



Connecting with the International Year of Light 2015



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National Optical Astronomy Observatory



INTERNATIONAL
YEAR OF LIGHT
2015

Globe at Night Program

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)

GLOBE AT NIGHT 2015

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

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?



Legend

2012 GLOBE at Night Magnitude

- Limiting Magnitude 1
- Limiting Magnitude 2
- Limiting Magnitude 3
- Limiting Magnitude 4
- Limiting Magnitude 5
- Limiting Magnitude 6
- Limiting Magnitude 7

Light Stars = Dark Stars

Legend

2014 GLOBE at Night Magnitude

- Limiting Magnitude 1
- Limiting Magnitude 2
- Limiting Magnitude 3
- Limiting Magnitude 4
- Limiting Magnitude 5
- Limiting Magnitude 6
- Limiting Magnitude 7

Shown above are the 18,500 observations from 97 countries during the 2014 campaign. Help us exceed these numbers in 2015!



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Link

[国際サイト \(英語\)](#)



国際ダークスカイ協会
東京支部 (IDA東京)



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てください！

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

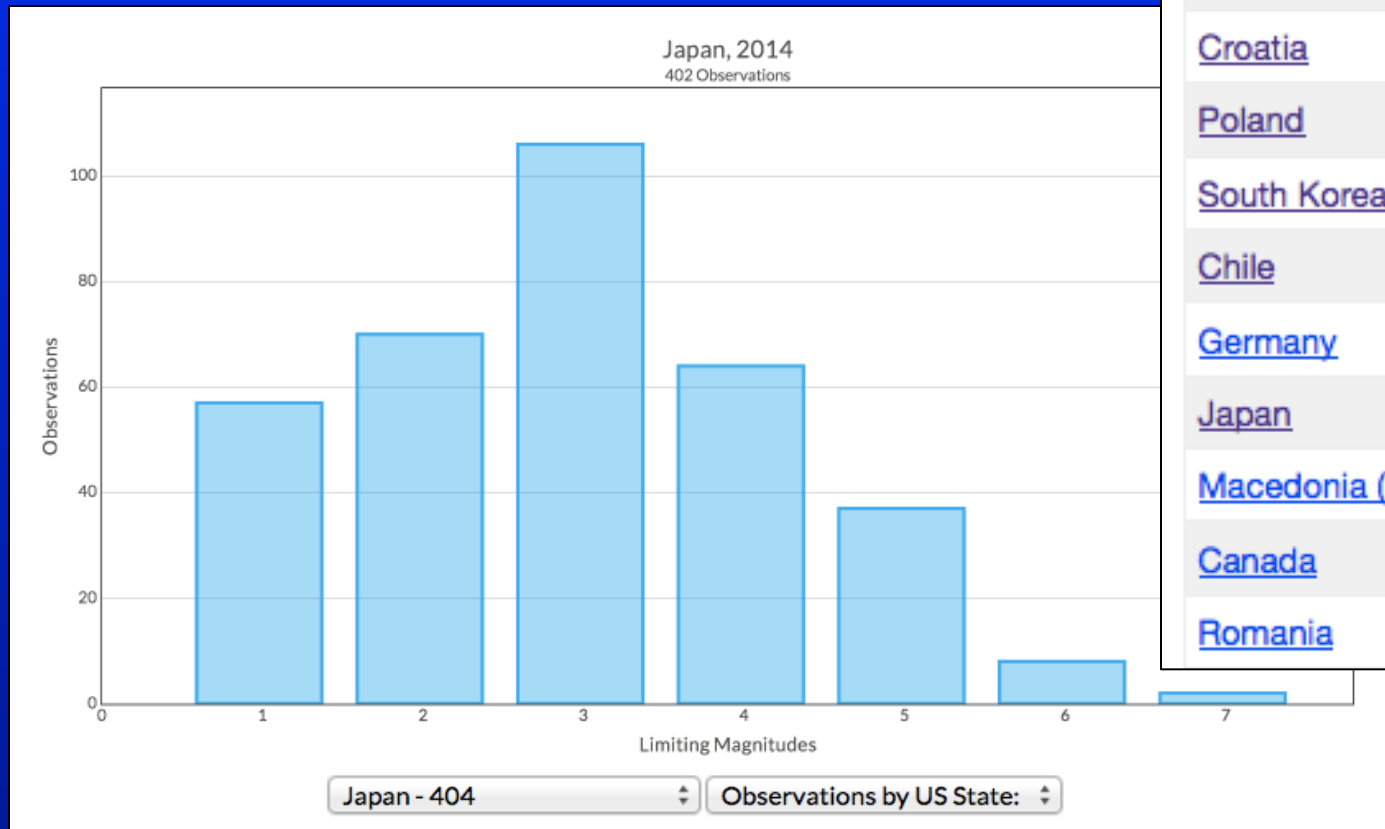




Measurements from Japan in 2014

Observations by Country:

Country	Obs.
United States	6114
Croatia	3200
Poland	1836
South Korea	1324
Chile	1087
Germany	607
Japan	404
Macedonia (FYROM)	400
Canada	360
Romania	310

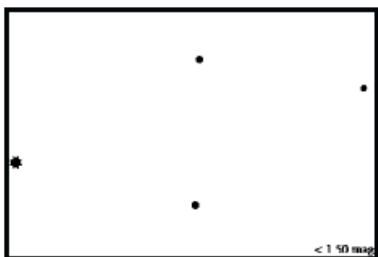




Which Stars Do You See?



○ Stars in Orion not visible



○ Magnitude 1 Chart



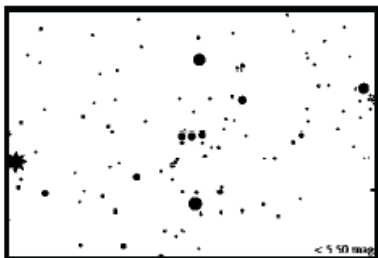
○ Magnitude 2 Chart



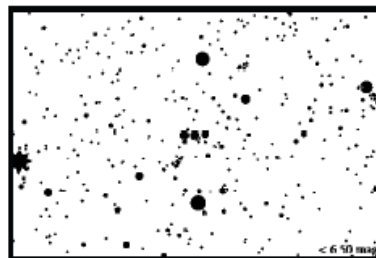
○ Magnitude 3 Chart



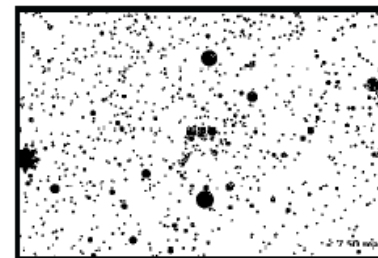
○ Magnitude 4 Chart



○ Magnitude 5 Chart



○ Magnitude 6 Chart



○ Magnitude 7 Chart



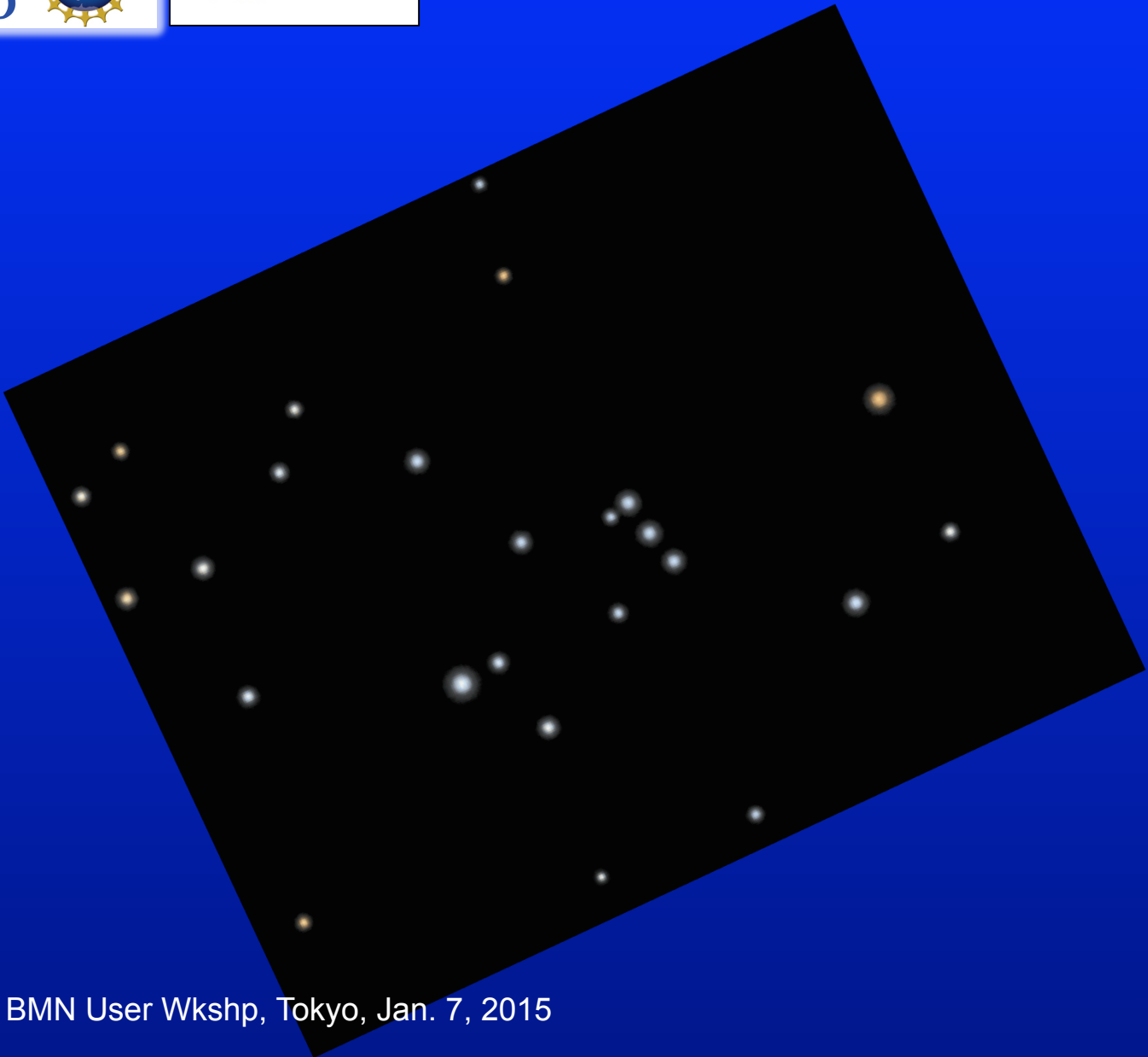
How many stars have we lost? (view from a mid-sized city)



150 stars
across sky



Faintest Star: Magnitude 4



540 stars
across sky



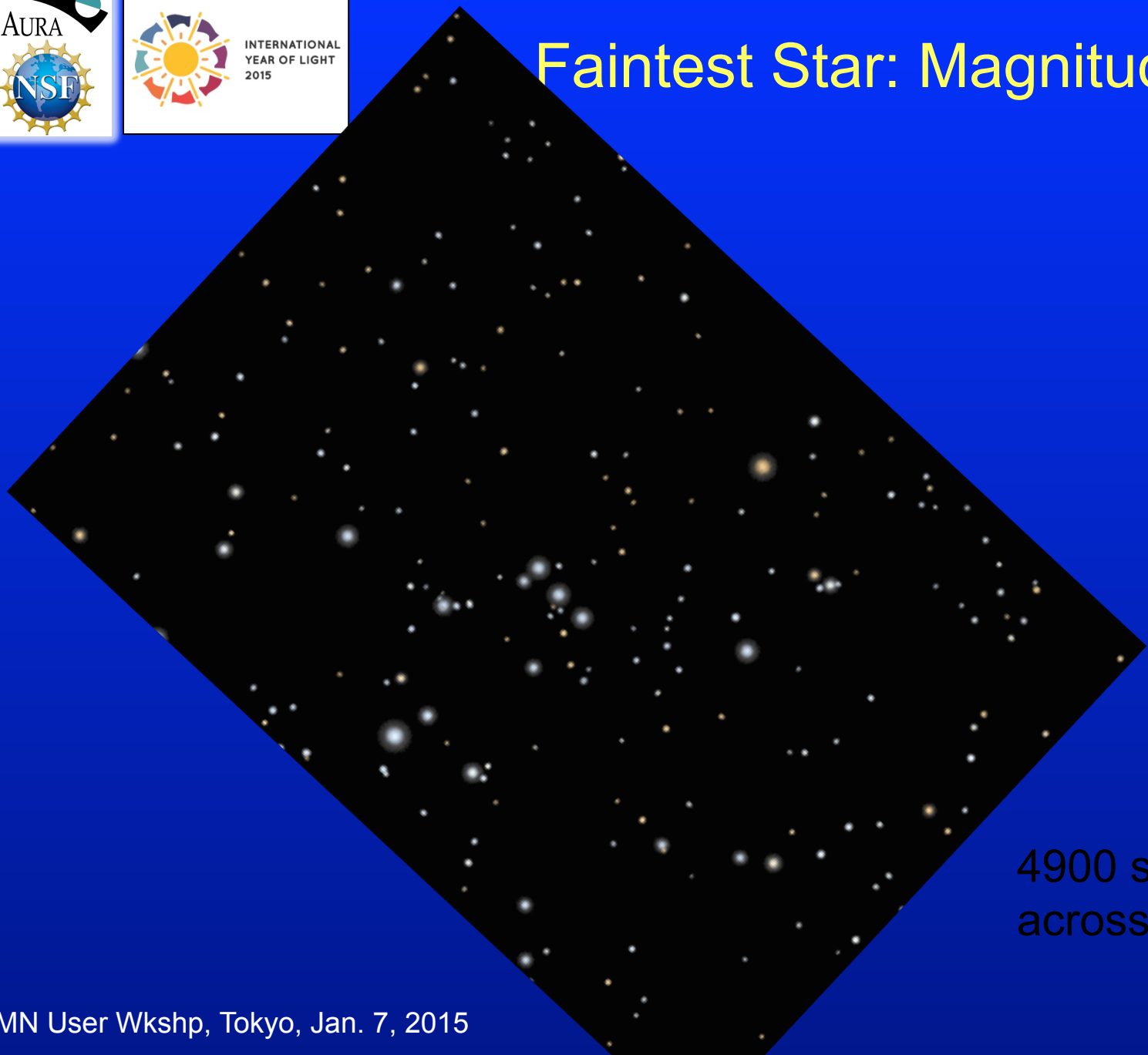
Faintest Star: Magnitude 5



1700 stars
across sky



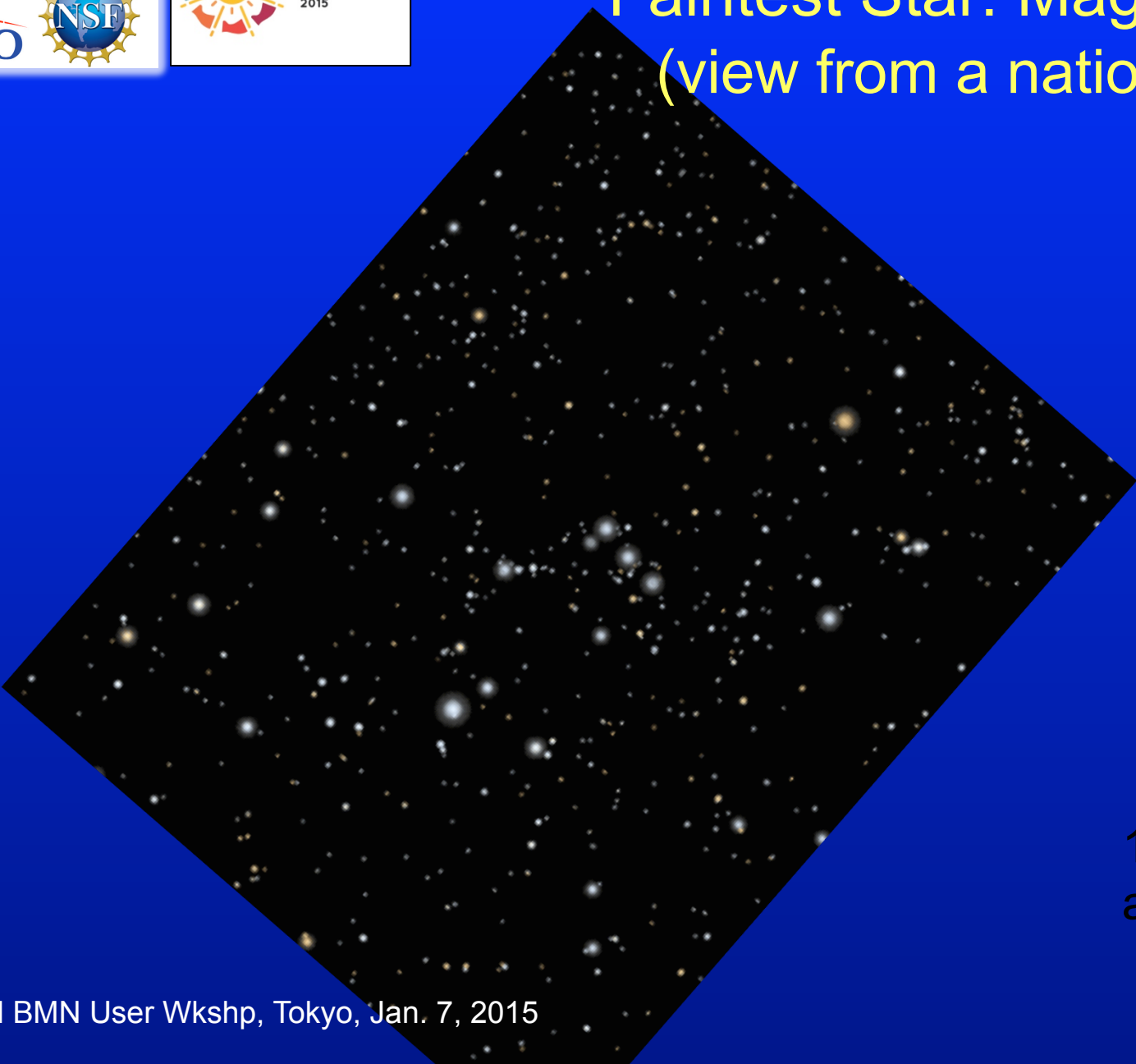
Faintest Star: Magnitude 6



4900 stars
across sky



Faintest Star: Magnitude 7 (view from a national park)



14,000 stars
across sky



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2015

Globe at Night Report Page Using Smart Devices

www.globeatnight.org/webapp/



In 26 languages



Globe at Night Report Page for Japan



Globe at Night

この端末から送信されたデータの履歴

1 いつ観察しましたか?

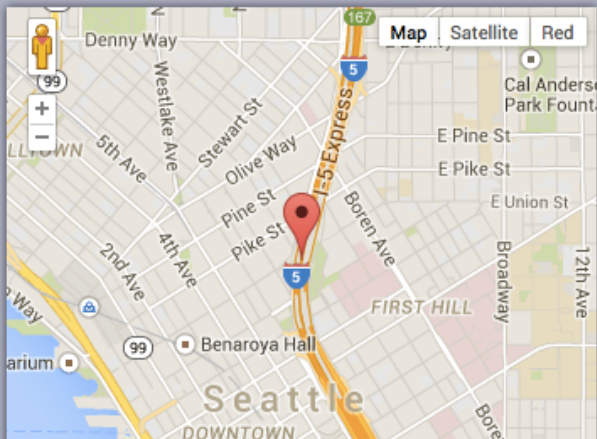
観察日
(年/月/日) 2015/01/7

観察時刻
(24 時間表示) 14:40

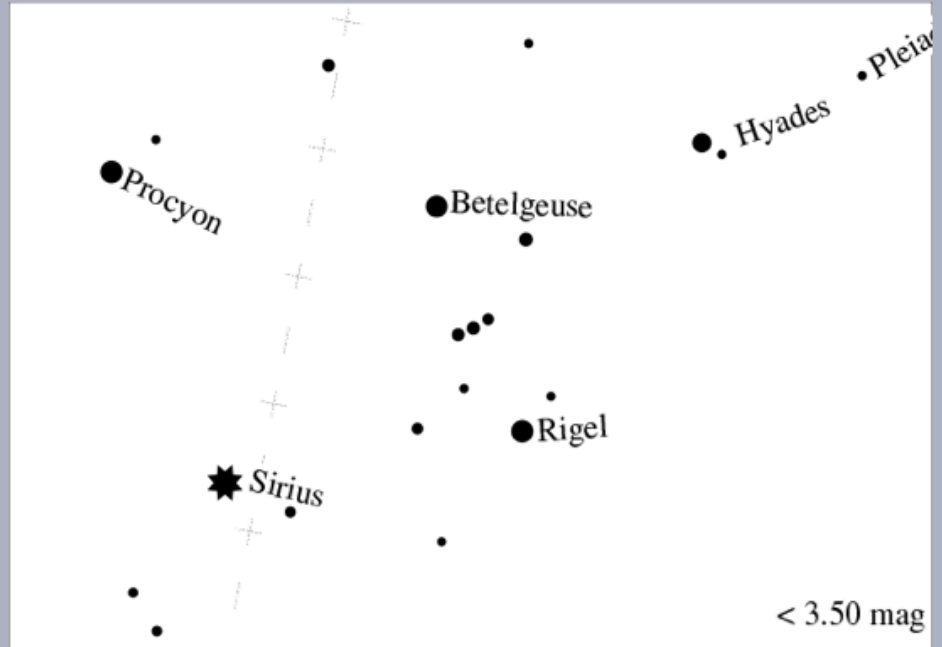
[夜間モード](#) の切り替え

2 どこで観察しましたか?

Map It!



3 夜空はどのくらいの暗さでしたか?



対象星座: オリオン座





When did you make your observations?



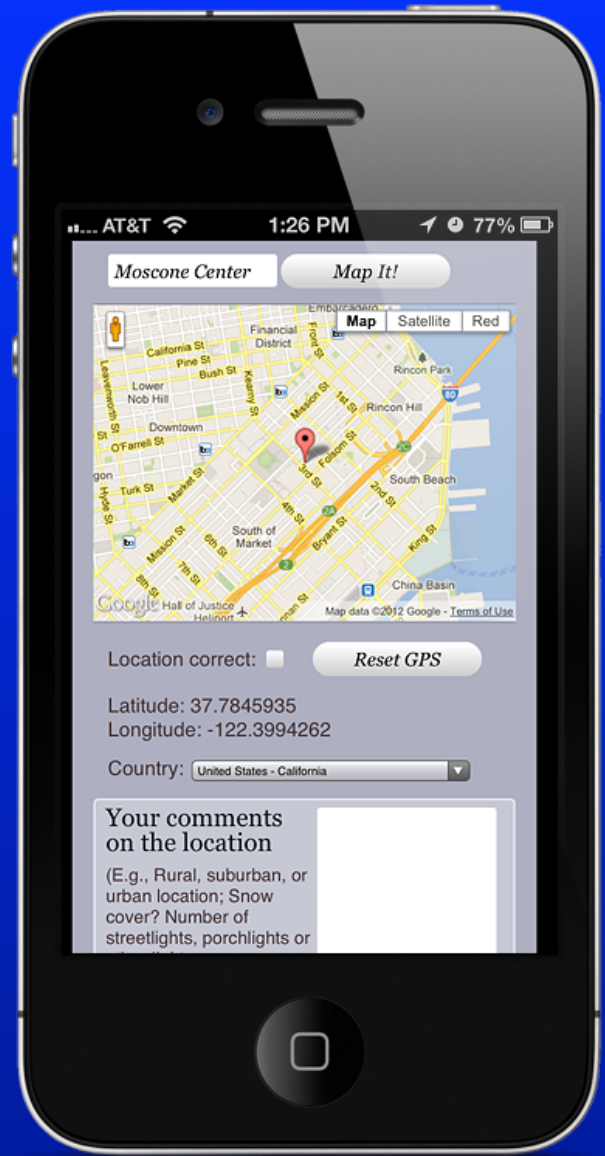


When did you make your observations?



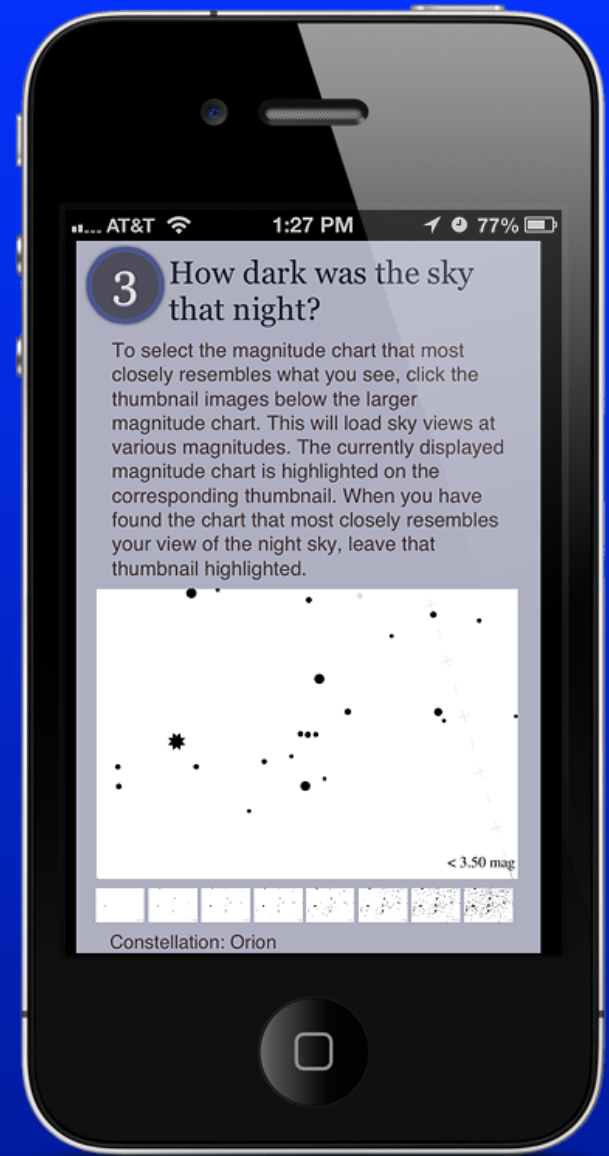


Where did you make your observations?





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:

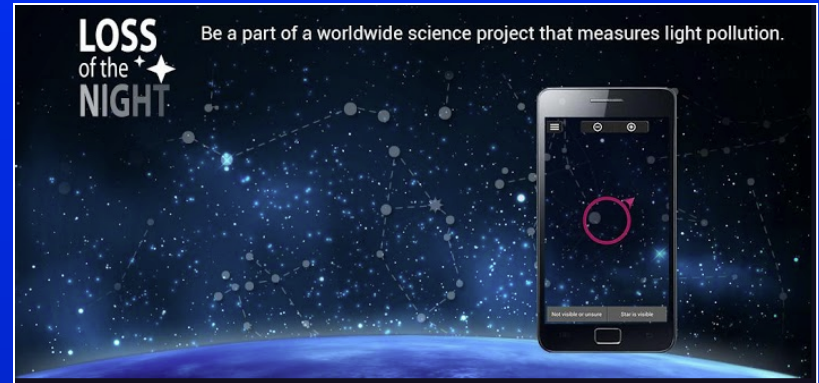




New Apps for Determining Night Sky Brightness

The Loss of the Night app

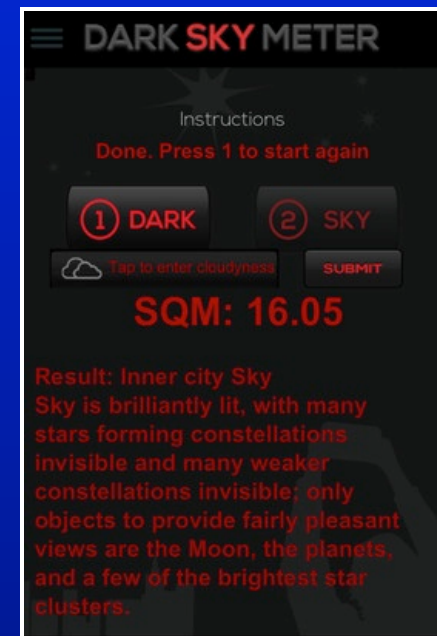
- Asks sequentially if you can see 7 stars
- Free app downloadable for Android & iPhones



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>

January 11-20

February 9-18

March 11-20

April 9-18

May 9-18

June 8-17

July 7-16

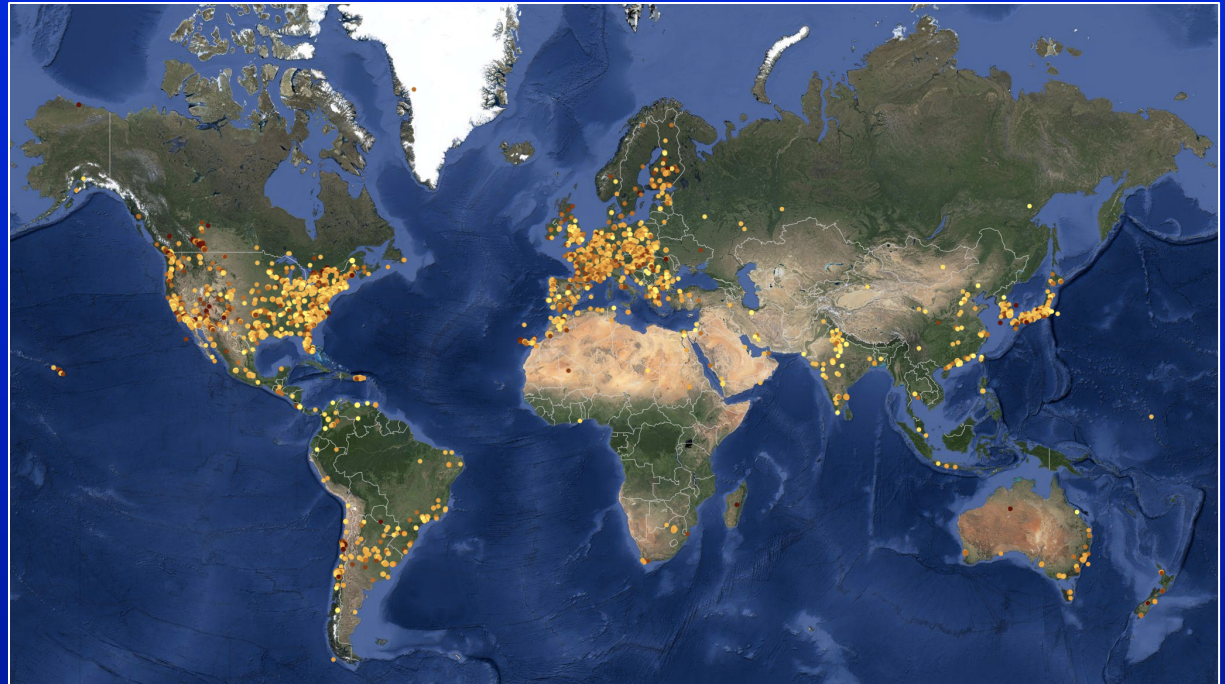
August 5-14

September 3-12

October 3-12

November 2-11

December 2-11





GaN Dates & Constellations

globeatnight.org/5-steps.php

Northern Constellations



Orion

January 11-20, February 9-18, March 11-20, 2015



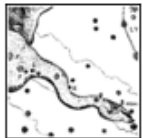
Leo

April 9-18, May 9-18, 2015



Bootes

June 8-17, July 7-16, 2015



Cygnus

August 5-14, September 3-12, 2015



Pegasus

October 3-12, 2015



Perseus

November 2-11, December 2-11, 2015

Southern Constellations



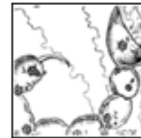
Orion

January 11-20, February 9-18, 2015



Crux

March 11-20, April 9-18, May 9-18, 2015



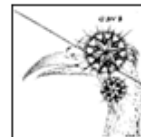
Scorpius

June 8-17, July 7-16, 2015



Sagittarius

August 5-14, September 3-12, October 3-12, 2015



Grus

November 2-11, December 2-11, 2015



GaN2015 Activity Guide in Japanese



夜空の明るさ世界同時観測キャンペーン 観測ガイド

www.globeatnight.org

2015年 キャンペーン期間 (対象：オリオン座)：1月11日 20時, 2月9日 18時, 3月11日 20時

街にはLEDの光があふれ、夜空が照らされ、星が見えにくくなってきています。また、無駄・過剰なLEDの光は、莫大なエネルギーの消費、生態系への悪影響、人間の生活・身体への悪影響をも引き起こしています。この光害(ひかりがい)の問題を啓発する活動に、あなたも参加してみませんか。GLOBE at Night(グローブ・アット・ナイト)は市民参加型の、夜空の明るさ世界同時観測キャンペーンです。

どなたでも簡単に参加できます。決められた時刻に屋外に出て夜空を眺め、星の見えるをインターネットで報告するだけ。2013年は世界89ヶ国から、計16,342件の観測報告がありました。ぜひあなたも参加して、光害の問題を考えてみませんか。そして、世界中の人々と、美しい星空・地球環境への思いを共有しましょう。

観測に必要なもの：

世界中の人々と共に観測をする、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、観測地点の位置情報(緯度・経度)を取得し、記録する

(a) 観測地点において、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/ を開くと、自動的に緯度・経度が記録されます。または家庭のパソコンから同サイトを開き、地図上で観測地点周辺をできるだけ拡大して表示し、観測位置をクリックしてください。

(b) パソコンで eo.ucar.edu/geocode を開き、地図上で観測地点周辺をできるだけ拡大して表示し、観測位置でダブルクリックすると、上に緯度・経度が表示されます。

(c) 観測地点において、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

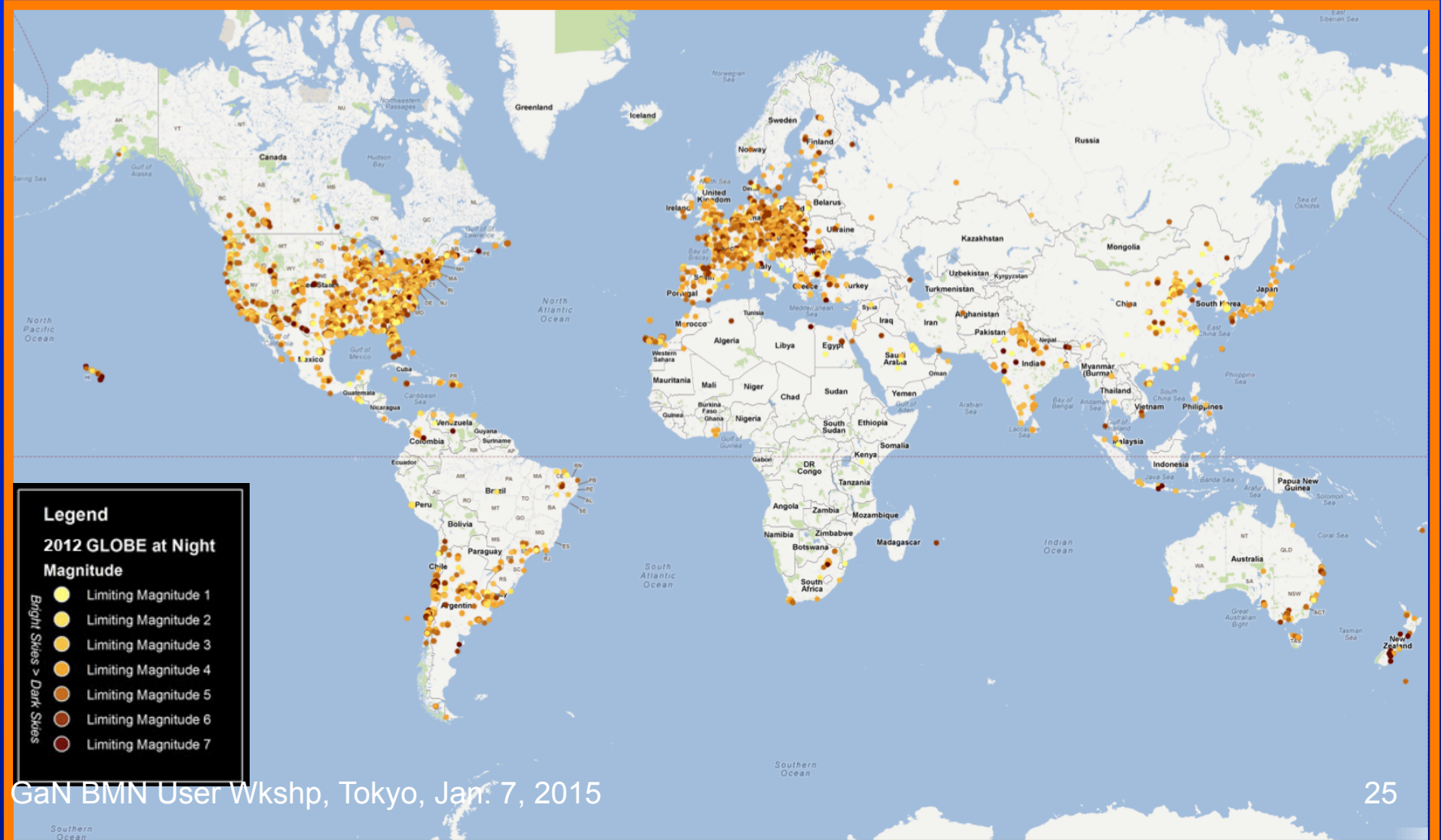
Constellation: Latitude: Read about the [Mythology of Orion](#), or review the [Magnitude Charts for Orion](#).





Interactive Data Map Globe at Night Campaign

globeatnight.org/map/





Regional Map Generator

globeatnight.org/mapapp/

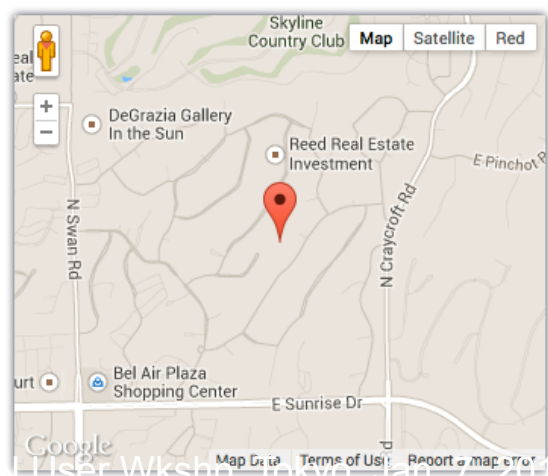
This map application allows you to map Globe at Night data points within a distance you specify around a city or an area of your choice. The resulting maps are bookmarkable and shareable.

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!**



Latitude: 32.3162119

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.

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.

2014 Year

Generate the map

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



Simple Report Form

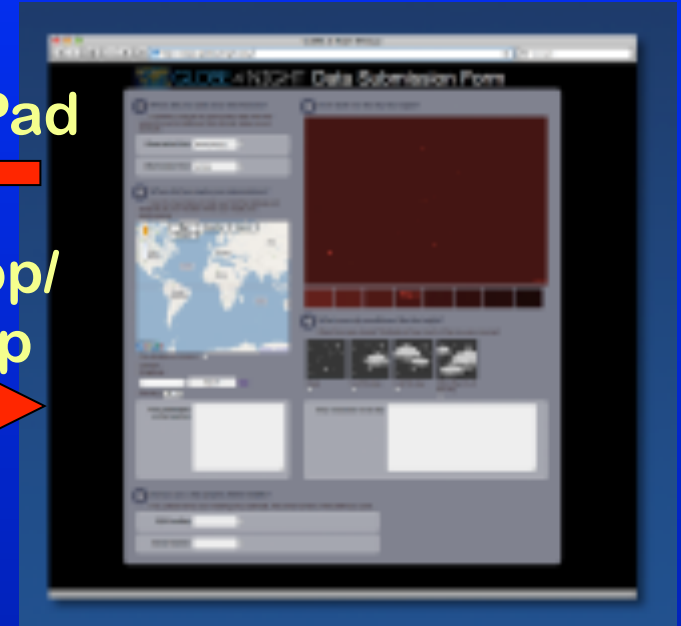
Cell
Phone



Tablet/Pad



Desktop/
Laptop



Measurements

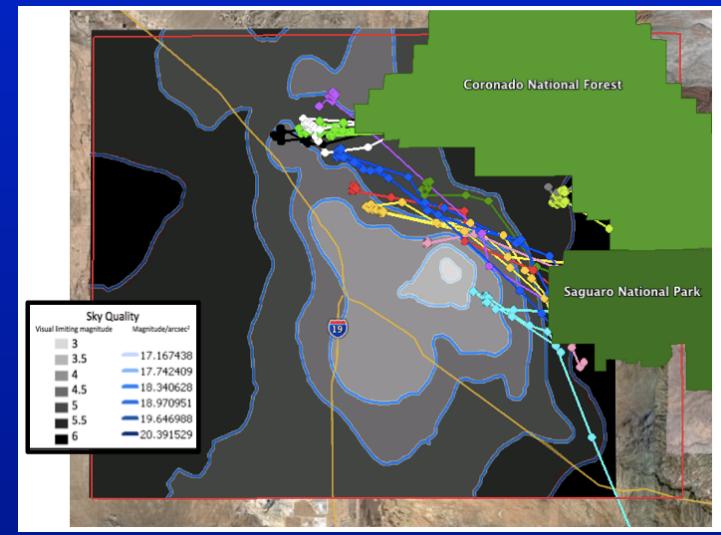
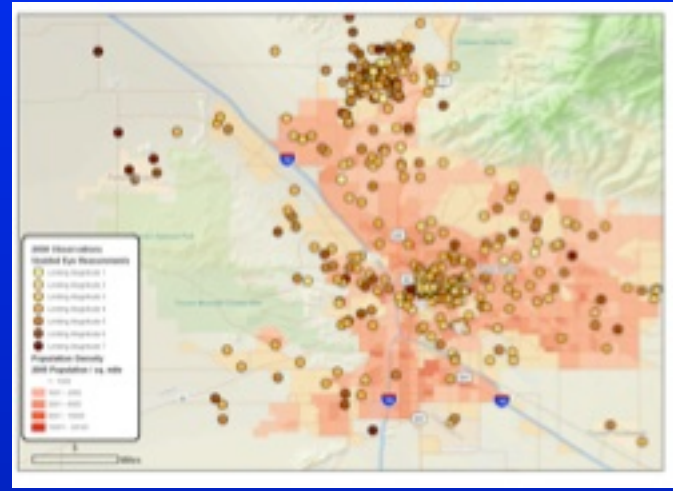
- are downloadable as datasets in various formats
- can be examined online via [Google Earth](#) or other tools
- used as the [basis of research](#) in a classroom or science fair project or even to inform the development of [public policy](#)



Possible Projects

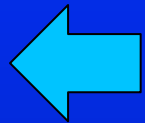
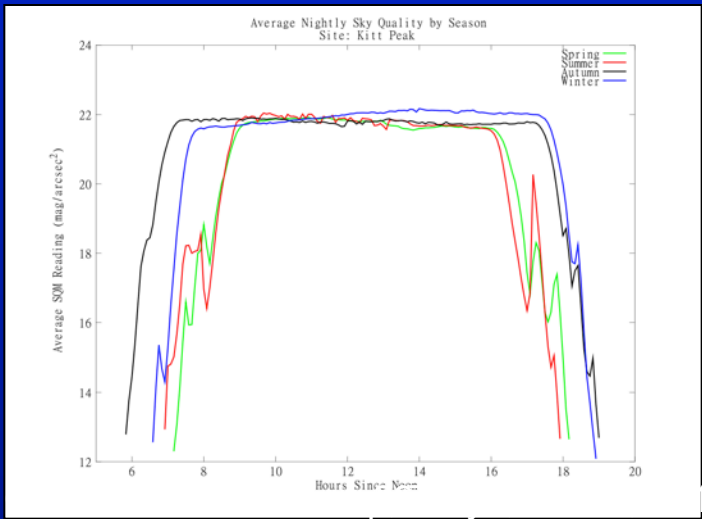
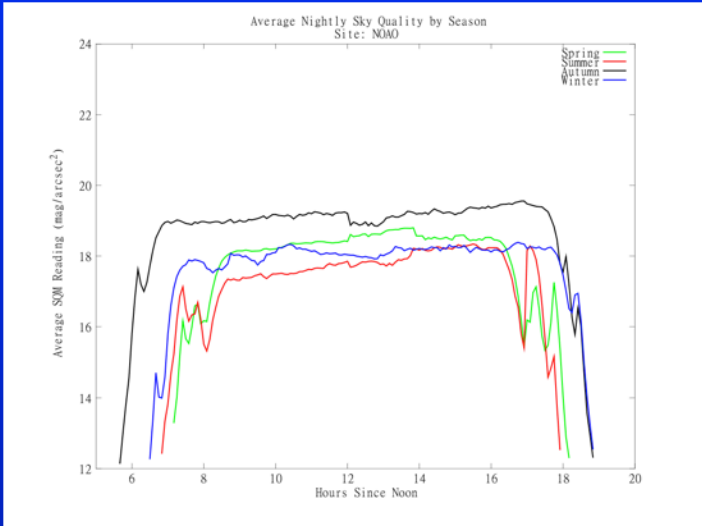
Students can

- 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





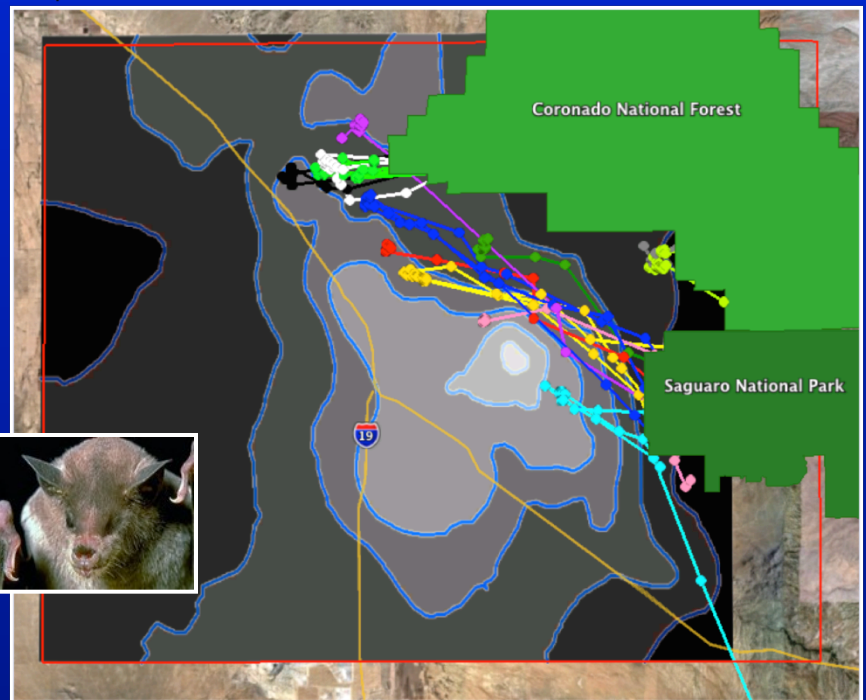
Research with SQM-L and SQM-LU Data



Seasonal variations in light pollution in city & on mountaintops

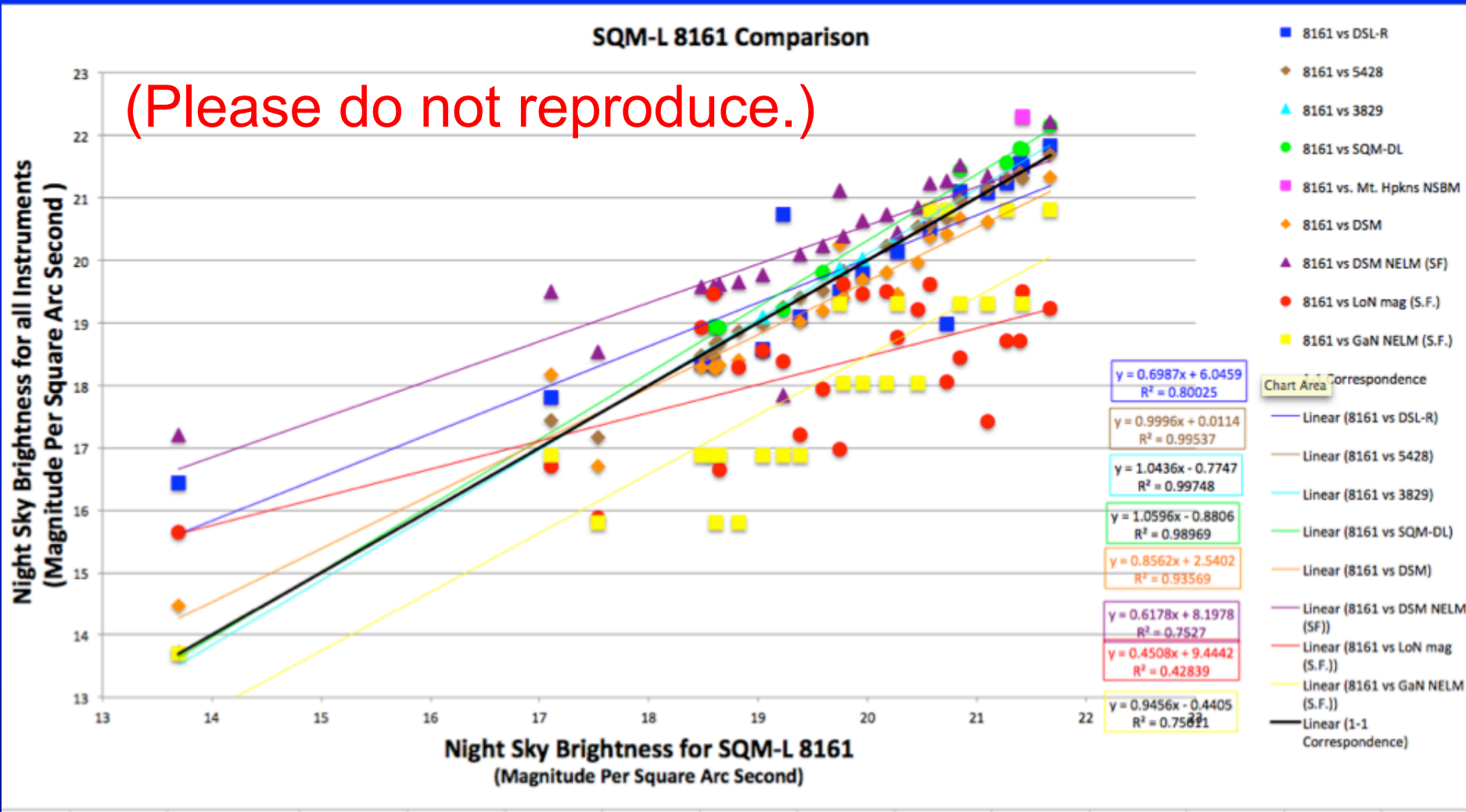


Lesser Long Nosed bats avoid Tucson city center





Comparing Different Ways to Measure Night Sky Brightness





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



GaN BMN User Wkshp, Tokyo, Jan. 7, 2015



Partners, Funding, Dissemination, Objective

- 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.



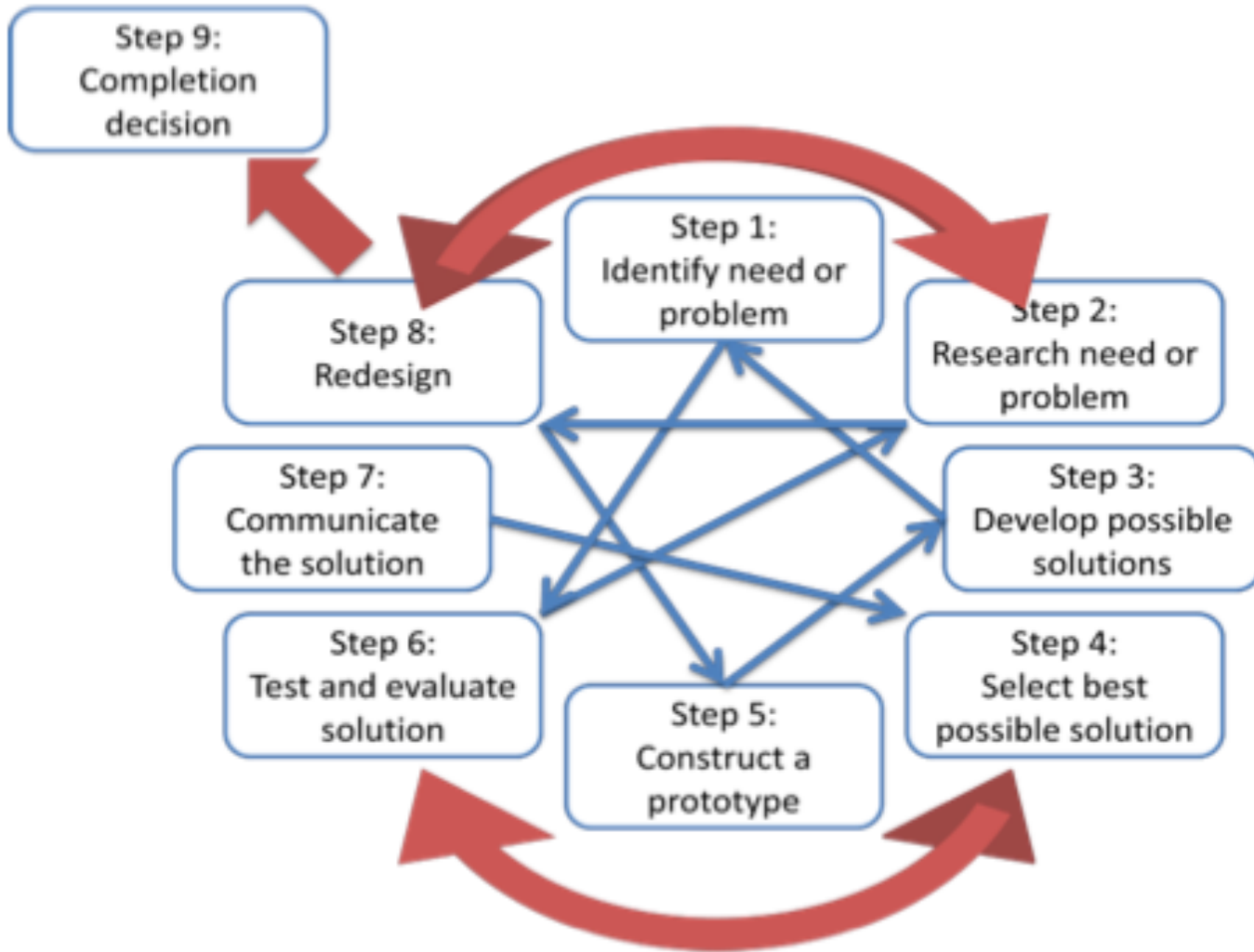
What is Problem-Based Learning?

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





Maglight Causes Misconceptions in Light Shielding Demo



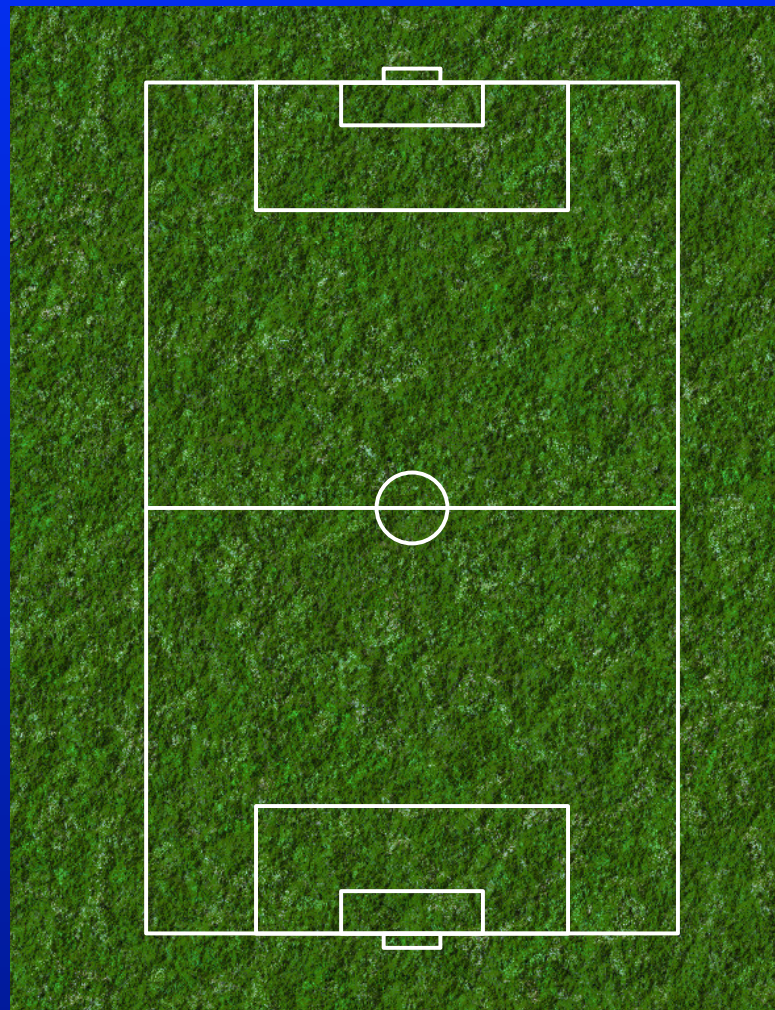
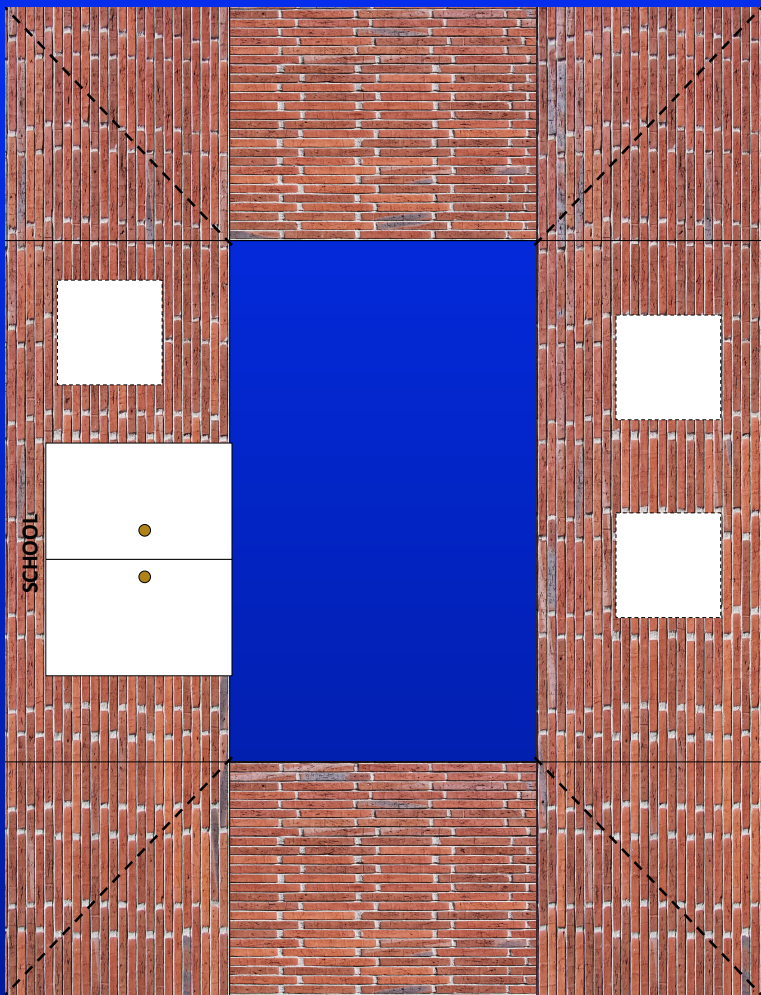


Globe Lights & Streetlights: 1 to 40 Scale Model for Light Shielding Lab





Model Build-a-School & Playing Field





Questions?





Contact Information

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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