

Total Solar Eclipse August 21, 2017 Columbia, SC

Photographing the 2024 Eclipse

SCOTT HULL GODDARD PHOTOGRAPHY CLUB 2/14/2024

Agenda

- Where will you be?
- Eclipse Phases: Partiality vs. Diamond Ring vs. Totality
- Planning: what do you want to achieve?
- Equipment: Camera, Lens, Filter, Mount, Logistics
- Stills vs. Video
- Techniques
- Concerns
- Post-processing
- Resources

Where will you be on April 8?



se.com from original at eclipse.gsfc.nasa.gov. Map copyright Google, INEGI, ORION-ME. Eclipse predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center.

If you're not in the totality band, you'll still experience some degree of eclipse

Even if you're just outside the band, though, you won't experience <u>any</u> totality

https://nationaleclipse.com/ maps.html

Where will you be?

- Look up times online
- Watch the weather, and be ready to move
- Anywhere with a clear view of the sky will do
- C1: Moon just starts to obscure the Sun: Sun is a circle
- C2/C3: Totality begins/ends: Sun looks black, surrounded by the corona

Alt: 51.9°

- C4: Moon no longer obscures the Sun: Sun is a circle again
- This eclipse will be basically in the southwest, about 45° elevation

	C1	C2	Peak	C3	C4
Goddard	2:05 PM	N/A	3:21 PM (89%)	N/A	4:35 PM
Carthage, NY	2:10 PM	3:23 PM	3:25 (3m38s)	3:27 PM	4:37 PM

https://eclipse2024.org/eclipse-cities/city/98469.html?lang=en





Eclipse Phases

Partial Eclipse: C1 until almost C2



- Totality: C2 until C3, up to 3-4 minutes
 - Near the center line is longer
 - Near the southern part is longer this time

Diamond Ring and Baily's Beads: about 1 minute after C3

Partial Eclipse: C3 until C4



Planning Your Photos

- Outside of totality very relaxed, easily distracted
 - How many shots do you want?
 - Over what duration?
 - Divide and take shots intervalometer, wristwatch, cellphone timer
- Diamond Ring remove the filter (or use a second camera)
 - LOTS of fast shots
 - Changes relatively quickly
- Totality for a couple minutes
 - Bracketing across a wide range of exposures
 - Doesn't change much
 - Enjoy the experience!
- Make a timeline of the entire eclipse, and what shots you want

Equipment - Cameras

Yes

Any camera will work, if you can filter the sunlight during partiality

- ► DSLR
- Mirrorless
- Point and Shoot
- Smart phone for wide angle shots
- Things to consider
 - Stills and video
 - Power: batteries or external power
 - Familiarity not the time to buy and learn to use a new camera

Equipment - Lenses

- You don't need a telescope in fact, telescopes might be worse
- Optimal lens: Telephoto, around 300 to 600 mm (equiv.) focal length
 - Zoom or fixed, but a solar filter is the main driver for partial eclipse shots
- Don't go too high magnification
 - During totality, the best views are away from the Sun
 - ▶ I made this mistake in 2017; this image used 600 mm (eq.) zoom
 - Sun's corona image is clipped on all sides as a result
- Don't go too low magnification
 - Make sure your Sun images are large enough to appreciate the shape
- Consistent focal length is best for montages



Equipment – Solar Filter

- Anywhere outside the totality path, you will need a solar filter at all times
 - Filter can only be safely removed just before until just after the Diamond Rings
 - > You are putting your camera sensor and lens at extreme risk without a filter
- ▶ Types of solar filters 1/100,000th of the sunlight transmitted
 - Mylar and some glass: bluish white Sun image, highest resolution \$\$ to \$\$\$\$
 - Metallized glass: yellow Sun image, good resolution \$\$\$
 - Solar-Lite polymer: yellow Sun image, good resolution \$\$
 - Black polymer: yellow Sun image, acceptable resolution \$
 - Solar filter vs. solar film
- ► Form factor
 - Purchased screw-on filter for lens
 - Made with polymer film and a UV filter
 - Slide-on assembly





Equipment - Mount

- Sun will move across the camera frame in about 8 minutes at 600 mm (equiv.) focal length – You will probably need to track the Sun
- Altitude-Azimuth Mounts "Alt-Az" or "Alt-Azimuth"
 - Typical camera tripod
 - Heavy duty camera tripod with tracking adjustment knobs
 - ▶ The Sun will appear to rotate as it crosses the sky, over a several hour period
- Equatorial Mount
 - More common for telescopes
 - Needs to be aligned to the North Star good trick in daytime...
 - Can track with a single knob or be motorized
 - Units are available to adapt camera tripods can be a little shaky





Equipment - Logistics

- The eclipse, start to finish, can be 2-4 hours, not to mention traffic
- Folding chair, hat, sunscreen, sun glasses, eclipse glasses
- Snacks and WATER
- Spare batteries or an external power source
- Make a checklist of ALL equipment
 - Don't forget that special cable siting on your desk at home
- Practice, Practice, Practice
- Weather forecast be prepared to move on "the day"
- Consider using an intervalometer, or built-in timer

Stills vs. Video

Partial eclipse period

- Still photos are plenty
- Nobody wants to watch 2 ½ hours of video trust me
- During the Diamond Ring/Baily's Beads phases
 - Only about a minute long, plus totality if you let it run
 - Video looks really cool especially if you film from the start of totality through the end of totality (unfiltered phases)
 - Stills can also look spectacular, but you lose the time element
 - Start with the Sun left of center: it could move through 1/3 of the frame in 4 minutes
- Consider running two cameras: one for video, and one for stills

Techniques – All Phases

- Practice, Practice, PRACTICE
 - Be able to find controls by feel
- Save raw files, to give yourself the best flexibility later
- Focus is more important than exposure
 - Sunspots are handy for fine tuning or checking focus
 - Autofocus works really well for me
 - Focus can change with temperature
 - The Moon is another good target during practice
- Consider setting up custom modes, if you have them
- Thin clouds, not a big problem you're mostly looking at the shape

Techniques – Phase Specific

Partial Eclipse – very relaxed time (don't miss the regular sequence)

- Work out a good exposure, and stick with it (about 1/250 sec, f/ 5.6, 100 ISO)
- Careful that focus doesn't drift as things warm up
- Diamond Ring / Baily's Beads Phases busiest times (about 1 minute each)
 - No filter rapid fire spray and pray time
 - Around 1/1000 sec, f/4.5, 100 ISO (adjust as needed for your widest aperture)
- Totality It's bracket time, baby (typically a couple minutes)
 - Start with the DR/BB exposure, and slow down from there
 - Up to 10 stops of bracketing is not crazy shoot up through 1 second
 - Bracket quickly, because the Sun does move slightly shot-to-shot
- And reverse the process...

Concerns

► SAFETY, SAFETY, SAFETY, SAFETY AND SAFETY!!

- Do not look directly at the Sun <u>unless and **only**</u> during totality
- Eclipse glasses or other certified safe solar filter
- Projection boxes are another option
- Power: camera, tracking head, photographer
- Know the timing ahead of time, and simulations will show you what to expect
- Don't forget to enjoy the eclipse experience!
 - Last total solar eclipse visible in US for decades
- Try to include some wide-angle and behind-the-scenes shots
 - It's a whole experience, so document it all

Post-processing (This could be a presentation in itself)

- Partial eclipse
 - Individual stills can look good; better as a montage
 - Set a large canvas size, and import individual images at regular spacing
- Diamond Ring / Baily's Beads the money shots
 - Usually stand-alone stills, possibly in a montage with the totality image
 - Background and Sun are generally black, with a bright ring and a 'diamond'
 - This phase changes rapidly, so you may have a lot of good shots
- ► Totality
 - Looks best if you blend the bracketed images like HDR
 - Be sure to use clustered sets, for easier alignment
- Upload to the club Flickr page, so we can see your work!

Resources

Don't just rely on what I've presented in a half hour – do more research

- Simulator: <u>https://eclipse2024.org/eclipse_cities/statemap.html</u>
- Simulator at Goddard: <u>https://eclipse2024.org/eclipse-cities/city/98469.html?lang=en</u>
- Alan Dyer video: <u>https://www.facebook.com/Astronomical.League/videos/2327565257435177</u>
- Alan Dyer e-book, \$11: <u>https://www.amazingsky.com/EclipseBook</u>
- Neewer Solar Filter