

Educational Activities for Dark-Sky in Japan

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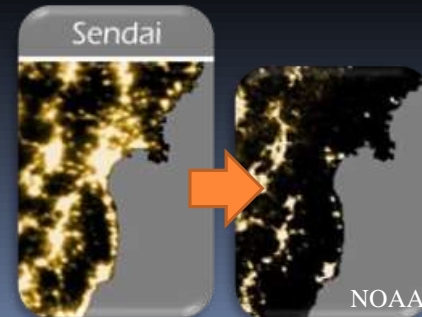
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IDA Education Committee

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Contents

- A plan of an environmental education program for elementary students through light pollution
- Promotions and results of the GLOBE at Night campaign in Japan
- Things that happened to lighting environment and night skies after the 3.11 earthquake



1. Plan of an environmental education program for elementary students

This program is supported by Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science during 2011-2014

One-off visiting class to elementary students



- Visiting local elementary schools to give one-off scientific experiment classes.



- Storytelling titled “To protect a starry sky” with picture cards (about 15 minutes)
- Since Oct. 2009: 22 times, 456 students (age 6-12) +parents

One-off visiting class to elementary students

picture card

よるあか
夜が明るくなると、
こまることもたくさんあります。
ひかりがい
光害 といいます。
夜が明るくなると…

picture card

picture card

picture card

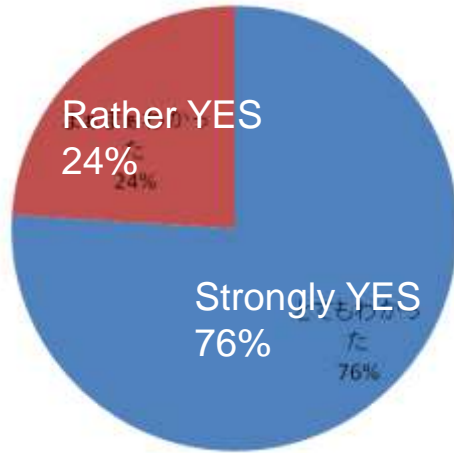
picture card

30 picture cards
include:
night-sky
brightness,
city light
brightness,
migratory birds,
sea turtle
hatchlings,
energy
consumption,
risks to human
body,
actions they can
do

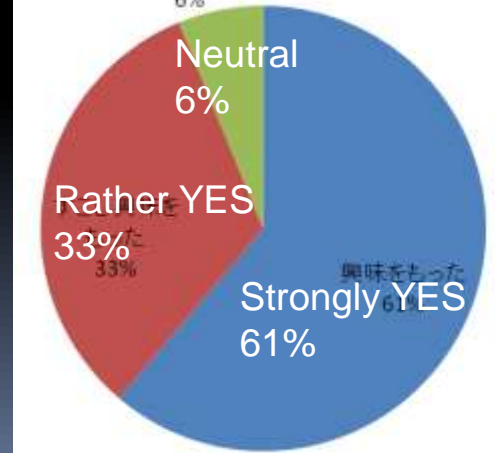
Students' responses to the light pollution story

- Most students listened intently.
- Students aged 7 and above seemed to understand the story well.
- They showed the most interest in the topic of nocturnal animals, as well as beautiful night skies and energy-saving.
- Results of questionnaires:

Q: Was it understandable for you?



Q: Did you gain interest in the topic?



Environmental education program to elementary students

- Purpose:
To develop students' understanding of relationship among human activities, ecosystem and the earth.
- Grade:
4th to 6th grade students. (3-year program)
- How to involve the program in elementary curriculum:
Allocate 6-8 hours of the subject “integrated studies” in a year
- Examined the Japanese curriculum guidelines and made a plan of students' activities of each grade ...

Theme and activities (draft)

- Theme of 4th grade: **Commune with nature**
 - Observation of animals, insects and plants
 - Observation of moon and stars
 - Investigation of stores and houses in their town ...
- Theme of 5th grade: **Learn nature**
 - Learn and study environmental pollutions, light pollution
 - Measurement of night-sky brightness
 - Discussion about relationship btw human and nature ...
- Theme of 6th grade: **Protect nature**
 - Experiment of energy conversion, Learn energy
 - Discussion and reconsideration of lifestyle
 - Participation in lights-off events ...

Environmental education program to elementary students

- Students will record what they have studied on “environmental study sheet”. On this sheet, all activities will be connected from a viewpoint of LP.
- By closely collaborating with elementary school teachers, the program will start the next academic year.
- I hope I can present something about it next year ...

2. Promotions and results of the GLOBE at Night campaign in Japan





GLOBE at Night



Light pollution awareness campaign
led by Connie Walker (NOAO)

GLOBE at Night Sponsoring Institutions



- the National Optical Astronomy Observatory (NOAO) in Tucson, AZ;
- The Global Learning and Observations to Benefit the Environment (GLOBE) Program, in Boulder, CO;
- the Environmental Systems Research Institute, Inc. (ESRI) in Redlands, CA;
- the International Dark-Sky Association (IDA) in Tucson, AZ; and
- the Centro de Apoyo a la Didactica de la Astronomia (CADIAS) in Altovalsol, Chile.

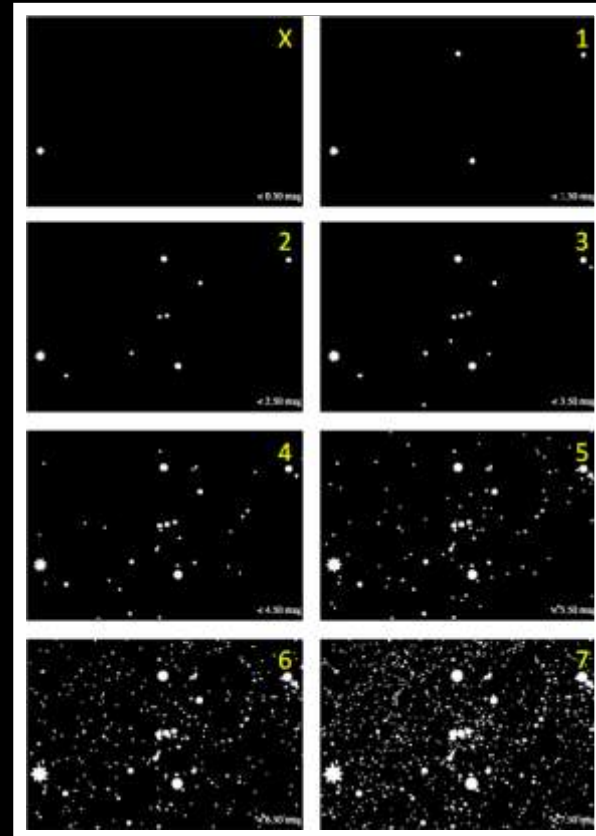
Other partners include the Astronomical Society of the Pacific, the American Astronomical Society, the Astronomical League, Astronomers Without Borders, The World At Night, and Let There Be Night.org.



GLOBE at Night

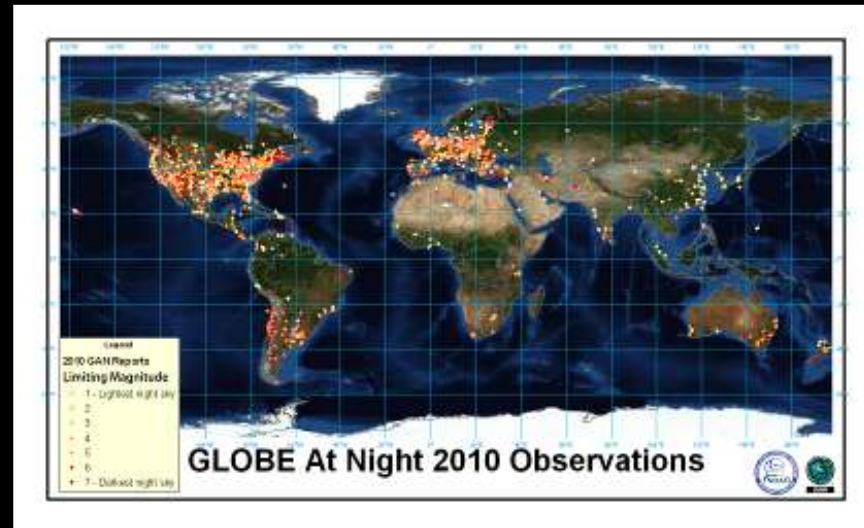


- Citizen-scientists **record the brightness of the night sky** by matching its appearance toward the constellation Orion, Leo and Crux with star maps of progressively fainter stars and submit it on-line.
- Details will be presented tomorrow morning by Connie.





GLOBE at Night



- Over the last 5 annual two-week GaN campaigns, **52,000 measurements** have been contributed from over 100 countries.
- GaN2011: two campaigns (2 weeks each) in Feb.-Apr.

GaN promotions in Japan



- GaN2010: **only 18 reports from Japan.** The website and the report form in English might be obstacles for Japanese people.
- I built a Japanese website. Based on the English site, but simple and some modifications for Japanese.

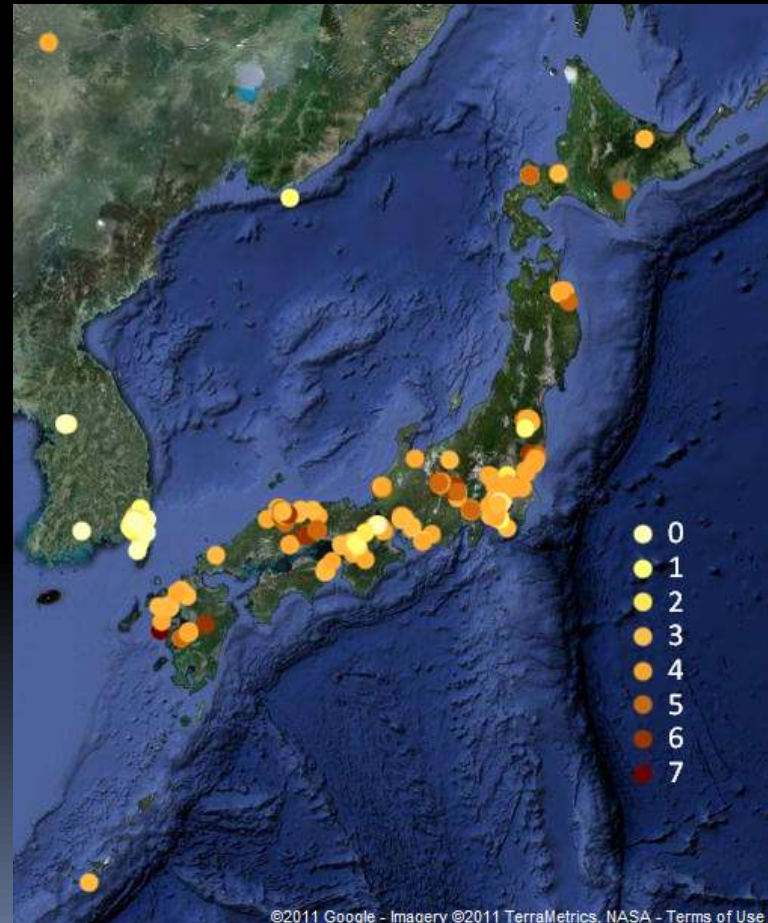
GaN promotions in Japan

- Japanese leaflets were sent to 60 institutions (observatories, planetariums, science museums) all over Japan. (4000 sheets in total)
- Several GaN star parties took place by amateur astronomical groups.
- On my request, a famous astronomical magazine put an article about GaN on its website. (most effective)
- On my request, a local TV station broadcast a short program about LP and GaN.
- The campaign has spread also in twitter and astronomical mailing lists.



GaN results in Japan

- The number of reports from Japan was about **290**, **18 times larger** than that of GaN2010. From 30 prefectures out of 47.
- The resultant map:
 - Yellow** - brightest sky
 - Dark brown** - darkest sky



GaN results in Japan

➤ Star charts reported from Japan

Chart3 - 41%

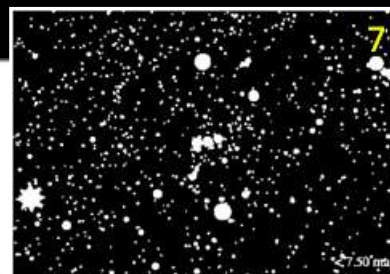
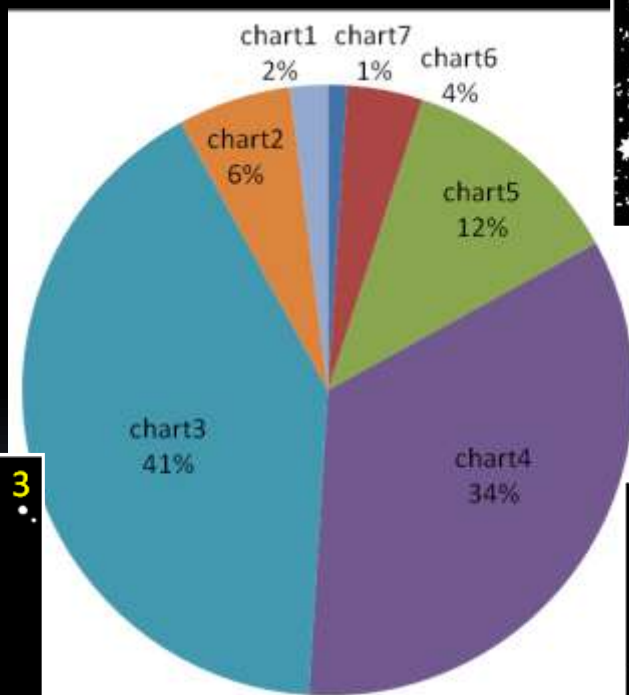


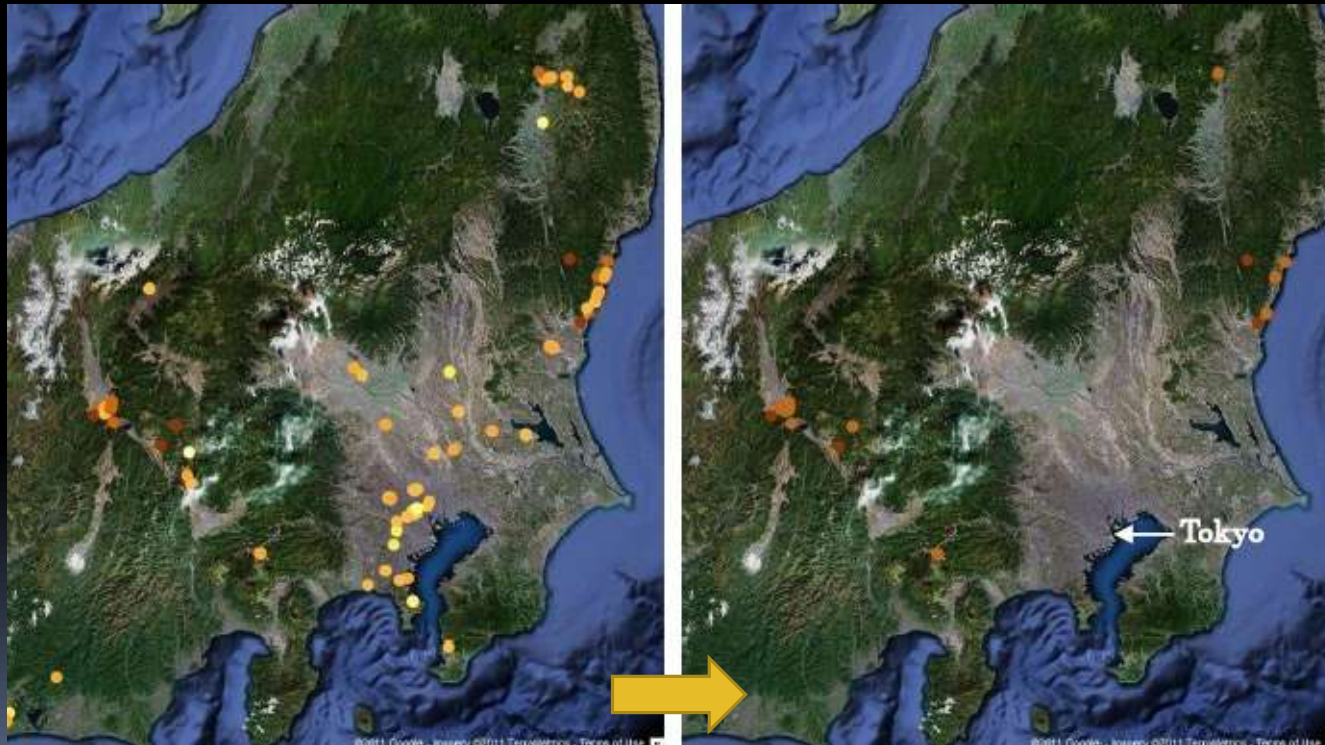
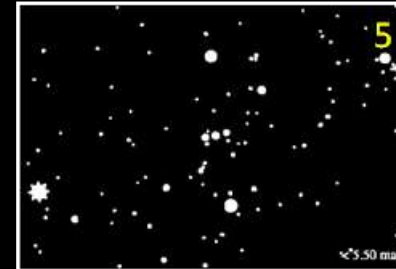
Chart7 - 1%

Chart4 - 34%



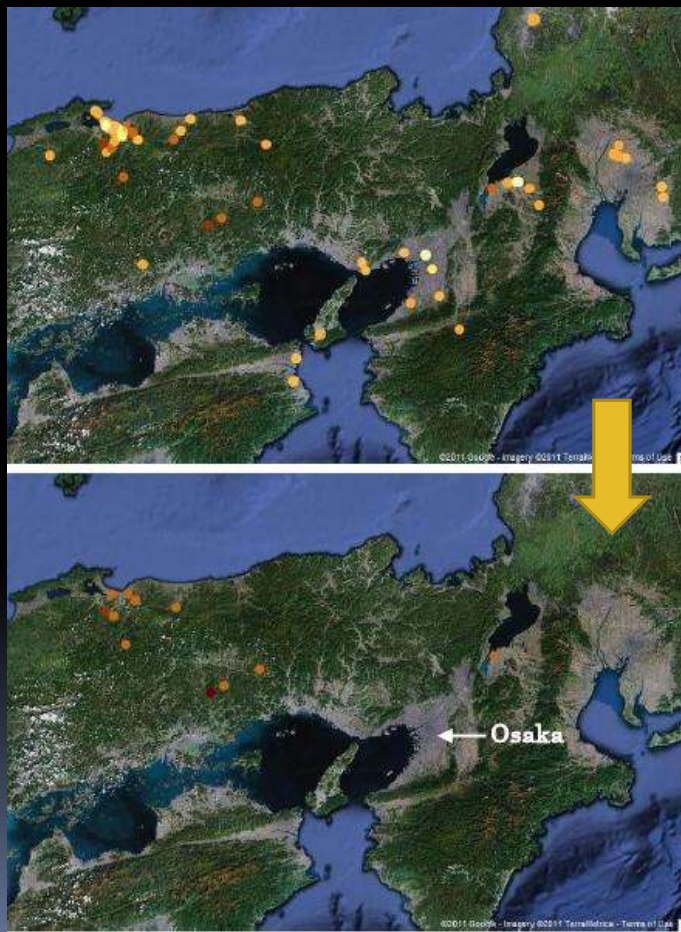
GaN results in Japan

➤ Map of Tokyo and surroundings



Restricted to Chart5,6,7

GaN results in Japan



➤ Map of Osaka and surroundings

Restricted to Chart5,6,7



Comments from reporters

- This campaign gave me a rare chance to see stars. I'm thankful for it. In my city the sky was brighter than my expectation. Some streetlights are unnecessary and should be switched off.
- I think the most important thing in this kind of campaign is to take place every year. I expect it.

The campaign was successful in Japan this year.

I want to expand it next year, for raising awareness of LP in Japan.

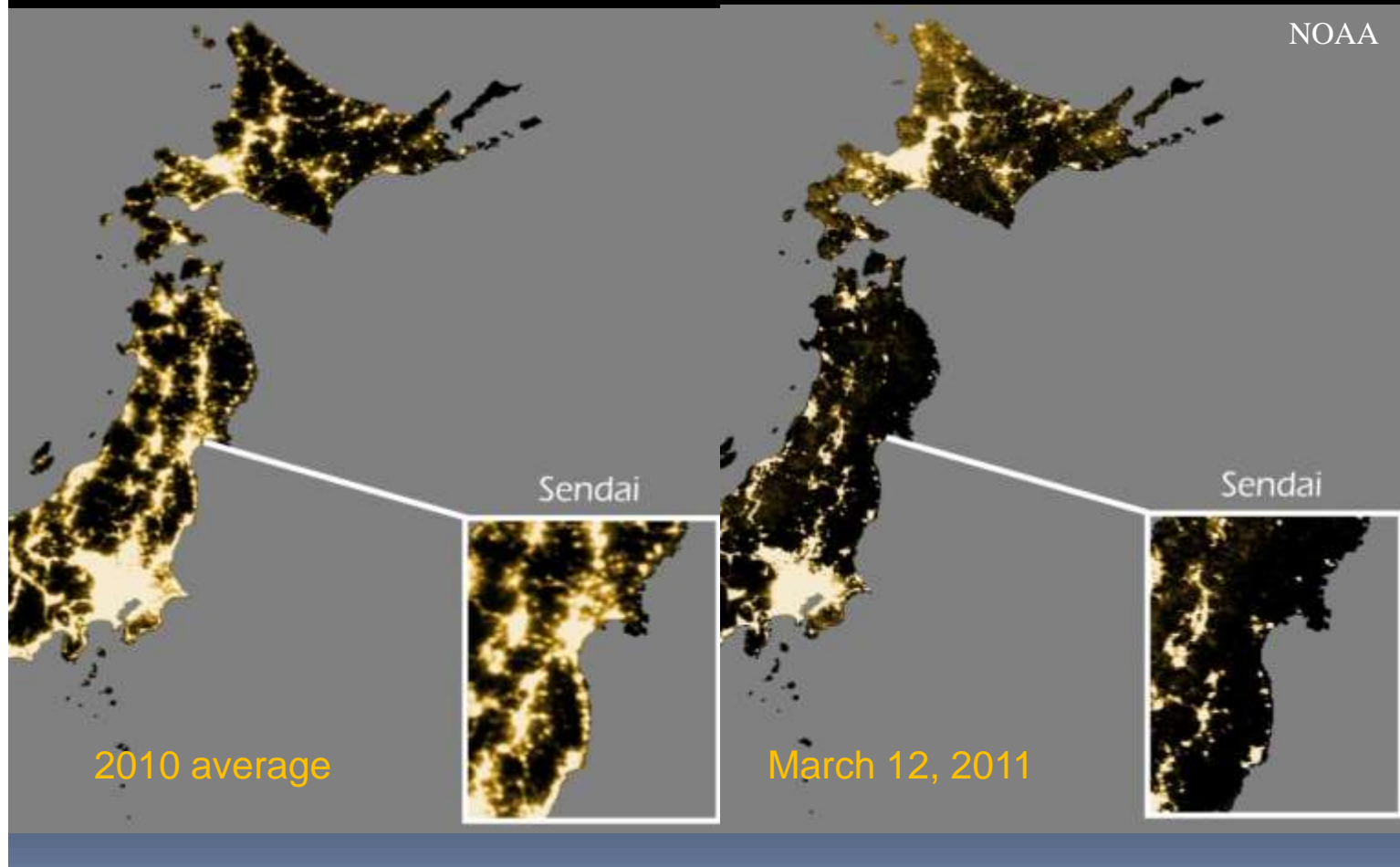
3. Things that happened to lighting environment and night skies after the 3.11 earthquake



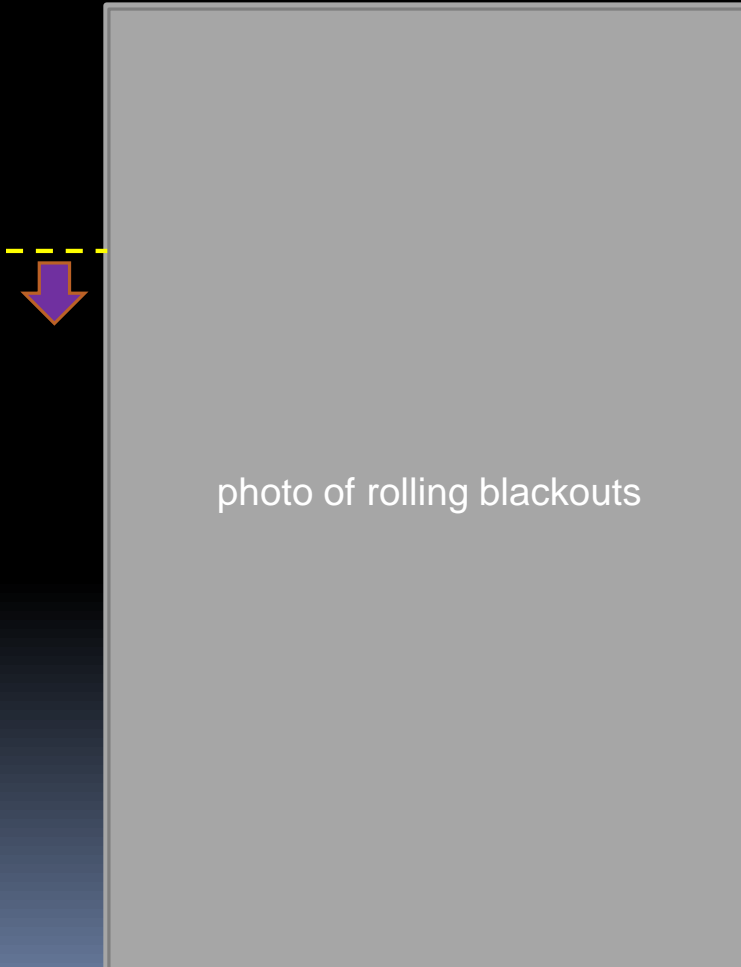
photo of Tokyo

“The Tokyo Dark”

City lights viewed from the satellite



Rolling blackouts



➤ In Tokyo area, rolling blackouts took place due to troubles of power plants.

➤ It made some people anxious about the security.

Voluntary switch-off



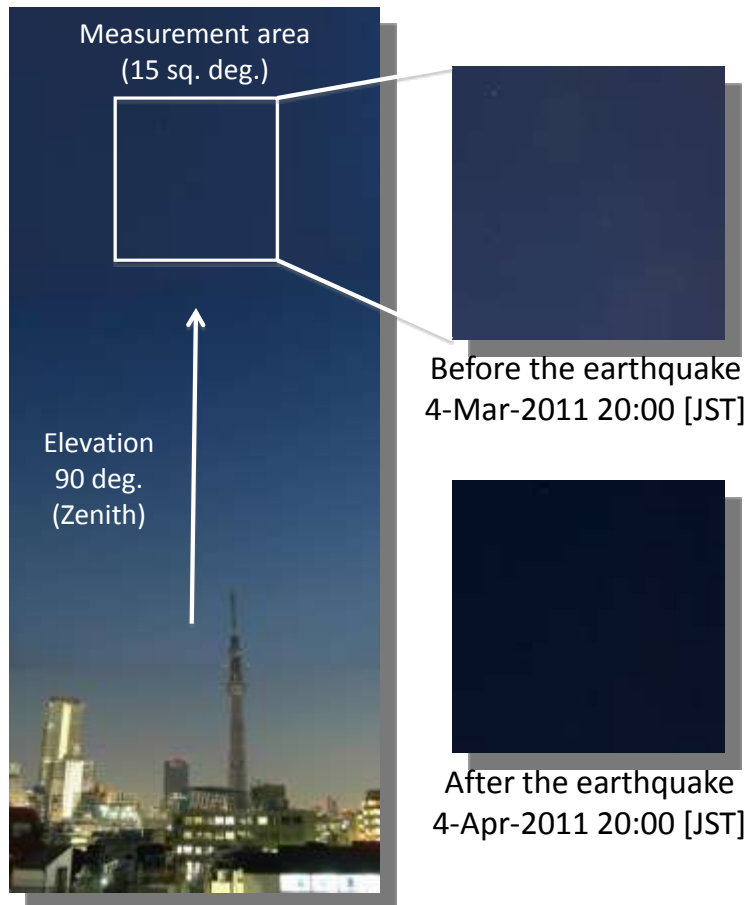
- Voluntary switching-off was done at many shops, buildings and streets nationwide.
- If you visited Tokyo last summer, you must be surprised by the darkness of the city ... but how dark?

photo of switch-off

photo of switch-off

photo of switch-off

Fixed Point Observation of Night-Sky Brightness of Tokyo, Japan



We achieved a fixed point observation of night-sky brightness of Tokyo. Observational condition are shown below.

[Location]

Lifelong Education Center of Sumida Ward, Tokyo. ($35^{\circ} 43'15''$ N, $139^{\circ} 49'06''$ E)

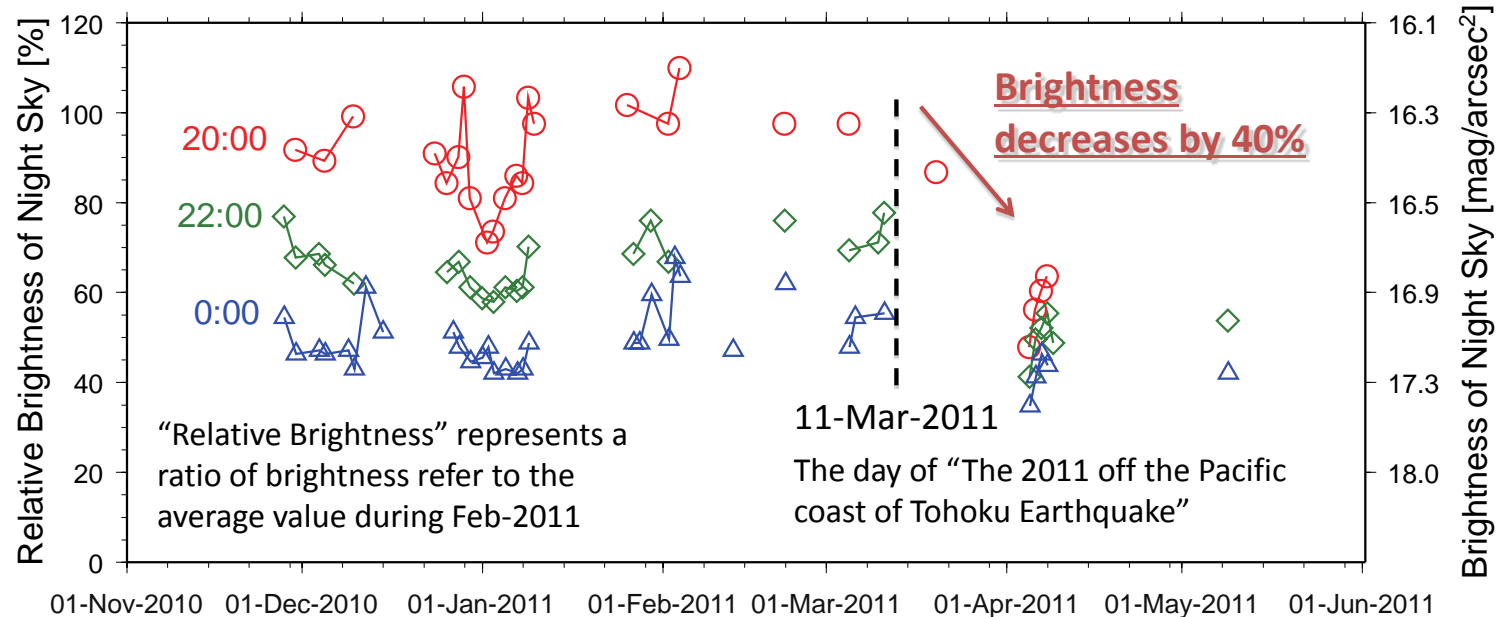
[Observation Time]

Every night from Nov-2010 to Now.
Data is acquired every 10 minutes from 18:00 to 6:00.

[Measurement Technique]

Measure the sensor count of calibrated Digital Still Camera (Canon EOS Kiss Digital) and take an average of 15 square-degree.

Night-Sky Brightness Decrease by 40 % after the Earthquake (NOT by rolling blackouts)



Night-sky brightness at 20:00 over the Tokyo decrease by 40% after the earthquake compared with the brightness during Feb-2011.

On the other hand, no power outage occurred during the observation.

This result indicates that the decrease of the brightness is the effect of power saving.

*Observations and analyses are carried out by ONOMA Fumiki and NOMURA Shiho, the members of Hoshizora Kodan.
Contact address and web site are nsb@kodan.jp & <http://www.kodan.jp/>

Problems by switch-off revealed in this situation



- They switched off a lot of **necessary lights!** (streets, stairs, underpasses ...) Their interest was only in electricity-saving.
- Visually handicapped people were in a socially difficult situation between electricity-saving and their walking security. (They could complain only on the Web...)
- A leading newspaper misreported “The number of crimes has increased rapidly in the darkened area.” -- Later, the Police Agency denied it.

Chance to change public consciousness on lighting?

- Japanese people have more interests in how to use lighting than ever before.
- According to the result of a questionnaire to the public in April, 88% answered that the current level of lighting is OK or we should cut more.
- However, many people seem to care about the amount of light and energy-saving only. They don't know impacts on wildlife, night-skies or their own bodies. A need for raising awareness of LP has been recognized again by these circumstances.

To raise awareness of light pollution



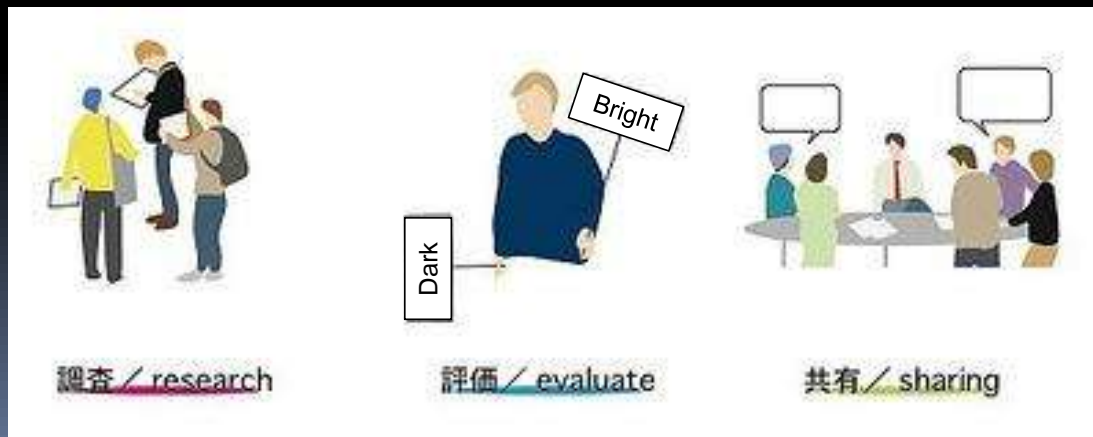
Brochure & Poster



I'm continuing awareness campaigns in my website.
Fortunately, articles about LP and my campaign appeared
in some newspapers.

To raise awareness of light pollution

- Lighting designer Izumi Okayasu has started '**Essential Light Japan Project**'
<http://essentiallight.jp/>
- Walking around Tokyo with many ordinary people to collect their voice about lighting environment of the area.
- To seek better lighting of the future.
- We have contacted each other and will collaborate ...



Thank you for your attention.

and

We Japanese appreciate all the support and pray from people around the world. Thank you very much.