Capturing The Great American Eclipse

on August 21, 2017

Northern Virginia Photographic Society

May 23, 2017

Dan L. Ward

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Eye Safety During a Total Solar Eclipse

It is never safe to look directly at the sun's rays – even if the sun is partly obscured.

When watching a partial eclipse, you **must** wear eclipse glasses at all times when facing the sun.

Or use an alternate indirect viewing method.

This also applies during a total eclipse except for the time when the sun is completely and totally blocked.

https://www.nasa.gov/content/eye-safety-during-a-total-solar-eclipse

Topics

1. What will I see?
2. Where can I see it safely
3. What do I need for photography?
4. How can I get “better” images?
5. Related Fun Stuff
6. Other resources?

Photo credit: Dr. Kate Russo – Eclipse Chasing Psychologist, author and blogger http://www.beingintheshadow.com/

Totality

Image by Luc Viatour http://www.lucnix.be/v/BEST+OF/Solar+eclipse+1999+Luc+Viatour.jpg.html

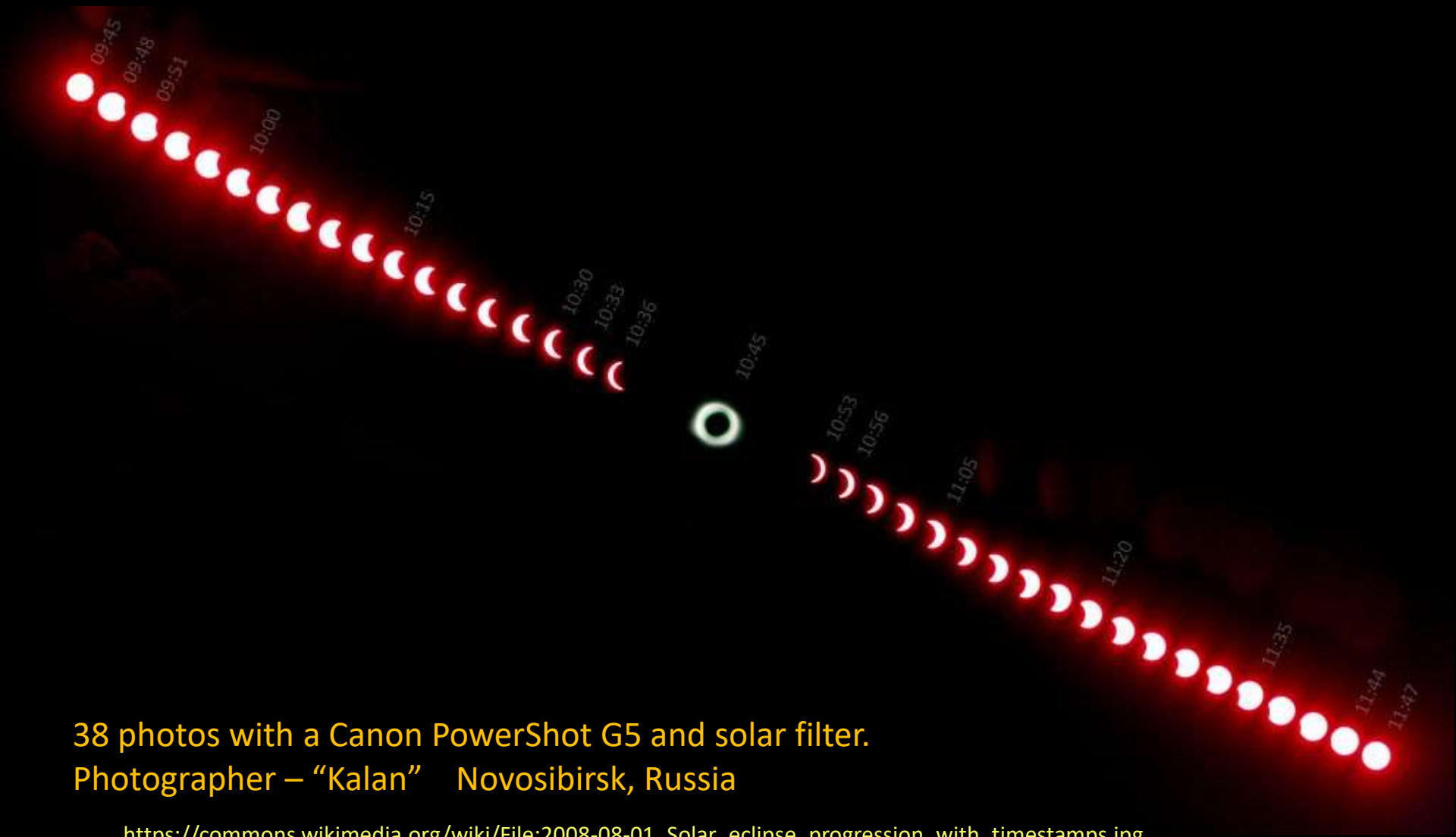
Partial Phases

Aruba 26 Feb 1998 Photos by Dan L. Ward
480mm f/6.8

Eclipse Progression

Three Hours from First Contact to Last Contact

~3 minutes between captures



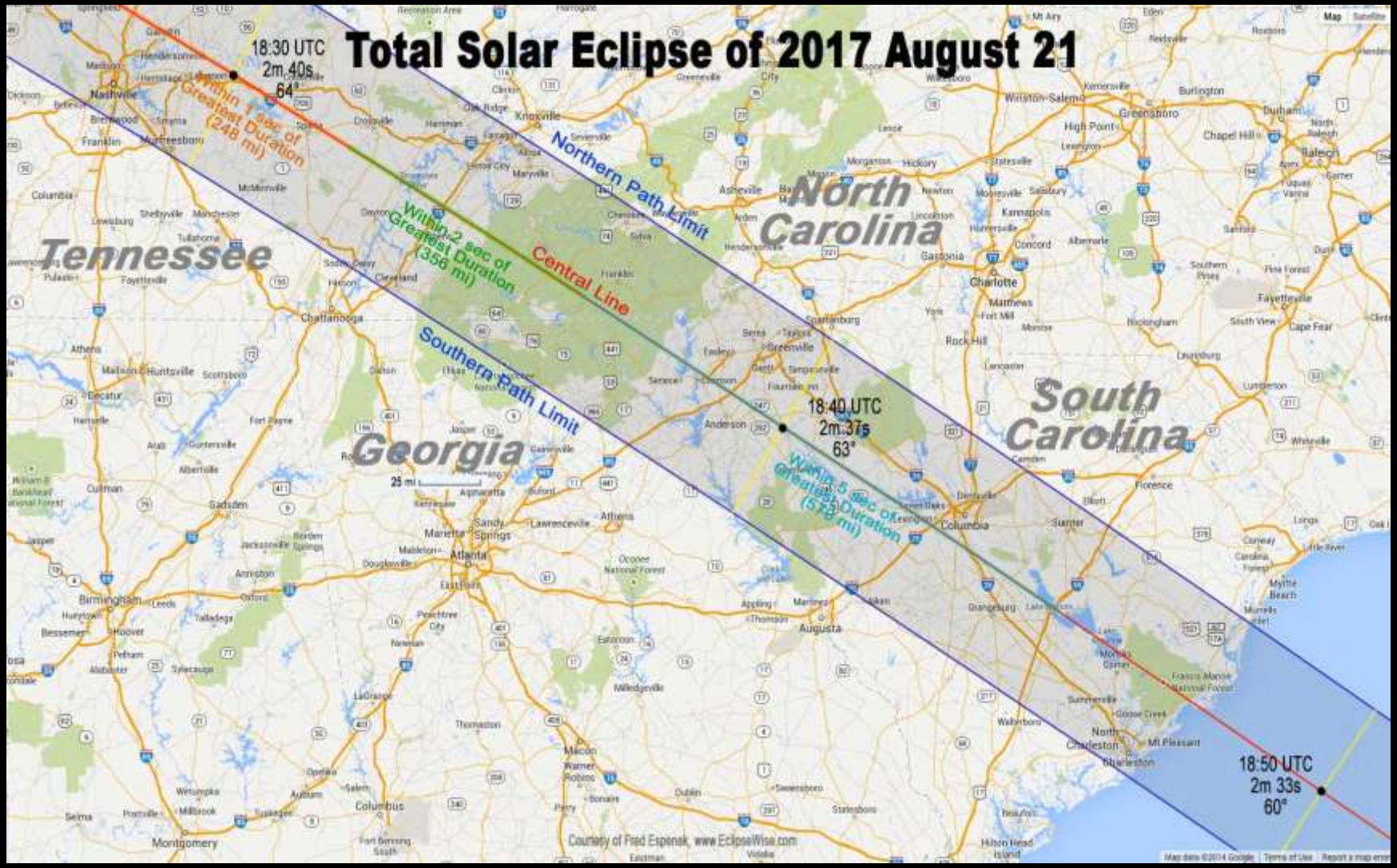
38 photos with a Canon PowerShot G5 and solar filter.
Photographer – “Kalan” Novosibirsk, Russia

https://commons.wikimedia.org/wiki/File:2008-08-01_Solar_eclipse_progression_with_timestamps.jpg

Path of Totality Aug 21, 2017

https://eclipse2017.nasa.gov/

Nearest Totality



Path of Totality Aug 21, 2017

Northern Virginia

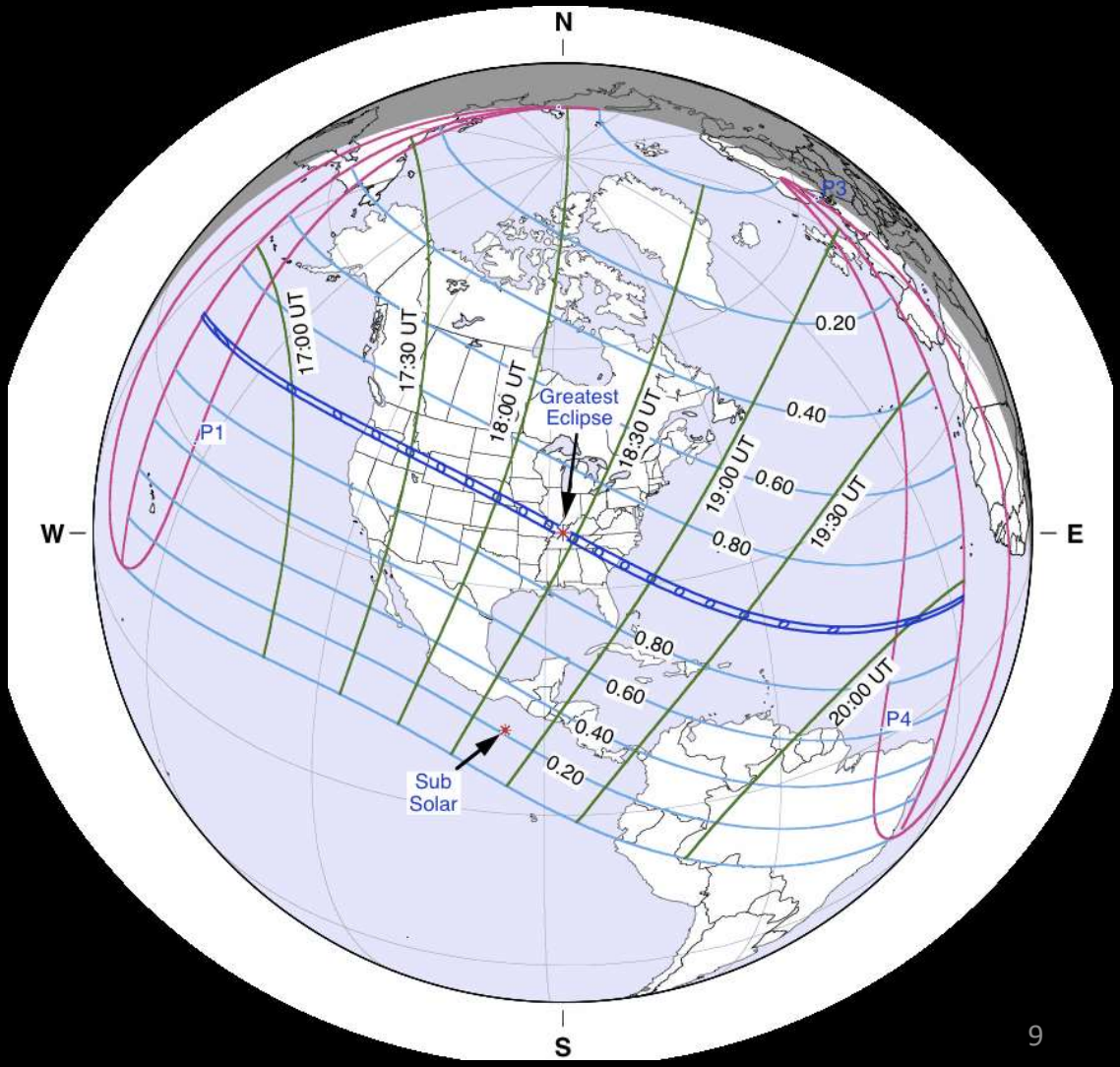
13:17 EDT Begin C1

14:43 EDT Maximum

16:01 EDT End C4s

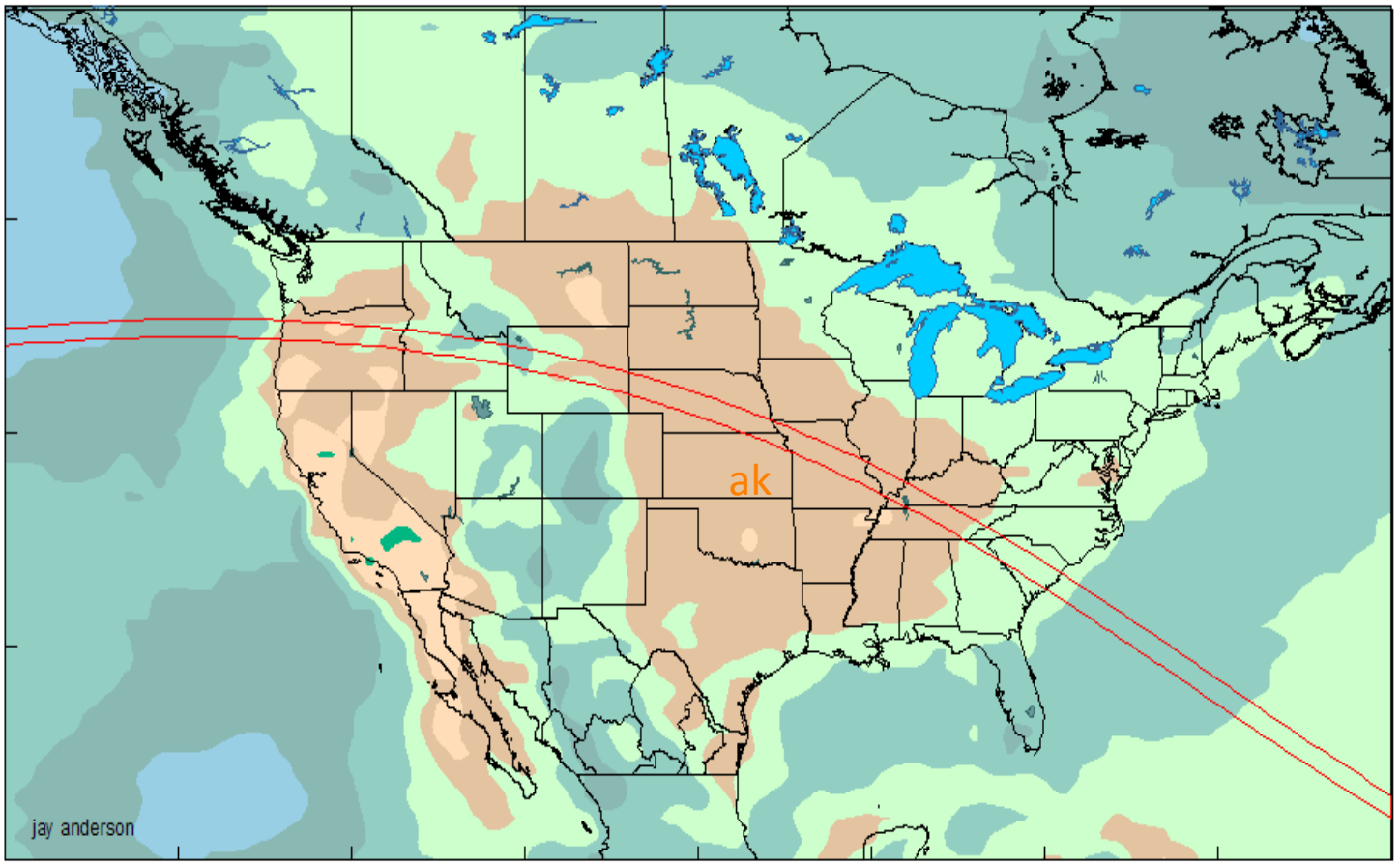
Max Eclipse 84%

Details vary by location
Calculated for Tysons Corner



Make Contingency Plans

Average Cloud Cover



Average August Cloud Amount along the Eclipse Track
2017 August 21

http://www.eclipse2017.org/2017/weather/2017_clouds.htm

Best Advice From the Experts!

A total solar eclipse is one of the most spectacular events any human will ever see. It's about the best that nature has to offer. If this is your first total eclipse, just enjoy it.

If you must take photos, keep it simple.

Camera Options

You can capture something with any camera. You will need a filter for anything other than a wide field view of partial eclipses. How crazy do you want to get?

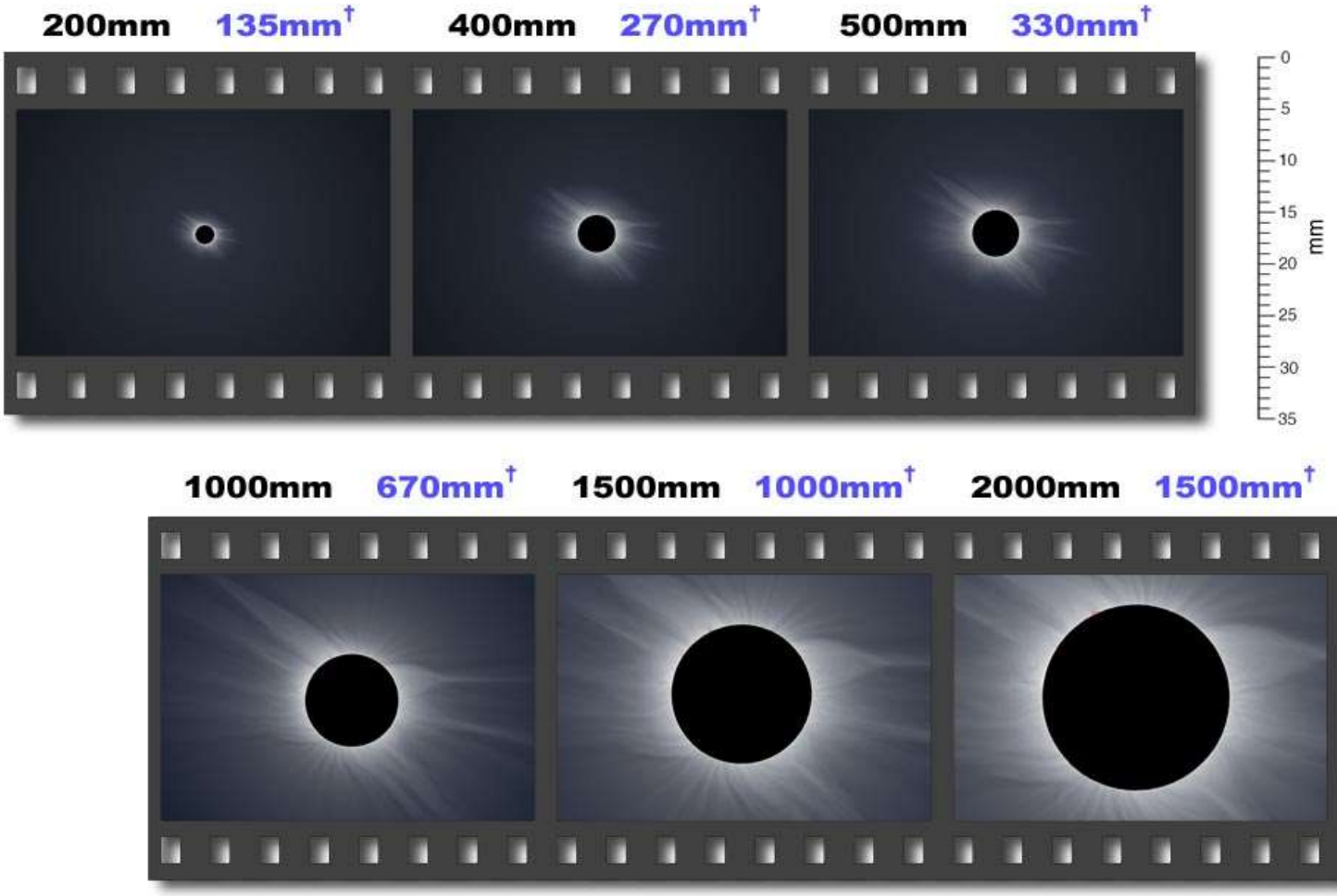
Keeping It Simple

- Smartphone, Point and Shoot, or Wide Angle
- Shoot unfiltered to capture people & landscape
- Hold an eclipse viewer up to filter the sun

- Capture the excitement of totality on a video
- No flash – no autofocus – daylight color
- Tripod and Intervalometer series

http://amazingsky.photoshelter.com/index

Going Big


200mm 135mm†
400mm 270mm†
500mm 330mm†
0
5
10
15
20
25
30
35
mm
1000mm 670mm†
1500mm 1000mm†
2000mm 1500mm†
†Focal lengths in BLUE are for DSLRs.
www.MrEclipse.com/SEphoto/SEphoto.html
©2008 Fred Espenak

Long Focal Length Options

If you want a larger eclipse image…

- 300mm to 800mm focal length
  - Zoom/mirror lens prone to ghosting
  - Teleconverters soften focus and may ghost
- Test optics using crescent Moon or Venus!
- Telescope with adapter – use a refractor, not compound optics to avoid ghosting
  - Check out telescopes at a public star party

www.novac.com

Getting the Best Eclipse Focus

- Use the optimal F/stop for your lens
  - typically – between f/5.6 and f/11
- Depth of field is irrelevant at 248,000 miles!
- Focusing Technique Suggestion
  - Focus first on edge
  - Use manual focus
  - Focusing mask can help fine tune
  - Focusing lever can improve tweaking
  - At best focus, lock in place with tape
  - Recheck focus periodically
  - Use raw and lowest acceptable ISO

Reducing Sun Image Blur

To Reduce Vibrations:

- Sturdy tripod - NOT extended!
- Hang weight on the tripod
- Vibration pads (mouse pads help)
- Remote shutter (wired or wireless)
- Shutter Timer (but it limits # of exposures)
- Intervalometer or timing software
- Mirror Lock Up

To avoid Motion Blur from the Sun

- Divide focal length into 500 for fastest shutter speed
  - (e.g. 500/200mm = 2.5 seconds, 500/800mm = 0.625 second)
- For longer exposures, use a tracking motor
  - Use solar rate, not sidereal
- Test gear well BEFORE Eclipse day. See what works!

“White Light” Solar Filters

All Exposures
300mm
f/8.0
ISO 100

Specialty Filters

(not recommended for eclipse photography)

H-alpha

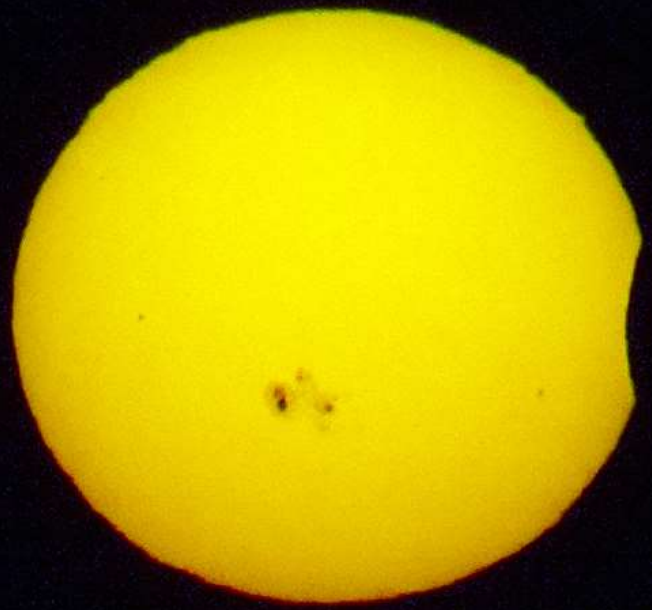
Solar Continuum

CaK

Calcium Filter photo by Chris Schur

Partial Solar Eclipse with Sunspots

Dan Ward 300mm f/10 1/300 sec ISO 320 Nags Head Oct 23, 2014



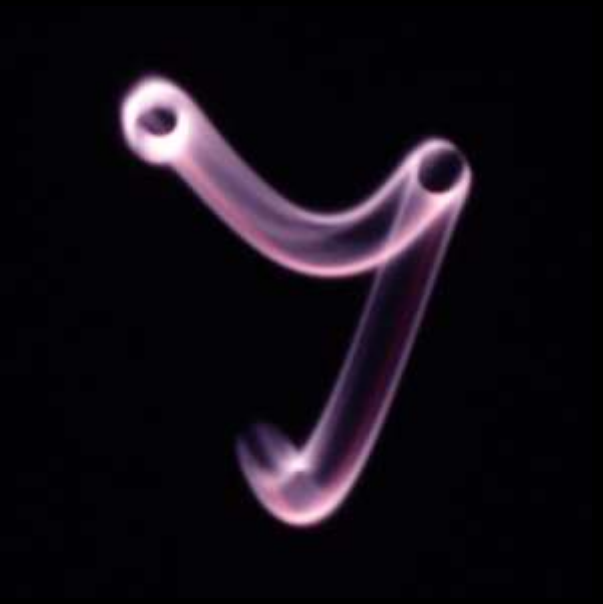
Totality Exposures

Length of Exposure will determine what you capture

20 Image Solar Corona Composite

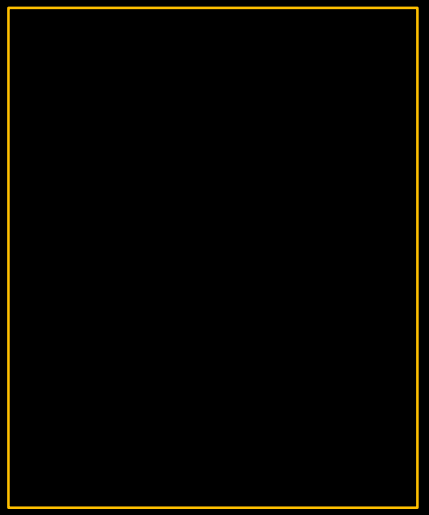
Aruba 26 Feb 1998

What Could Possibly Go Wrong?



No Tripod

Ghosting



Filter not removed

Clouds, forgotten gear, traffic jams, heat stroke, dehydration, sunburns, potty calls, insects, reptiles, last straw arguments --- you name it

More Hints

Don’t go nuts about Photographing the eclipse -
Enjoy it, take snapshots of people enjoying the event and
Get copies of “expert” images later.

But if you must:

1. Remove your Solar Filter during totality!
2. Fred Espenak recommends:
    2. ISO 400 and fixed aperture
    3. sweet spot is usually *f/8-f/16*
3. *Bracket shutter speeds*

    1/1000 to 1 second or more
4. Practice, Practice, Practice

Not Everyone Will Be Equally Excited

Three hours is a long time. Plan Ahead

Some Cool Partial Phase Projects

Make an Eclipse Sign

Photograph Eclipse Shadows

Future Solar Eclipses

24 Solar Eclipses in the next 11 Years

in Northern Virginia, we can see 6 Partials:

- Aug 21, 2017 – Total – US Coast to Coast
- June 10, 2021 – Annular - Canada
- Oct 14, 2023 – Annular – Western US
- Apr 8, 2024 – Total – Central US
- Aug 12, 2026 – Total – Iceland
- Jan 26, 2028 - Annular - South America

https://en.wikipedia.org/wiki/List_of_solar_eclipses_in_the_21st_century

NVPS Member Forum - 10/24/17

An Eclipse Night to share our images:

- Exciting images of the Partial Eclipse
- Stunning images of Totality
- Interesting eclipse destination images
- People sharing the eclipse experience
- *Maybe* a few epic failures as lessons learned

There will be NO CLOUD PHOTOS because no one will get clouded out!

Solar Eclipse Resource List

- **NASA Solar Eclipse Site**: https://eclipse2017.nasa.gov/
- **How to Photograph a Solar Eclipse – Fred Espenak's site:** http://www.mreclipse.com/SEphoto/SEphoto.html
- **Northern Virginia Astronomy Club (NOVAC)**: http://www.novac.com/wp/
- **Thousand Oaks Solar Filters:** http://www.thousandoaksoptical.com/index.html
- ***Sky & Telescope* Magazine**: http://www.skyandtelescope.com
- **National Science Teachers Observers Guide**: http://static.nsta.org/extras/solarscience/SolarScienceInsert.pdf
- **Eye Safety:** https://eclipse.gsfc.nasa.gov/SEhelp/safety.html
- **Jerry Lodriguss Total Solar Eclipse Exposures:** http://astropix.com/html/i_astrop/eclipse.html
- **Eclipse Orchestrator - automated eclipse photography software**
- http://www.moonglowtechnologies.com/products/EclipseOrchestrator/index.shtml
- **American Astronomical Society** https://eclipse.aas.org/event-map
- **Being in the Shadow – Dr. Kate Russo's site** http://www.beingintheshadow.com/
- **American Paper Optics** **https://www.eclipseglasses.com/**
- **Orion Telescopes articles and products:** http://www.telescope.com/home.jsp

Books:

- **Eclipse Bulletin: Total Solar Eclipse of 2017 August 21 – Fred Espenak & Jay Anderson**
- **Observe Eclipses – Michael D. Reynolds & Richards A. Sweetsir**
- **How to Photograph the Solar Eclipse – Alan Dyer (iBook)**

suggested by Dan L. Ward (photos@danlward.com)

Questions?

Image by Luc Viatour - 1000mm F/10

Vary shutter speed only

ISO 400 f/10

Partial = 1/60 (ND5)

Totality – no Filter

Bailey's Beads 1/500

Chromosphere 1/250

Prominences 1/125

Corona 1/30 , 1/8 , **½,** 2s, 4s, 8s

http://www.lucnix.be/v/BEST+OF/Solar+eclipse+1999+Luc+Viatour.jpg.html

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