Connecting with the International Year of Light 2015

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National Optical Astronomy Observatory

GaN BMN User Wkshp, Tokyo, Jan. 7, 2015
Goal: Bring awareness on issues about light pollution through citizen science

Numbers: Over 118,000 measurements from 115 countries in the last 9 years of campaigns

Audience: people from 8 – 80

Events: 10-day campaigns each month (no Moon in early evening)
2015年キャンペーンが始まります！

2014年は日本から404件の報告がありました。2013年（620件）に次いで過去2番目に多く、世界の国でも7番目の報告数でした。全国からたくさんのご参加、本当にありがとうございました。

2015年キャンペーンも、昨年同様、1月から12月まで毎月観察期間が設定されています。2015年は【国際光年】、GaNはその【公式イベント】です。人間社会・生態系・環境における「光」の重要性を再認識し、光害の問題について広く一般の方々に考えてもらうために、ぜひGaNへの参加を呼び掛けください！

GaNに関する情報は【Twitter】でも発信しています。ぜひフォローをお願いします。

GLOBE at Night (GaN) 概要

国際ダークスカイ協会東京支部（IDA 東京）
Measurements from Japan in 2014

Observations by Country:

<table>
<thead>
<tr>
<th>Country</th>
<th>Obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>6114</td>
</tr>
<tr>
<td>Croatia</td>
<td>3200</td>
</tr>
<tr>
<td>Poland</td>
<td>1836</td>
</tr>
<tr>
<td>South Korea</td>
<td>1324</td>
</tr>
<tr>
<td>Chile</td>
<td>1087</td>
</tr>
<tr>
<td>Germany</td>
<td>607</td>
</tr>
<tr>
<td>Japan</td>
<td>404</td>
</tr>
<tr>
<td>Macedonia (FYROM)</td>
<td>400</td>
</tr>
<tr>
<td>Canada</td>
<td>360</td>
</tr>
<tr>
<td>Romania</td>
<td>310</td>
</tr>
</tbody>
</table>

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Which Stars Do You See?

Circle one of the following:

- Stars in Orion not visible
- Magnitude 1 Chart
- Magnitude 2 Chart
- Magnitude 3 Chart
- Magnitude 4 Chart
- Magnitude 5 Chart
- Magnitude 6 Chart
- Magnitude 7 Chart
How many stars have we lost?
(view from a mid-sized city)

150 stars across sky
Faintest Star: Magnitude 4

540 stars across sky
Faintest Star: Magnitude 5

1700 stars across sky
Faintest Star: Magnitude 6

4900 stars across sky
Faintest Star: Magnitude 7 (view from a national park)

14,000 stars across sky
Globe at Night Report Page
Using Smart Devices
www.globeatnight.org/webapp/

In 26 languages
Globe at Night Report Page for Japan

1. When did you observe?
   - Date: 2015/01/07
   - Time: 14:40

2. Where did you observe?

3. What kind of darkness was the night?
   - Difficulty level: 3.50 mag
   - Constellation: Orion
When did you make your observations?
When did you make your observations?
Where did you make your observations?
How dark is the sky?
What are the sky conditions?
Did you use a Sky Quality Meter?
Using Sky Quality Meters

• Press start button here:

• Light enters here:

• Read-out numbers here:
New Apps for Determining Night Sky Brightness

The Loss of the Night app
• Asks sequentially if you can see 7 stars
• Free app downloadable for Android & iPhones

Dark Sky Meter app
• Free app during IYL2015
• For iPhones 4S & later versions

Data goes into Globe at Night database!
Globe at Night 2015

- International citizen-science campaign on monitoring light pollution

Campaign Dates: [http://www.globeatnight.org](http://www.globeatnight.org)

January 11-20
February 9-18
March 11-20
April 9-18
May 9-18
June 8-17
July 7-16
August 5-14
September 3-12
October 3-12
November 2-11
December 2-11
## Northern Constellations

<table>
<thead>
<tr>
<th>Constellation</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Orion</strong></td>
<td>January 11-20, February 9-18, March 11-20, 2015</td>
</tr>
<tr>
<td><strong>Leo</strong></td>
<td>April 9-18, May 9-18, 2015</td>
</tr>
<tr>
<td><strong>Bootes</strong></td>
<td>June 8-17, July 7-16, 2015</td>
</tr>
<tr>
<td><strong>Cygnus</strong></td>
<td>August 5-14, September 3-12, 2015</td>
</tr>
<tr>
<td><strong>Pegasus</strong></td>
<td>October 3-12, 2015</td>
</tr>
<tr>
<td><strong>Perseus</strong></td>
<td>November 2-11, December 2-11, 2015</td>
</tr>
</tbody>
</table>

## Southern Constellations

<table>
<thead>
<tr>
<th>Constellation</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Orion</strong></td>
<td>January 11-20, February 9-18, 2015</td>
</tr>
<tr>
<td><strong>Crux</strong></td>
<td>March 11-20, April 9-18, May 9-18, 2015</td>
</tr>
<tr>
<td><strong>Scorpius</strong></td>
<td>June 8-17, July 7-16, 2015</td>
</tr>
<tr>
<td><strong>Sagittarius</strong></td>
<td>August 5-14, September 3-12, October 3-12, 2015</td>
</tr>
<tr>
<td><strong>Grus</strong></td>
<td>November 2-11, December 2-11, 2015</td>
</tr>
</tbody>
</table>
夜空の明るさ 世界同時観察キャンペーン 観察ガイド
www.globeatnight.org

2015年度 キャンペーン期間（対象：オリオン座）：11月11日〜11月20日
肉眼・双眼鏡で観察

世界中の人々と共に観察をする、簡単な5つのステップ
(www.globeatnight.org/observe.html)

(1) 次のいずれかの方法により、観察時点の位置情報（緯度・経度）を取得し、記録する
（a）観察時点において、GPS機能をもったスマートフォン等からウェブアプリ www.globeatnight.org/webapp/を開く。
（b）パソコンで eo.ucar.edu/geocode を開き、地図上で観察地点周辺をできるだけ拡大して表示し、観察位置をダブルクリックしてください。
（c）観察時点において、GPS機能付きデバイス（ハンディGPS、デジカメ、カーナビ等）で緯度・経度を読み取ってください。
Can you find Orion?  
globeatnight.org/finding

Constellation: Orion  Latitude: 40N  Read about the Mythology of Orion, or review the Magnitude Charts for Orion.
Interactive Data Map
Globe at Night Campaign
globeatnight.org/map/
This map application allows you to map Globe at Night data points within a distance you specify around a city or an area of your choice. The resulting maps are bookmarkable and shareable.

You can also download a CSV file of those data points that can be opened in Excel, or other spreadsheet. Find the download link in the generated map’s Legend.

**Input map center**

The application asks first for the center of the map, which can be simply a city name or a common place name, or as specific as a mailing address or a latitude and longitude (in decimal degrees). Note: the map will plot up to 4000 data points.

Type the location of the map center into the text box and click **Map It!**

**Provide a radius**

Provide a radius (in km) to define the area around the center of the map within which you want to show data points.

Provide a **Radius**

**Data Year**

Choose the year in which the data set was taken from the pull down menu. There is a data set for every year since 2006.

**Generate the map**

The map is now ready to be made. Click “Generate Map”.

**Latitude:** 32.3162119

**Generate Map**
Simple Report Form

Measurements

- are downloadable as datasets in various formats
- can be examined online via Google Earth or other tools
- used as the basis of research in a classroom or science fair project or even to inform the development of public policy
Possible Projects

Students can

• Compare data over time (changes, trends)
• Compare data on population density
• Use in a lighting survey
• Search for dark sky oases
• Monitor ordinance compliance
• Study affects of light pollution on animals or plants
• Study affects on human health
• Study affects on safety, security, energy consumption, cost

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Tucson, Arizona, USA
Seasonal variations in light pollution in city & on mountaintops

Lesser Long Nosed bats avoid Tucson city center
Comparing Different Ways to Measure Night Sky Brightness

(Please do not reproduce.)
New Light Pollution & Astronomy Programs through the IYL2015 Cosmic Light Theme

• IYL leadership → IAU Executive Committee → IAU Commission 50 → Working Group → Organize a theme on “Cosmic Light”.

• The main cornerstone projects for Cosmic Light: Quality Lighting Kits, Galileoscopes, Light: Beyond the Bulb, Cosmic Light Awareness
A New IYL “Cosmic Light” Cornerstone Project

- Quality Lighting Toolkit, guide with PBL lesson, tutorial videos, Google+ Hangouts, resources
• NOAO received grants from IAU and OSA for outreach on quality lighting during the International Year of Light.

• NOAO’s partners are CIE (International Commission on Illumination), IDA (International Dark-Sky Association), SPIE (International Society for Optics and Photonics) and OSA (The Optical Society).

• The kits will be distributed to their chapters in the USA and worldwide and to interested educators.

• The objective is to bring awareness of the issues surrounding light pollution but also to make a difference in terms of knowledge, attitude and behavior. To take action by using quality lighting.
Setting up the Challenge

- Introduce problem: “I live in a city, but it has these issues…”
  - Mayor of the city (the teacher) forms a committee to tackle the redesign, students have been hired into the positions
- Break class into groups of 4, each group takes a different part of the city
  - Suburban (neighborhood)
  - Beach
  - Park
  - Highway
  - Sports field/arena
  - Shopping center
  - School
- Each person in the group has a role on the committee:
  - Safety Officer
  - Medical Officer
  - Environmental Consultant
  - Urban Planner

A problem-based learning opportunity with some scaffolding

Identify the problems; evaluate the situation; come up with a solution. “Conference” at end.
Problem-based learning is a dynamic classroom approach in which students actively explore real-world problems and challenges and acquire a deeper knowledge while working in small collaborative groups.
Engineering Design Process
from “Infusing Engineering Design into High School STEM Courses” by Morgan Hynes, et al.
Beta testing light shielding lab

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Maglight Causes Misconceptions in Light Shielding Demo
Globe Lights & Streetlights: 1 to 40 Scale Model for Light Shielding Lab
Model

Build-a-School & Playing Field
Connie Walker
• Globe at Night Program Director
• 1-520-318-8535 or
cwalker@noao.edu

Websites of interest
 Globe at Night campaign: www.globeatnight.org
 Dark Skies Rangers activities: www.globeatnight.org/dsr/
 The International Dark-Sky Association: www.darksky.org
Globe at Night

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WWW.GLOBEATNIGHT.ORG
Get Out and Observe the Night Sky!

Engage people worldwide in observing the nighttime sky.
Encourage students and families to participate in citizen-science with a hands-on learning activity.
Gather light pollution data from an international perspective to monitor sky brightness and its effects.

Can you see the stars?