# *Total solformørkelse i Sibirien 1. august 2008*


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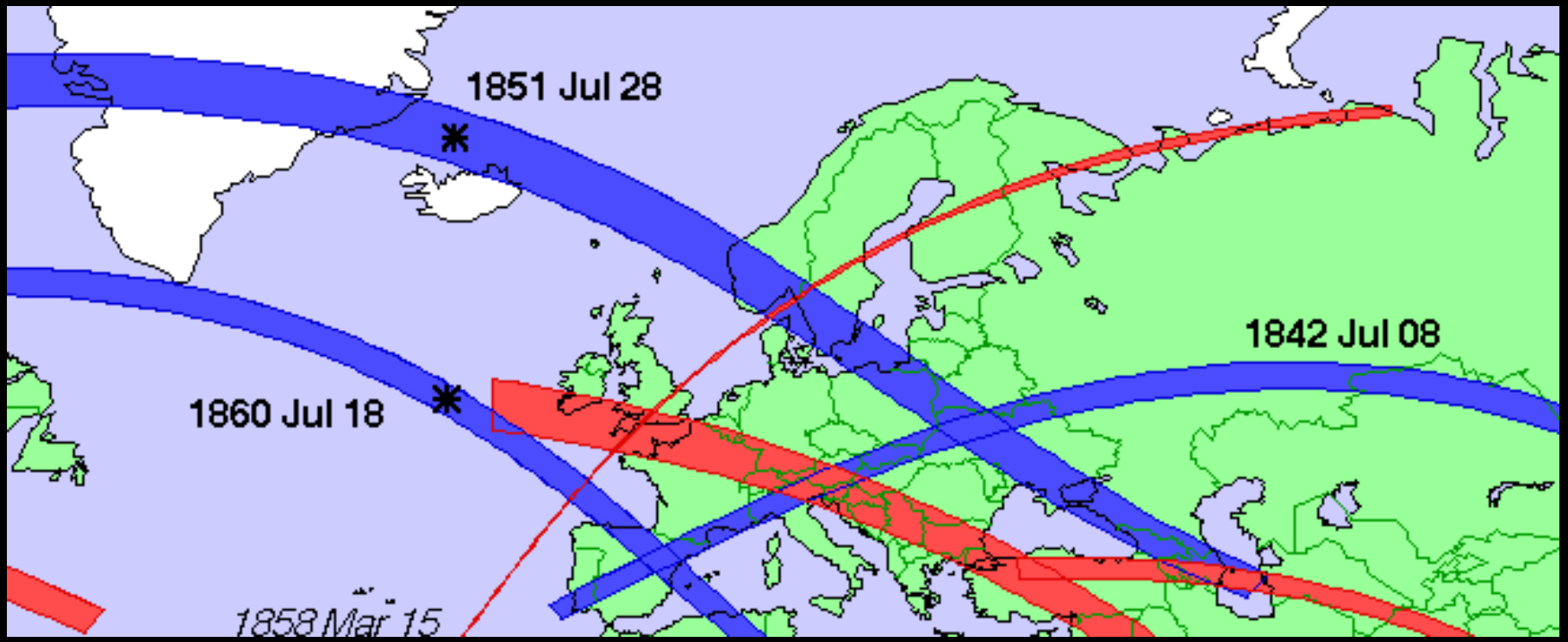
*Christianshavns Gymnasium*

# Total solformørkelse

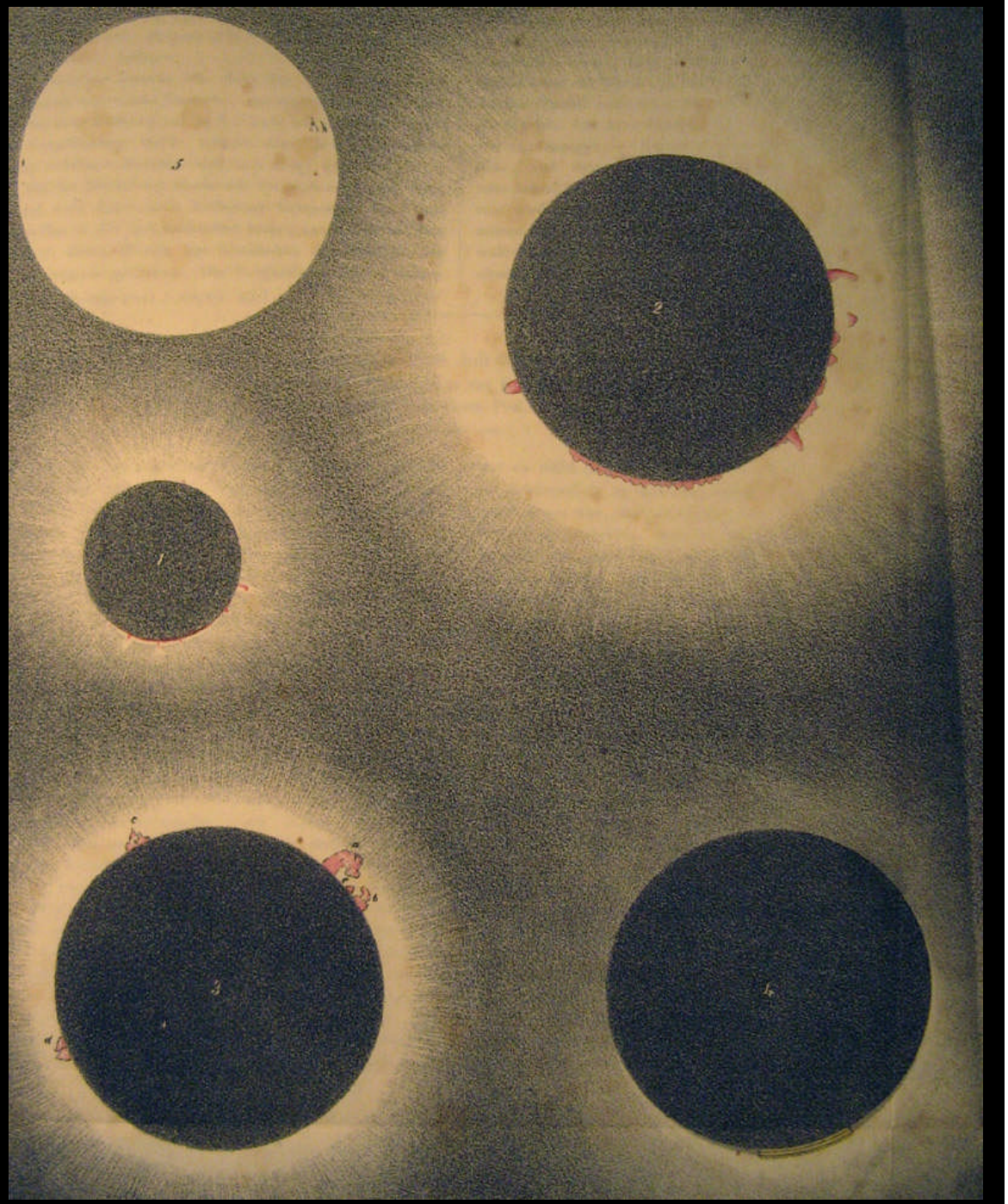
- Dag bliver til nat
- Planeter synlige
- Kold luft
- Morgenrøde
- Forudsigelighed
- Eksotiske steder

# Seneste totale solformørkelse i Danmark
# 28. juli 1851

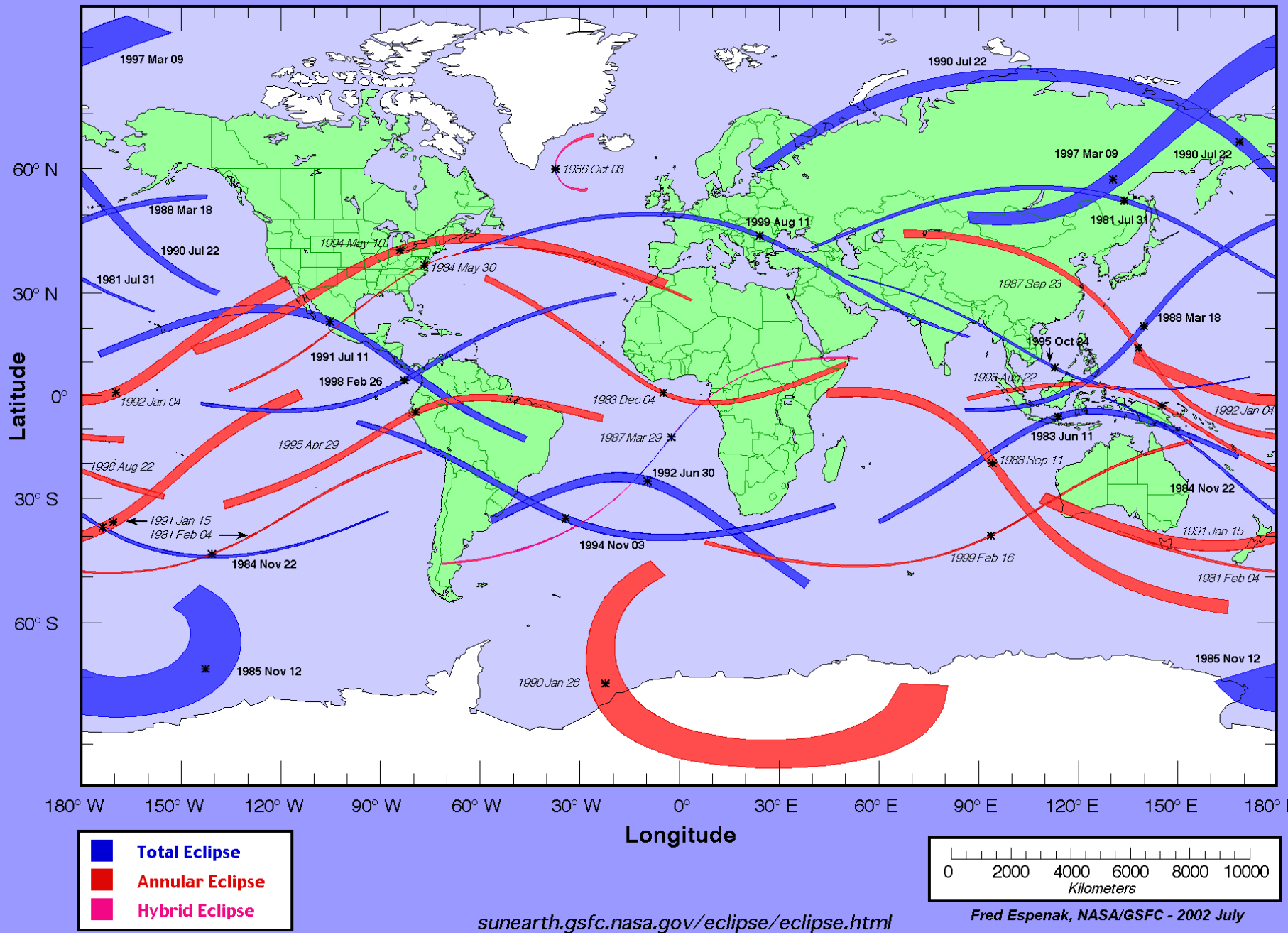



***- og den næste kommer i 2142...***

# Tegninger af total solformørkelse i Danmark 28. juli 1851

# Total and Annular Solar Eclipse Paths: 1981–2000

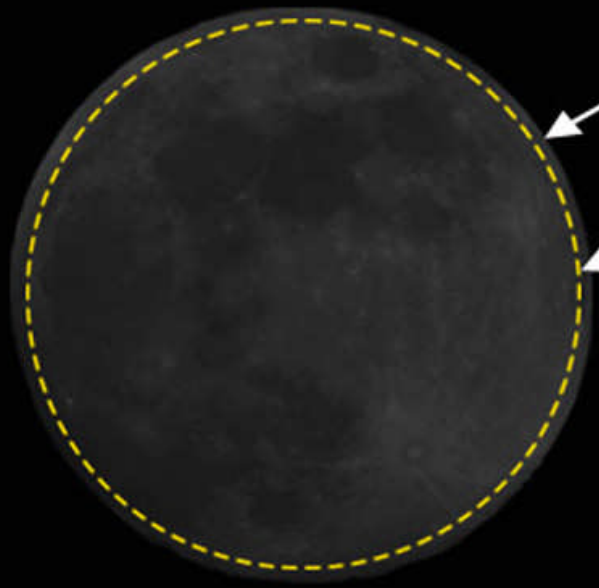



sunearth.gsfc.nasa.gov/eclipse/eclipse.html

Fred Espenak, NASA/GSFC - 2002 July


TOTALITY
WORLD TOUR
Atlantic Ocean, Southern Africa Jun 21, 2001 4:36
Southern Africa, Indian Ocean, Australia Dec 4, 2002 2:03
Antarctica Nov 23, 2003 1:57
South Pacific Ocean Apr 8, 2005 4:31
Africa, Turkey, Kazakhstan, Russia Mar 29, 2006 4:06
Greenland, Russia, China Aug 1, 2008 2:27
India, China, Pacific Ocean Jul 22, 2009 6:38
S. Pacific Ocean, south tip of South America Jul 11, 2010 5:20
Australia, Pacific Ocean Nov 13, 2012 4:02
Atlantic Ocean, central Africa Nov 3, 2013 1:39
N. Atlantic Ocean, Norwegian Sea, Svalbard Mar 20, 2015 2:46
Indonesia, N. Pacific Ocean Mar 9, 2016 4:09
United States (from Oregon to South Carolina) Aug 21, 2017 2:40
S. Pacific Ocean, Chile, Argentina Jul 2, 2019 4:32
Chile, Argentina Dec 14, 2020 2:09

# Hovedaktørerne: Solen og Månen

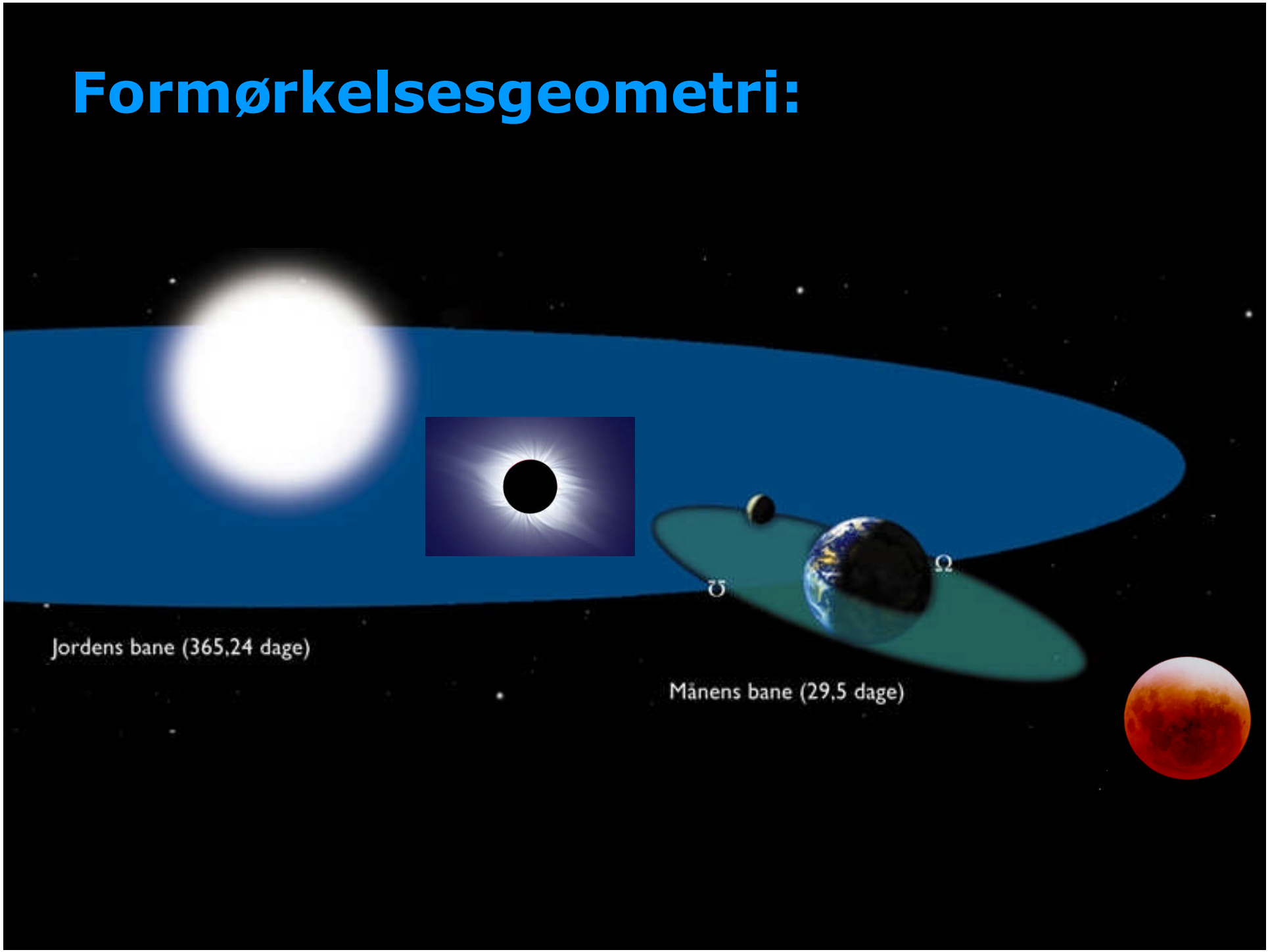


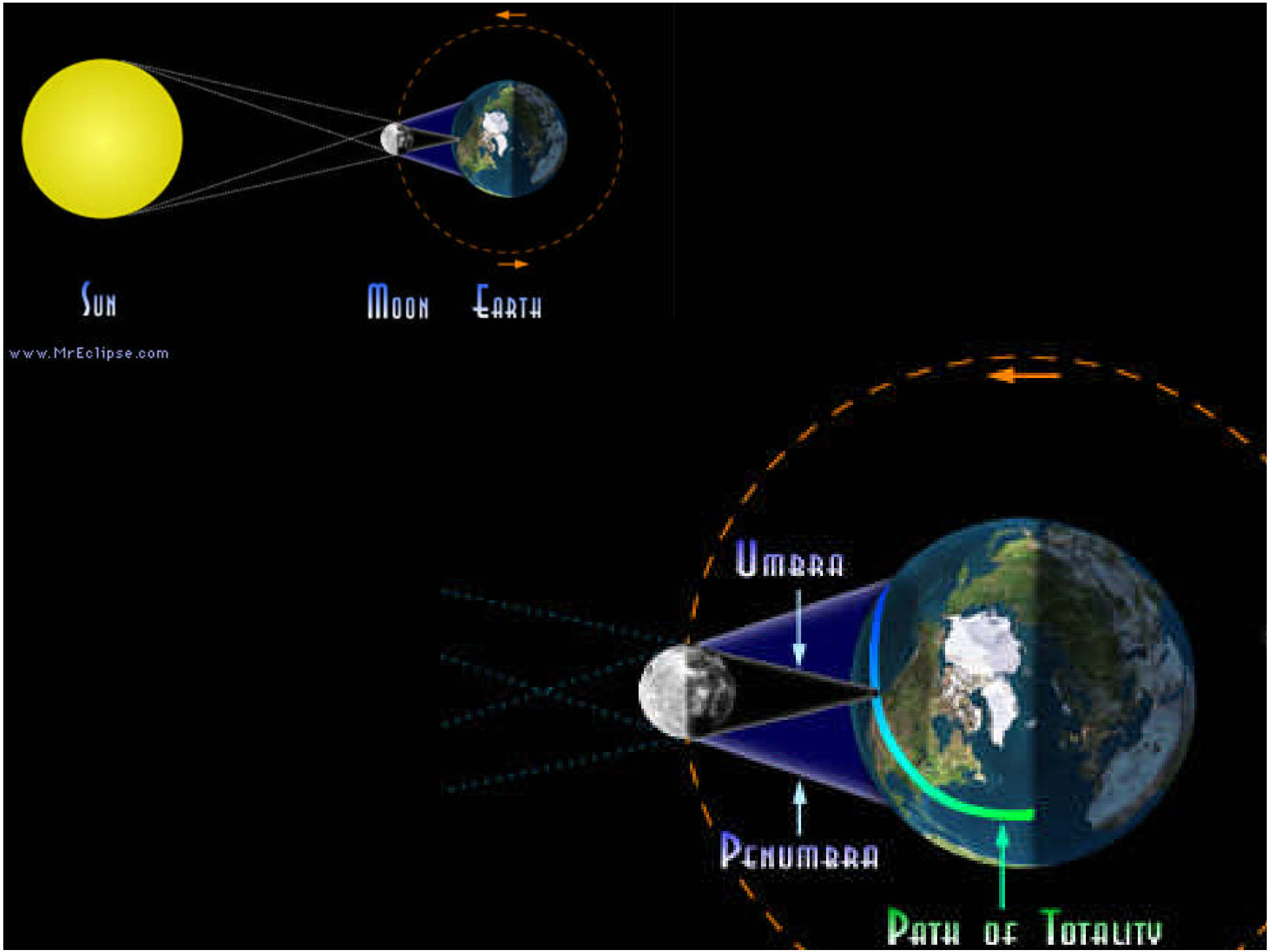
Månens afstand = 364.718 km
Månens vinkeldiameter = 0,546 grader

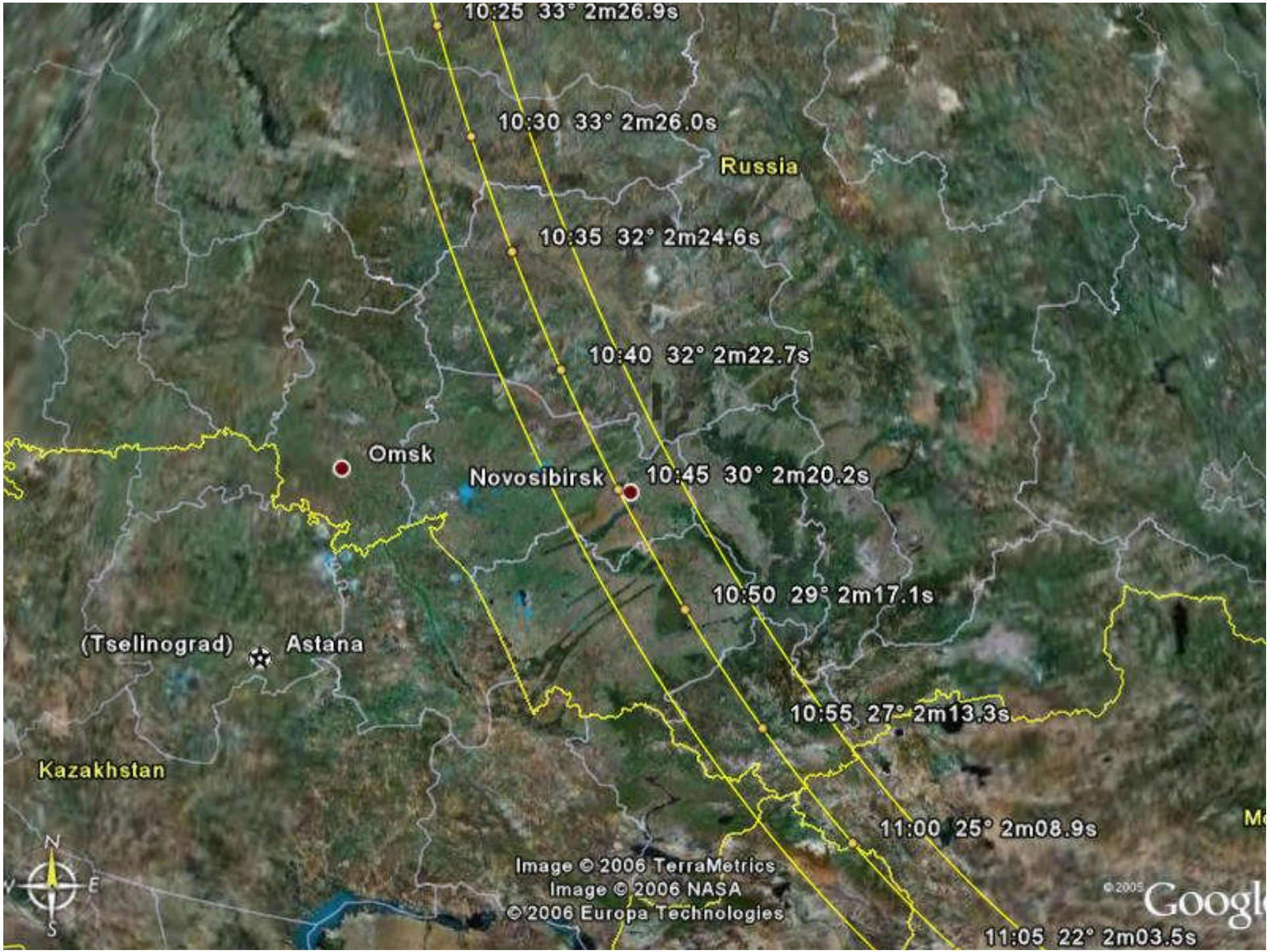
Solens afstand = 151.830.375 km
Solens vikeldiameter = 0,525 grader

Månens tilsyneladende størrelse vil være lidt større end Solens, hvilket indikerer en længere totalitet.

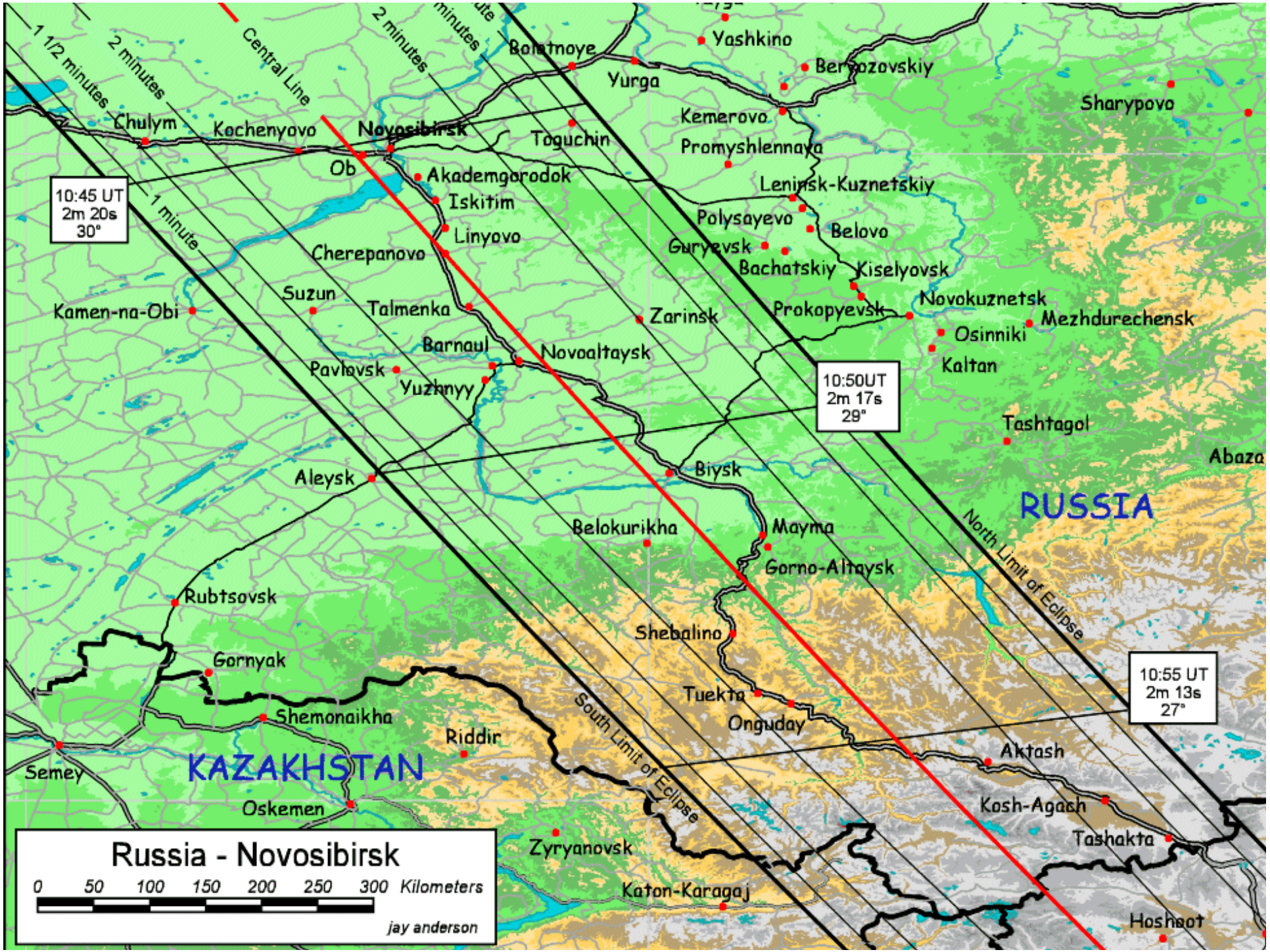
# Formørkelsesgeometri:




Sun
Moon
Earth
www.MrEclipse.com
Umbra
Penumbra
Path of Totality

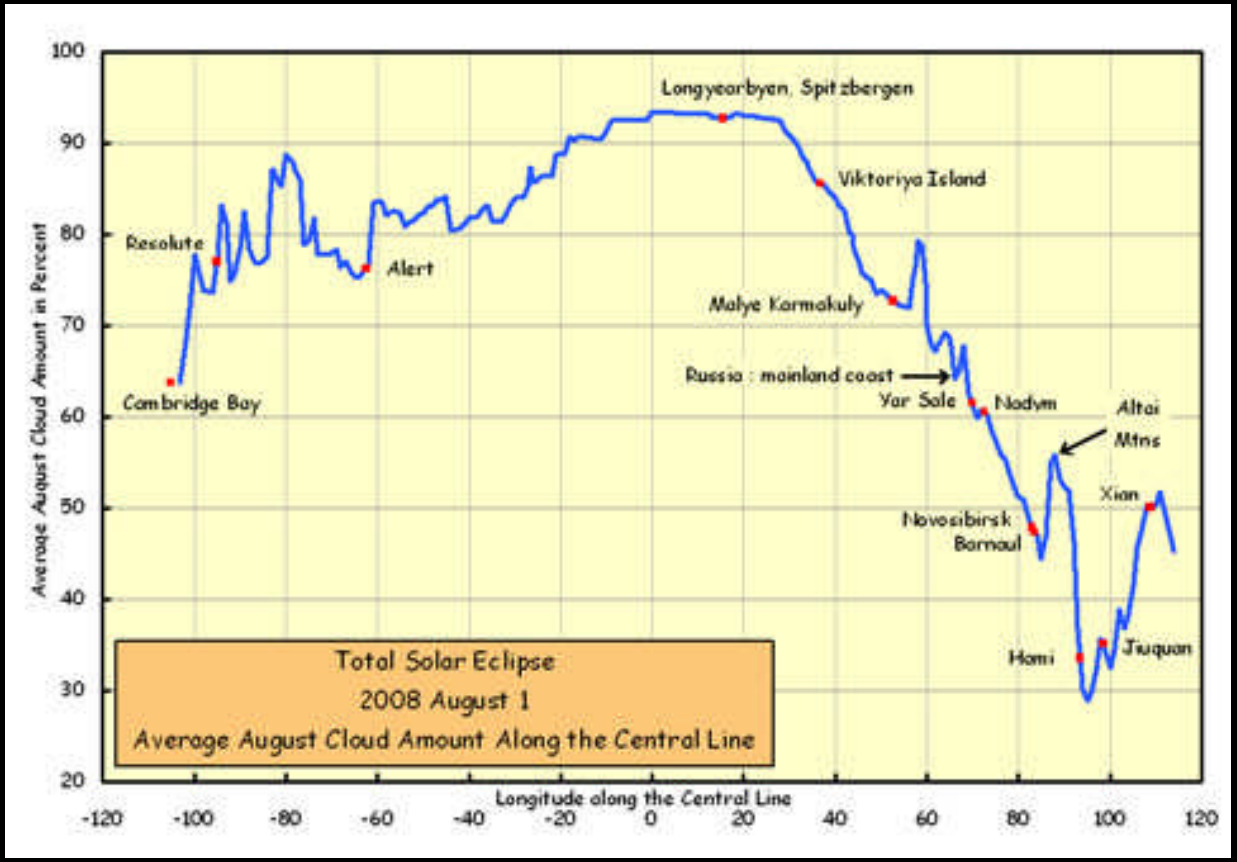

10:25 33° 2m26.9s
10:30 33° 2m26.0s
Russia
10:35 32° 2m24.6s
10:40 32° 2m22.7s
Omsk
Novosibirsk
10:45 30° 2m20.2s
10:50 29° 2m17.1s
(Tselinograd)
Astana
10:55 27° 2m13.3s
Kazakhstan
11:00 25° 2m08.9s
Image © 2006 TerraMetrics
Image © 2006 NASA
© 2006 Europa Technologies
11:05 22° 2m03.5s


Total Solar Eclipse
2008 Aug 01
10:10 UT
02m26s
33°
10:20 UT
02m27s
34°
10:30 UT
02m26s
33°
10:40 UT
02m23s
32°
10:50 UT
02m17s
29°
11:00 UT
02m09s
25°
Noril'sk
Vorkuta
Nadym
Surgut
Nizhnevartovsk
RUSSIA
Enisejsk
Tomsk
Krasnojarsk
Chelyabinsk
Omsk
Novosibirsk
Novokuznetsk
Barnaul
Astana
Pavlodar
Karaganda
Ust'-Kamenogorsk
Hovd
Altay
KAZAKHSTAN
MONGOLI
Alma
Ata
Urumqi
Yining


1 1/2 minutes
2 minutes
Central Line
2 minutes
minutes
Yashkino
Yurga
Kemerovo
Sharypovo
Chulym
Kochenyovo
Novosibirsk
Toguchin
Promyshlennaya
Ob
Akademgorodok
Iskitim
Leninsk-Kuznetskiy
10:45 UT
2m 20s
30°
1 minute
Linyovo
Polysayevo
Belovo
Cherepanovo
Guryevsk
Bachatskiy
Kiselyovsk
Suzun
Talmenka
Novokuznetsk
Kamen-na-Obi
Zarinsk
Prokopyevsk
Mezhdurechensk
Osinniki
Barnaul
Novoaltaysk
Pavlovsk
Yuzhnyy
Kaltan
10:50UT
2m 17s
29°
Tashtagol
Aleysk
Biysk
Abaza
RUSSIA
Belokurikha
Mayma
North Limit of Eclipse
Gorno-Altaysk
Rubtsovsk
Shebalino
Gornyak
10:55 UT
2m 13s
27°
Tuekta
Onguday
Shemonaikha
South Limit of Eclipse
Riddir
Aktash
KAZAKHSTAN
Semey
Kosh-Agach
Oskemen
Tashakta
Zyryanovsk
Katon-Karagaj
Hoshoot
Russia - Novosibirsk
0 50 100 150 200 250 300 Kilometers
jay anderson

# Vejrudsigten:

## Sandsynlighed for solskin: ca. 50 %



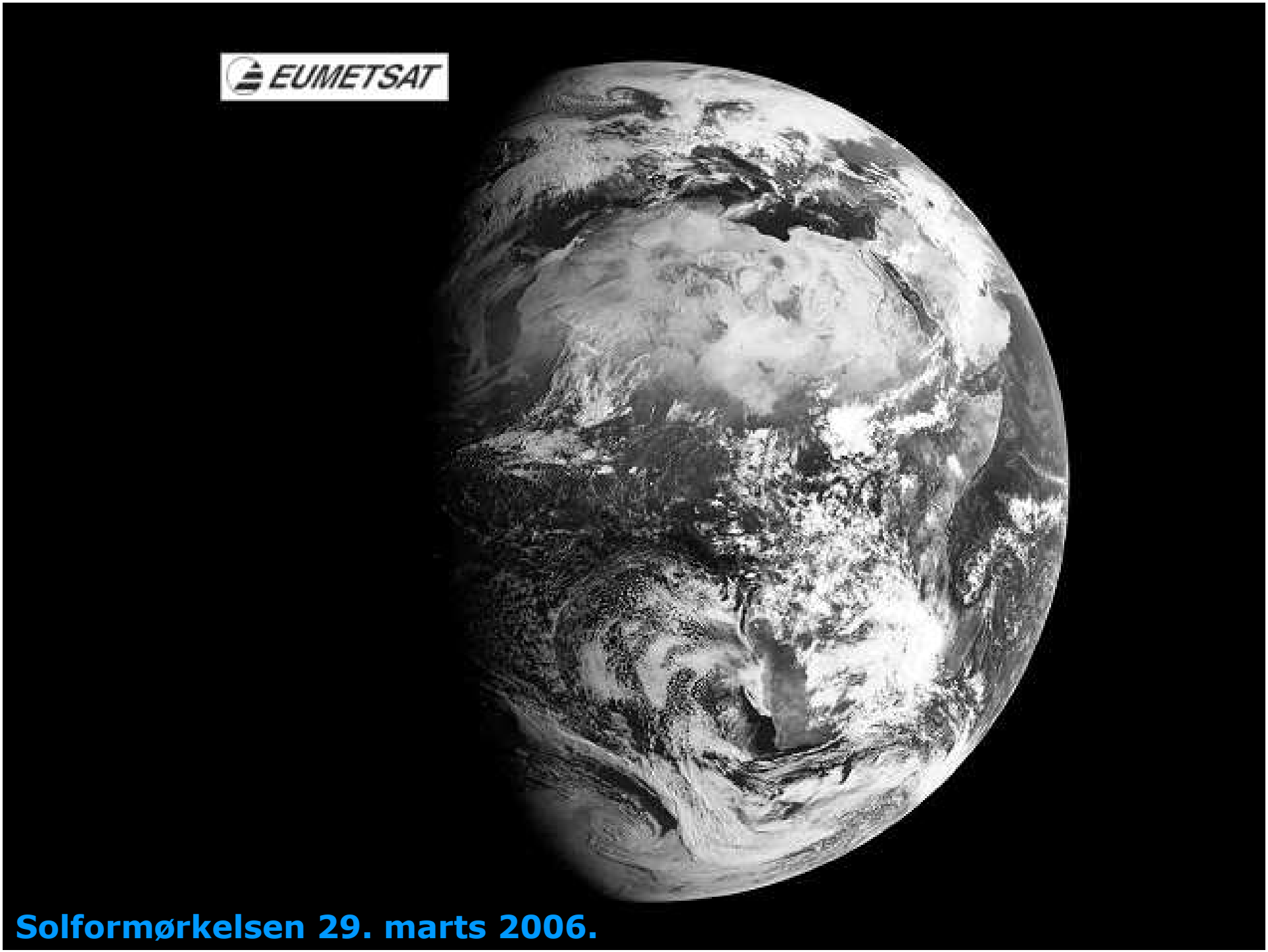
# Månens skygge:

**Månens skygge bevæger sig fra Canada, henover det nordlige Grønland og ned gennem Sibirien, Mongoliet og Kina.**

**Hastighed er ca. 1000 km/t – som et jetfly...**

**Det gælder om at være på et rigtige sted på det rigtige tidspunkt.**

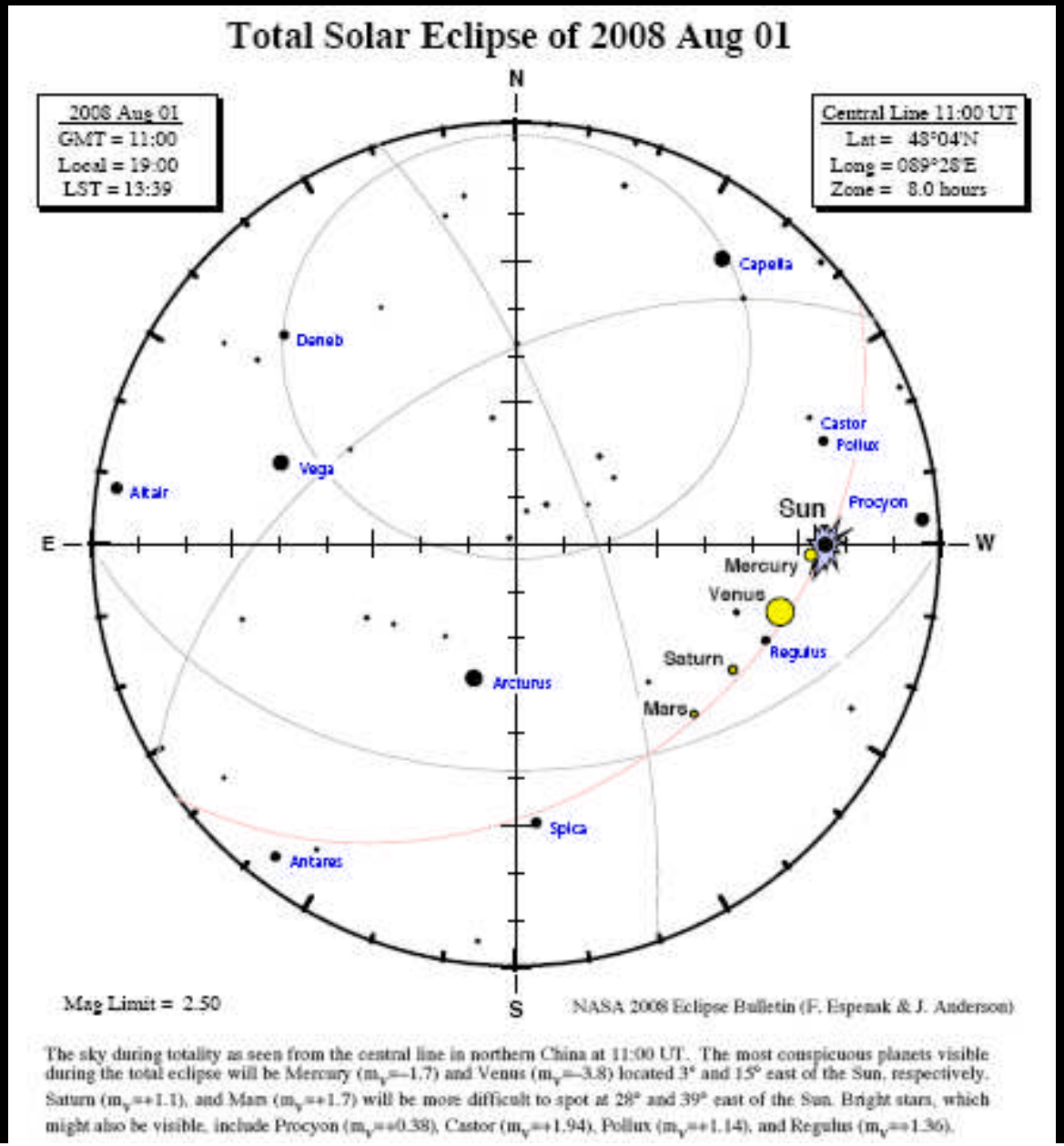
**Foto: NASA**



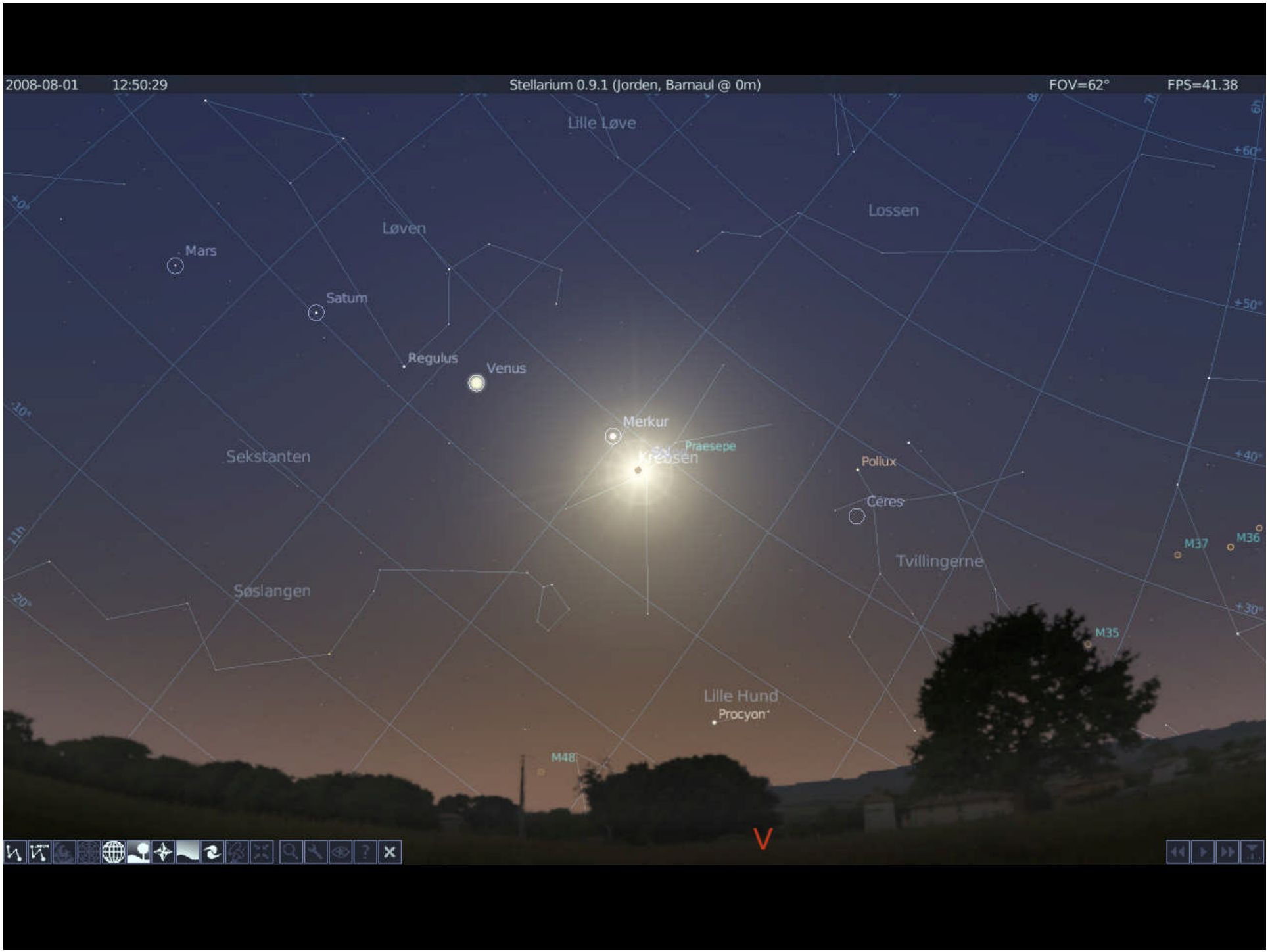

Solformørkelsen 29. marts 2006.

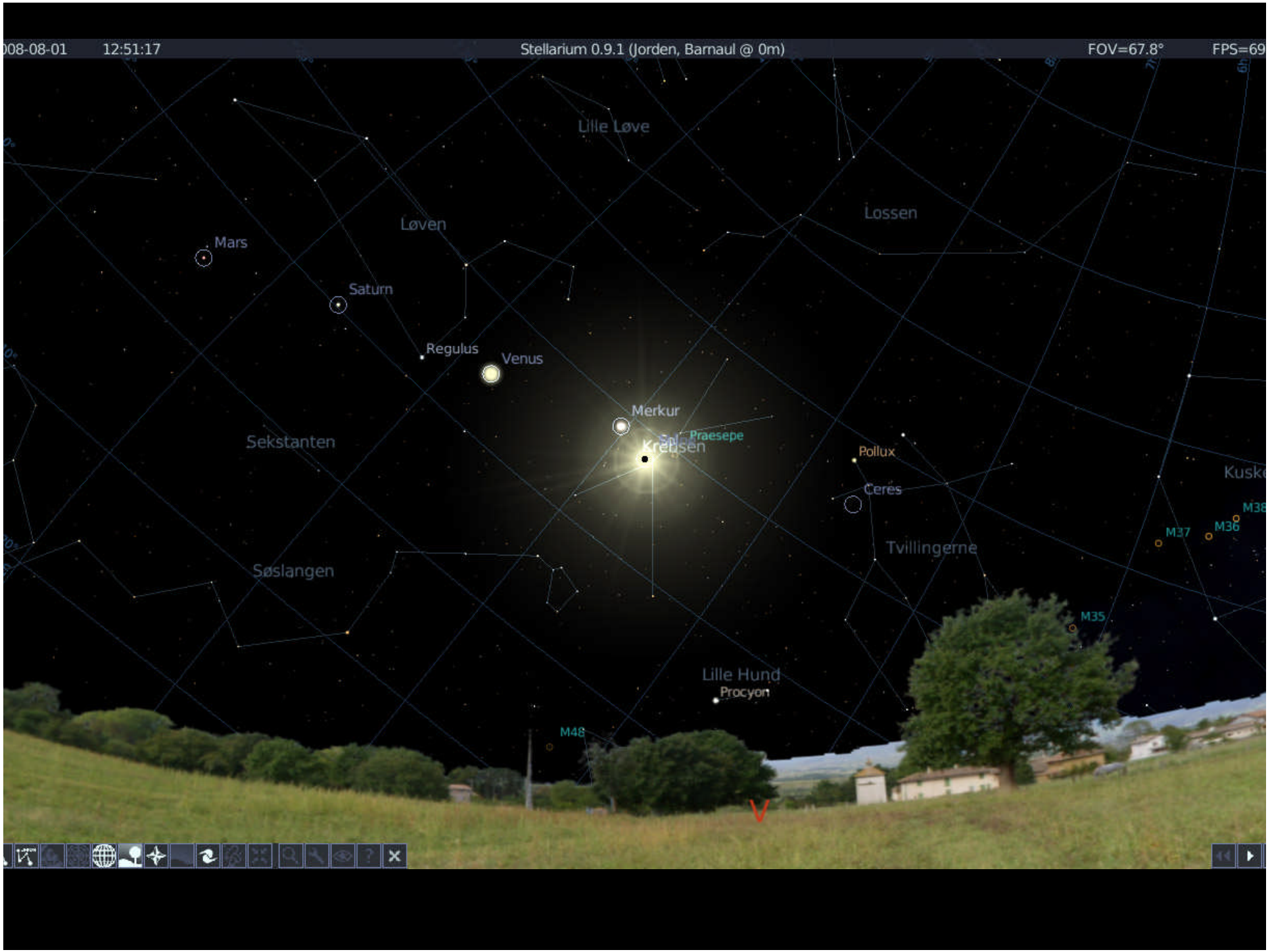
# Planeter og stjerner:

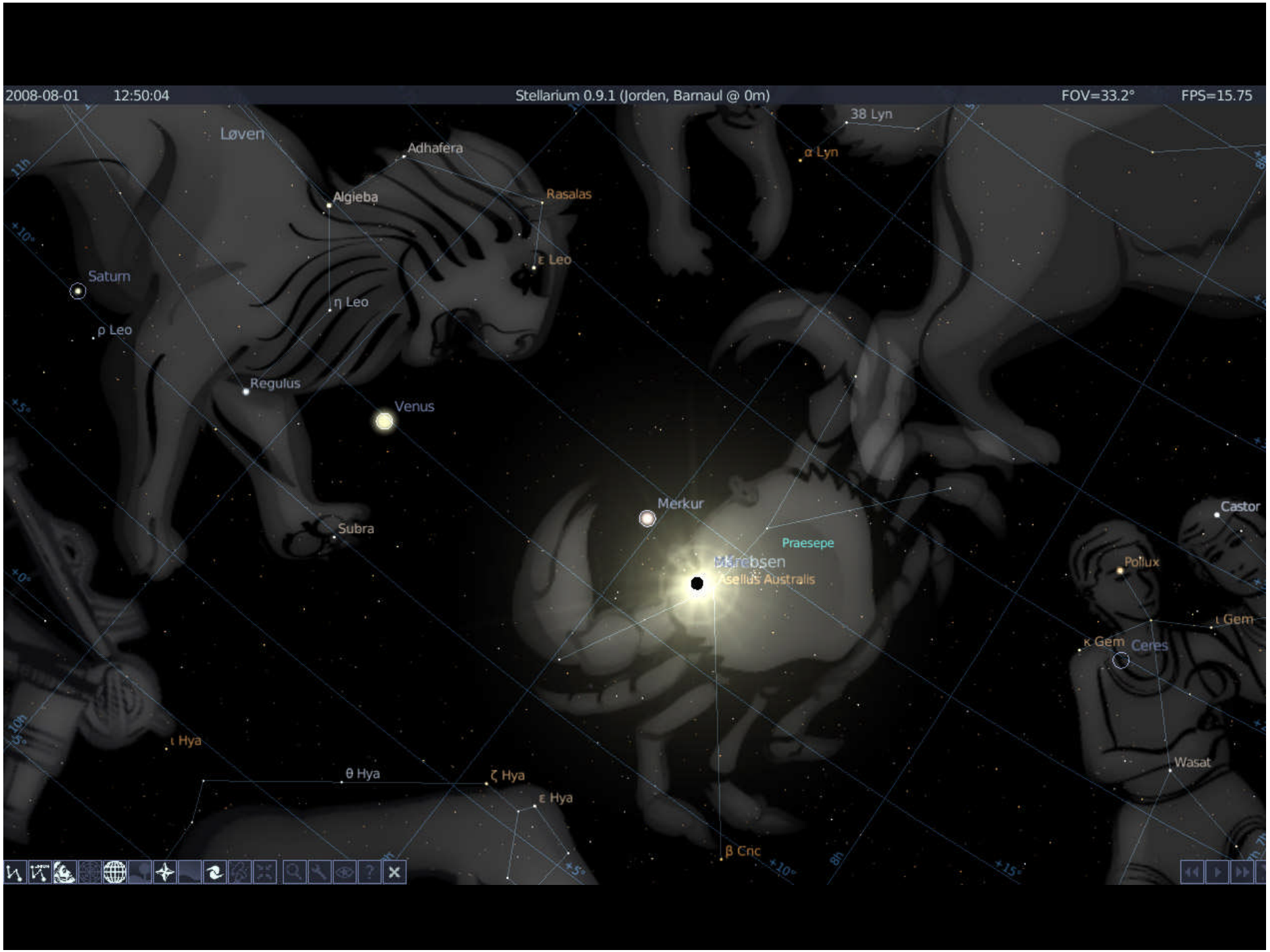
**Op til 5-10 min. før 2. kontakt vil man kunne skimte de klareste planeter og måske stjerner.**

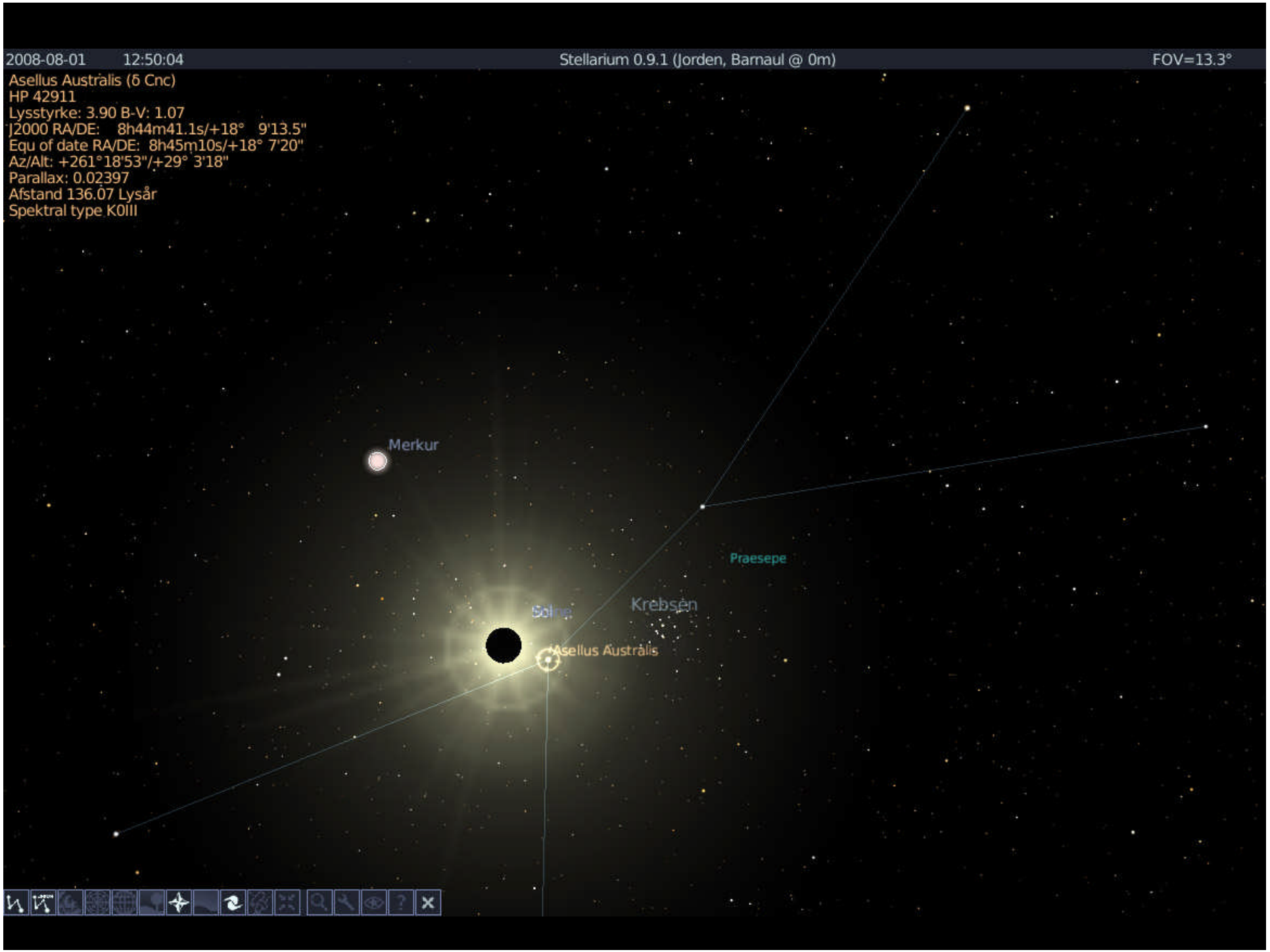



The sky during totality as seen from the central line in northern China at 11:00 UT. The most conspicuous planets visible during the total eclipse will be Mercury ($m_v$=–1.7) and Venus ($m_v$=–3.8) located 3° and 15° east of the Sun, respectively. Saturn ($m_v$=+1.1), and Mars ($m_v$=+1.7) will be more difficult to spot at 28° and 39° east of the Sun. Bright stars, which might also be visible, include Procyon ($m_v$=+0.38), Castor ($m_v$=+1.94), Pollux ($m_v$=+1.14), and Regulus ($m_v$=+1.36).


2008-08-01 12:50:29
Stellarium 0.9.1 (Jorden, Barnaul @ 0m)
FOV=62°
FPS=41.38
Lille Løve
Løven
Lossen
Mars
Saturn
Regulus
Venus
Merkur
Praesepe
Krebsen
Pollux
Ceres
Sekstanten
Søslangen
Tvillingerne
M37
M36
M35
Lille Hund
Procyon
M48
+60°
+50°
+40°
+30°
+0°
-10°
-20°
11h
V


008-08-01 12:51:17
Stellarium 0.9.1 (Jorden, Barnaul @ 0m)
FOV=67.8°
FPS=69
Lille Løve
Løven
Lossen
Mars
Saturn
Regulus
Venus
Merkur
Praesepe
Krebsen
Sekstanten
Pollux
Ceres
Tvillingerne
M37
M36
M35
Søslangen
Lille Hund
Procyon
M46
S
V


2008-08-01 12:50:04
Stellarium 0.9.1 (Jorden, Barnaul @ 0m)
FOV=33.2°
FPS=15.75
Løven
Adhafera
Algieba
Rasalas
38 Lyn
α Lyn
ε Leo
η Leo
ρ Leo
Saturn
Regulus
Venus
Merkur
Subra
Praesepe
Asellus Australis
Pollux
Castor
ι Gem
κ Gem
Ceres
Wasat
ι Hya
θ Hya
ζ Hya
ε Hya
β Cnc


2008-08-01 12:50:04
Stellarium 0.9.1 (Jorden, Barnaul @ 0m)
FOV=13.3°
Asellus Australis (δ Cnc)
HP 42911
Lysstyrke: 3.90 B-V: 1.07
J2000 RA/DE: 8h44m41.1s/+18° 9'13.5"
Equ of date RA/DE: 8h45m10s/+18° 7'20"
Az/Alt: +261°18'53"/+29° 3'18"
Parallax: 0.02397
Afstand 136.07 Lysår
Spektral type K0III
Merkur
Praesepe
Krebsen
Asellus Australis

# Vigtige tidspunkter:

**(Barnaul, lokal tid)**

- **16.44.57 1. kontakt - Månen rører solranden**
- **17.47.31 2. kontakt - Totaliteten starter**
- **17.49.47 3. kontakt - Totaliteten slutter**
- **18.48.16 4. kontakt - formørkelsen afsluttet.**

**Varighed i alt: ca. 2 timer og 4 min.**
**Varighed af totaliteten: 2 min. 16 sek.**
**Højde over horisonten: 29°**
**Retning: Vest**

**62 min.** **2 min.** **60 min.**


Solskiven svinder ind til en bue, der bliver mindre og mindre
(set igennem formørkelsesbriller)
Kort efter kan man se:
- BAILYS PERLER
- DIAMANTRING-EFFEKTEN
Sollyset slipper kun igennem få steder på Månens rand, hvor der er lidt dybere kratere og månedale.

# Tyrkiet

**29. marts 2006**

**Kl. 13:53:57**

**Kl. 13:55:07**


Kl. 13:55:13

**Solens korona:**

**Venus -->**

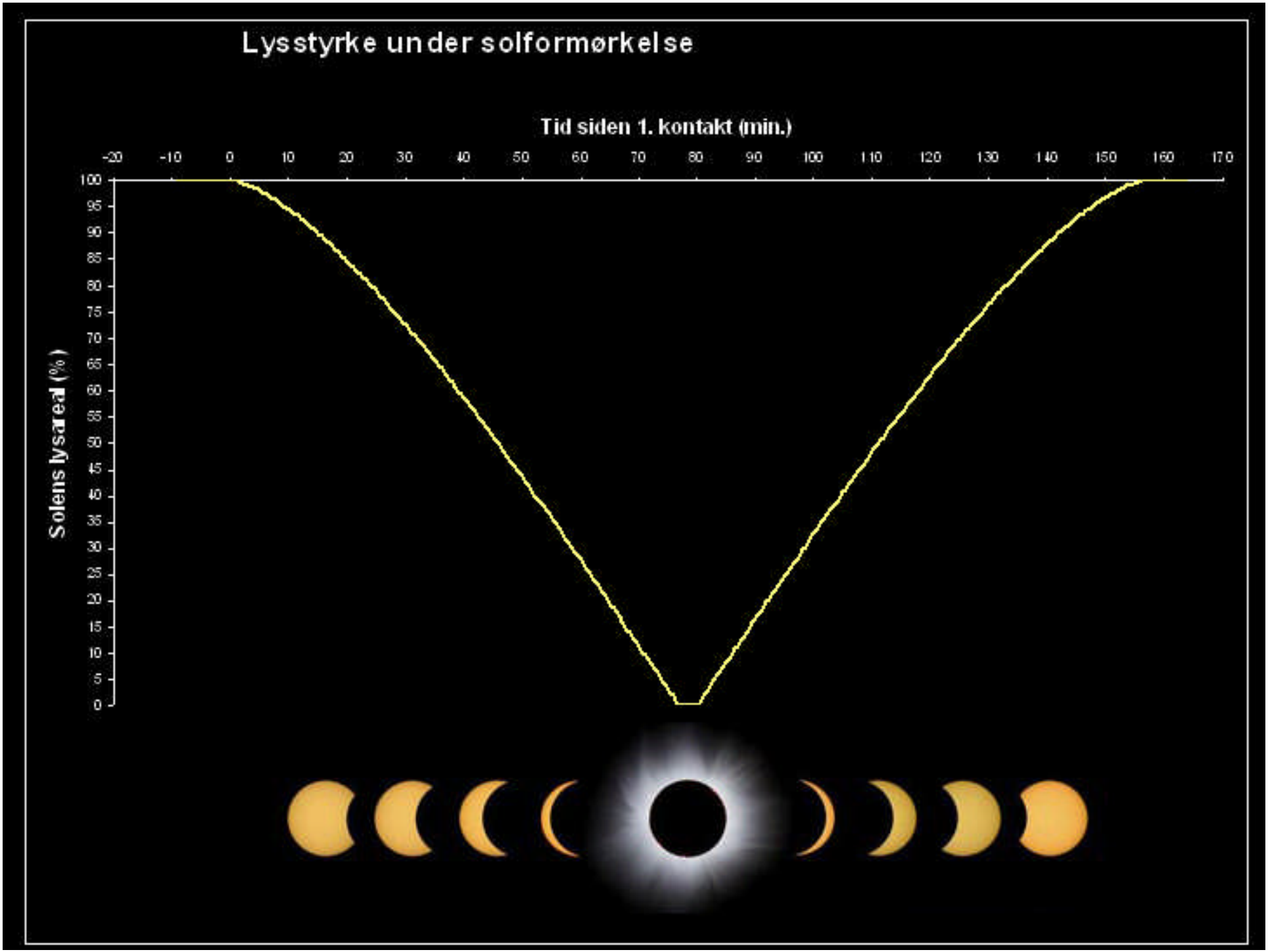

Lysstyrke under solformørkelse
Tid siden 1. kontakt (min.)
-20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170
Solens lysareal (%)
100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

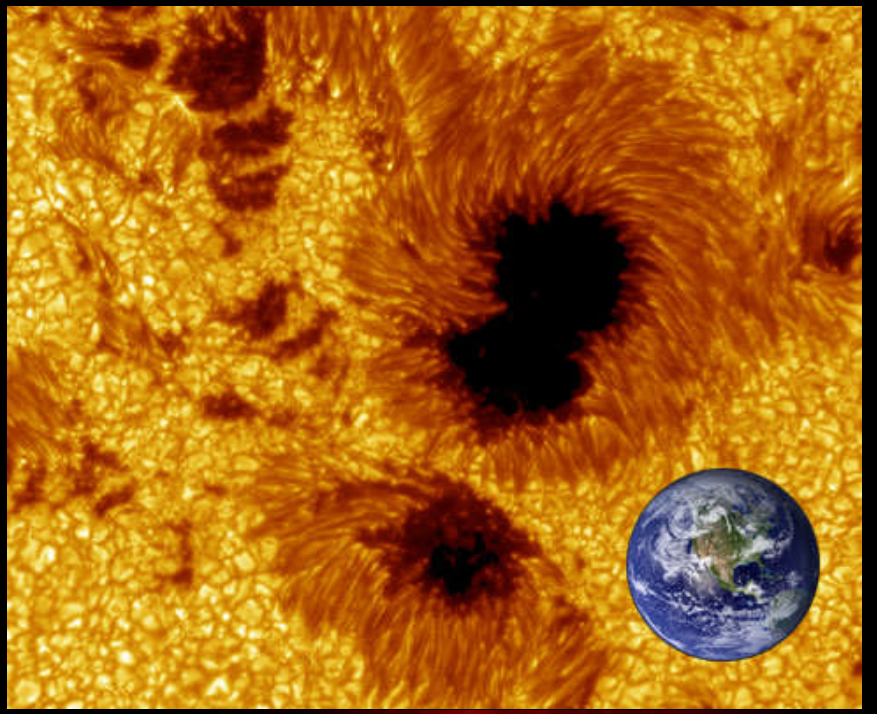
Foto: Christian K. Jensen

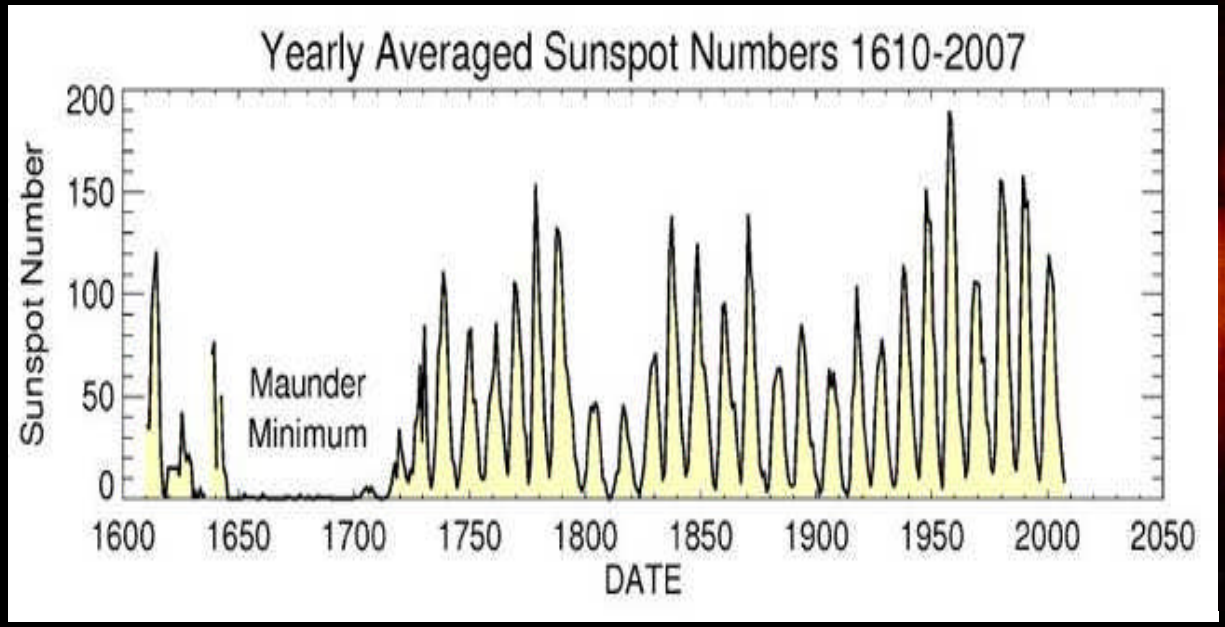
Foto: Christian K. Jensen

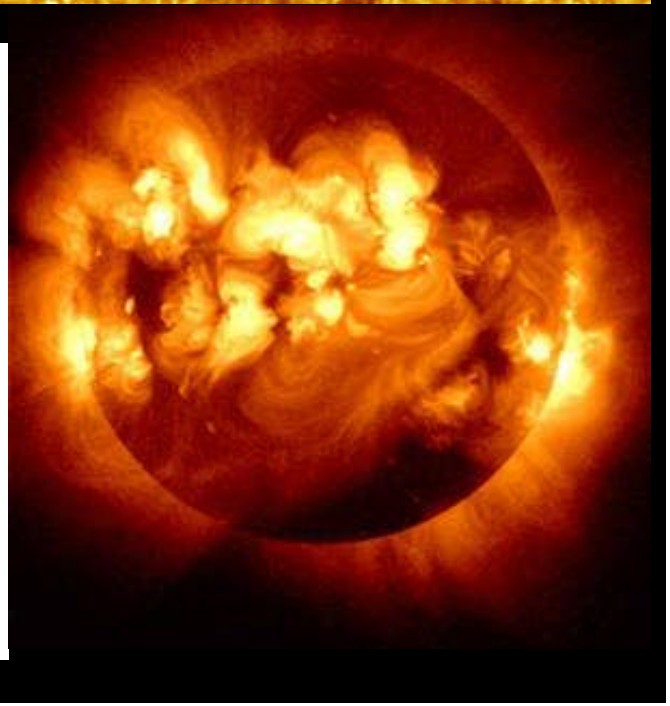
# Solaktivitet:

**Antallet af solpletter er et mål for Solens magnetiske aktivitet.**

**Der har næsten ikke været nogen solpletter i de seneste år, og aktiviteten er ved at vokse igen.**





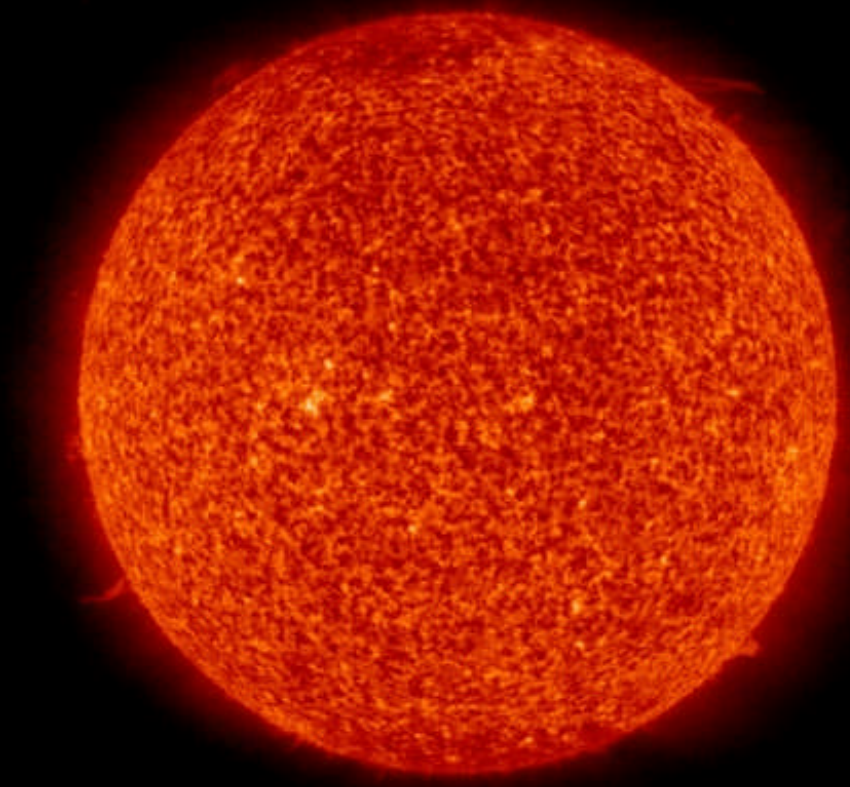



# Aktuelle billeder af Solen:

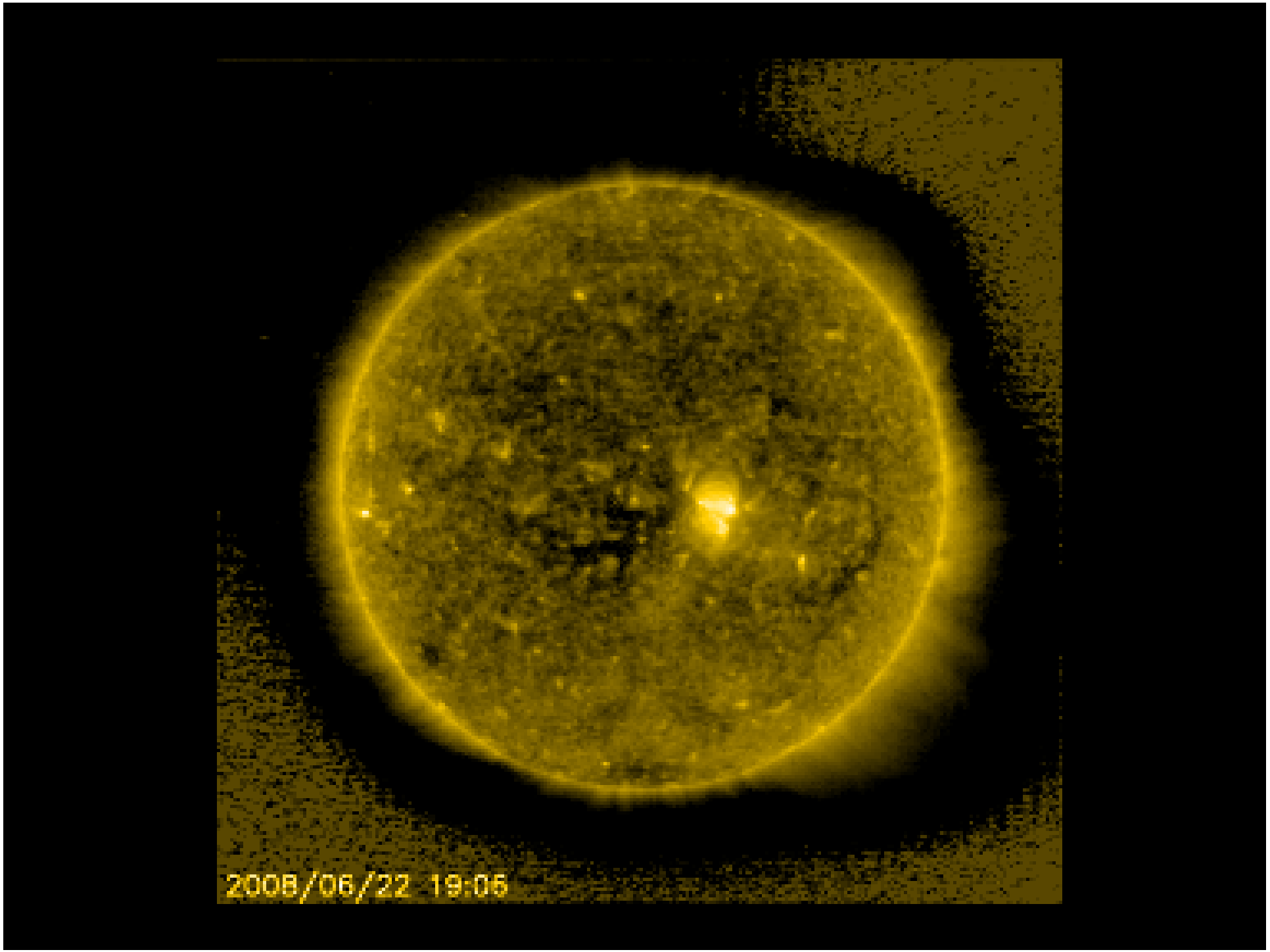
**Fotosfæren: Ingen solpletter**

2008/07/28 16:00

**Men der er aktivitet…**

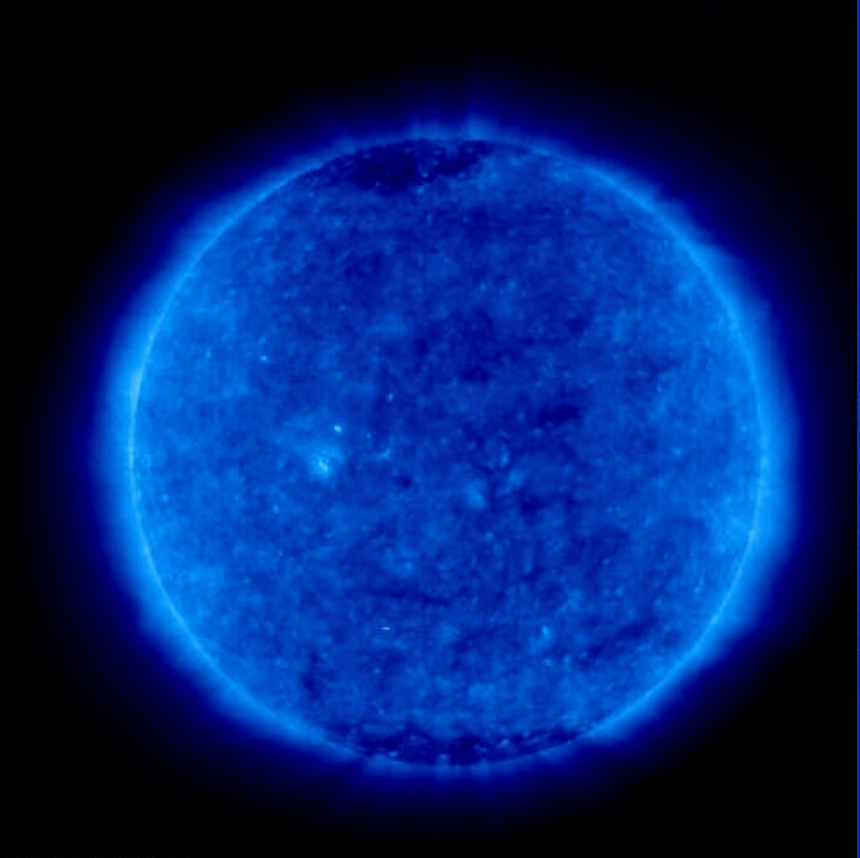


2008/07/28 13:37

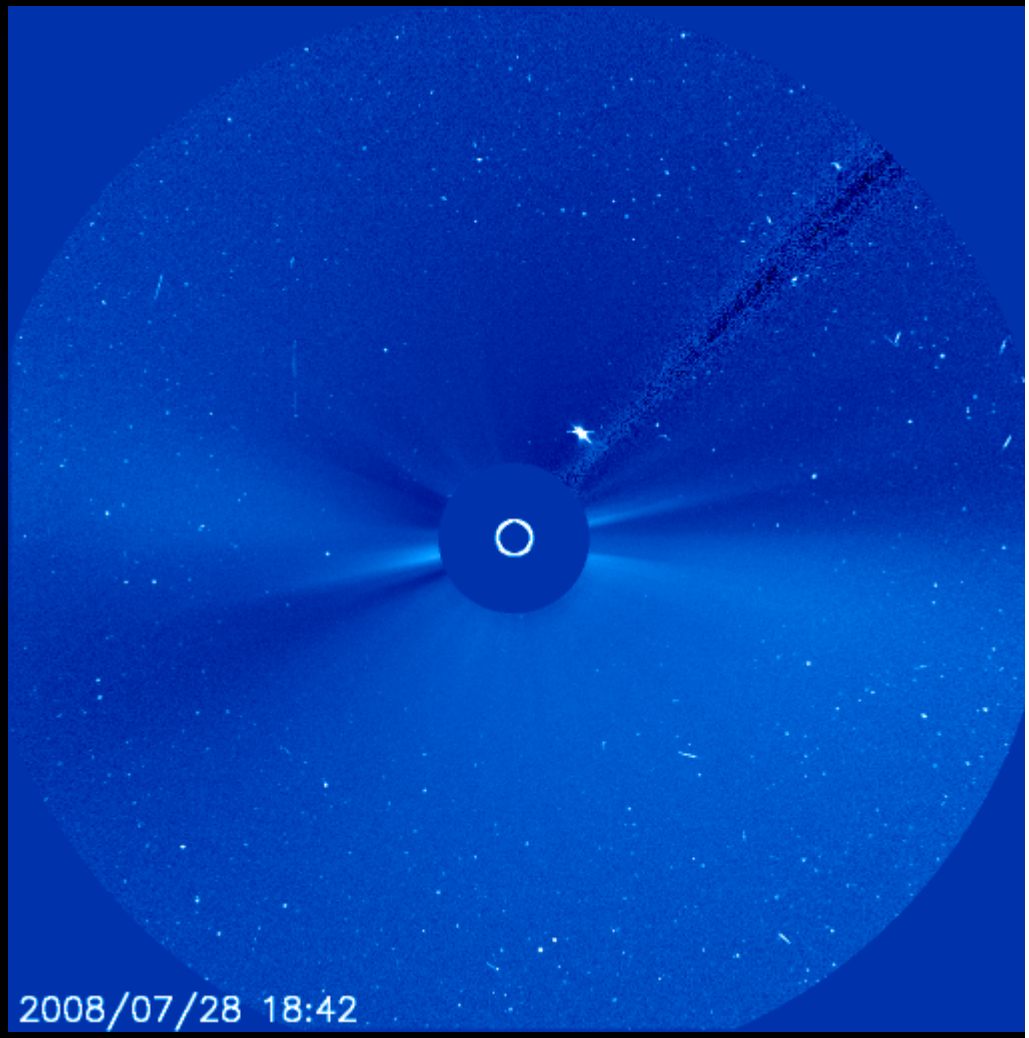

2008/06/22 19:06

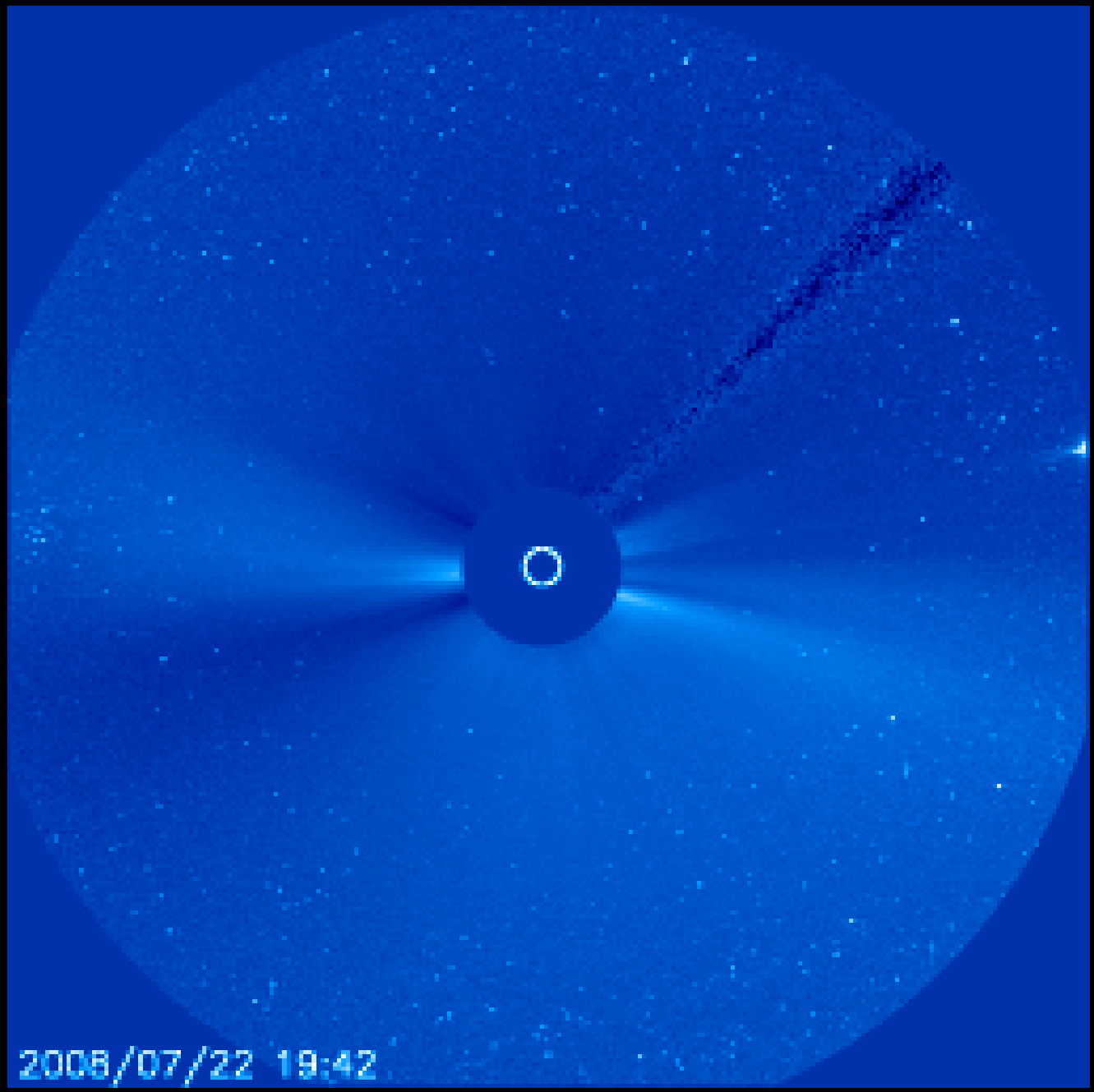
# Aktuelle billeder af Solen:

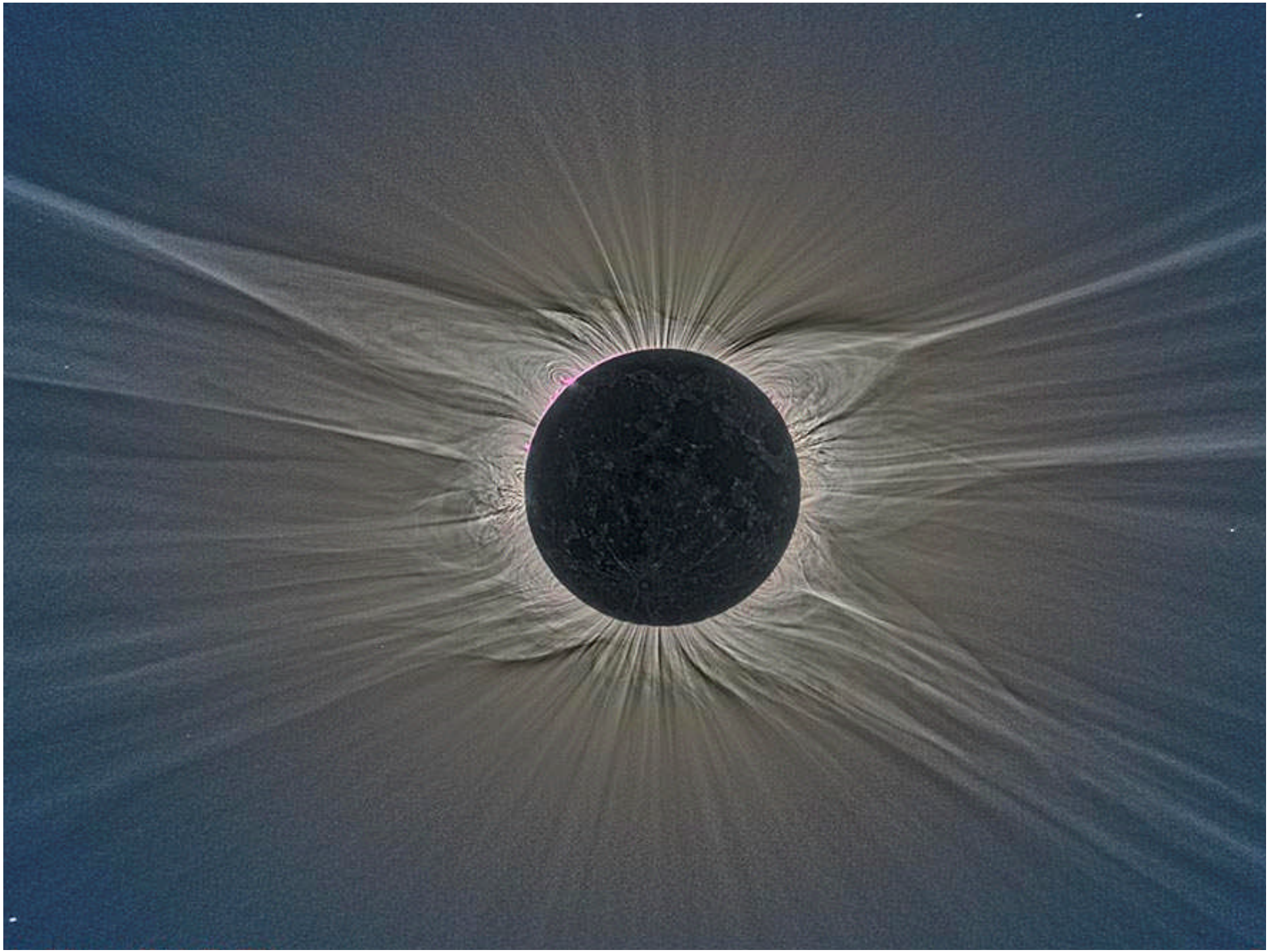
## Koronaen




## Den ydre korona og stjernehimlen

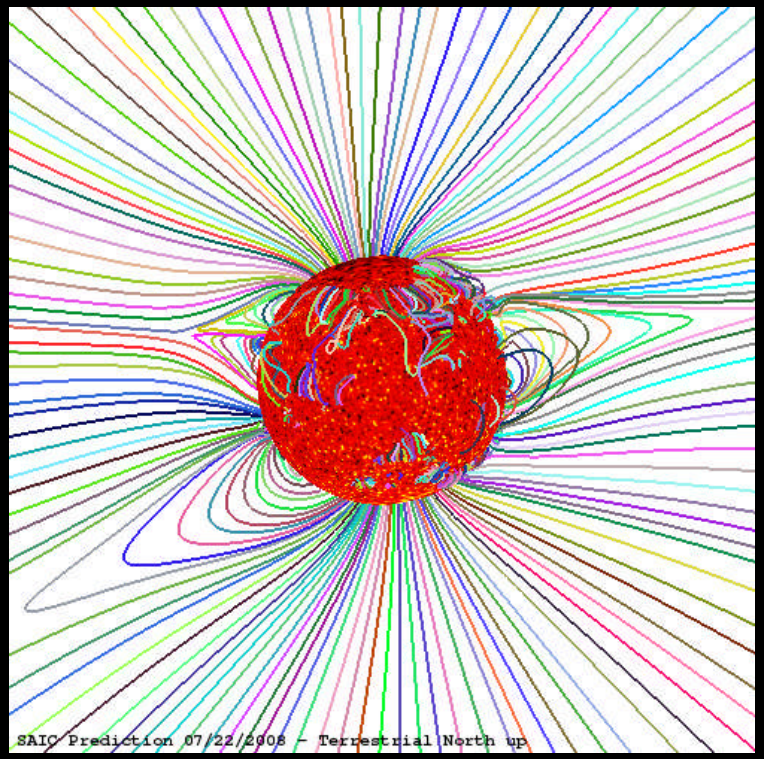


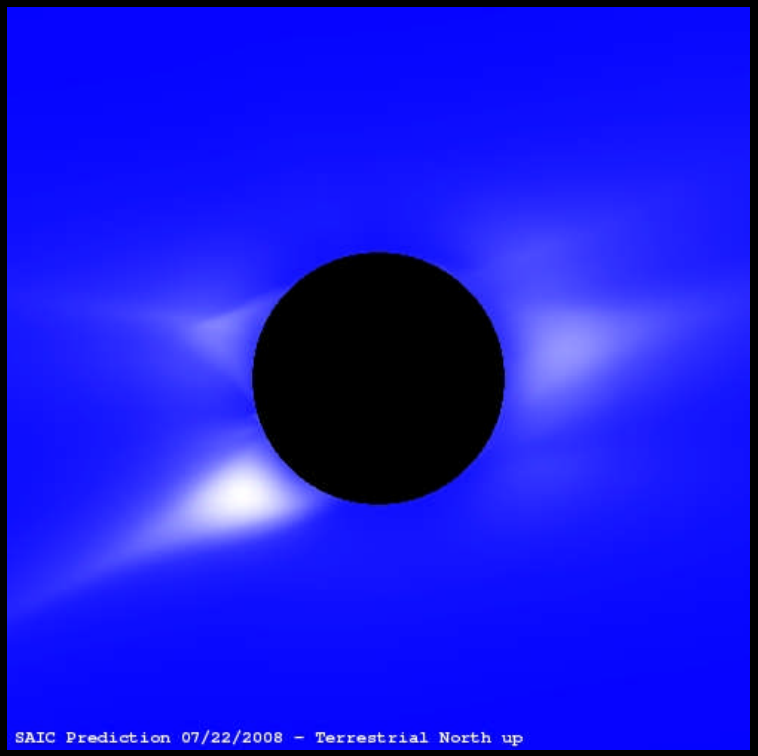

2008/07/22 19:42



# Koronaen:

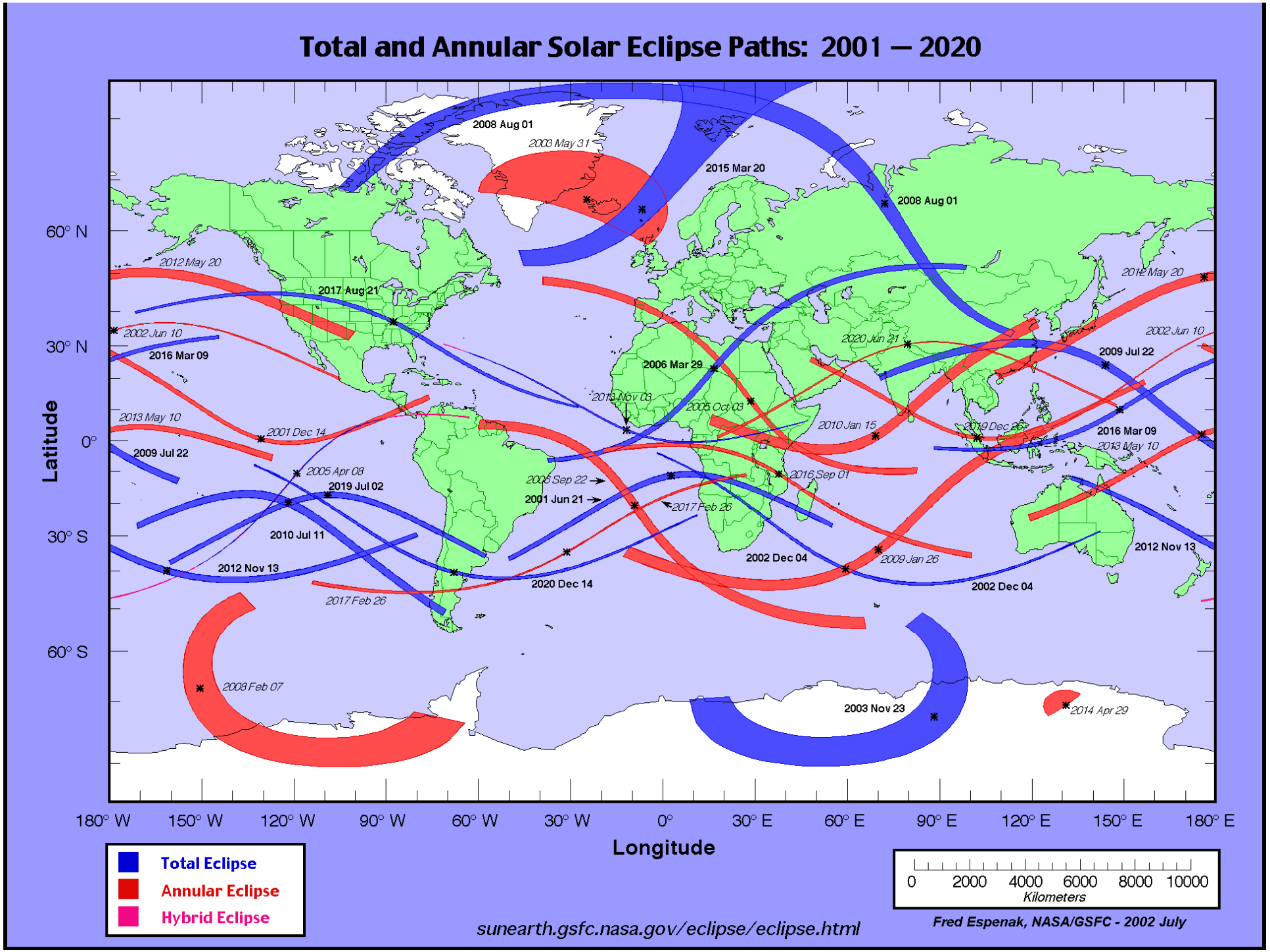
**Detaljerede modeller af Solens aktuelle magnetfelt muliggør en forudsigelse af Solens korona.**

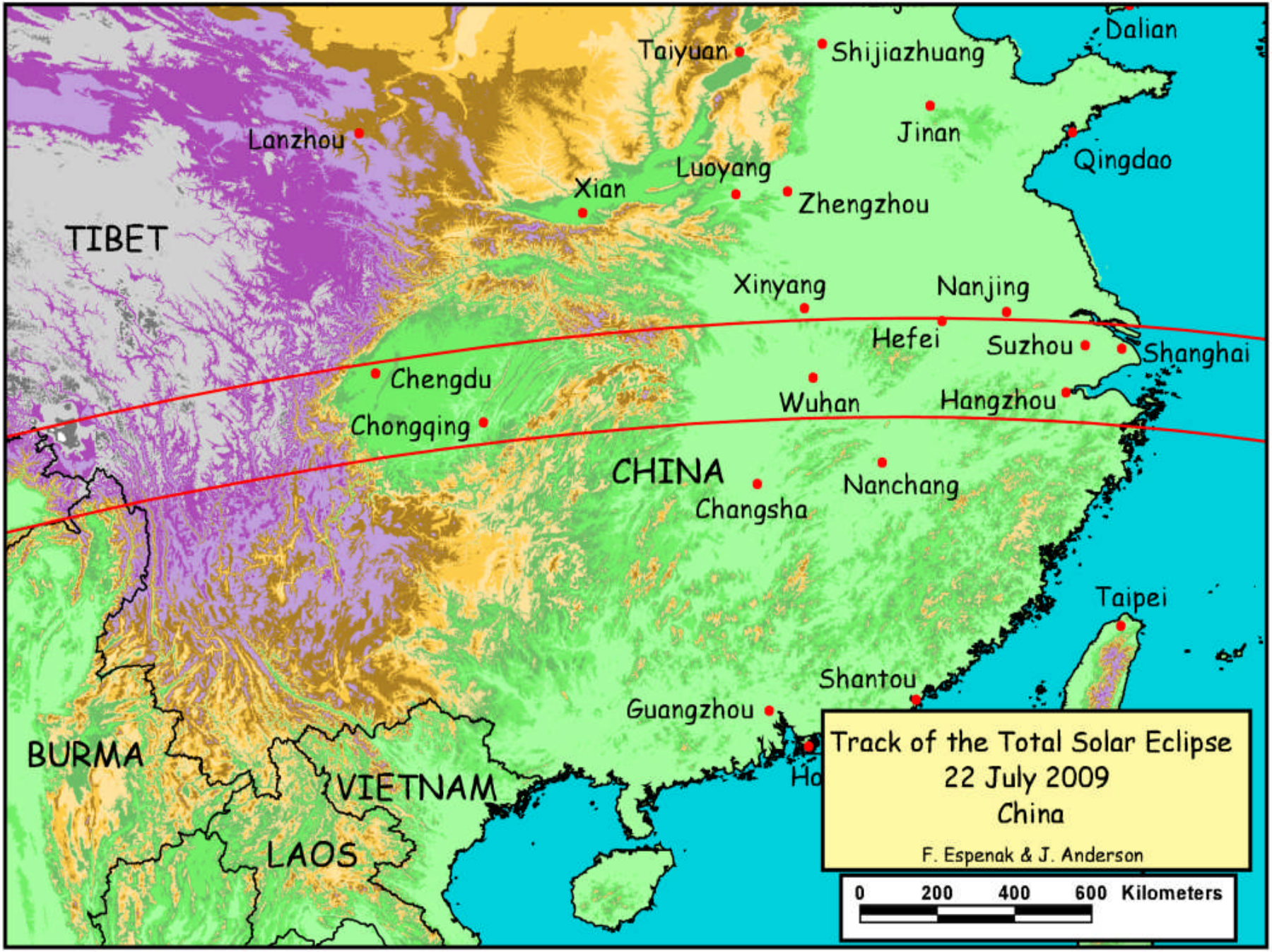



**Kilde**

# Hvor skal vi hen næste gang?



Total and Annular Solar Eclipse Paths: 2001 – 2020
2008 Aug 01
2008 May 31
2015 Mar 20
2008 Aug 01
2012 May 20
2017 Aug 21
2012 May 20
2002 Jun 10
2016 Mar 09
2020 Jun 21
2002 Jun 10
2009 Jul 22
2006 Mar 29
2013 Nov 03
2005 Oct 03
2010 Jan 15
2013 May 10
2001 Dec 14
2019 Dec 26
2016 Mar 09
2009 Jul 22
2013 May 10
2005 Apr 08
2006 Sep 22
2016 Sep 01
2019 Jul 02
2001 Jun 21
2017 Feb 26
2010 Jul 11
2012 Nov 13
2002 Dec 04
2009 Jan 26
2012 Nov 13
2020 Dec 14
2002 Dec 04
2017 Feb 26
2008 Feb 07
2003 Nov 23
2014 Apr 29
60° N
30° N
0°
30° S
60° S
Latitude
180° W
150° W
120° W
90° W
60° W
30° W
0°
30° E
60° E
90° E
120° E
150° E
180° E
Longitude
Total Eclipse
Annular Eclipse
Hybrid Eclipse
0
2000
4000
6000
8000
10000
Kilometers
sunearth.gsfc.nasa.gov/eclipse/eclipse.html
Fred Espenak, NASA/GSFC - 2002 July


Dalian
Taiyuan
Shijiazhuang
Jinan
Lanzhou
Qingdao
Luoyang
Xian
Zhengzhou
TIBET
Xinyang
Nanjing
Hefei
Suzhou
Shanghai
Chengdu
Wuhan
Hangzhou
Chongqing
CHINA
Nanchang
Changsha
Taipei
Shantou
Guangzhou
BURMA
VIETNAM
LAOS
Track of the Total Solar Eclipse
22 July 2009
China
F. Espenak & J. Anderson
0 200 400 600 Kilometers

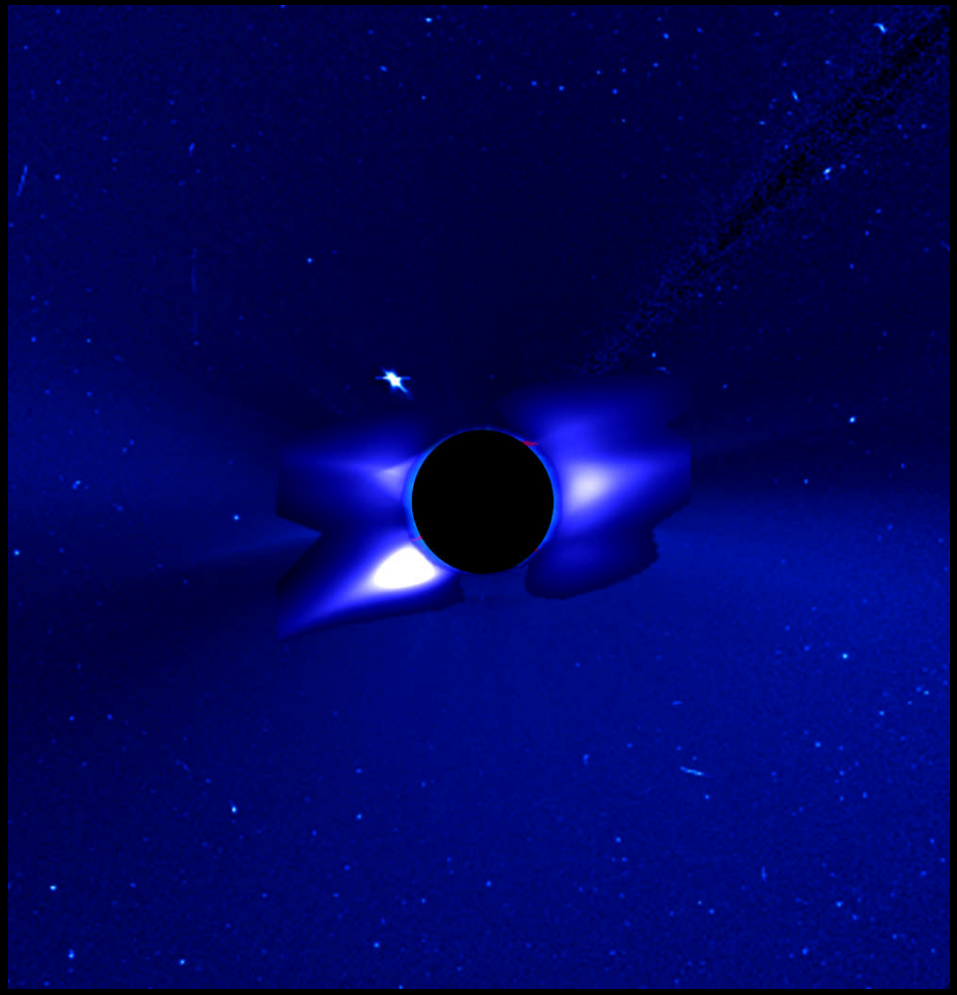
# Andre formørkelser:

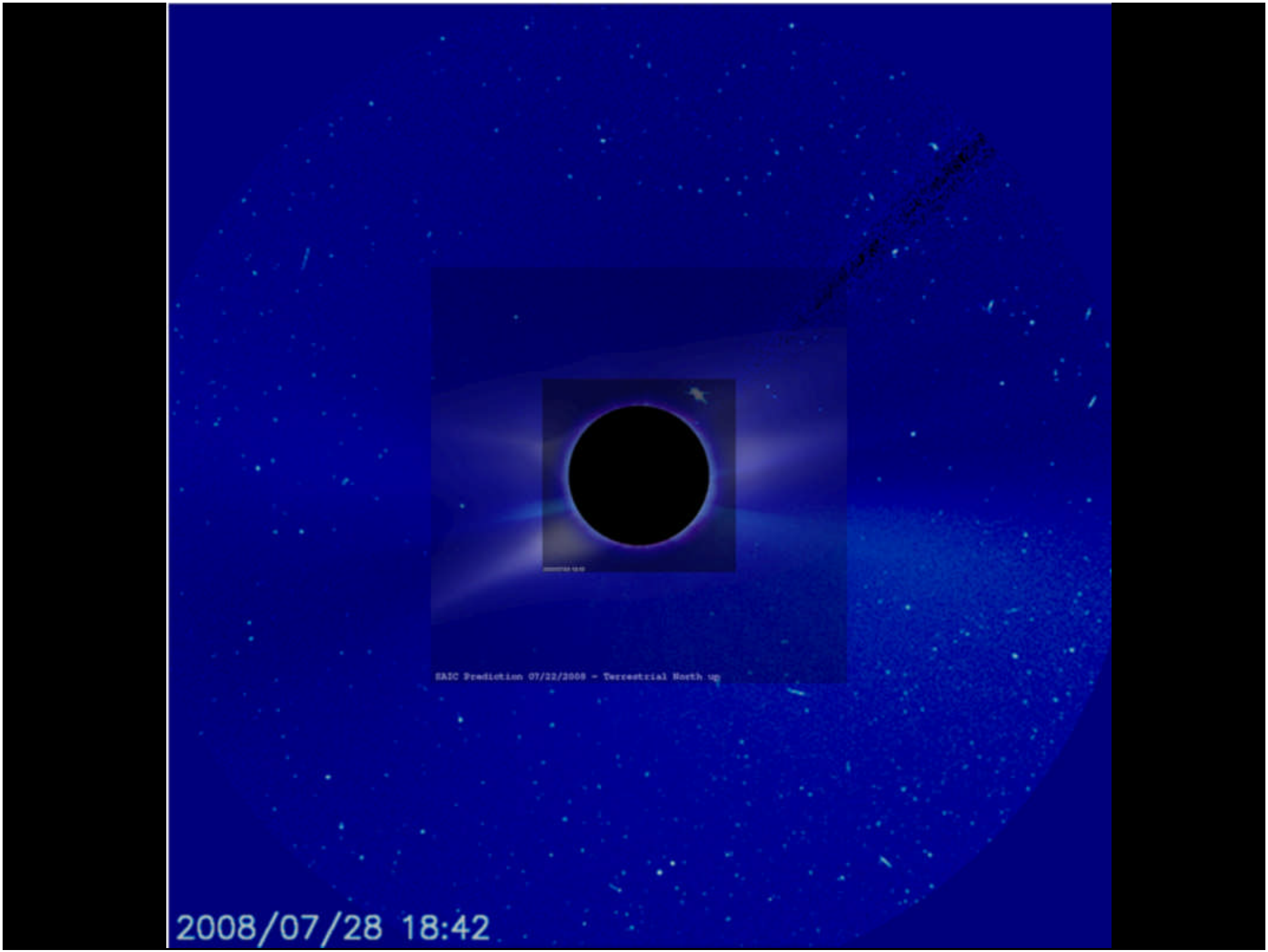
Saturn set fra Cassini-rumsonden

Jupiters måne Io
og dens skygge

Mars' måne
Phobos passerer
ind foran Solen

## Et bud på hvordan formørkelsen vil komme til at se ud:




EAIC Prediction 07/22/2008 - Terrestrial North up
2008/07/28 18:42