



The **GLOBE** at Night 2011

Extrava**GaNza**

Rob Sparks (on behalf of Connie Walker)
(National Optical Astronomy Observatory)

March 9, 2011

GLOBE North America Partner Meeting,
NSTA Conference 2011



Light Pollution Affects...



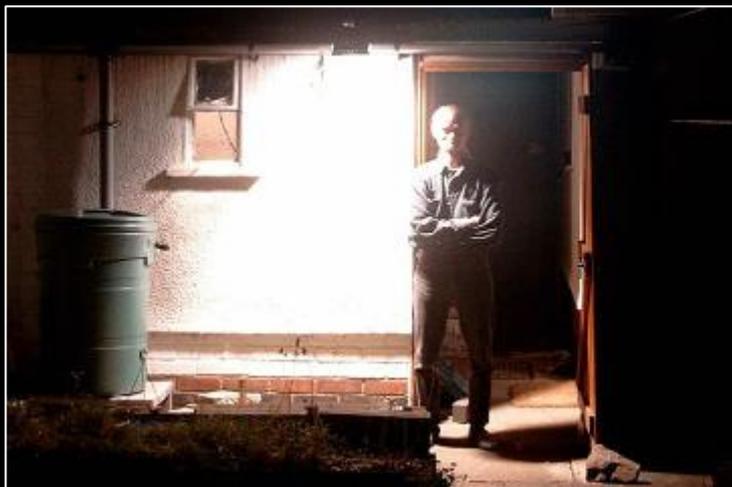
Astronomical Research



Energy, Safety & Security



Human Health



Wildlife



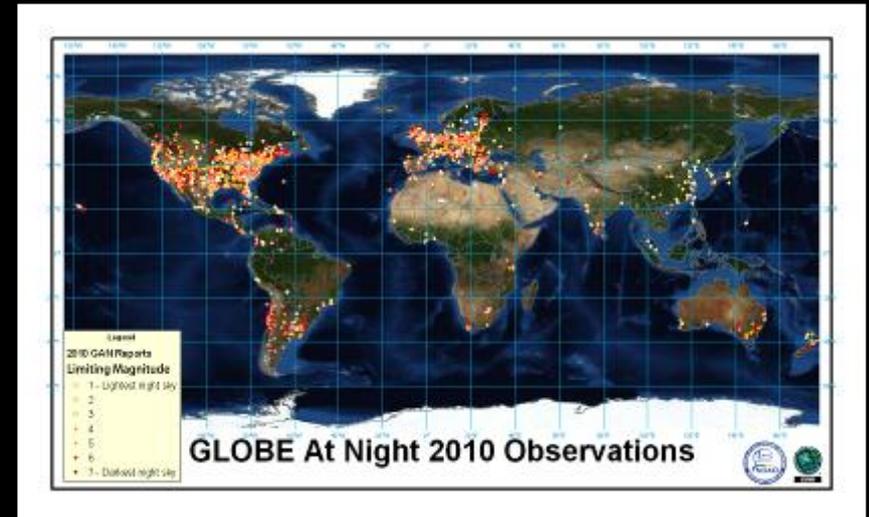


GLOBE at Night

www.globeatnight.org



- Citizen-scientists record the brightness of the night sky by matching its appearance toward the constellation Orion with star maps of progressively fainter stars.



- Measurements are submitted on-line and resulting maps of all worldwide observations are created.
- Over the last 6 annual two-week GLOBE at Night campaigns, over 60,000 measurements have been contributed from over 100 countries.



GLOBE at Night – 2 Ways to Participate



- The “**classic**” GLOBE at Night has citizen-scientists **observing** the constellation of Orion to measure light pollution.
- The “**digital**” GLOBE at Night has citizen-scientists use meters to obtain **more precise measurements** of the night sky brightness.





What's New with GLOBE at Night?



- An on-line community with Facebook and Twitter – **getting lots of attention!**
- A web application to submit GLOBE at Night data using mobile devices – **in use!**
- More monthly campaigns – **two this year!**
- On-line video tutorials of the Dark Skies Rangers activities – **coming soon!**
- A user-friendly analysis tool on the GLOBE at Night website – **in the future!**



GLOBE at Night Website

www.globeatnight.org



- 5 step citizen science program – simple to participate
- Background information on key concepts
- Interactive games
- Fun quizzes to check proficiency
- Teacher and Family Guides in 16 different languages
- Postcards, flyers en español también!
- Report page
- Map page with data in various formats

If Orion looked like this in your sky, what limiting magnitude would you report?

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



View from Latitude 0° (the Equator)

Question 1 of 5

Submit

Images and development courtesy of Dennis L. Harvi. © Copyright 2007 University Corporation for Atmospheric Research

Magnitude of Stars | Finding Orion Interactive | Orion Mythology | Light Pollution Interactive | Light Pollution | Sky Quality Meters

What does your nighttime sky look like? Are you observing light pollution in your sky? * Also in Spanish.



Drag the Magnitude slider left and right to make more (left) or less (right) light pollution. Drag the Latitude slider up and down to change the view of Orion to match the sky as seen from your location on Earth.

How does the amount of background light pollution affect your ability to see the fainter stars in the constellation Orion?

Credits

* Adobe Flash Player required



Simple Report Form

www.globeatnight.org/report.html

www.globeatnight.org/webapp



Cell
Phone



Date and Time

Tablet/Pad



Location

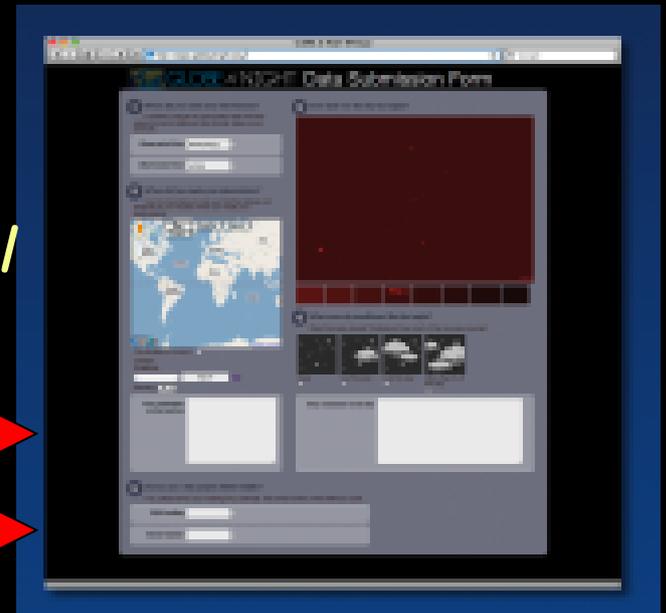


Orion data

Desktop/
Laptop



Cloudiness
and SQM data





1 When did you make your observations?

If needed, change the observation date and time using the current date and time format, below, as an example.

Observation Date
 (yyyy/mm/dd)

Observation Time
 (24 hour time)

Switch to [Nighttime version](#).

2 Where did you make your observations?

Use the map below to help you find the latitude and longitude of your location when you made your observations

Type the [street address](#), the [common name](#), or the latitude and longitude (in decimal degrees) of your location into the text box & click **Map It!**. Refine your location by zooming in, scrolling and tapping the map.

If you have the Latitude and Longitude in Degrees (°), Minutes (') and Seconds (") (DMS), [use our conversion tool](#) to convert them to decimal degrees and map the location.

When your location is correct, click the checkbox.

Map It!

Location correct: **Reset GPS**

Latitude: 32.236358
 Longitude: -110.85308099999997
 Country:

Your comments on the location (E.g., Rural, suburban, or urban location; Snow cover? Number of streetlights, porchlights or other light sources (vending machines, etc.) in vicinity; Trees or structures in vicinity)

On a main street in a medium-sized city. Two streetlights on either side of me, each 25 yards away. No obstruction of view of constellation.

3 How dark was the sky that night?

To select the magnitude chart that most closely resembles what you see, click the thumbnail images below the larger magnitude chart. This will load sky views at various magnitudes. The currently displayed magnitude chart is highlighted on the corresponding thumbnail. When you have found the chart that most closely resembles your view of the night sky, leave that thumbnail highlighted.

4 What were sky conditions like that night?

Were there any clouds? Estimate how much of the sky was covered (touch/click the image below):

Clear 1/4 of the sky 1/2 of the sky More than 1/2 of the sky

Your comments on the sky (E.g., Haze - direction? Clouds - type, direction? Sky glow/light dome - direction?)

Just a slight haze to the west probably due to the city lights.

5 Did you use a Sky Quality Meter (SQM)?

If so, please tell us your reading and, optionally, the serial number of the SQM you used.

SQM reading

Serial Number





Data Sets

www.globeatnight.org/report.html



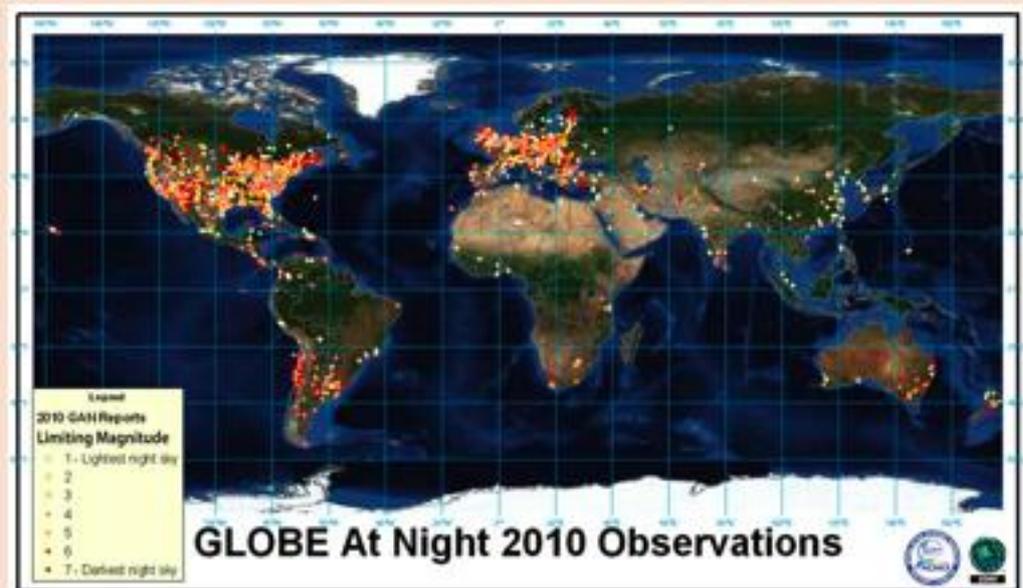
- are **downloadable** as datasets in **various formats**
- can be examined online via **Google Earth** or other tools
- used as the **basis of research** in a classroom project or even to inform the development of **public policy**

2010 Results: 17,805 total observations

- Download the 2010 GLOBE at Night data:

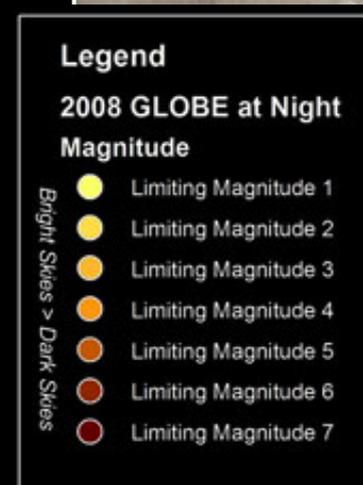
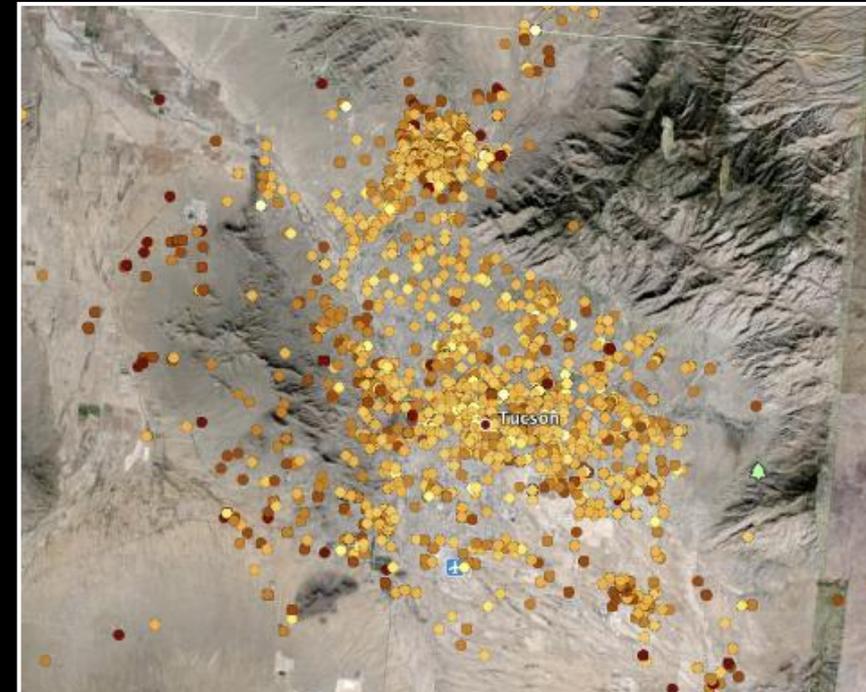
Full Dataset (.txt)
Full Dataset (.xls)
Full Dataset (.csv)
Full Dataset (shapefiles, .zip)
Full Dataset (ESRI geodatabase, .zip)
Full Dataset (Google Maps, .kmz)
SQM Dataset (Google Maps, .kmz)
File Formats and Field Names (.txt)

2010 Observations. Click on the map below for more detail.



Data Exploration

- Comparison of data over time (changes, trends)
- Comparison to data on population density
- Search for dark sky oases
- Monitor ordinance compliance
- Effects of light pollution on animals or plants
- Effects on human health
- Effects on safety, security, energy consumption, cost





Dark Skies Rangers Activities



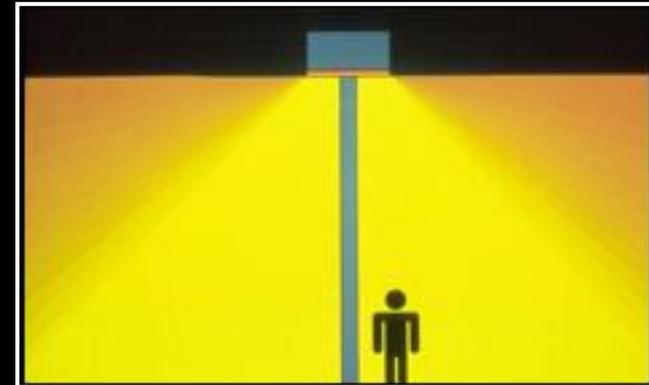
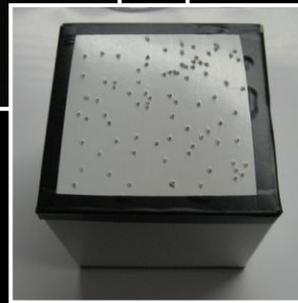
www.darkskiesawareness.org/DarkSkiesRangers/



- **Explorer**
 - Light Shielding Demo
 - School Outdoor Lighting Audit
 - Student Symposium
- **Protector**
 - Turtle Hatching Activity
 - Wildlife Activity (Insects)
- **Advocate**
 - Magnitude Reader
 - Finding Leo, Orion, etc.
 - A Star Hunt Campaign.
- **Ranger** (Students present results.)

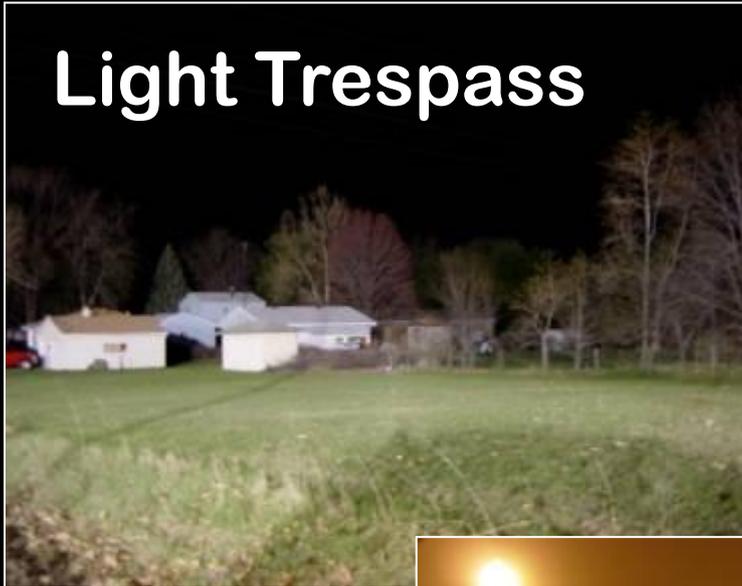


Shielding Helps Minimize Light Pollution



3 Main Types of Light Pollution

Light Trespass



Glare



Sky Glow





A Lighting Audit

www.darkskiesawareness.org/DarkSkiesRangers/



- **Characterizing Lights**

- Use the diffraction gratings & spectroscopes to examine different types of lights.
- Discuss which are and are not energy efficient.

- **School Outdoor Lighting Audit**

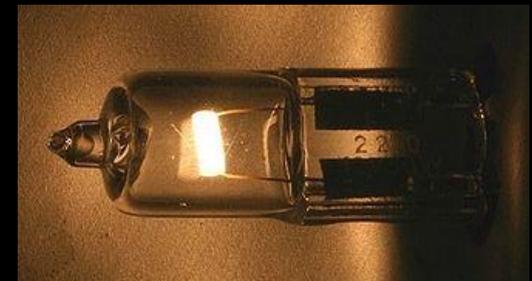
An activity to audit the outdoor lighting around a school building to evaluate the energy efficiency & provide better solutions



Compact Fluorescent



Incandescent



Halogen

Lighting Responsibly

- Shine the light down.
- See the effect, not the source.
- Light only where and when needed.
- Don't over light.
- Use energy efficient sources.





Preparing for GLOBE at Night

www.darkskiesawareness.org/DarkSkiesRangers/



- **Constellation at Your Fingertips**

The activity uses glow-in-the-dark puffy paints to trace a constellation picture on a transparency. After it dries, a UV light is used to help visualize the constellation, Leo (or Orion), at night.



- **“How Light Pollution Affects the Stars” (Magnitude Reader)**

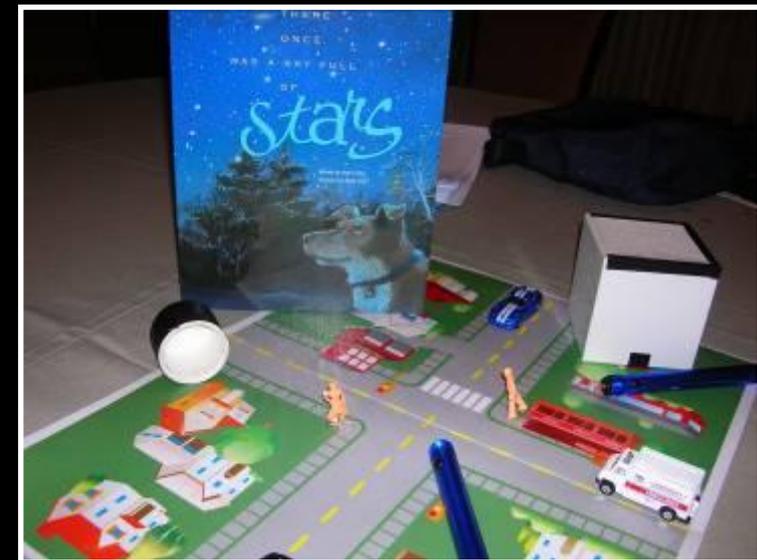
The activity has students build a simple magnitude reader to show how many stars are lost due to light pollution & the concept of limiting stellar magnitudes.



Dark Skies Education Kits (600 kits distributed)



- Materials for a light shielding demonstration
- Dark Skies Ranger activities
- Dark Skies Education & GLOBE at Night resources on CD and 2 DVDs
- Advertising materials (postcards, poster, flyers, etc)
- Children's Book: "There Once was a Sky Full of Stars"
- Quiet Skies Activity (AM radio & fan)
- Sky Quality Meter (optional)

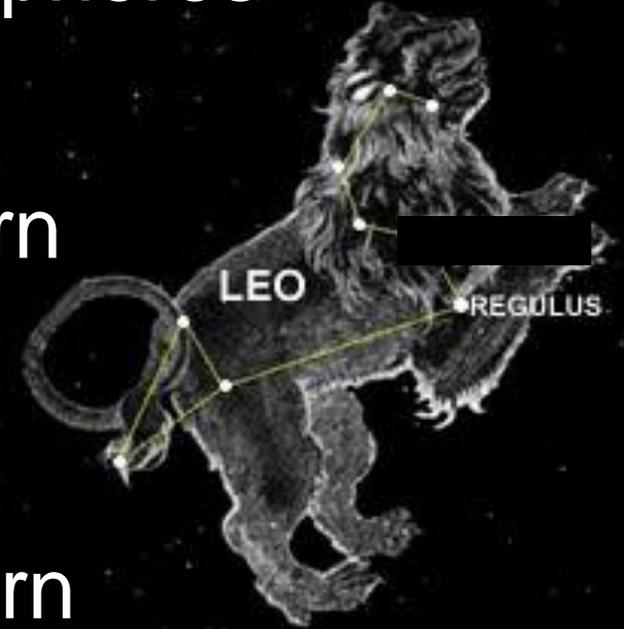




GLOBE at Night Campaign 2011



- February 21 to March 6 for both Northern and Southern Hemispheres
 - Uses Orion.
- March 22 to April 4 for Northern Hemisphere
 - Uses Leo.
- March 24 to April 6 for Southern Hemisphere
 - Uses Leo or Crux.

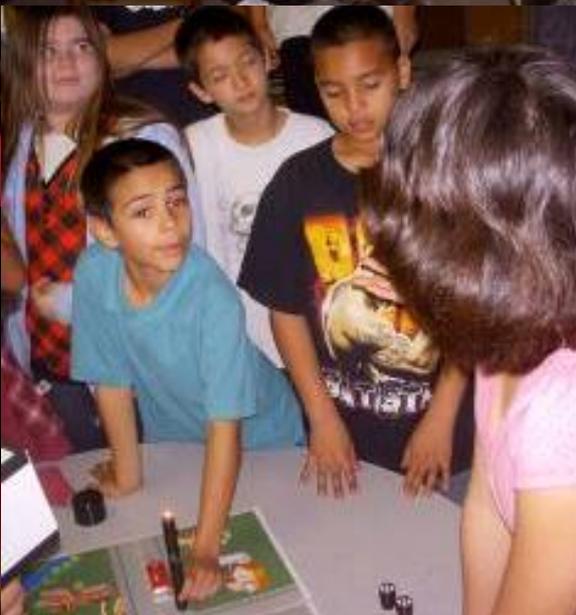




2011 Statistics (So Far!)



- Data submitted from 90 countries
- About 8,000 observations so far
- 57% from the United States
- Other top countries are Canada, Poland, India, Czech Republic, Japan and German
- Data can be submitted until March 15th for the first campaign
- Second campaign starts soon!
 - March 22nd – April 4th (northern hemisphere)
 - March 24th – April 6th (southern hemisphere)





Further Information



Websites of interest:

- www.darkskiesawareness.org/DarkSkiesRangers/
- www.globeatnight.org
- www.facebook.com/GLOBEatNight
- twitter.com/GLOBEatNight
- www.globeatnight.org/webapp/
- www.globeatnight.org/Tucson/

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Sponsoring Institutions



GLOBE at Night (www.globeatnight.org) has been a collaboration between

- 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;
- the Galileo Teacher Training Program (GTTP); 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.

