

港大天文學家傳授「秘笈」解讀雙子座流星雨 呼籲市民遵守「觀星禮儀」 流星共享

HKU's astronomers interpret the Geminid Meteor Shower
Promote stargazing manners and dark sky conservation

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「保育星空·流星共享」行動
"Be a responsible stargazer"
Enjoy the meteor shower Campaign

了解更多 know more:

<http://nightsky.physics.hku.hk/KE/201718/>



- 流星、流星雨的科學
Science of meteor & meteor shower
- 「每小時天頂流星數」的含意
Explaining the “Zenithal Hourly Rate”
- 光污染對流星數目的影響
Light pollution & meteor observation
- 「懶人包」圖解
Educational infographics
- 「保育星空·流星共享」行動
“Be a responsible stargazer •
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流星、流星雨的科學

Science of meteor & meteor shower

- **Meteoroid:** a small body of rock or metal; an enormous number of them exist in our Solar System
- **Meteor:** meteoroid enters the atmosphere, air friction will cause it and the atmosphere to glow, creating a bright streak of light in the sky



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流星、流星雨的科學

Science of meteor & meteor shower

- **Meteor shower:** when the Earth sweeps past regions of meteoroids, large number of meteors will appear in the sky
- **Radiant:** meteors appear to be radiating from radiant in the sky
- Meteor showers are named by the constellation where the radiant is located



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流星、流星雨的科學

Science of meteor & meteor shower

- The Earth sweeps past certain group of meteoroids around the same time every year, thus meteor showers reappear roughly at the same each year.
- Major annual meteor showers in 2017:

	Activity	Peak	ZHR	Local observation condition
Perseids	17/07 - 24/08	12/08	150	Unfavourable
Orionids	02/10 - 07/11	21/10	20	Favourable
Leonids	06/11 - 30/11	18/11, 00:30	10	Favourable
Geminids	04/12 - 17/12	14/12, 14:30	120	Excellent

Courtesy: HK Space Museum

- The numbers of observable meteors of different meteor showers are different each year, depending on various factors e.g., the activity of the shower in that particular year, timing of the peak, and moon phase, etc.



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流星、流星雨的科學

Science of meteor & meteor shower

- **Geminids**

- Radiant is located at the constellation Gemini
- Meteoroids are related to the asteroid 3200 Phaethon
- Peak of Geminids occurs on Dec 14
- Zenithal Hourly Rate of = 120

- **Geminids 2017**

- Moon is absent during peak hours
- Meteor shower with the best observing conditions this year
- The best observing time for HK: midnight to 5 am on Dec 14



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輻射點
radiant

雙子座
Gemini

2014/12/14
00:46:04 (GMT+8)

Photo by MewChu
facebook.com/HK.StarryNight

E



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「每小時天頂流星數」的含意

Explaining the “Zenithal Hourly Rate”

- “Zenithal Hourly Rate” (ZHR)
 - Hourly number of meteors of a particular meteor shower observable
 - To achieve this number:
 - an observer with totally dark-adapted eyes
 - radiant directly up the zenith
 - observing site has an unobstructed field-of-view
 - without moonlight and light pollution
- ZHR is an ideal figure, the actual number observable will always be smaller than that
- Peak activity of the Geminids this year occurs at daytime (~2:30 pm) on Dec 14 in Hong Kong



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「每小時天頂流星數」的含意

Explaining the “Zenithal Hourly Rate”

- The actual number of observable meteors depends on many factors, such as:
 - light pollution condition of the observing site
 - geographic location of the observing site
 - activity of the shower
 - timing of the peak
 - altitude of the radiant
 - observer’s eyesight
 - observer’s experience
 - moon phase
 - cloud amount
 - field-of-view



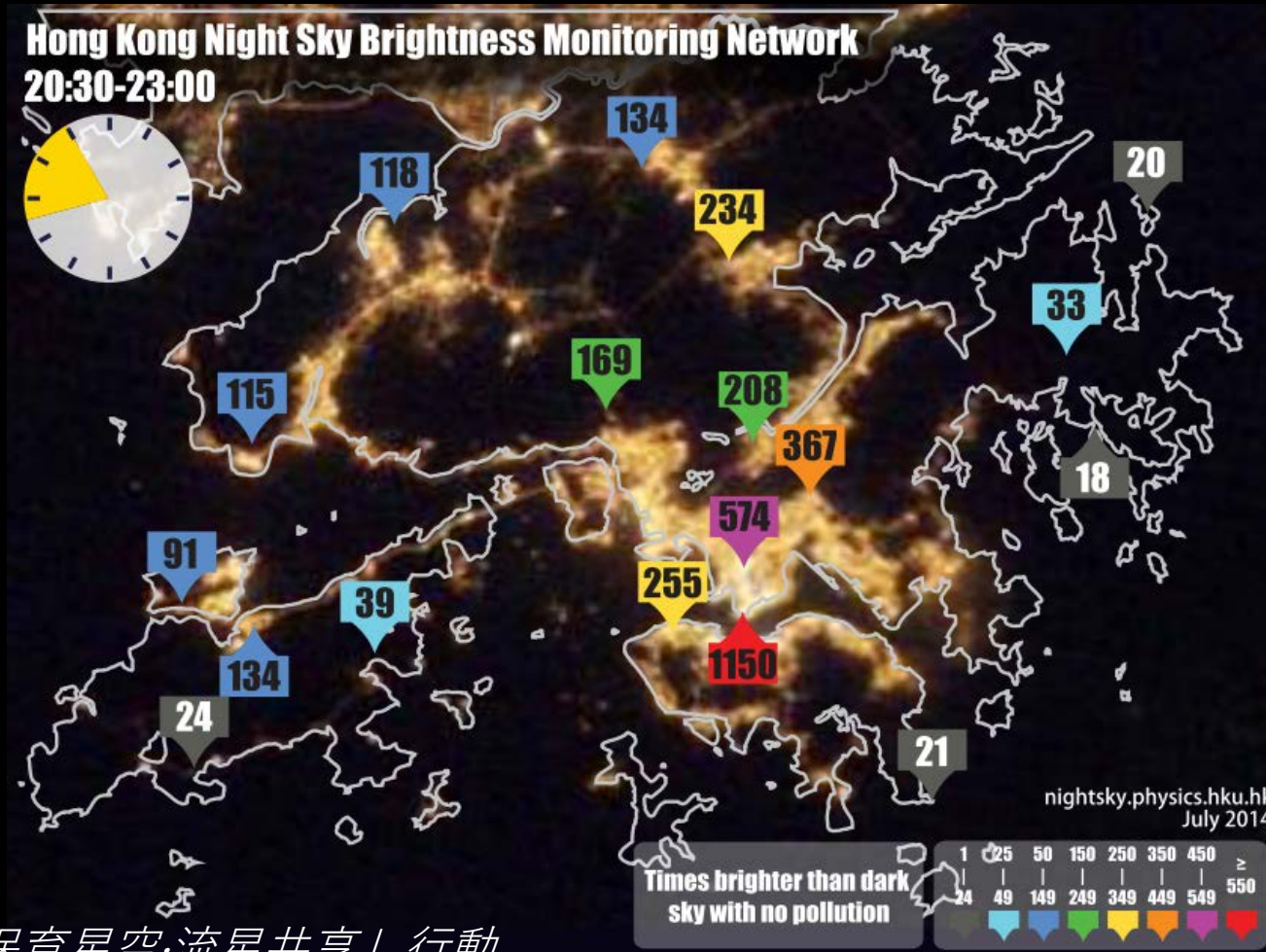
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光污染對流星數目的影響

Light pollution & meteor observation



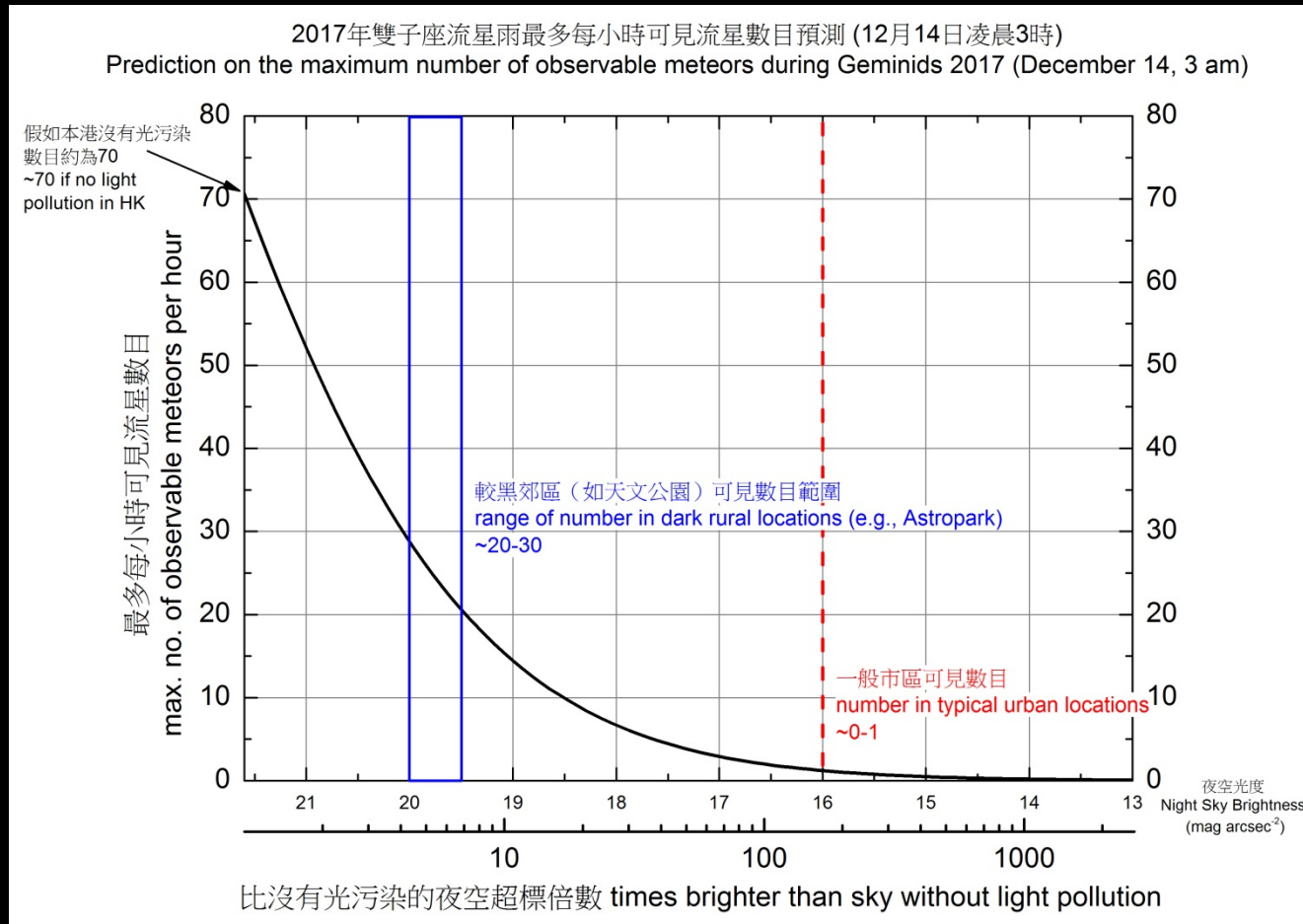
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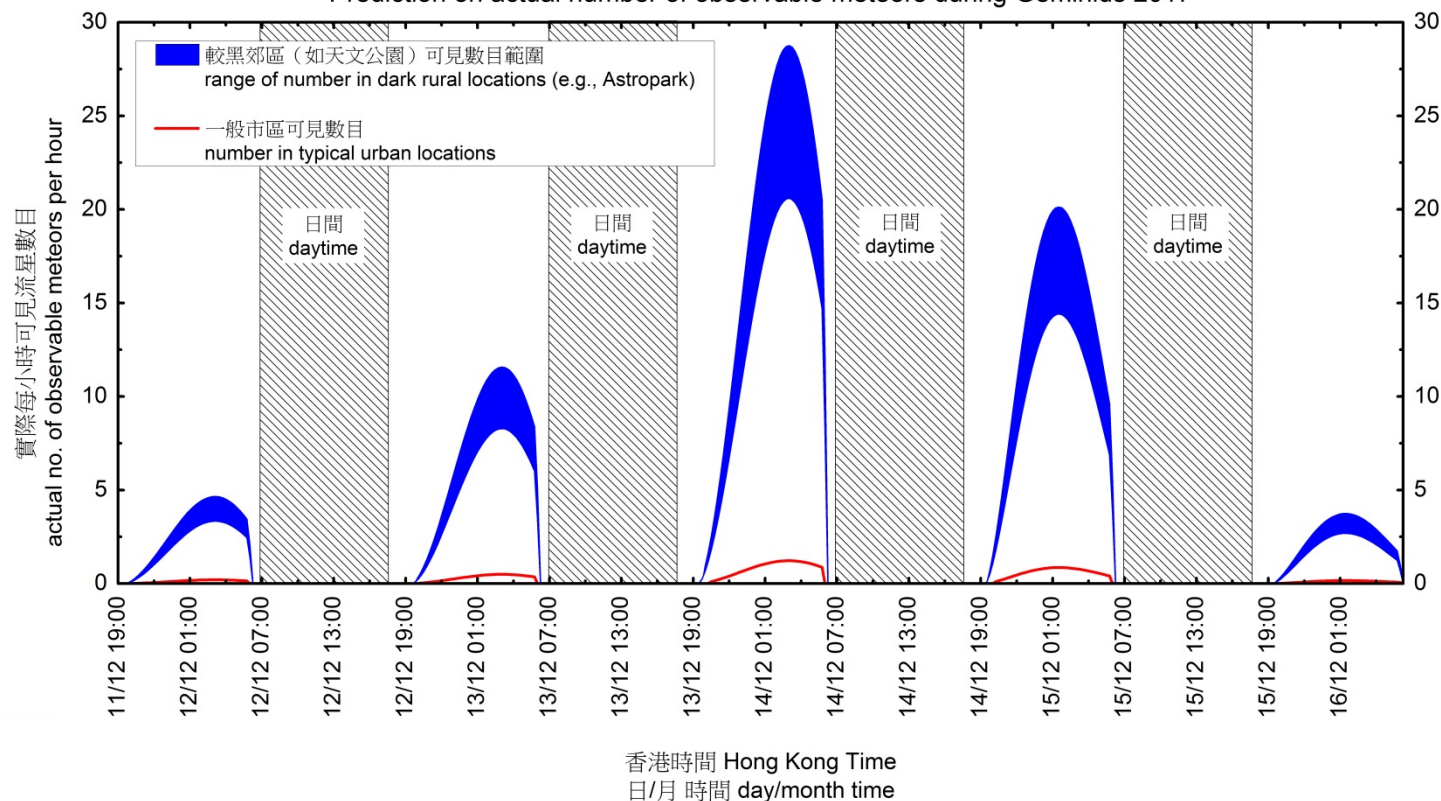
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光污染對流星數目的影響

Light pollution & meteor observation

2017年雙子座流星雨實際每小時可見流星數目預測
Prediction on actual number of observable meteors during Geminids 2017



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「懶人包」圖解

Educational infographics

Zenithal Hourly Rate

To achieve 120 meteors per hour

Experienced observer with excellent eyesight and totally dark-adapted eyes

Radiant at zenith

Actual number of meteors affected: 120 million

Serious light pollution in Hong Kong

Geminids 2017

Meteor Shower

Meteor: a meteoroid enters the atmosphere and glows due to friction

Meteor Shower: meteors radiating from a single point in the sky

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Tips for Viewing the Shower

Time:



Good weather



Best time to see in
Hong Kong:
Dec 14
Midnight - 5am
(HKT)

Place:



Stay away
from light
pollution



Open space with
wide field-of-view

Gear:



Proper
stargazing
manners



No telescope
needed!



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Proper Stargazing Manners

No powerful
lighting or flash



Use red light
torches



Take your
litter home



Protect
Mother Nature



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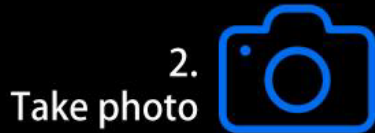
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Campaign

Report Bad Lighting Fixtures



1. Look for poor lighting fixtures



3. Record location/
share location in
Facebook

4. Post to Facebook with hashtags
#ResponsibleStargazer
#MeteorShower



Icons made by Freepik, Smashicons, Gregor Cresnar, Smashicons from www.flaticon.com



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「保育星空·流星共享」行動

“Be a responsible stargazer • Enjoy the meteor shower”

Campaign

Post photos of yourself
enjoying the night sky
with proper stargazing
manners to Facebook



Icons made by Freepik, Dave Gandy, fps web agency, frc

Post to Facebook with hashtags

#ResponsibleStargazer

#MeteorShower



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Campaign



示範
demo



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