Observation of Night Sky Brightness at Showa Station

Kaijo High School Earth Science Club

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Introduction

We can't see beautiful night sky!!

Why did this sky so shine?

We clarified the relationship between aerosol and brightness of night sky.

Mitaka

Subject

We need to compare the place of no light pollution.

Are they the same mechanism under different environment?

What is it the true darkness of night sky?

Outline of this observation

The people of the 55th Antarctic wintering party acted for our observation.

- Place: The observation room at Showa Station
- Term: 2014/3～2014/11
- Interval time: Every 5 minutes

We set SQM-LE beside the aurora camera.

We controlled LE from PC in this room.

Showa Station

This station is managed by National Institute of Polar Research(NiPR).

※Shinjuku(Our school):North latitude 35 degrees,42 minutes,18secons
East longitude 139 degrees,42 minutes,8secons
The Showa Base: South latitude 69 degrees,00 minutes,22seconds
East longitude 39 degrees,35 minutes,24 seconds

Location of Shinjuku and The Showa Base(from『Yahoo! Map』)

Research target

1.The brightness of night sky

Compare with Shin-juku data, Analyze aerosol and aurora

Confirm universality of our mechanism.

2.The influence of the brightness of the moon

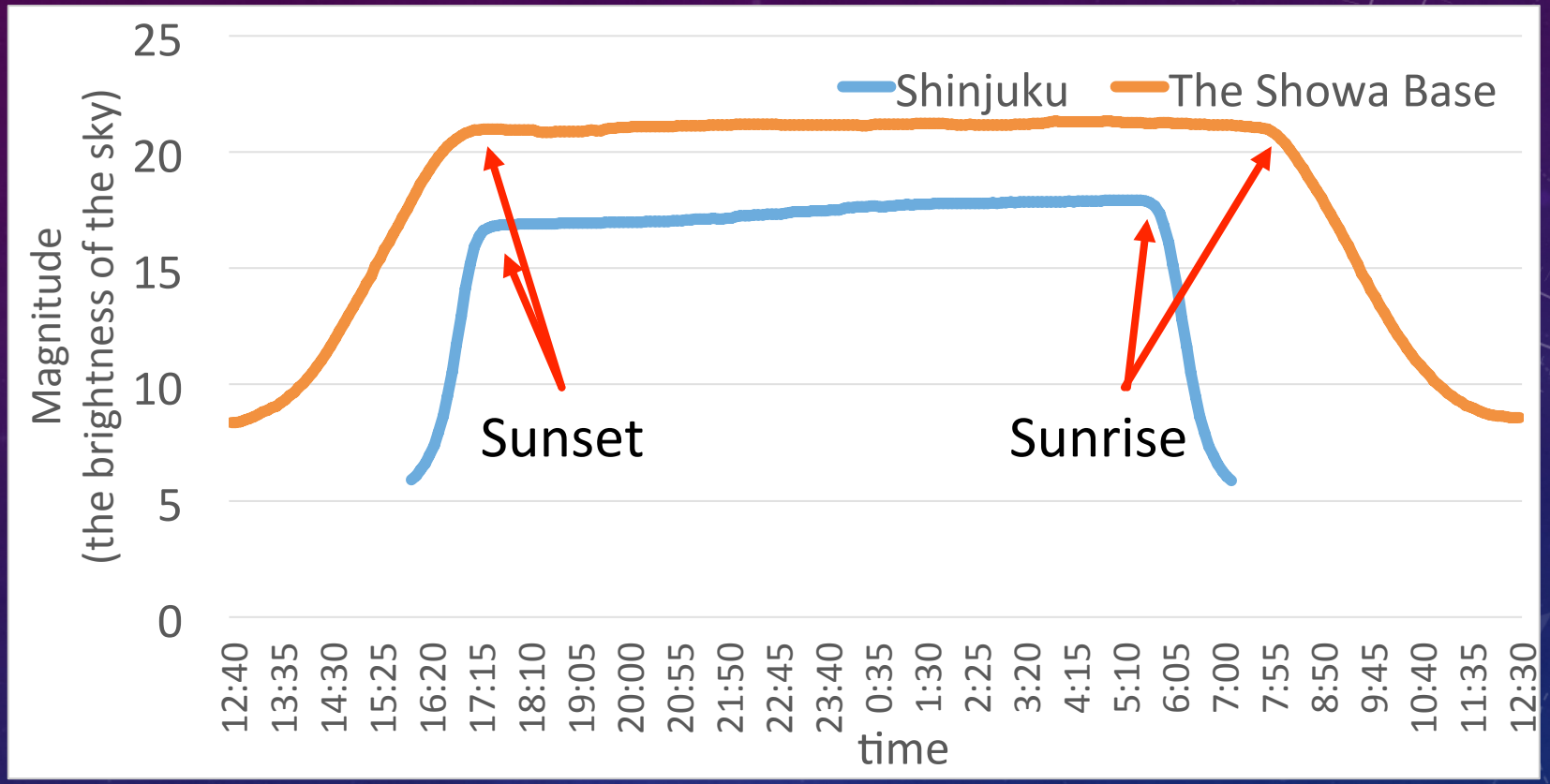
Research the influence of the moon on the night sky

We can predict the brightness of night sky when there is the moon.

Result and study

1.The brightness of night sky at Showa Station

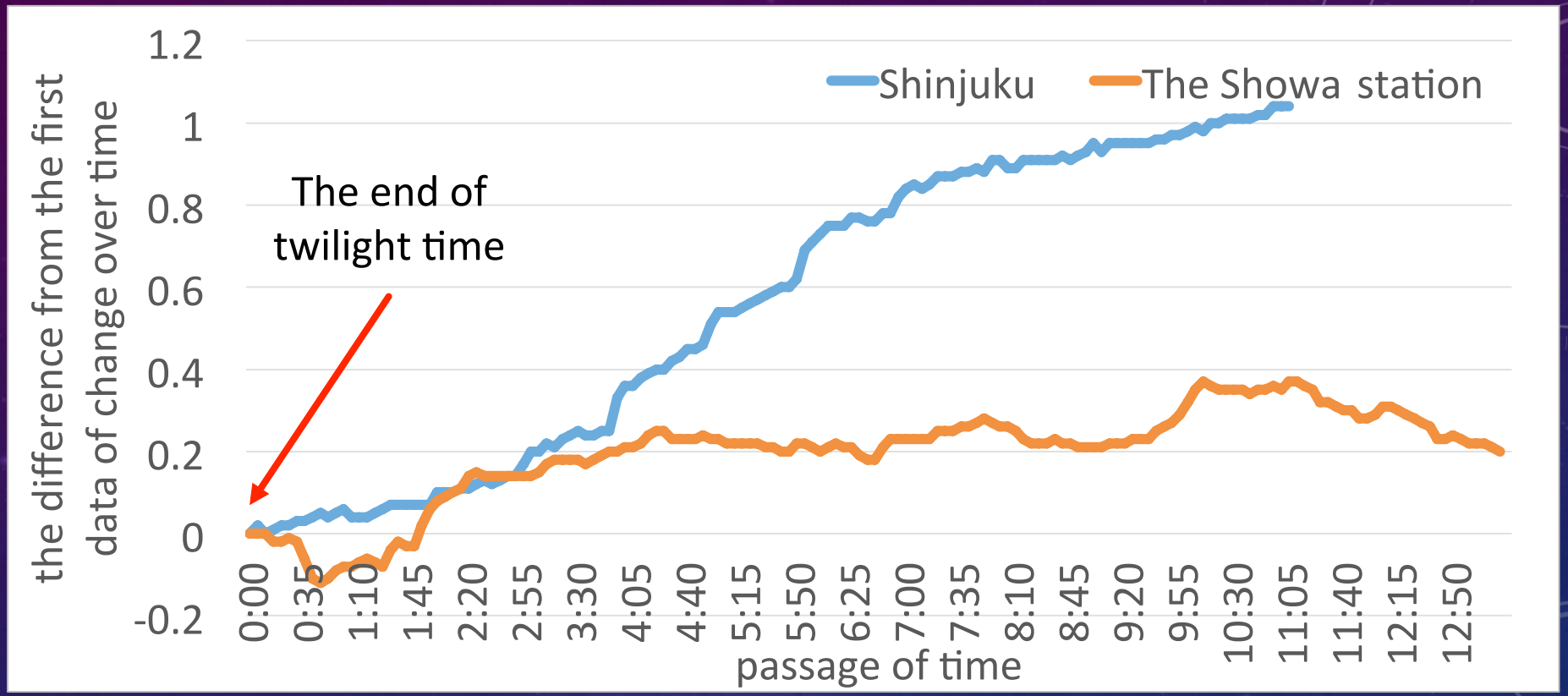
Comparison of the brightness of night sky of one day



Comparison of the brightness of night sky of one day between Shinjuku(2013/12/13) and Showa Station(2014/6/26)

- ✓ **Showa Station is darker than Shinjuku.**
- ✓ The twilight time at Showa Station is longer than that of Shinjuku.

Without twilight time…

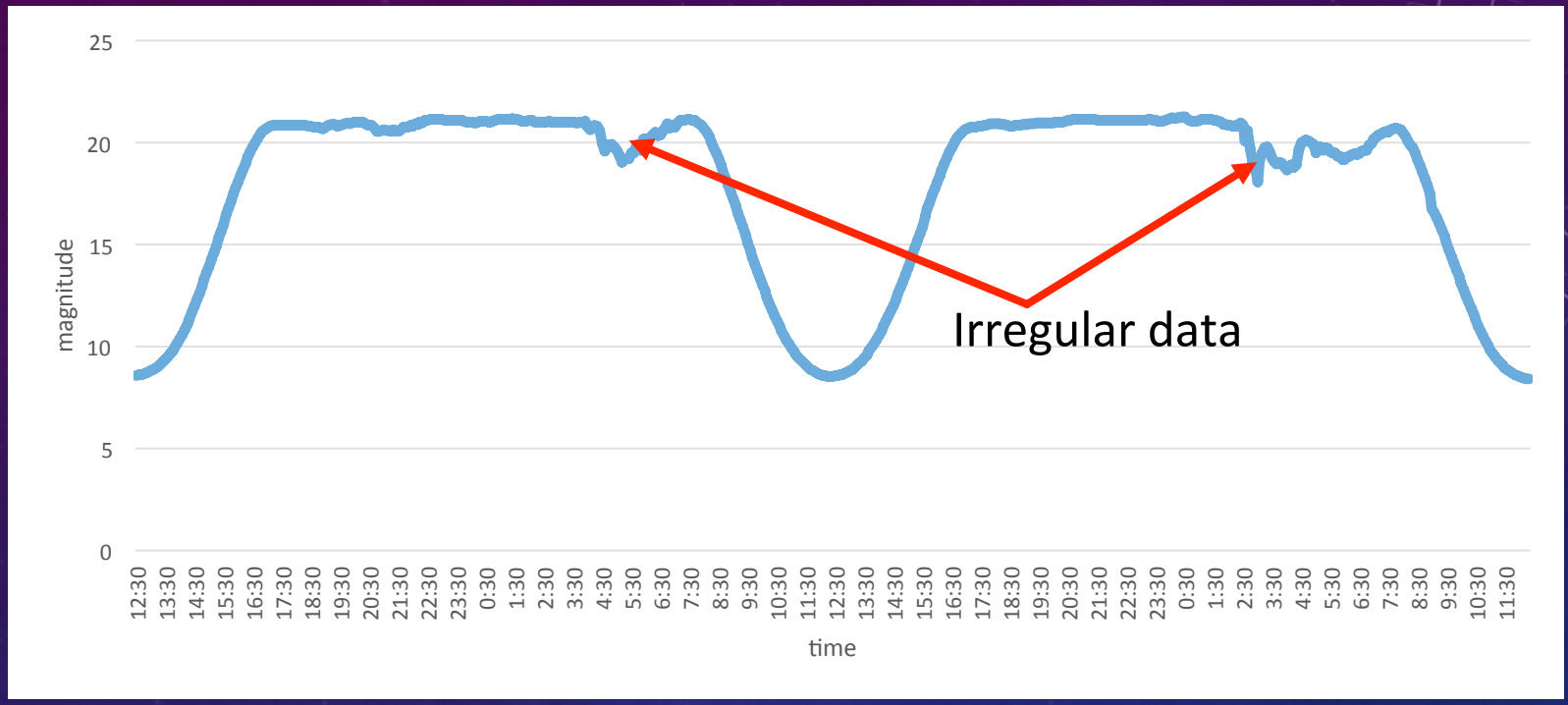


Comparison of the darkness of night sky of one day between Shinjuku(2013/12/13) and Showa Station(2014/6/26)

✓ **The fluctuation of data at Showa Station is smaller than that of Shinjuku.**

⇦What is the change's cause at Showa Station?
(Artificial light, aerosol, aurora…)

Irregular data



The data at Showa Station(2014/6/28-6/30)

According to the 55th Antarctic wintering party member…

Aurora appeared at Showa Station these days.

⇒Aurora caused this irregular.

Result and study

2. Influence of the brightness of the moon

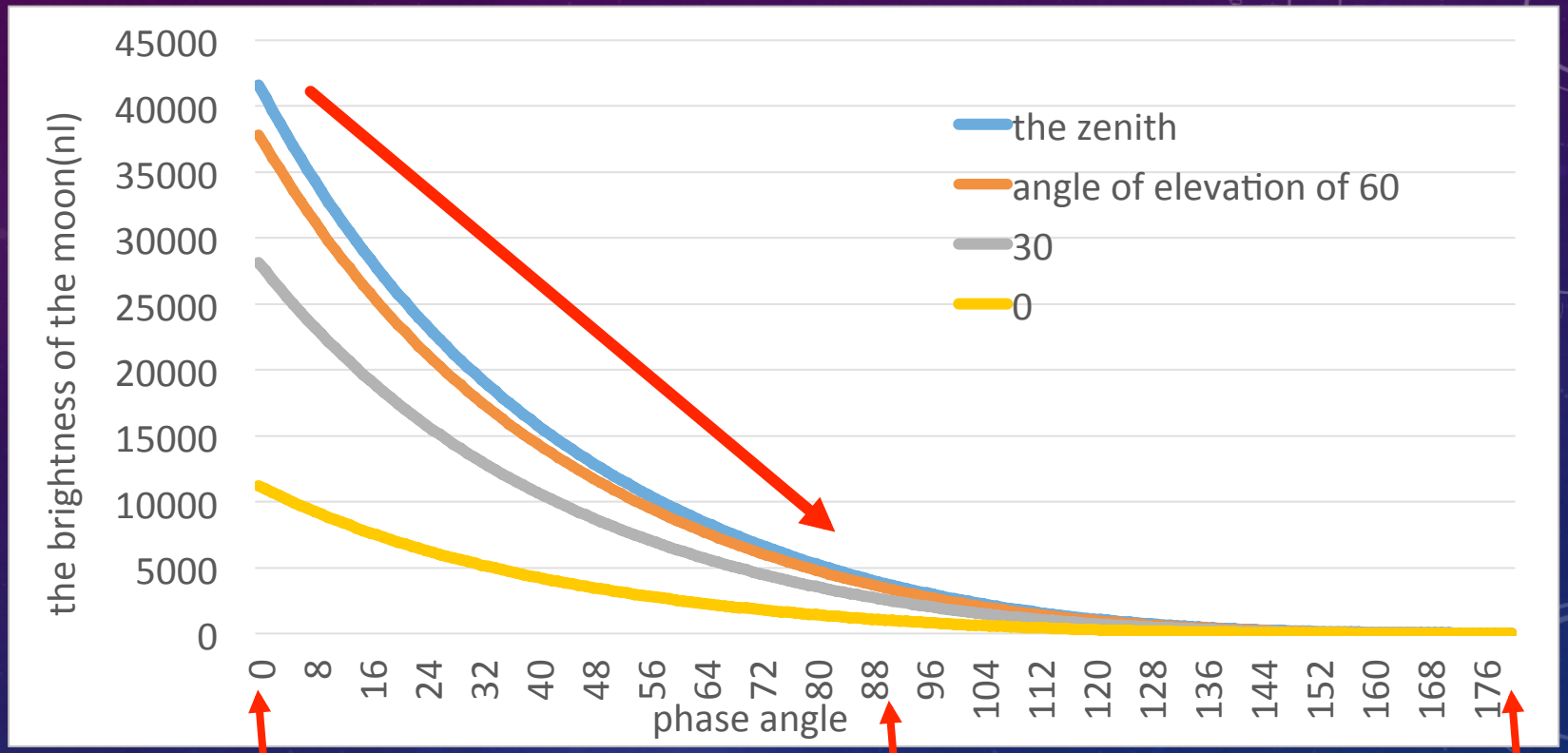
*We used the report (Kevin Krisciunas and Bradley E. Schaefer , *A MODEL OF THE BRIGHTNESS OFMOONLIGHT* , 1991.) to research the influence of the moon.

Based on change of the moon's phase angle

(Theoretical value)

Bright

Dark



Full moon

Half-moon

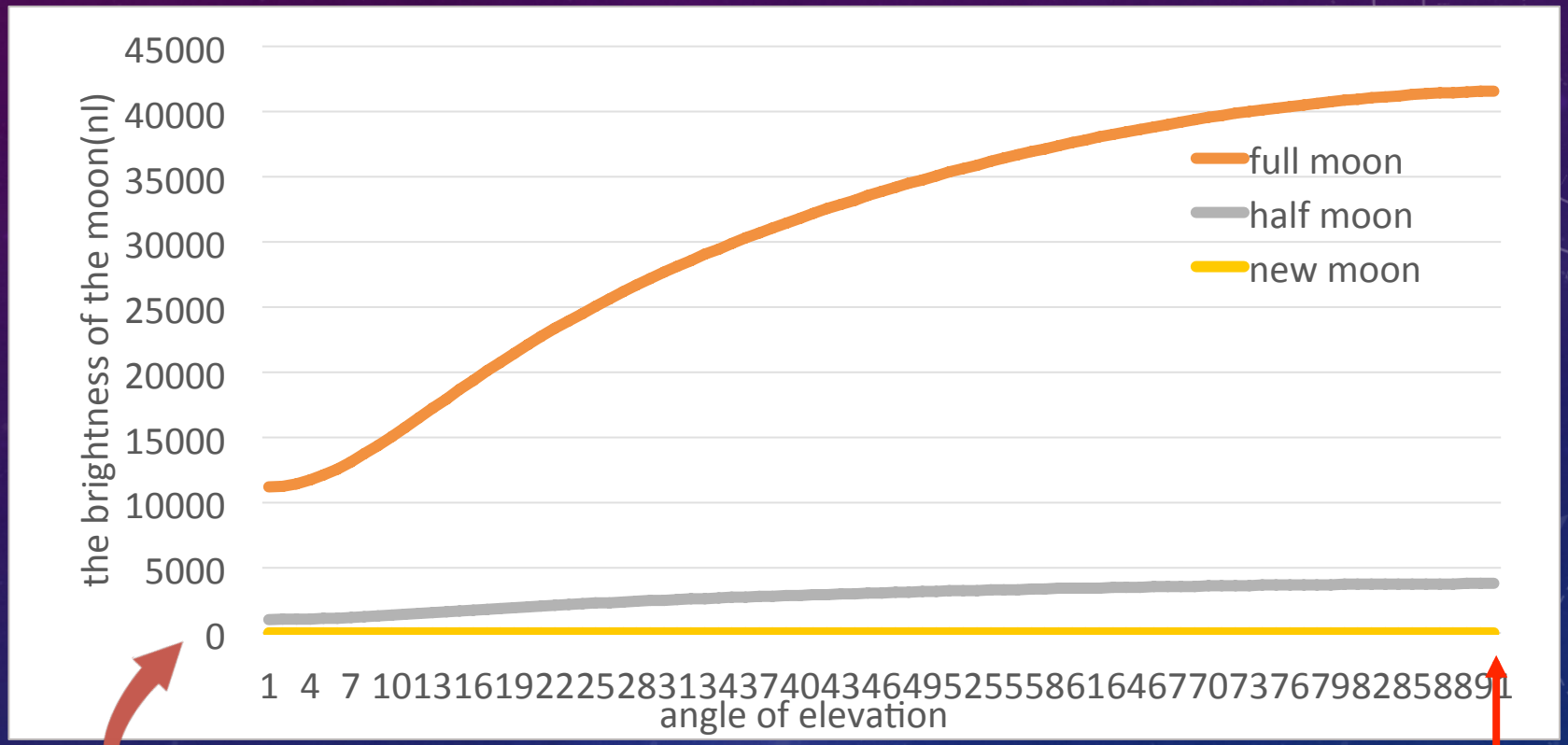
New moon

✓ It became dark sharply from full moon to half-moon.

(any elevation are same trend.)

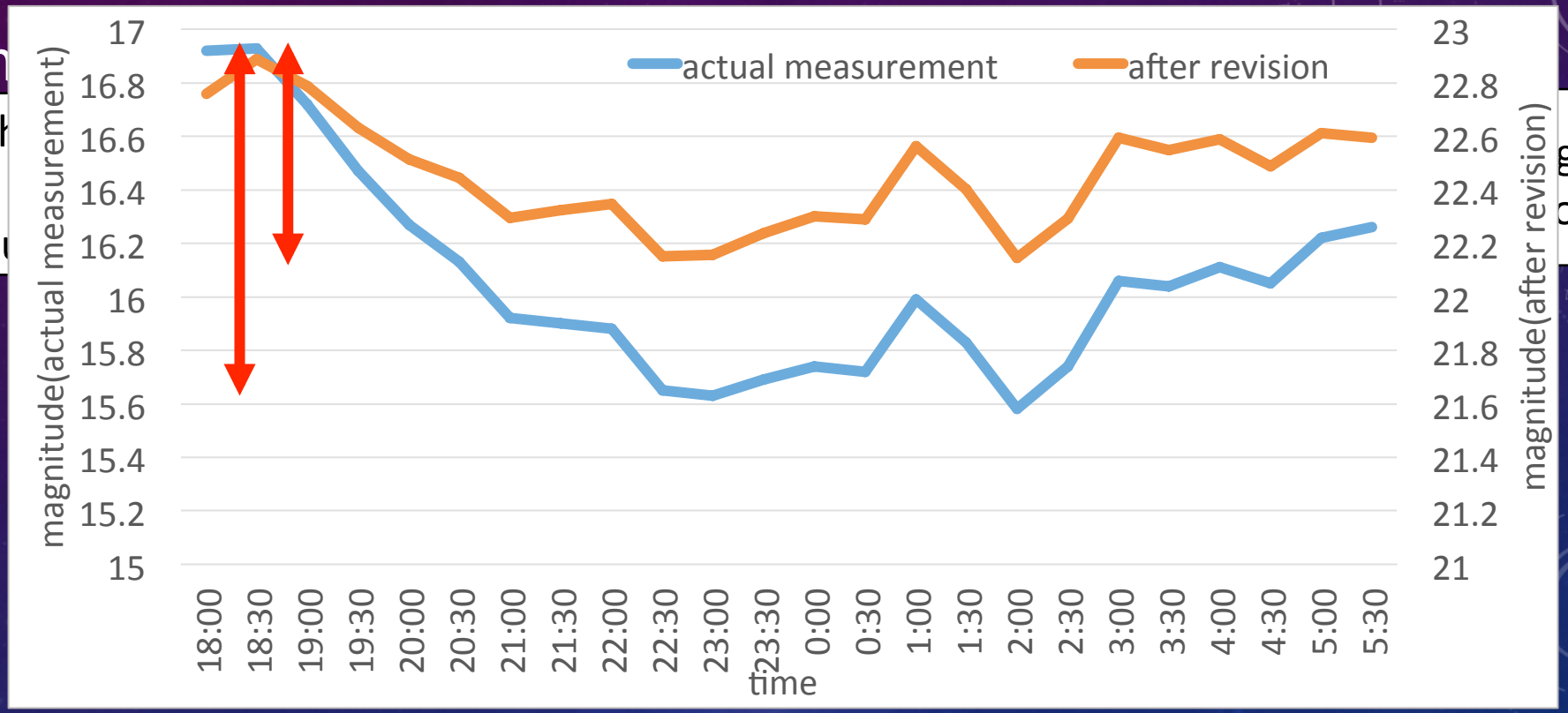
Based on change of the moon's elevation

(Theoretical value)



✓ There are the influence of the moon even if the moon got closer to the horizon.

The brightness of night sky without the influence of the moon



The brightness of night sky without the influence of the moon(2014/6/13・full moon)

After revision… It became dark on a whole.

The change over time became small.

⇒We can remove the influence of the moon to some degree **but…**

There are other influences besides the moon.

Assignment

I think 3 points in this research's future.

1.Moon
Not only full moon but also other shapes.

2.Aerosol

3.Aurora
⇐This is the most important to this research(Showa Station)

Bibliography・Gratitude

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・Kevin Krisciunas and Bradley E. Schaefer , *A MODEL OF THE BRIGHTNESS OF MOONLIGHT* , 1991.

I appreciate the feedback offered by someone.
I would like to express the deepest appreciation to under people.
Dr. Jun-ichi Watanabe(National Astronomical Observatory of Japan Vice-Director General)
Dr. Takeshi Uemura(Consultant of Kaijo junior & senior high school Earth Science Club)
Dr. Shuki Ushio(National Institute of Polar Research , The captain of the 55th Antarctic wintering party)

Thank you for listening!!