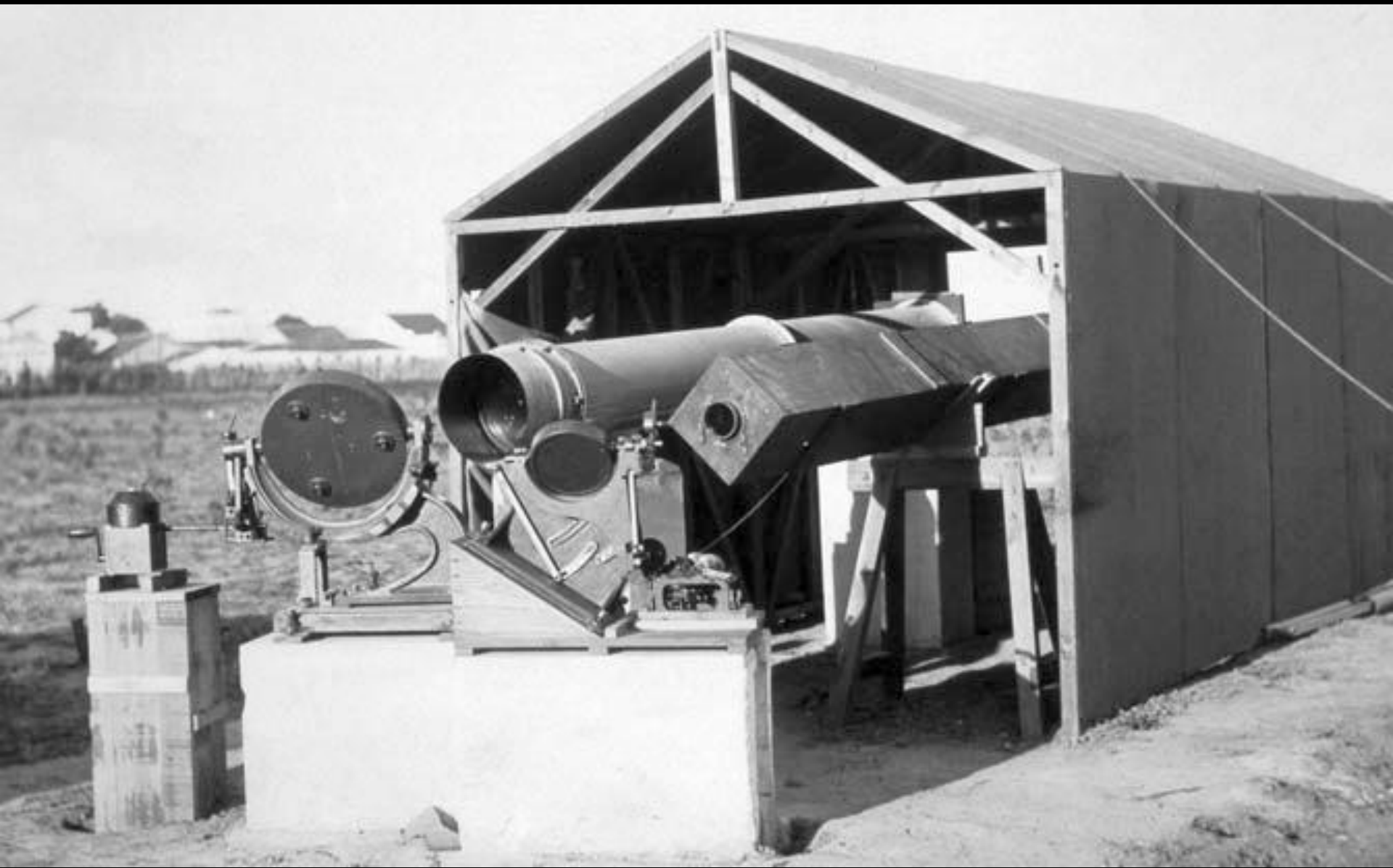


Techniques and results of high resolution video obtained at the 2010 and 2013 TSEs

Nick James (British Astronomical Association)
ndj@nickdjames.com





Eddington's equipment at Sobral, Brazil. 1919 May 29.
(4-inch lens + 13-inch astrograph) 10x8 inch plate, 1 arcmin/mm

BBC Sky at Night, Monte Umbe, 16mm movie, 1973

4K

2K

1080p

720p

DVD

VCD

720x576/50i (470k)

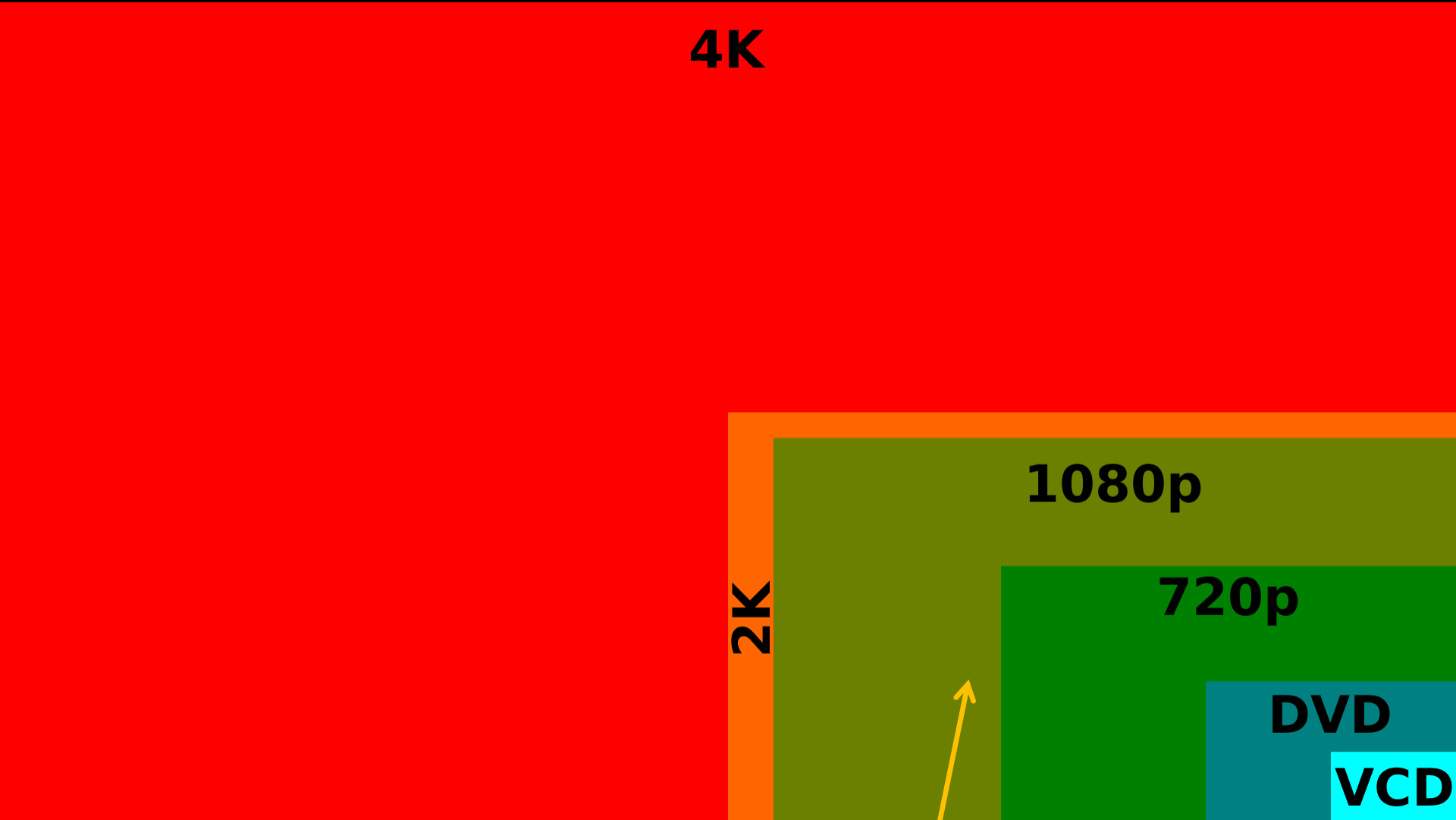






11:14:00

00:45:01:13



4K

2K

1080p

720p

DVD

VCD

3840x2160/50p (4M)

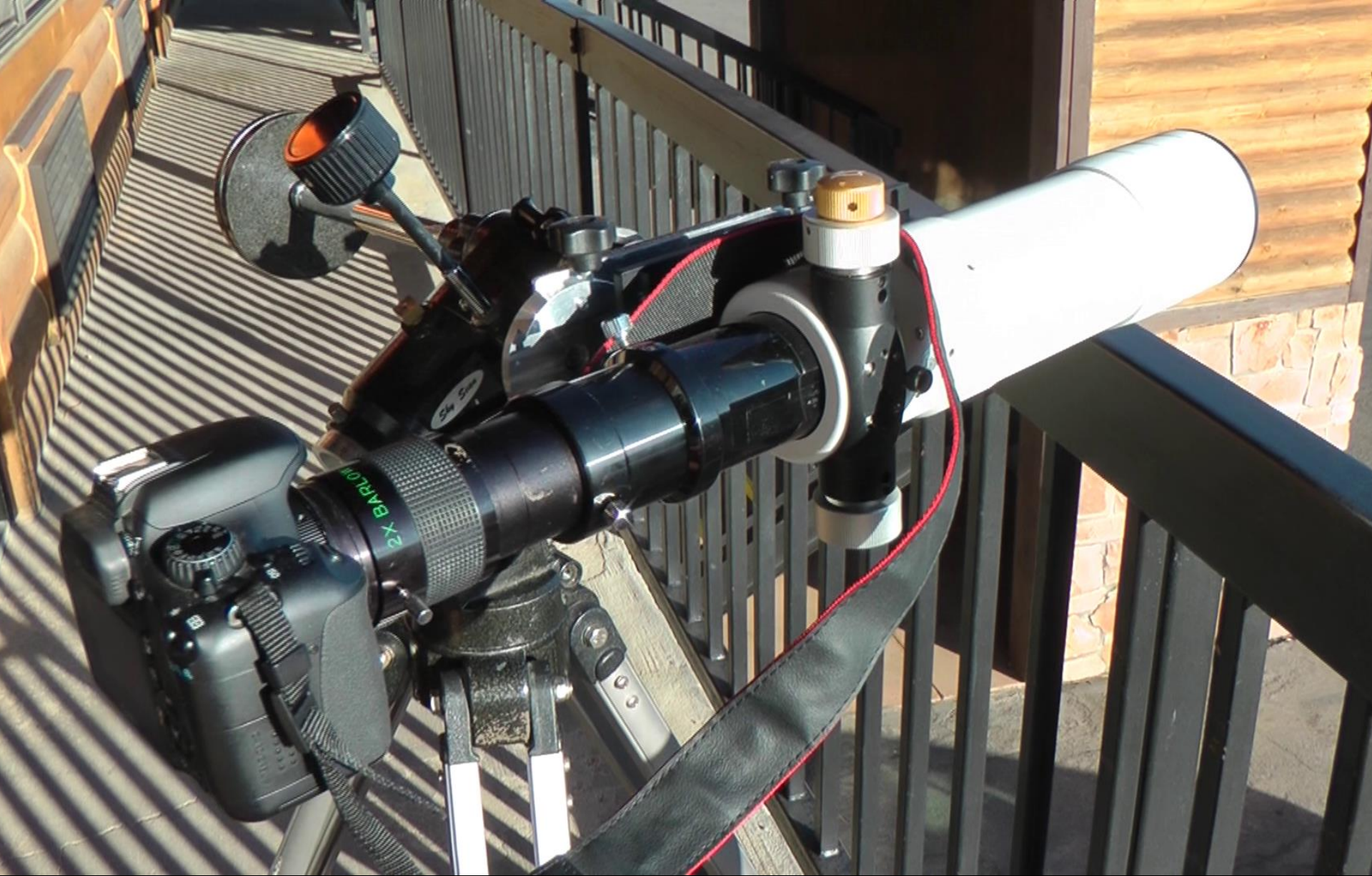
1920x1080/50p (2M)



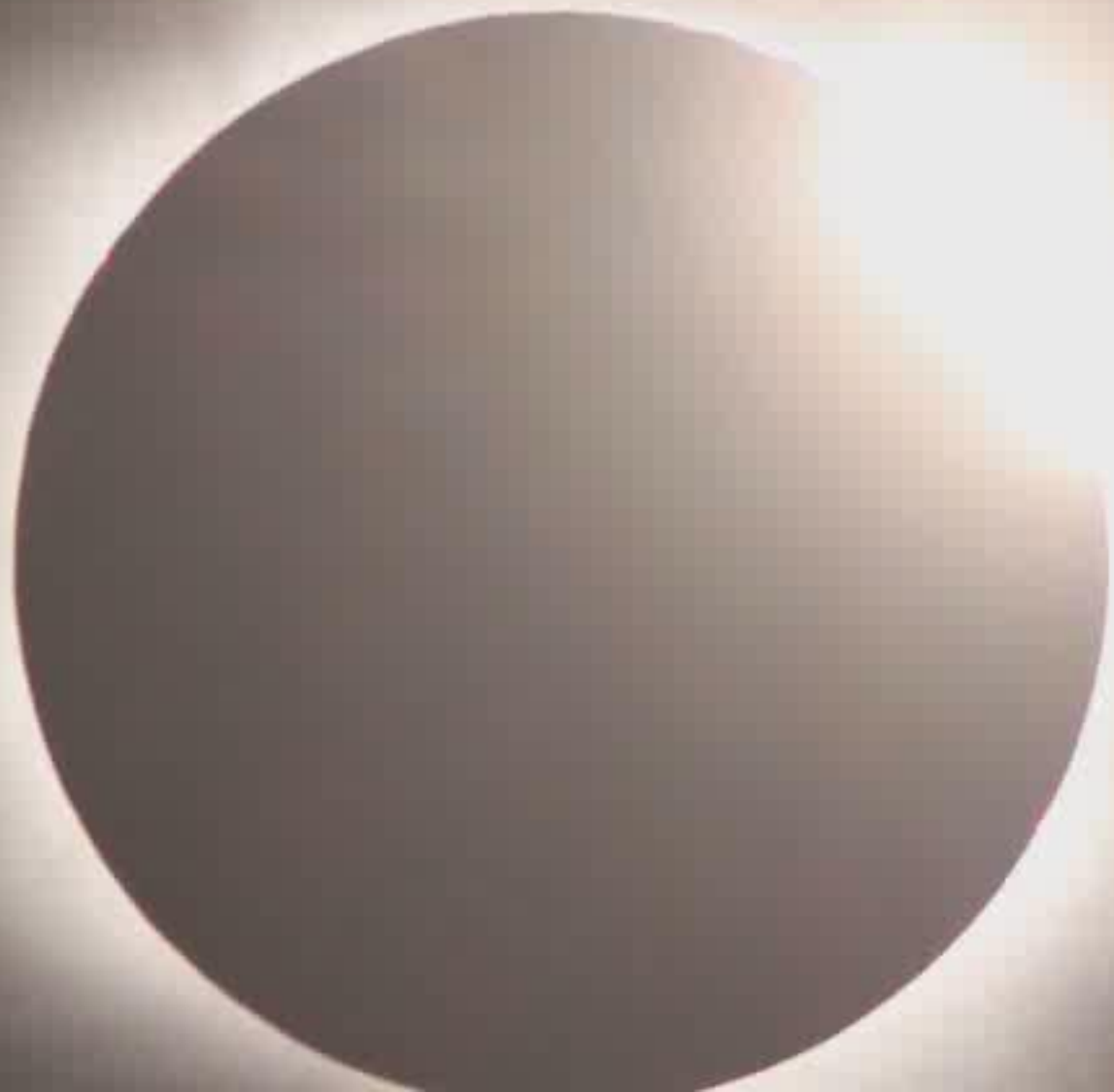


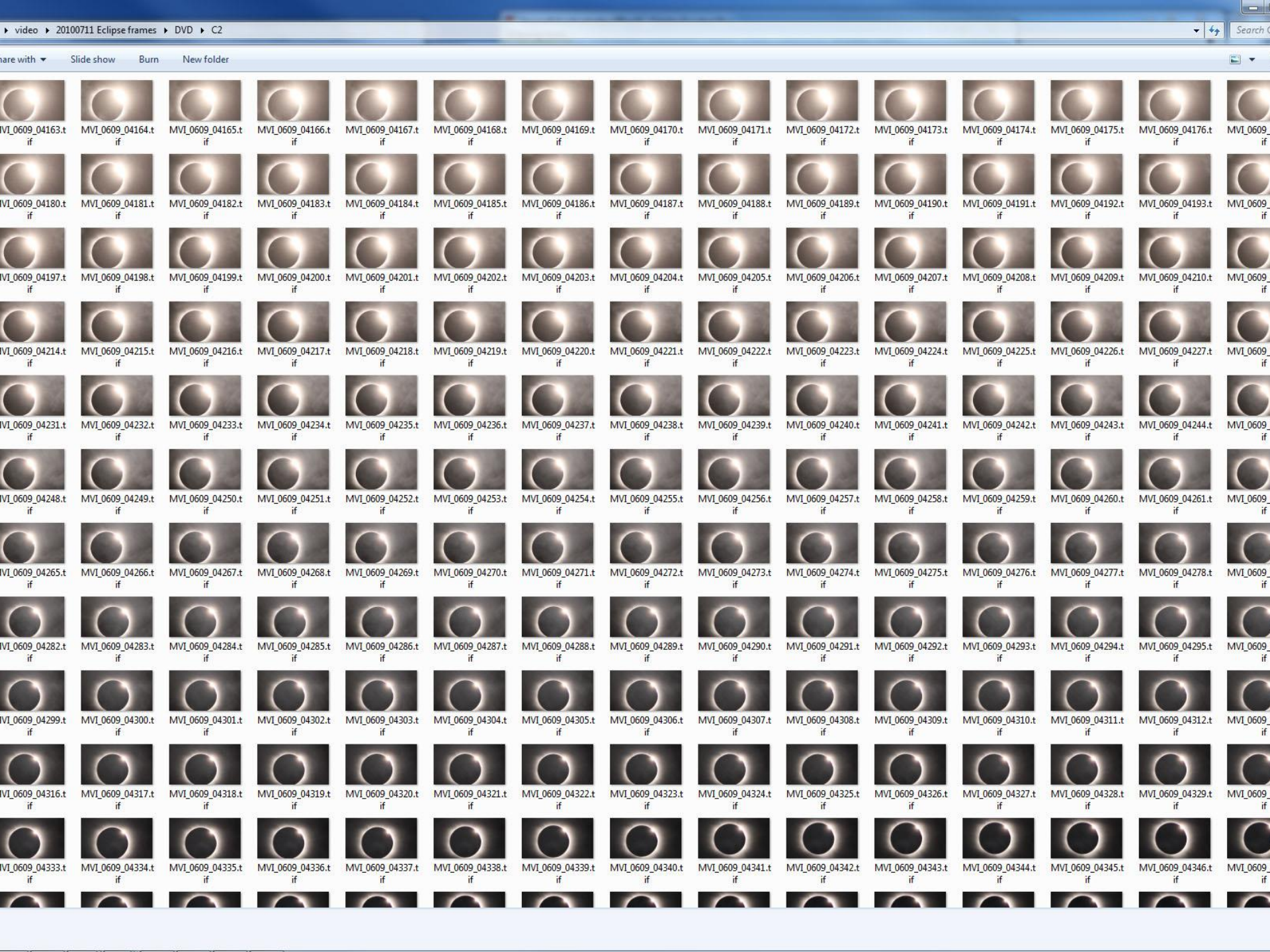
22.3 x 14.9 mm
5184 x 3456 pix
4.3 um pixels
14-bit true raw
Full manual

HD video:
1920x1080, 30p
1280x720, 60p



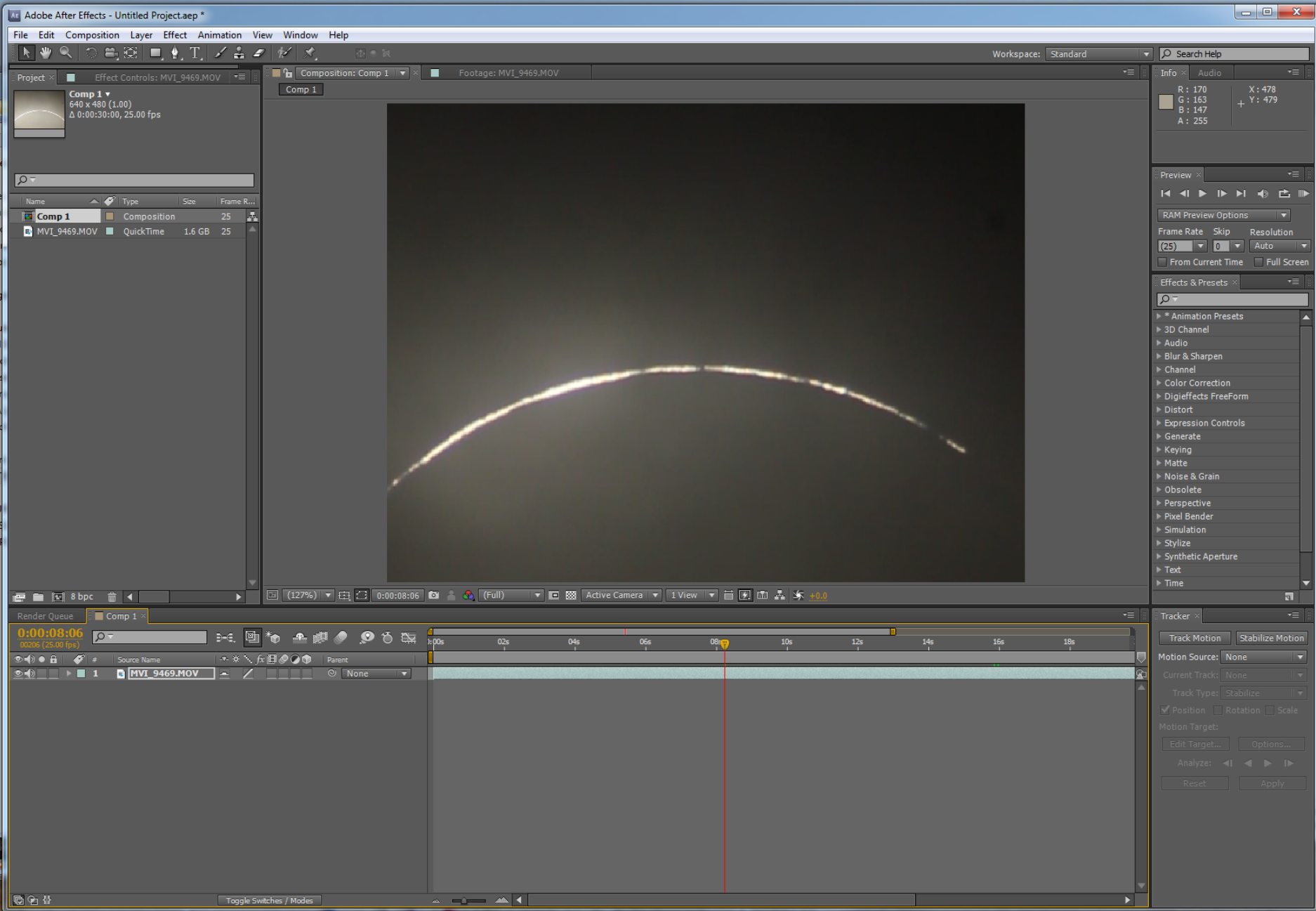
First used on Hao on 2010 July 11





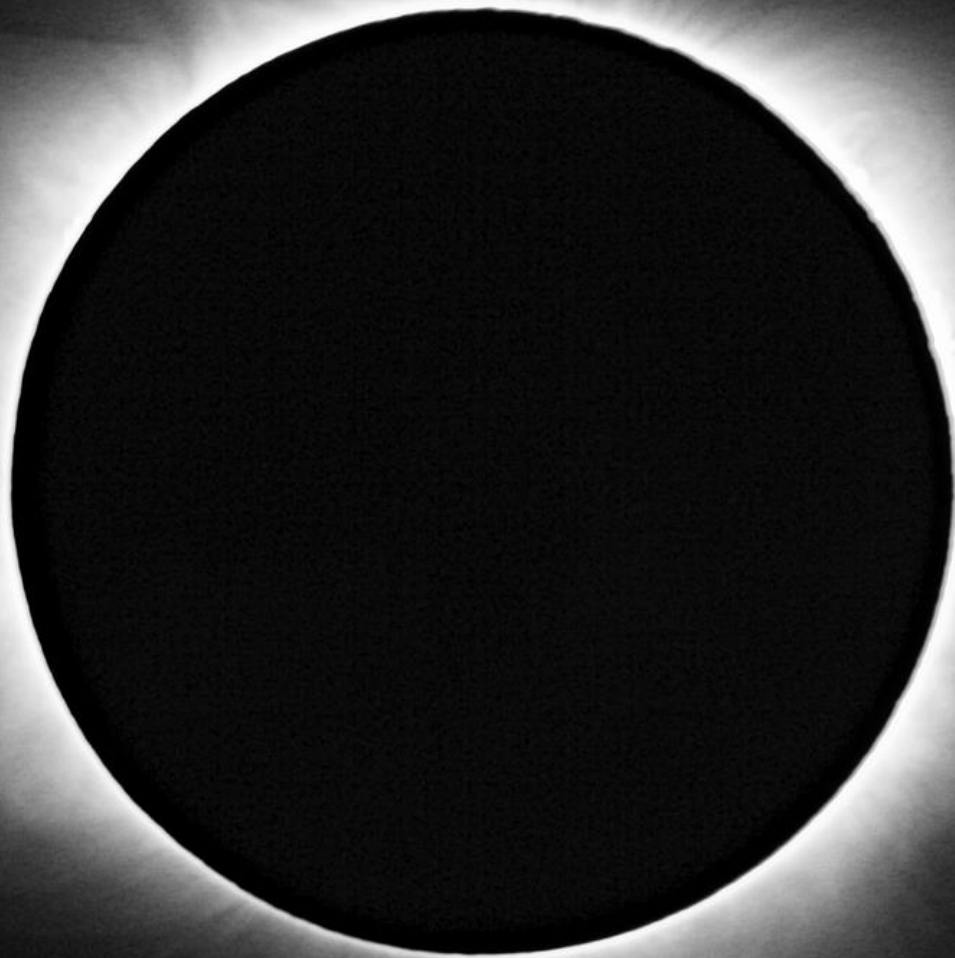
Share with Slide show Burn New folder

- MVI_0609_04163.tif
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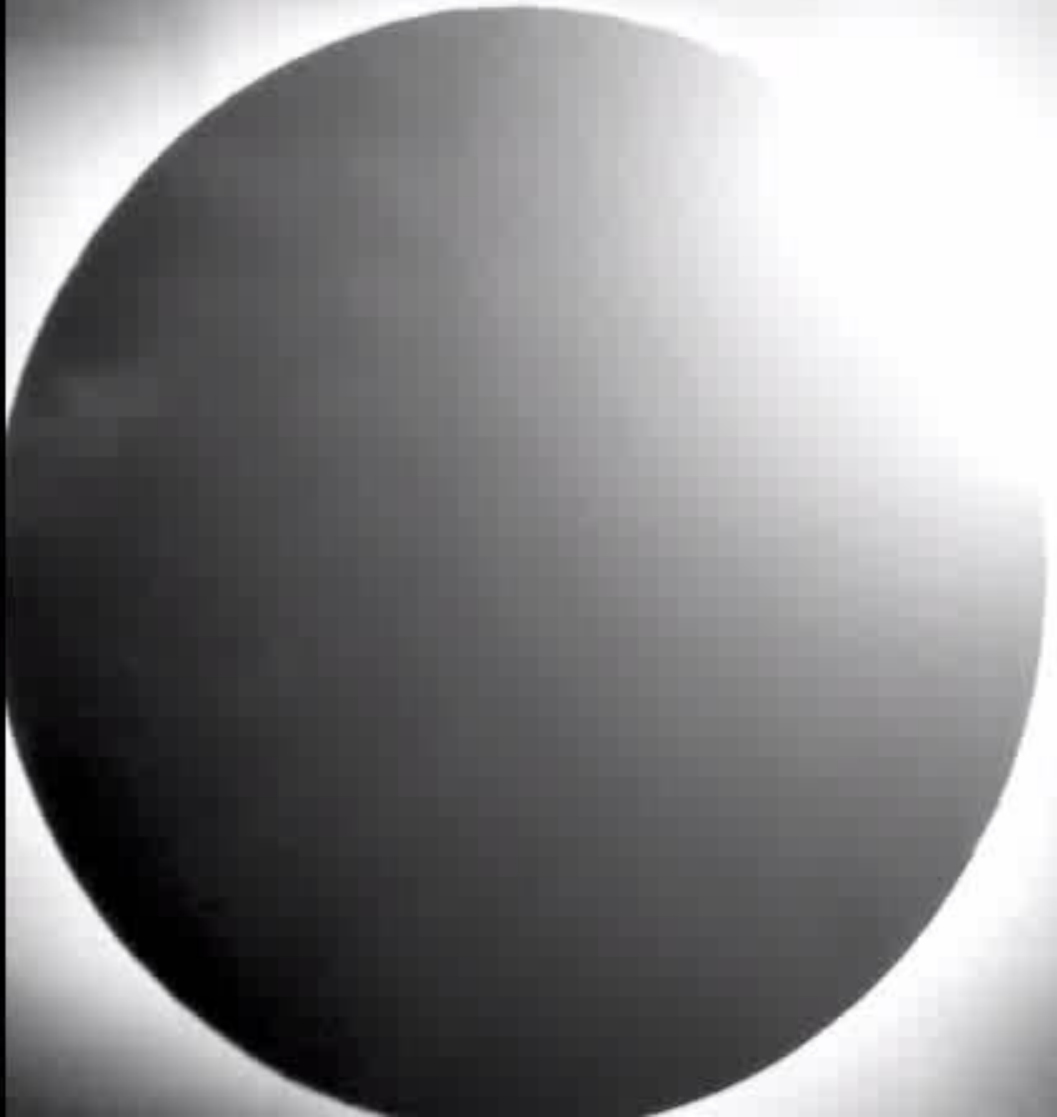








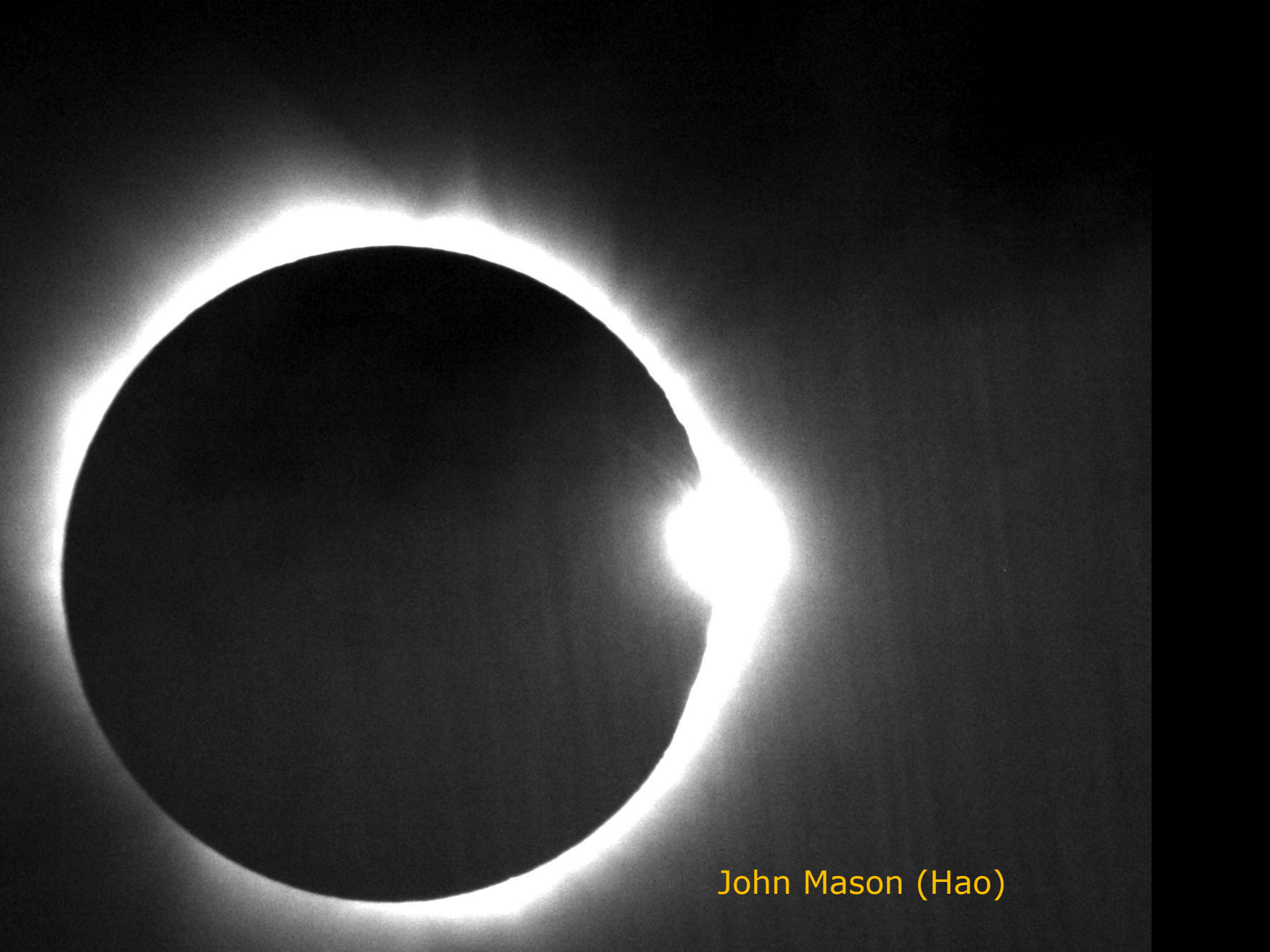








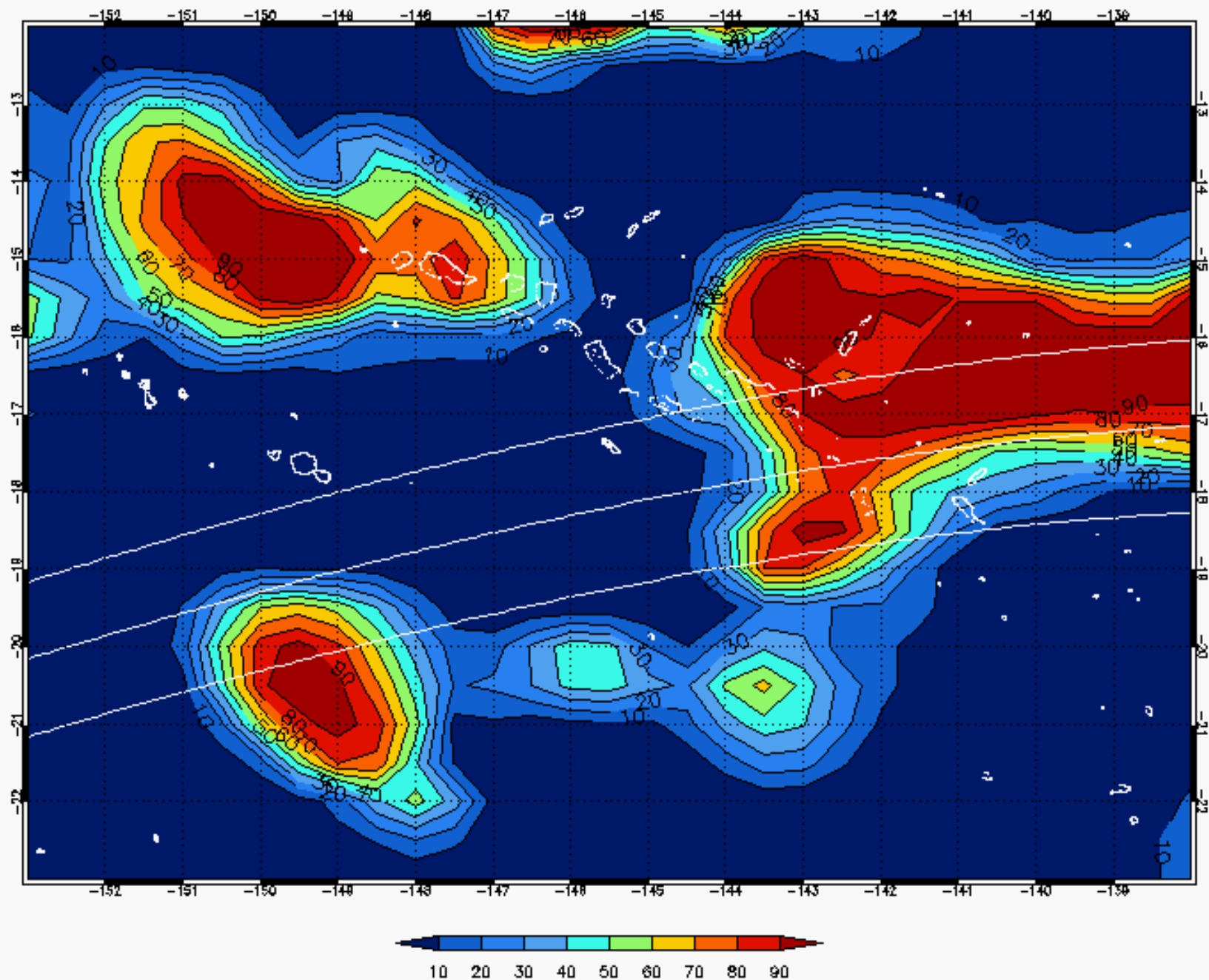




John Mason (Hao)

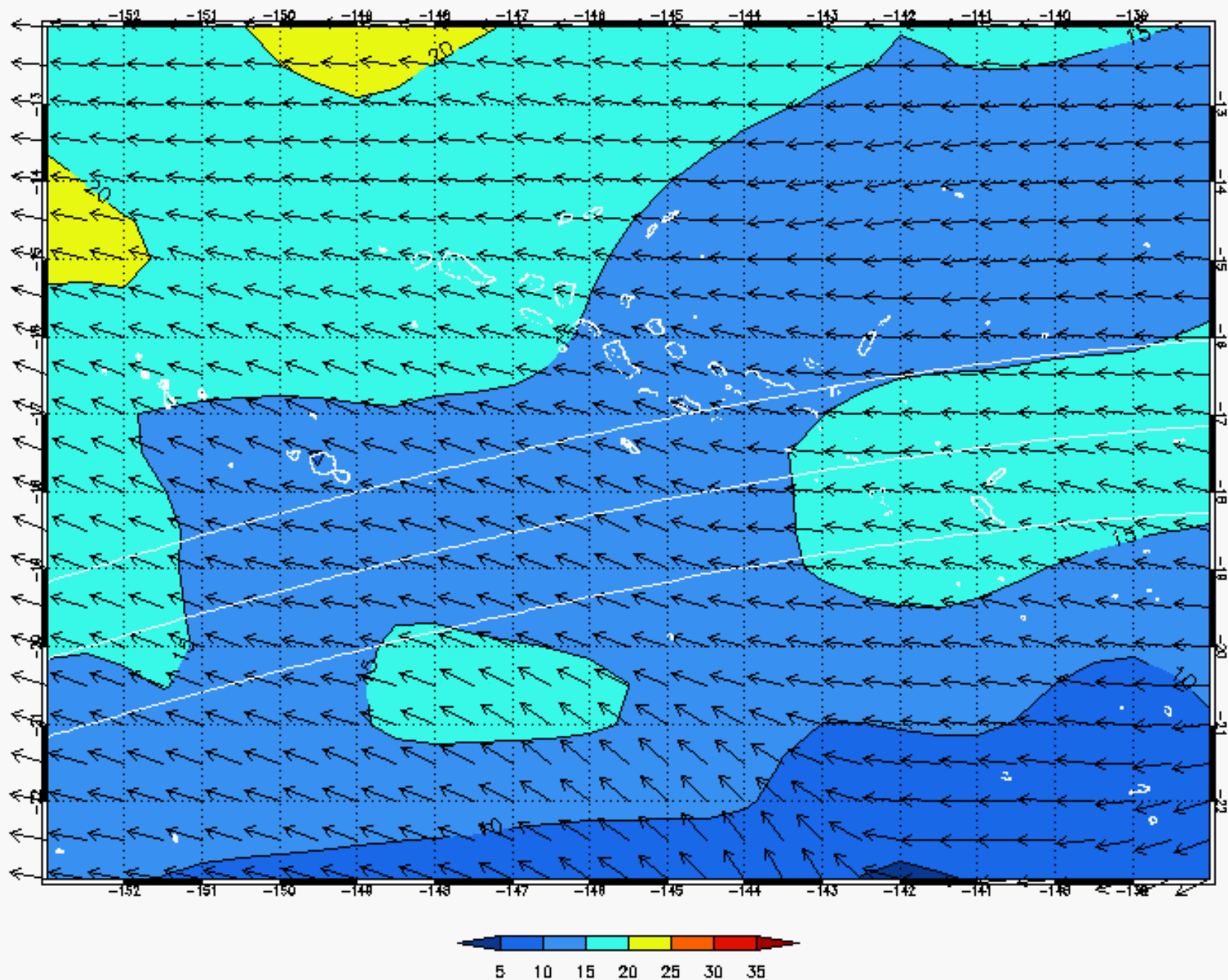
Low Cloud Cover (%) at 18 UTC Sunday 11 July 2010

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10 metres Wind (knots) at 18 UTC Sunday 11 July 2010

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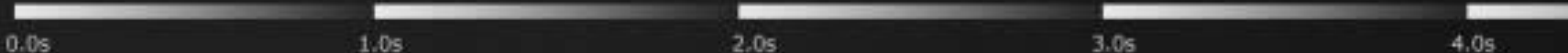
**Cloud base 400-600m, Temp 25C
wind 15-20kt bearing 100deg
2.3 arcmin corresponds to 0.9m
at 400m and 33 deg altitude.**

2'.3



Each video frame is shifted 10 pixels to the right. A total of 400 frames (16s) are included

Original video at <http://youtu.be/QzKdERhXsS>



Magic Lantern

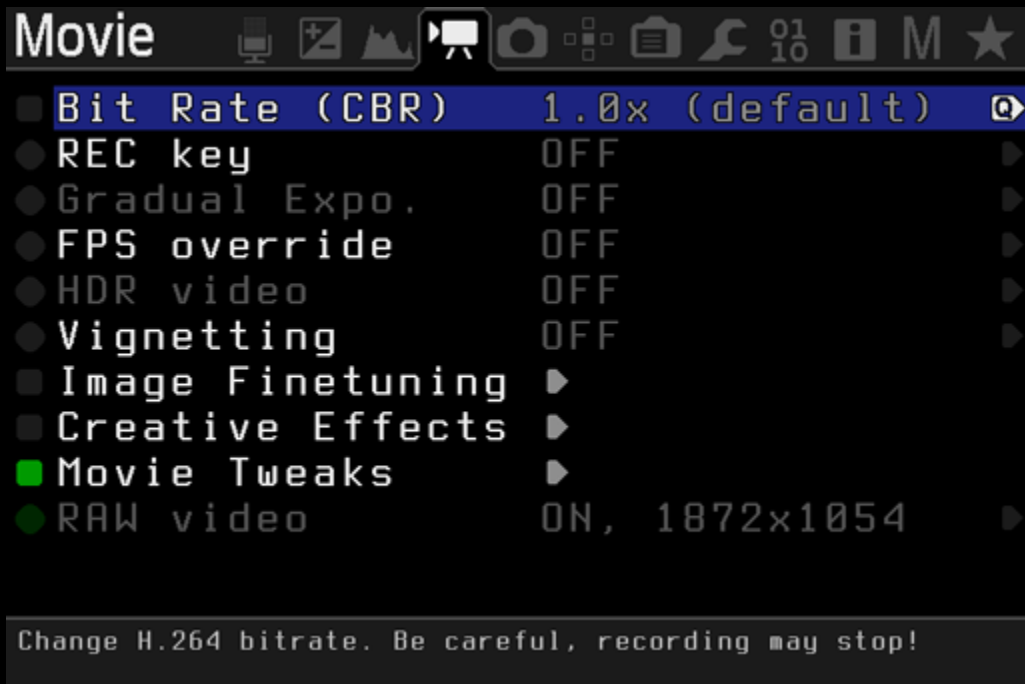
- Software add on which runs from SD card and adds lots of very useful features to Canon cameras.
- Open-source, free.
- Can run in-camera scripts
- Stable v2.3



- <http://www.magiclantern.fm/downloads.html>

Raw video

- Canon cameras compress HD video using H.264
- ML allows raw video and nonstandard resolutions.
- Approx 4GB/min via HDMI!



4K

2K

1080p

720p

DVD

VCD

3840x2160/50p (4M)



Canon EOS 1Ds C

- 4K video is 2x HD 3840x2160, up to 120fps
- 4K res is around 4GB/min at 24p lossy
- EOS-1Dc 4096x2160, 24p, HD at 60p
- 8-bit 4:2:2 uncompressed via HDMI





Canon C500
4K video
120fps

\$20K

Things are much easier these days...

- High sensitivity, high resolution digital sensors
- Good quality, inexpensive refractors
- DSLRs providing high frame rate, progressive HD video
- Massive data storage in a very small space
- Software add-ons such as ML give very good manual control
- 4K cameras are here now if you have plenty of money
- In a few years high frame rate 4K will be in many amateur DSLRs
- Video and still imaging have merged.