



Making and Reporting Observations for GLOBE at Night

GLOBE at Night has two different “flavors” - the classic observations that anyone can enjoy making with unaided eyes; and a new effort to obtain precise measurements of the night sky using digital sky-brightness meters, especially to identify and preserve urban dark-sky oases. This document outlines both of these methods, explaining how to make and report observations.

Unaided Eye Observations

There are five basic steps to participation in GLOBE at Night through unaided eye observations. These steps are also outlined in detail on the GLOBE at Night website (<http://www.globe.gov/GaN/observe.html>).

1.) Find your latitude and longitude.

There are a few different methods you can choose from:

- Use a GPS unit every time you take a GLOBE at Night measurement. Report as many decimal places as the unit provides.
- Visit <http://eo.ucar.edu/geocode/> on-line. Input your location. Or input your city; zoom in/out and pan around until you find your location. Double-click and the latitude and longitude will be displayed.
- Download “Google Earth” at <http://www.earth.google.com>
- Use topographic map of your area.
- Determine your latitude and longitude with the interactive tool when reporting observations on the GLOBE at Night Web site.

2.) Go outside an hour after sunset (about 8 – 10 pm) and find Orion.

- Determine the darkest area where most stars visible.
- Wait 10 minutes for eyes to adapt to the dark.
- Locate Orion via http://www.globe.gov/GaN/observe_finder.html
You may also try: <http://analyzer.depaul.edu/paperplate/globe.htm>

3.) Match your view of the sky to one of the magnitude charts.

Magnitude charts are available on the GLOBE at Night website:

http://www.globe.gov/GaN/observe_magnitude.html They are also available in the family activity packet available for download on the site:

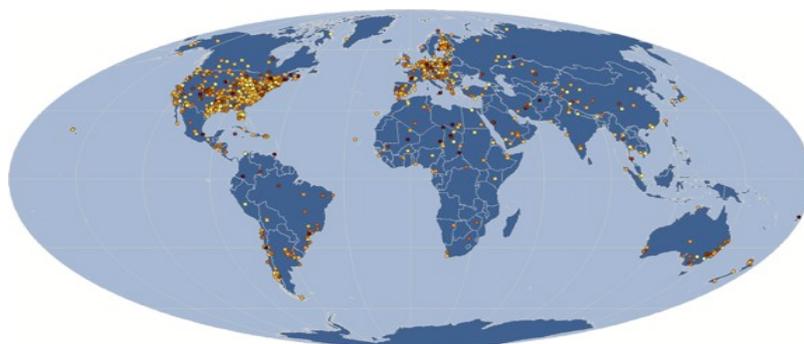
http://www.globe.gov/GaN/GaN2009ActivityPacket_Family.pdf

4.) Report your observation.

- The observation forms are available during the campaign at <http://www.globe.gov/GaN/report.html>
- Paper versions of the observation forms as well as additional information are always available in either the downloadable Teacher or Family Packets at <http://www.globe.gov/GaN/observe.html>

5.) Compare your observation to thousands around the world.

Find the results from past campaigns here: <http://www.globe.gov/GaN/analyze.html>



Here, the darker dots represent darker skies (fewer lights at night) and the brighter dots represent brighter skies (more lights at night).

More information on each of these steps and the Teacher and Family Activity Packets are available at: <http://www.globe.gov/globeatnight/observe.html>

Observations using the Sky Quality Meter (SQM)

The Sky Quality Meters (SQMs) add a new twist to the GLOBE at Night program. They allow us to expand the citizen science experience by making it more scientific and more precise, to measure changes over time, and to map a whole city in detail and identify oases. We have been able to take the campaign to another level by taking advantage of a portable sky-brightness meter.

The SQMs allow for rapid and easy characterization of urban sky glow at many different locations. The repeatability of the readings with the device is +/- 0.1 magnitude/square arcsec according to Dr. Patrick Seitzer (U. Michigan).



Important parts of the SQM

- Push start button here.

- Light enters here.

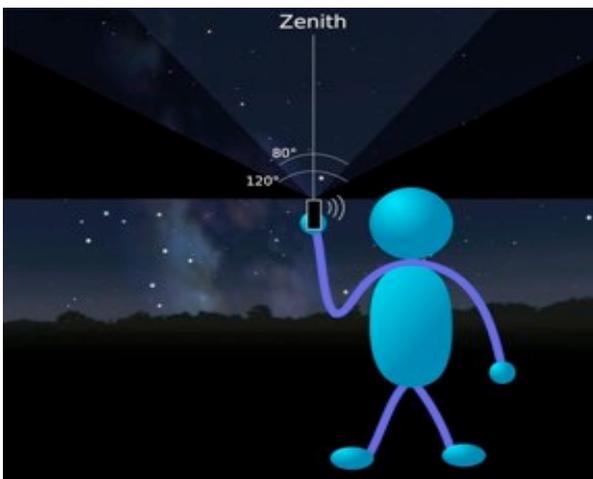
- Read out numbers here.



Using the SQM

You will receive an instruction sheet with your SQM. Refer to this for detailed instructions. The meters are easy to use. Here's a basic overview:

- Observations should be taken when the Sun contributes no light to the SQM's sky glow reading. It is best to wait until after astronomical twilight for total natural darkness. Also the Moon should not be up.
- Point the SQM directly above (at the zenith). The SQM sensor is on the same side as the display.
- The SQM should be held at or above head level so that shadows or reflections from your body do not interfere with the reading.



- Avoid using the SQM in areas that are shaded by trees or buildings.
- After you press the button to take a reading, the SQM will beep each second while it is accumulating photons. The beeping will stop once the reading is ready to be viewed. Face the SQM towards you at this time to note the reading.

What do the numbers mean?

The SQM measures how much light (coming in from a cone of sky about 80 degrees wide) strikes a sensor. The meter then converts that amount of light into units of magnitudes per square arc-second. Basically the larger the number the darker the sky. A meter reading of 21.00 would indicate a very dark site, while a reading of 16.00 would indicate a degraded, light polluted sky. For more information on the meaning of the units used by the SQM, see: <http://www.nightwise.org/magnitudes.htm>



Report your data

- For practice outside the GLOBE at Night campaign, fill out the following quantities on the paper versions of the observation forms available in either the Teacher or Family Packets at <http://www.globe.gov/GaN/observe.html>:
 - Date and Local Time
 - Country
 - Latitude and Longitude (either in decimal OR degree format)
 - Cloud Cover
 - SQM Reading (and Orion reading)
- OPTIONAL INPUT:
 - Comments on Location and Sky Conditions
 - SQM Serial # (a good thing to have though)
- To report SQM data during the GLOBE at Night campaign, you only need to fill out the same quantities on the form at <http://www.globe.gov/GaN/report.html>:

For a thorough explanation of what quantities to report and how, see http://www.globe.gov/GaN/learn_SQM.html.