

The Latest of Climate Change in Hong Kong

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Hong Kong Observatory

Hong Kong, China

Contents

- Observed climate change in Hong Kong since 1885
- Climate projections for Hong Kong in the 21st century
- Outreach activity and public education

Climate monitoring in Hong Kong

Hong Kong Observatory Headquarters (HKO)

Observation began in 1884 (interrupted during WWII)

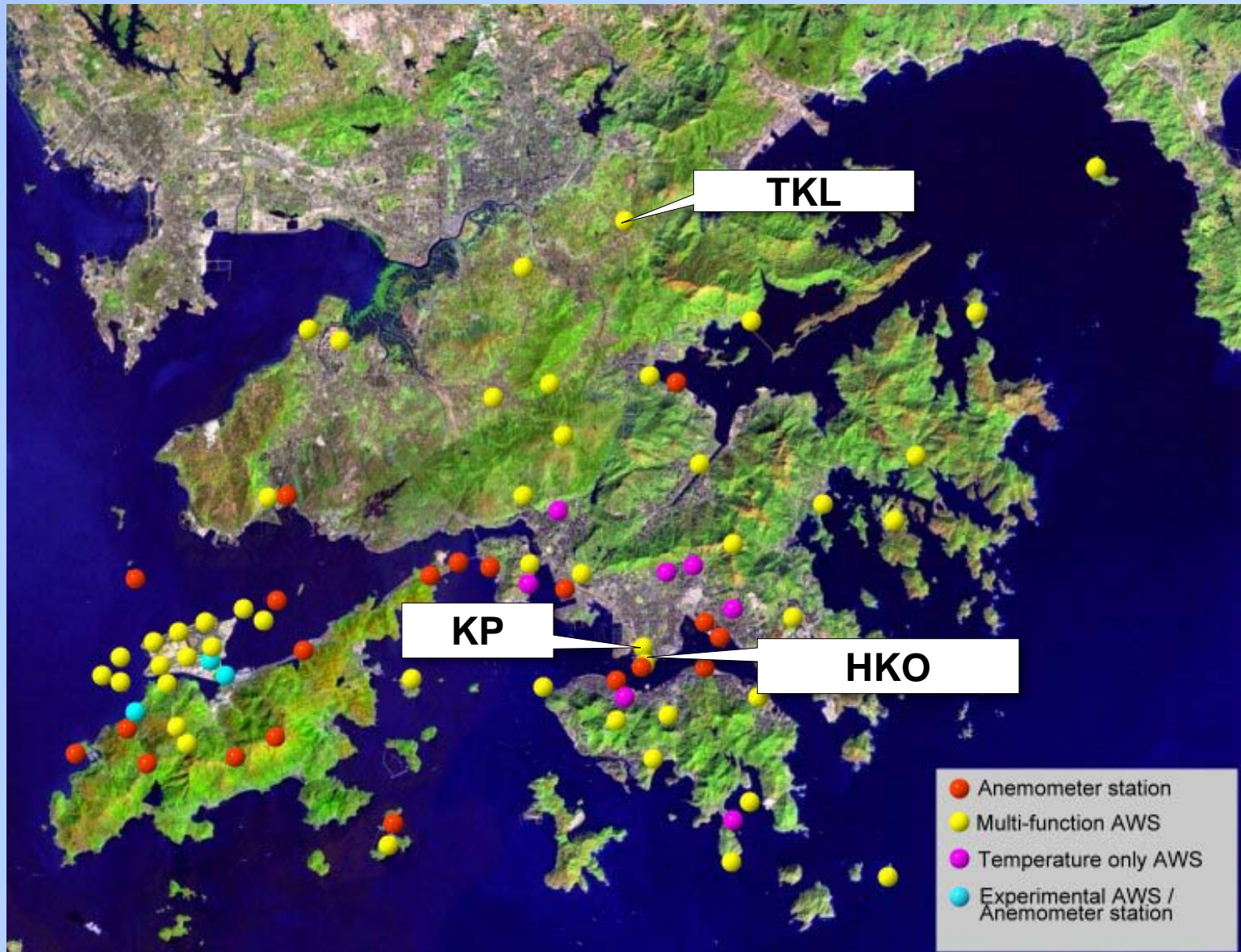
King's Park Meteorological Station (KP)

Upper-air station since 1951

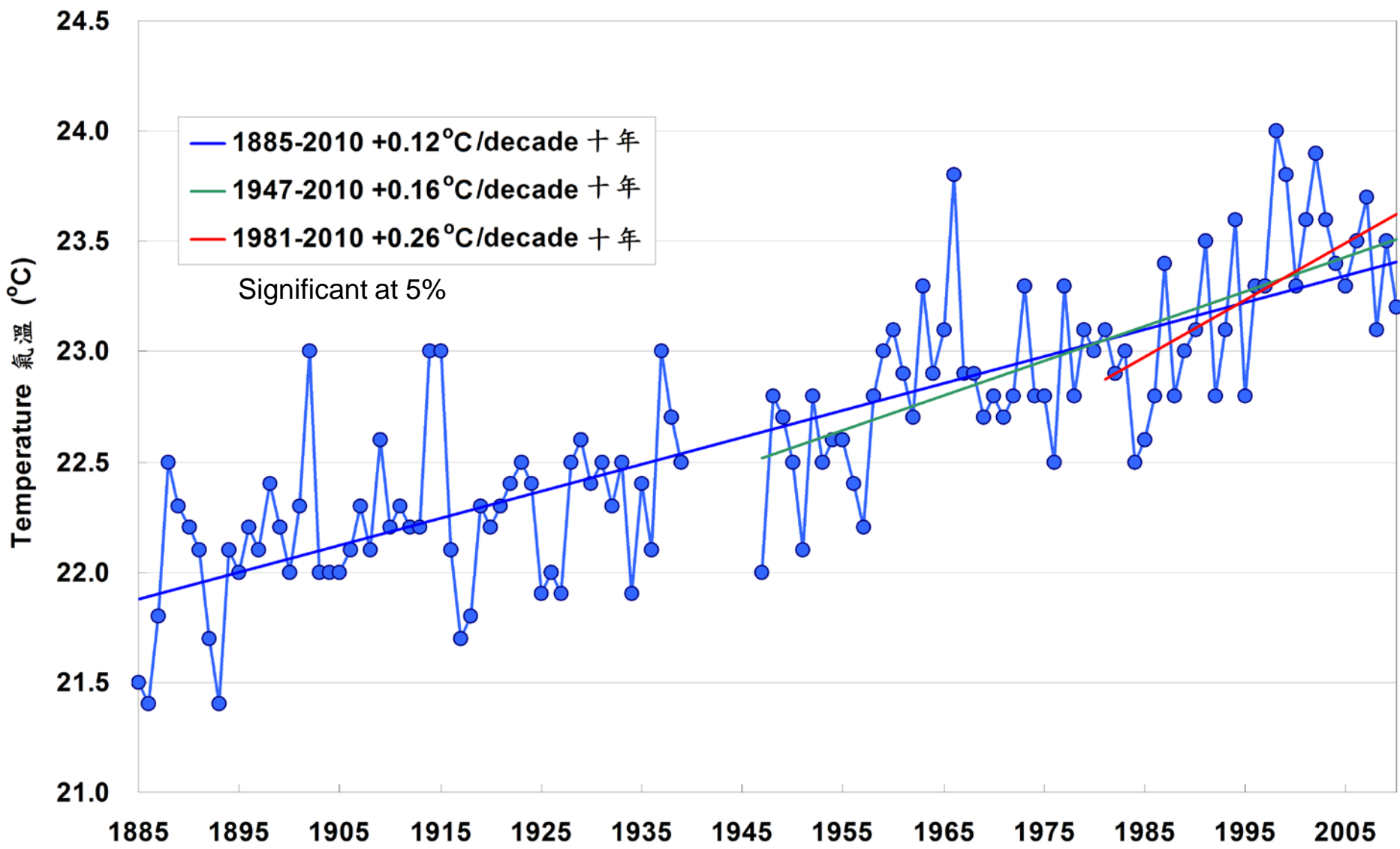
Ta Kwu Ling Automatic Weather Station (TKL)

Rural weather station since 1985

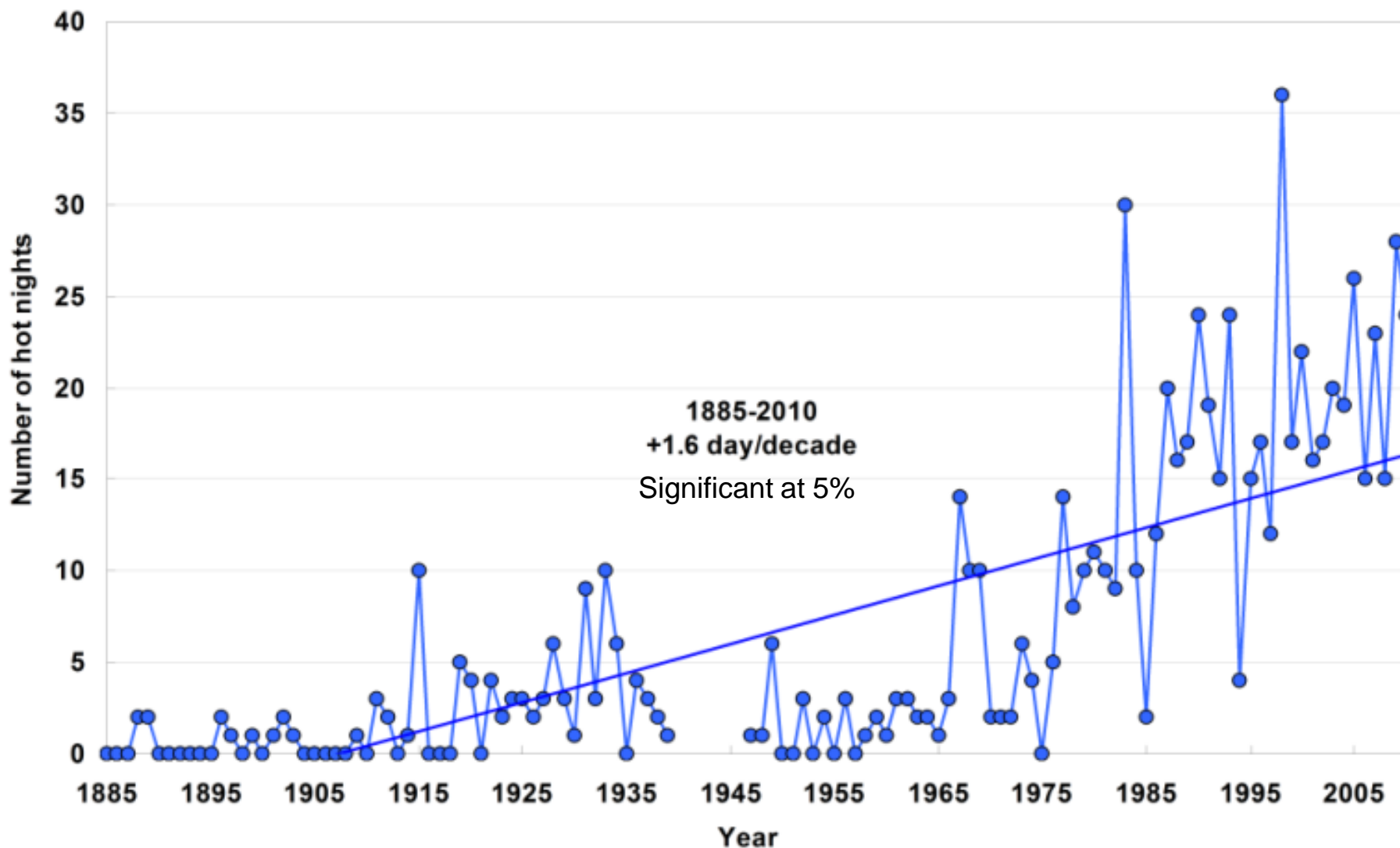
Enhanced Coverage of Monitoring Network since the mid-1980s



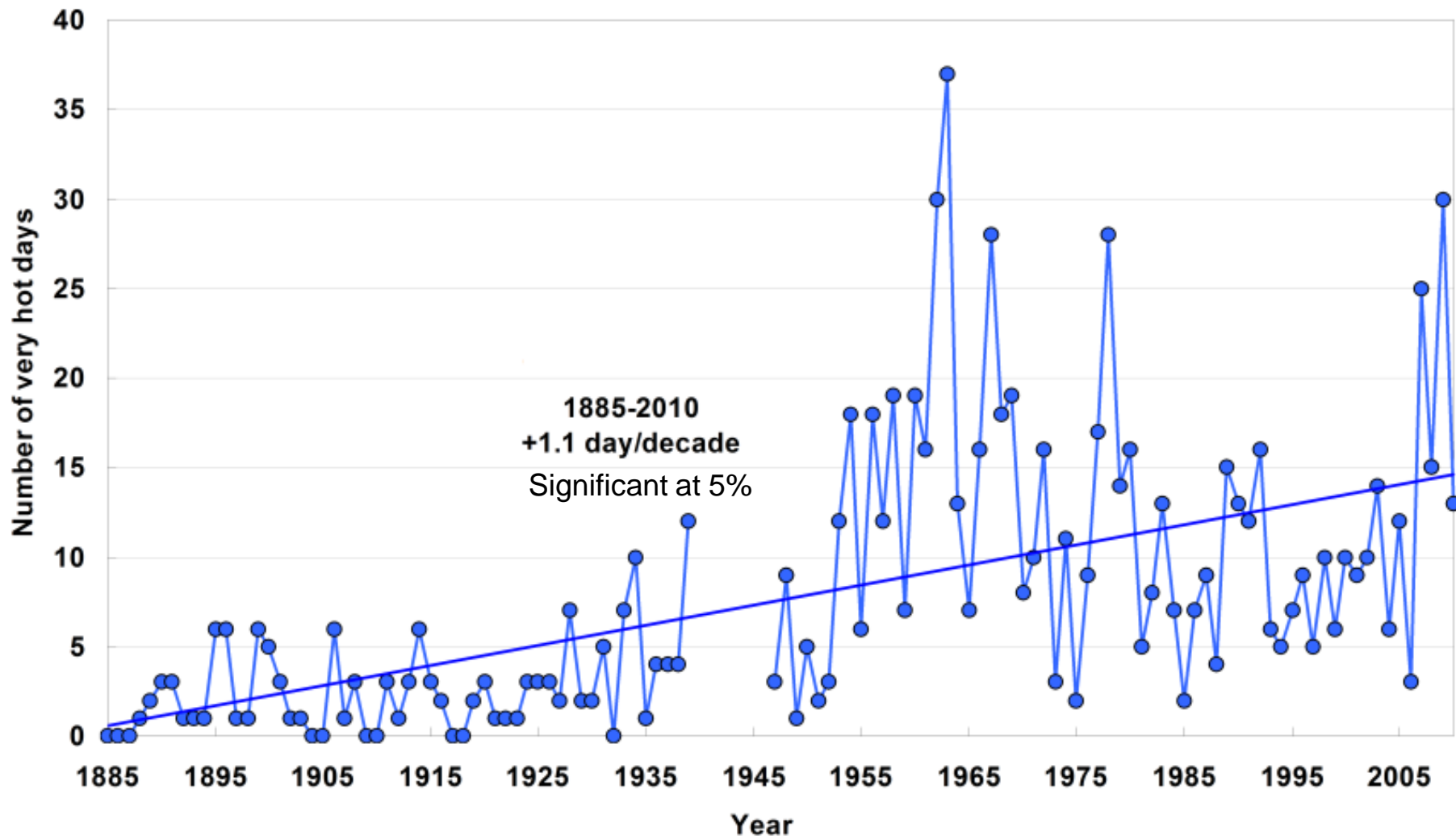
Rising annual temperature in Hong Kong (1885-2010)



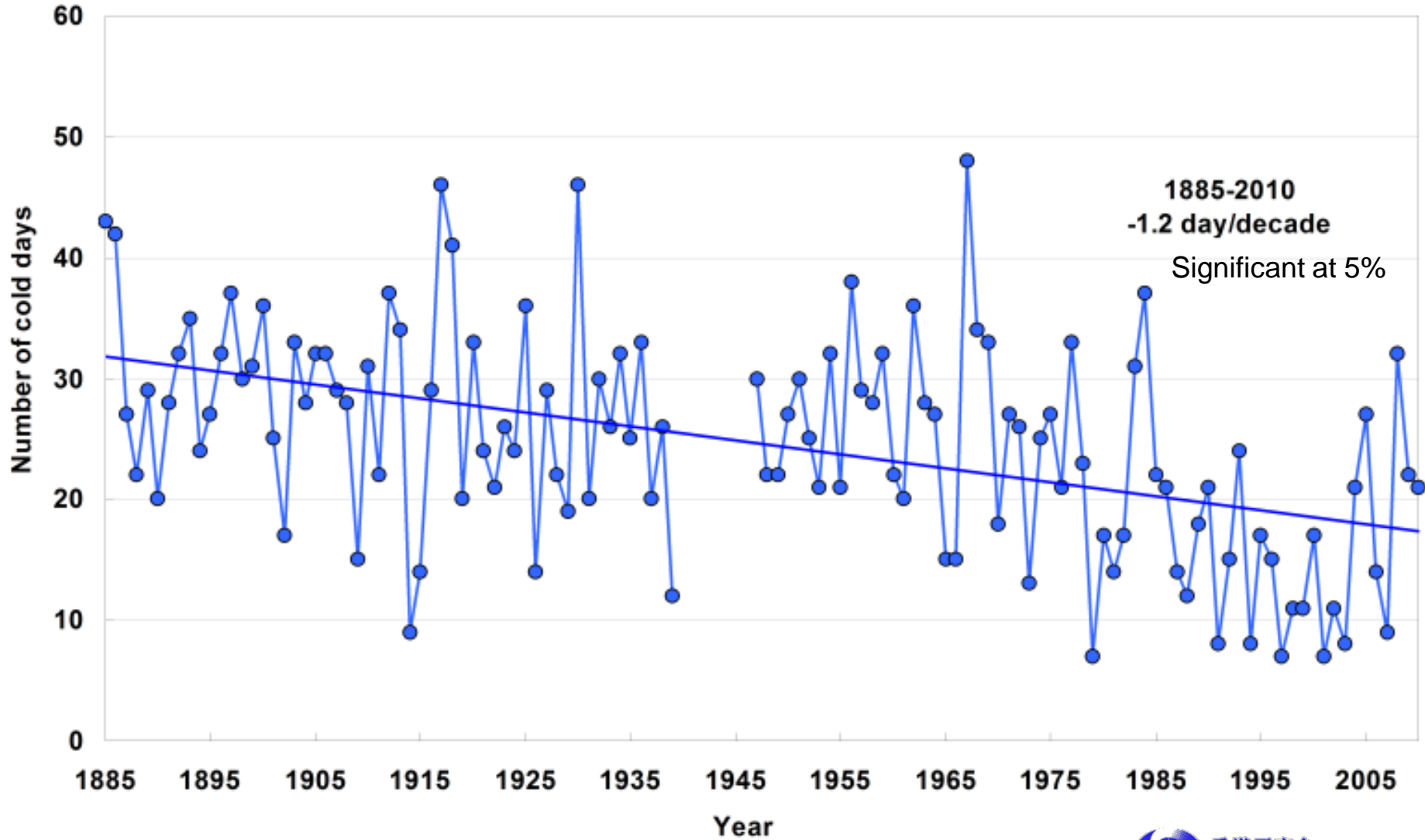
Increasing annual no. of hot nights (Tmin \geq 28 C)



Increasing annual no. of very hot days ($T_{max} \geq 33\text{ C}$)



Decreasing annual no. of cold days ($T_{min} \leq 12\text{ C}$)

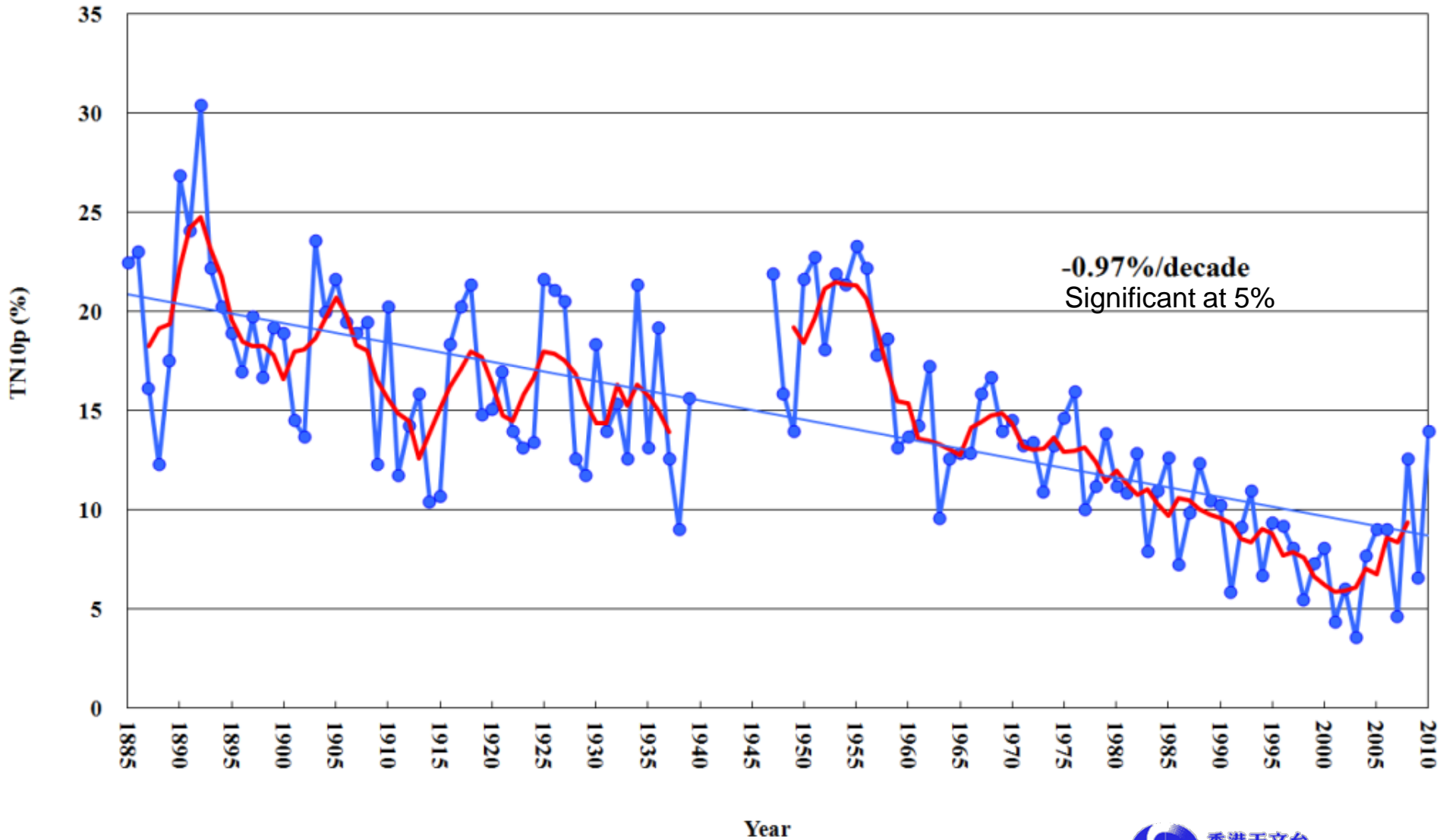


Extreme indices adopted from ETCCDMI

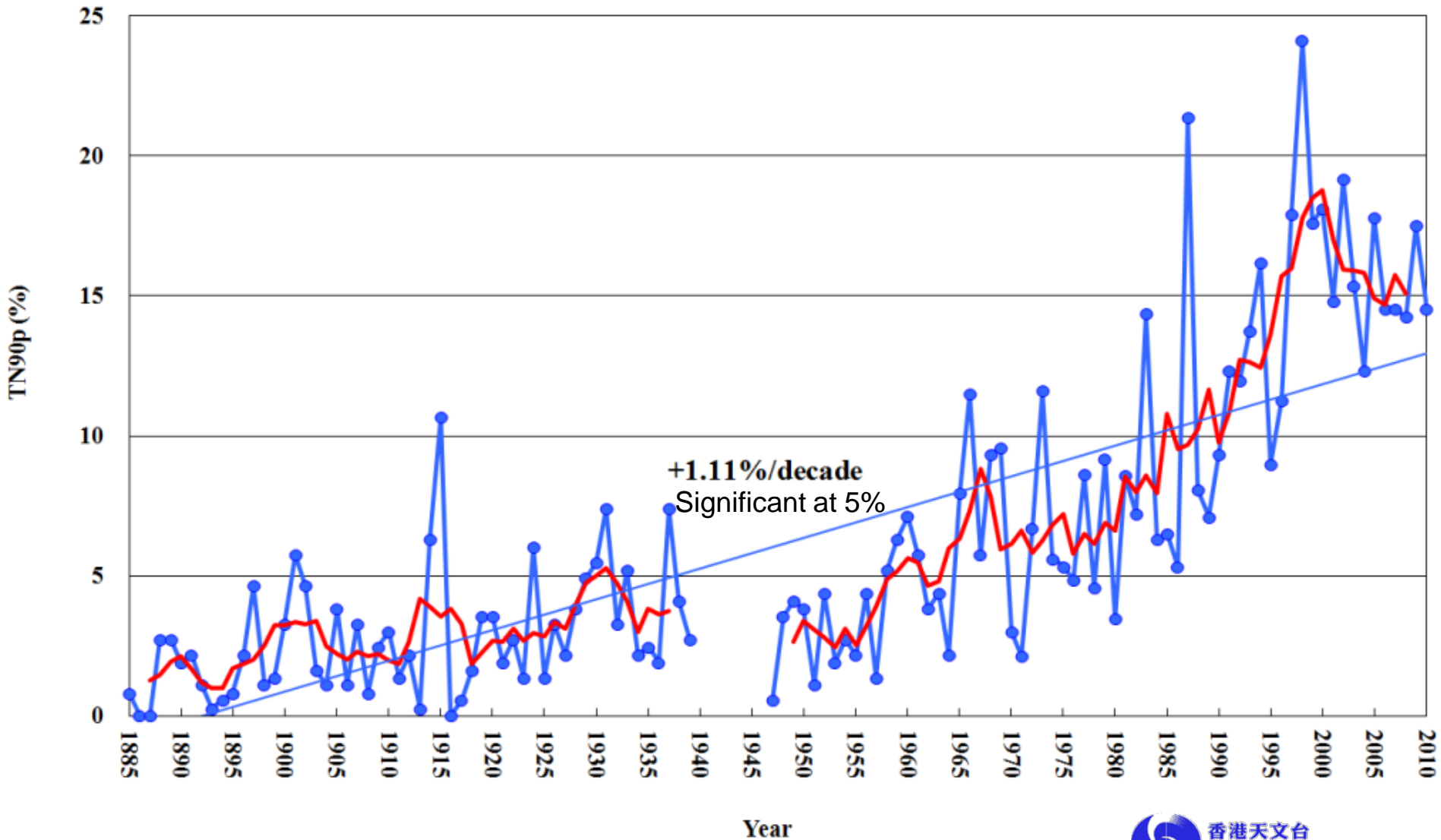
TN10p (cool nights)	Percentage of days when daily minimum temperature < 10th percentile
TN90p (warm nights)	Percentage of days when daily minimum temperature > 90th percentile

ETCCDMI – Expert Team on Climate Change Detection, Monitoring and Indices, WMO CCI/WCRP CLIVAR

TN10p – cool nights index



TN90p – warm nights index

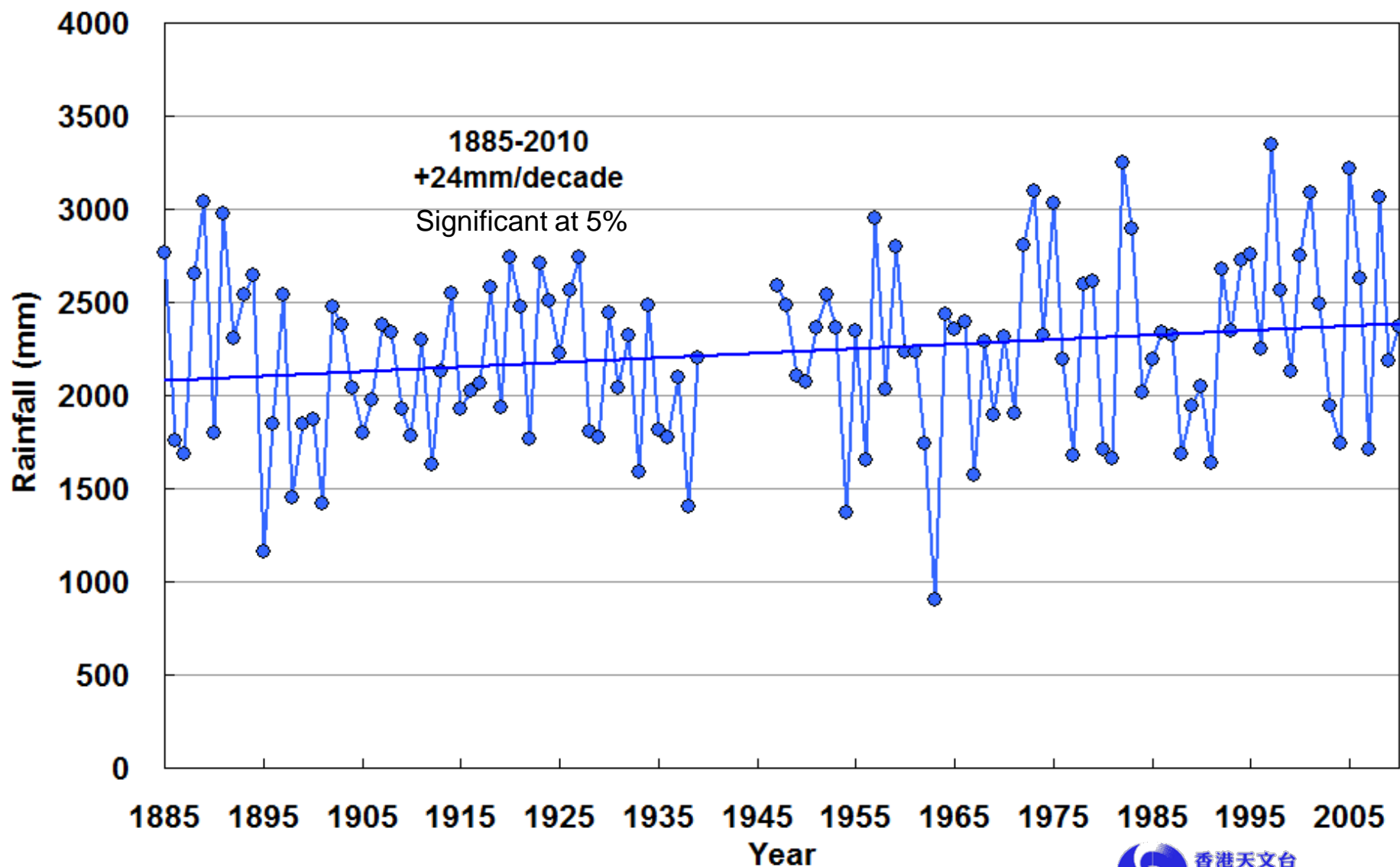


Analysis using time dependent Generalized Extreme Value (GEV) distribution

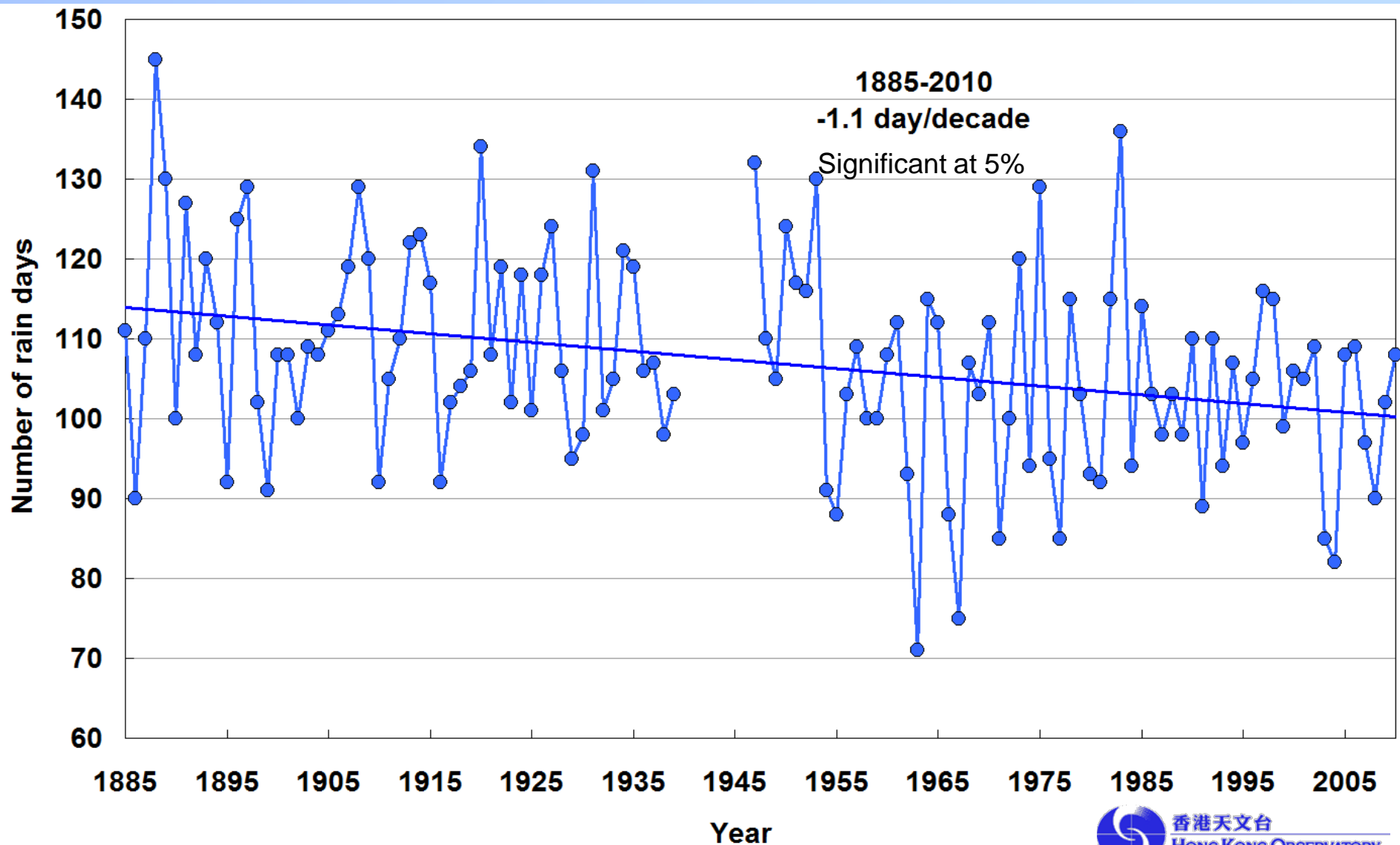
Extreme event	Return period in 1900	Return period in 2000
Minimum Temp. $\leq 4^{\circ}\text{C}$	6 years	163 years
Maximum Temp. $\geq 35^{\circ}\text{C}$	32 years	4.5 years

(Source : Wong, M.C. and H.Y. Mok, 2009: Trends in Hong Kong Climate Parameters Relevant to Engineering Design. HKIE Civil Division Conference 2009 : Conference on Engineers' Responses to Climate Change.)

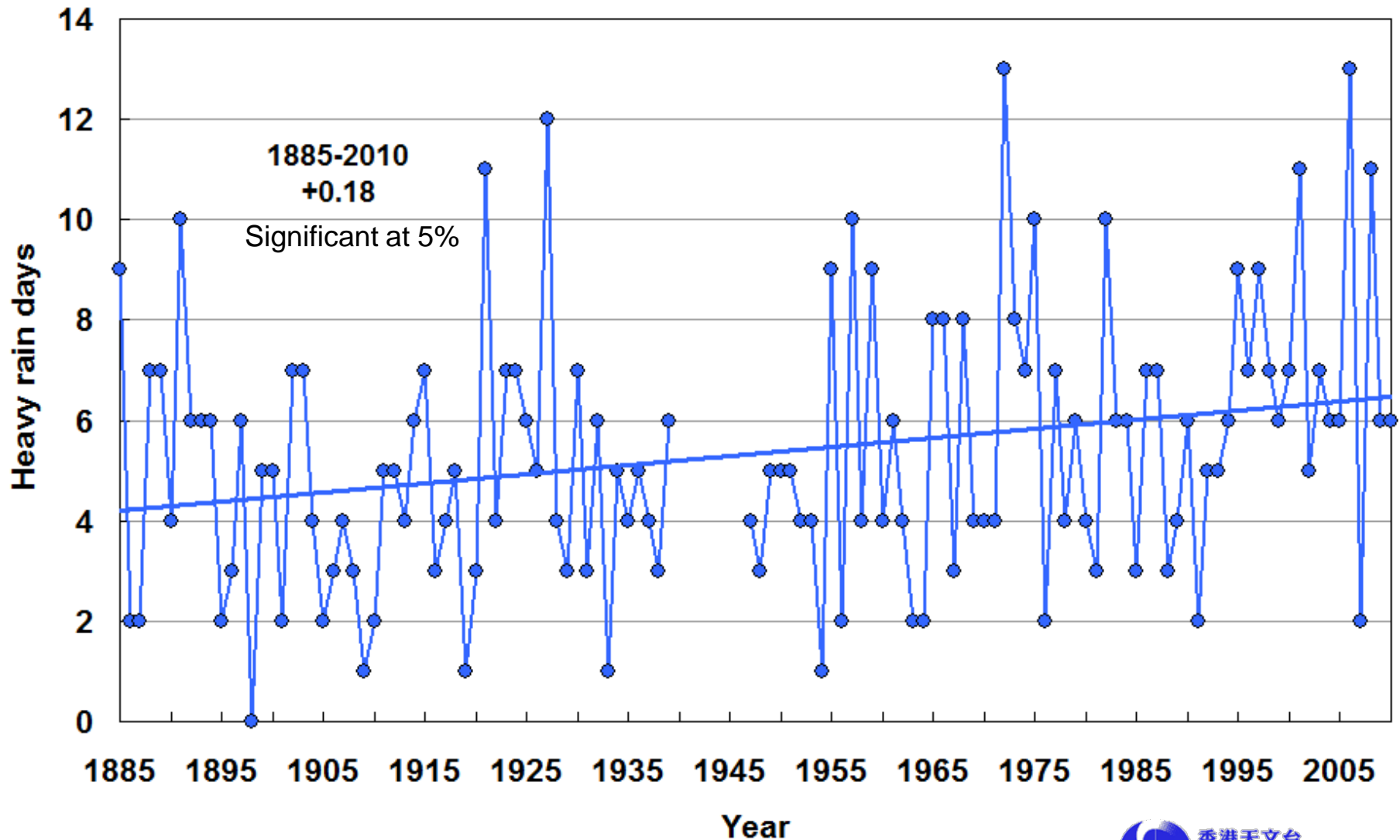
Rising annual rainfall in Hong Kong (1885-2010)



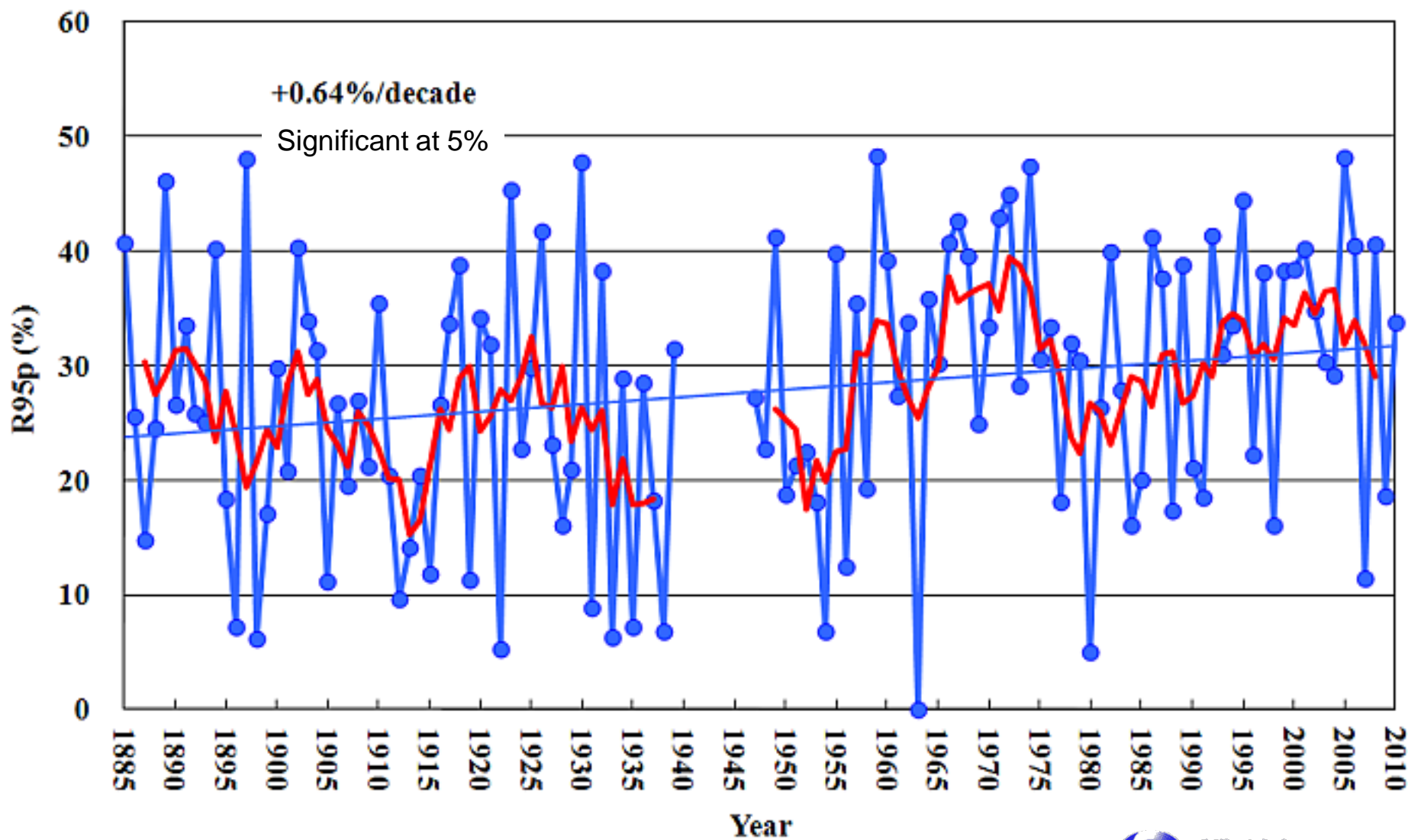
Decreasing no. of rain days (daily rainfall ≥ 1 mm)



Increasing no. of heavy rain days (hourly rainfall ≥ 30 mm)



R95p – fraction of annual rainfall amount due to extreme rainfall days (adopted from ETCCDMI)

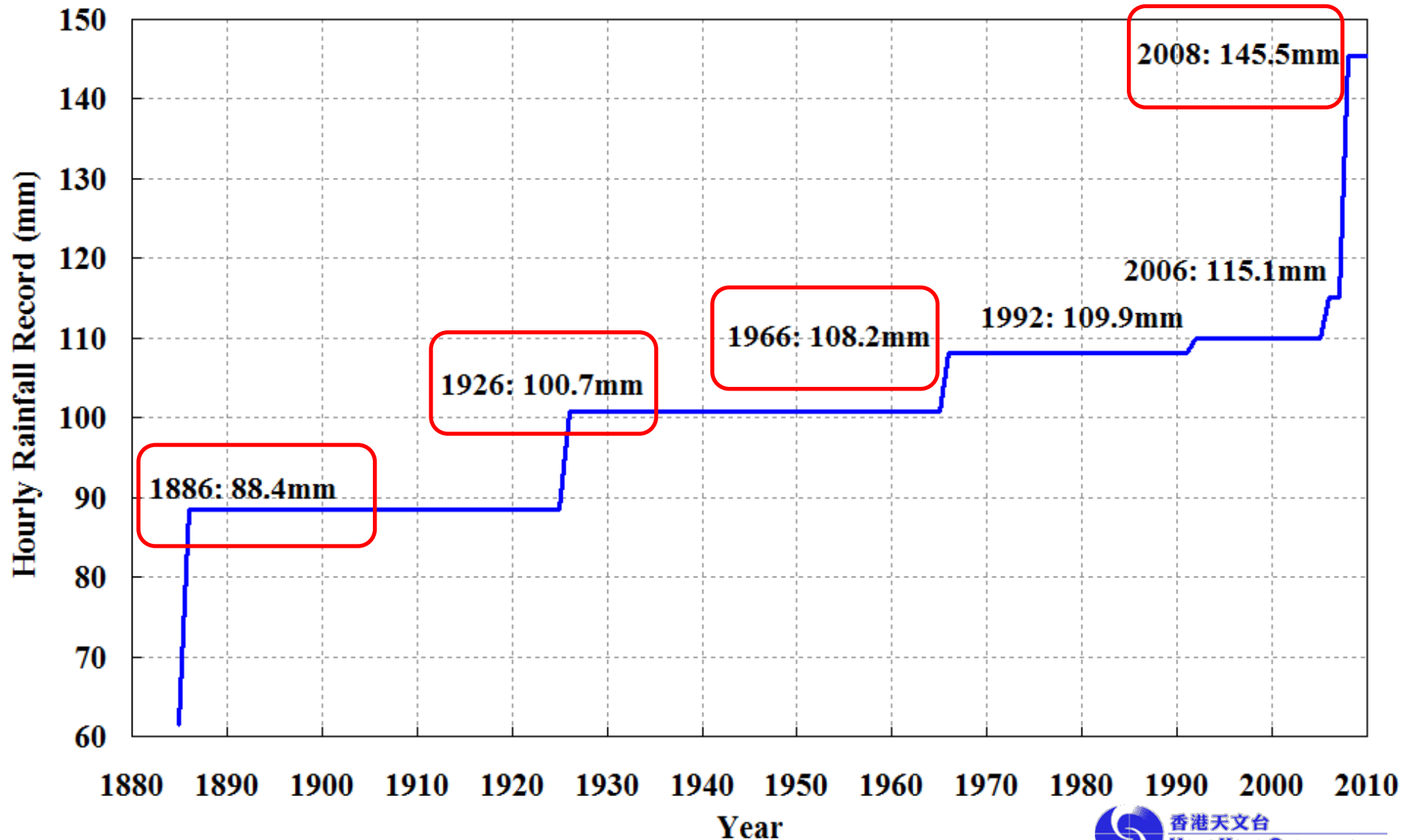


Analysis using time dependent Generalized Extreme Value (GEV) distribution

Extreme event	Return period in 1900	Return period in 2000
Hourly rainfall $\geq 100\text{mm}$	37 years	18 years

(Source : Wong, M.C. and H.Y. Mok, 2009: Trends in Hong Kong Climate Parameters Relevant to Engineering Design. HKIE Civil Division Conference 2009 : Conference on Engineers' Responses to Climate Change.)

Record high hourly rainfall at the HKO (1885 – 2010)

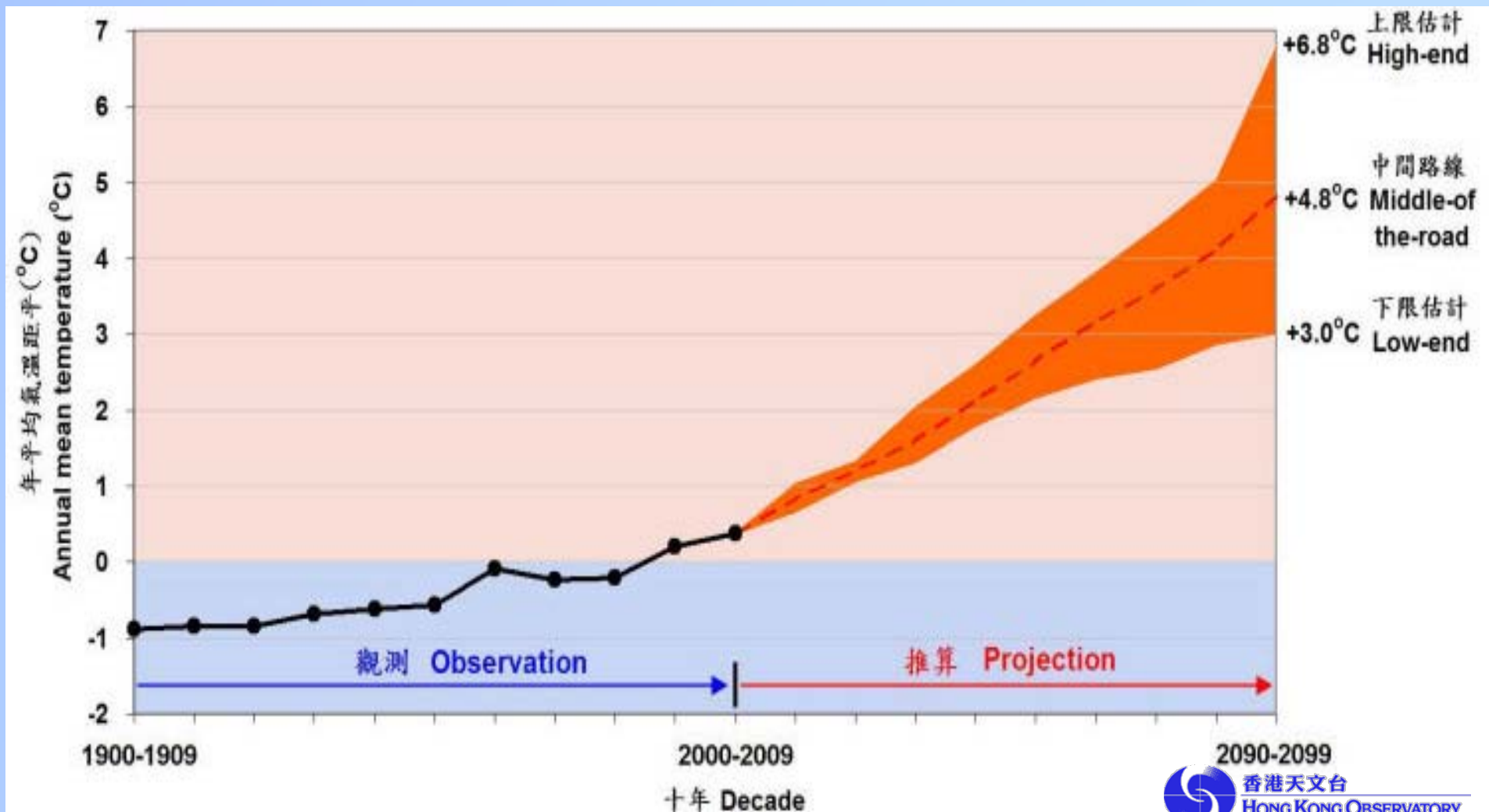


Projections for Hong Kong (based on IPCC AR4)

- ~30 sets of global model data (A2, A1B, B1) were used
- Downscaling technique: multiple regression
- Incorporated urbanization effect in temperature projection
- Projected quantities:
 - Annual mean temperature
 - Annual total rainfall
 - Extreme indices

Temperature projection for Hong Kong

- Statistically downscaled model data from IPCC AR4 to station level
- Incorporated urbanization effect
- Result: the rising trend will continue

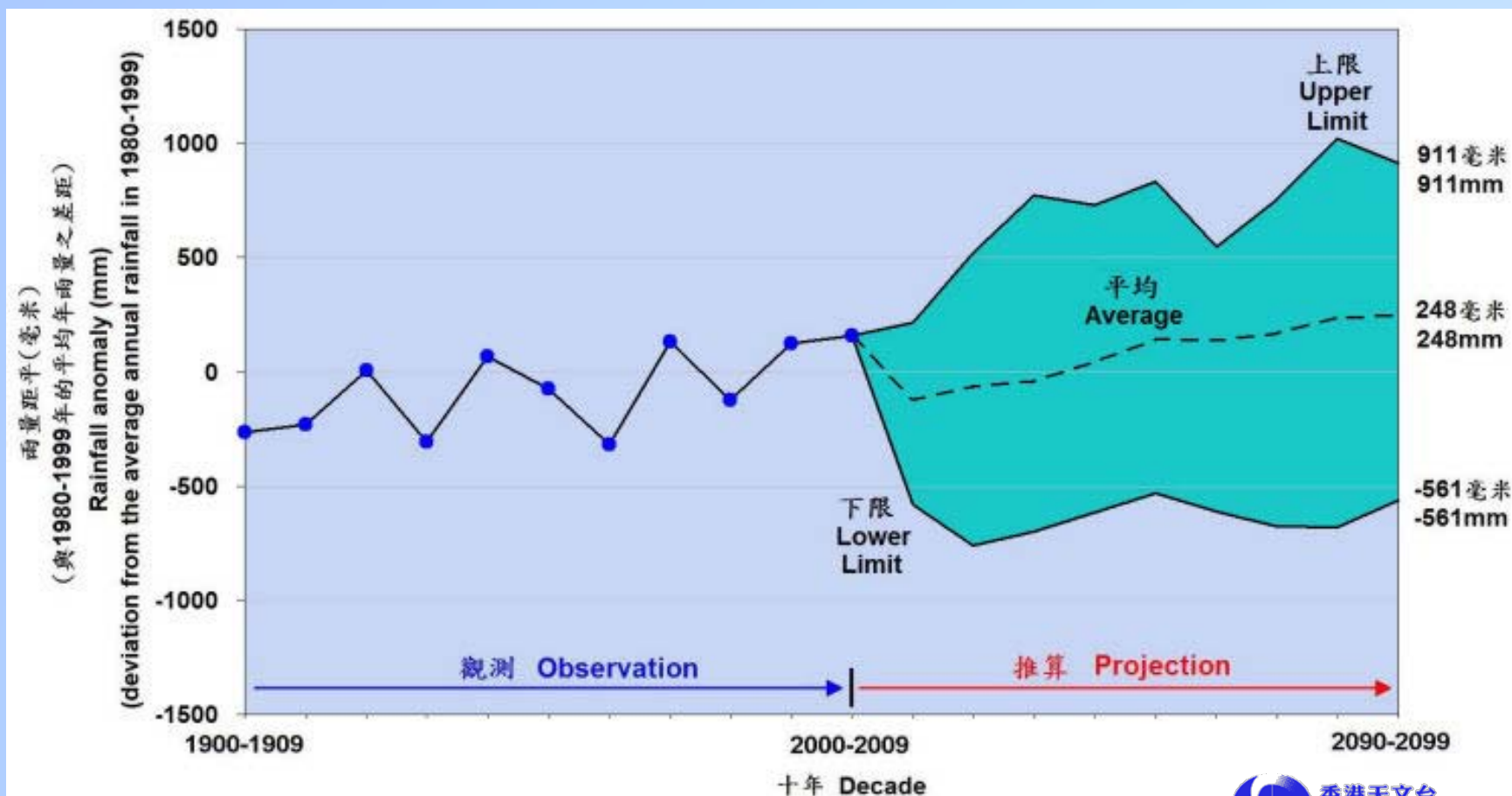


Projection of extreme indices in Hong Kong

	1980-1999 (actual)	2050-2059	2090-2099
Annual no. of cold days ($T_{\min} \leq 12\text{C}$)	17	4	1
TN10p (%)	9.4	1	0.3
TN90p (%)	11.6	53.4	74.2
Annual no. of hot nights ($T_{\min} \geq 28\text{C}$)	16	96	137
Annual no. of very hot days ($T_{\max} \geq 33\text{C}$)	9	51	89

Rainfall projection for Hong Kong

- Statistically downscaled model data from IPCC AR4 to station level
- Results:
 - much larger uncertainty
 - rainfall will increase during the latter half of the 21st century









Projection of extreme indices in Hong Kong

	1980-1999 (actual)	2050-2059	2090-2099
Annual no. of rain days (daily rainfall \geq 1 mm)	104	82	77
Annual no. of heavy rain days (daily rainfall \geq 100 mm)	3.5	4.3	5.3
R95p (%)	28.8	33.8	39.3

Some local impacts of climate change

- Increasing electricity demand (67% GHG emission due to electricity generation in 2008)
- Health issue – heat stress
- Flood risk – rising sea level, more extreme rainfall events
- Landslide risk – more heavy rain

More climate change info. on www.hko.gov.hk

氣溫 Temperature	年雨量 Annual rainfall	海平面 Sea level
 上升 rise	 上升 rise	 上升 rise
能見度 Visibility	雲量 Cloud amount	太陽總輻射 Solar radiation
 下降 fall	 上升 rise	 下降 fall

Public Education and Outreach Activities

Speaker team on climate change



Educational package



Climate change webpage

Hong Kong Observatory
The Government of the Hong Kong Special Administrative Region

GOVHK 香港政府一站通 繁體版 簡休版

SEARCH SITE MAP

Print Version PDF Version

CLIMATE CHANGE

Climate change has become a major challenge of our time. In 2007, the United Nations [Intergovernmental Panel on Climate Change \(IPCC\)](#) clearly indicated in its Fourth Assessment Report that the increase in the atmospheric greenhouse gas concentration due to human activities are very likely responsible for the observed global warming since the middle of the 20th century.

The Hong Kong Observatory (HKO), as the government department responsible for studying the scientific basis of climate change, has over the years been actively carrying out research on climate change in Hong Kong and sparing no effort in its public education activities.

This webpage serves to provide the public with a convenient means to access various information related to global and local climate change, including [background on global climate change](#), [observed climate change in Hong Kong](#), [future climate projections](#), [educational resources](#), [climate change outreaching activities in Hong Kong](#), and [publication and references](#), etc.

Global Climate Change

- Definitions of climate change
- Cause of climate change by human activities
- Observed global climate change
- Projection of global climate for the 21st century

» More

Observed Climate Change in Hong Kong

- Temperature
- Rainfall
- Mean sea level
- Cloud amount, solar radiation and evaporation

» More

Documentaries on climate change shown on public transport vehicles



HKO officer



Workshop and exhibition on climate change



Press events



- Press events to promulgate research results
- Summary for the public, government departments/bureaux

Future Work on Climate Change

- More studies on extreme weather events (extreme temperature, heavy rain, tropical cyclones, etc.)
- Prepare online climate quiz and climate change booklet, enhance the educational package ...
- Update climate projections for Hong Kong based on IPCC AR5 model data

Thank You