources, from partners) on GIS platform
- risk assessments
- Use visual video to illustrate impact
 - Typhoon-related multi-hazards (Typhoon Committee project)

Youtube here: <https://www.youtube.com/watch?v=8aBMgzNNrpg>

dropbox: <https://www.dropbox.com/s/yribeld3bqu2se6/Typhoon-warnings-combinedrevrev.mp4?dl=0>

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

