

# The Sun...a star in our solar system (continued)



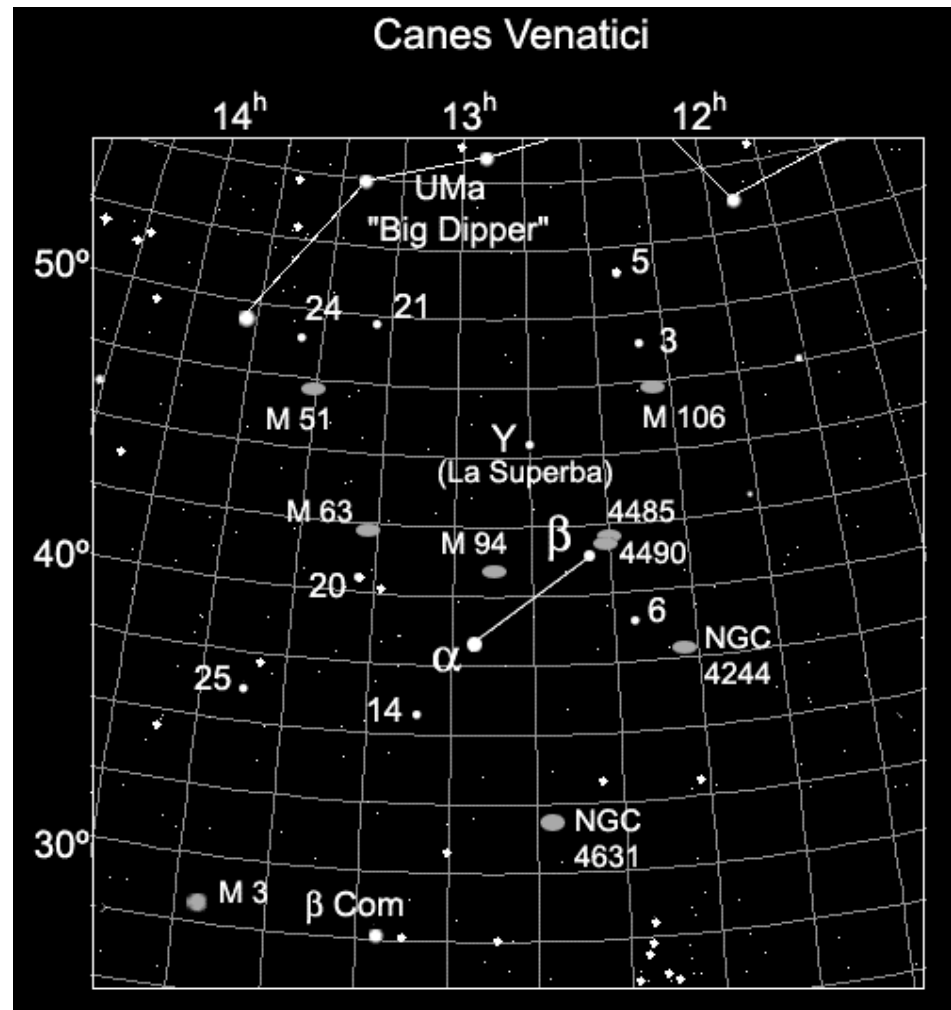
2010-04-17

Pete Lawrence

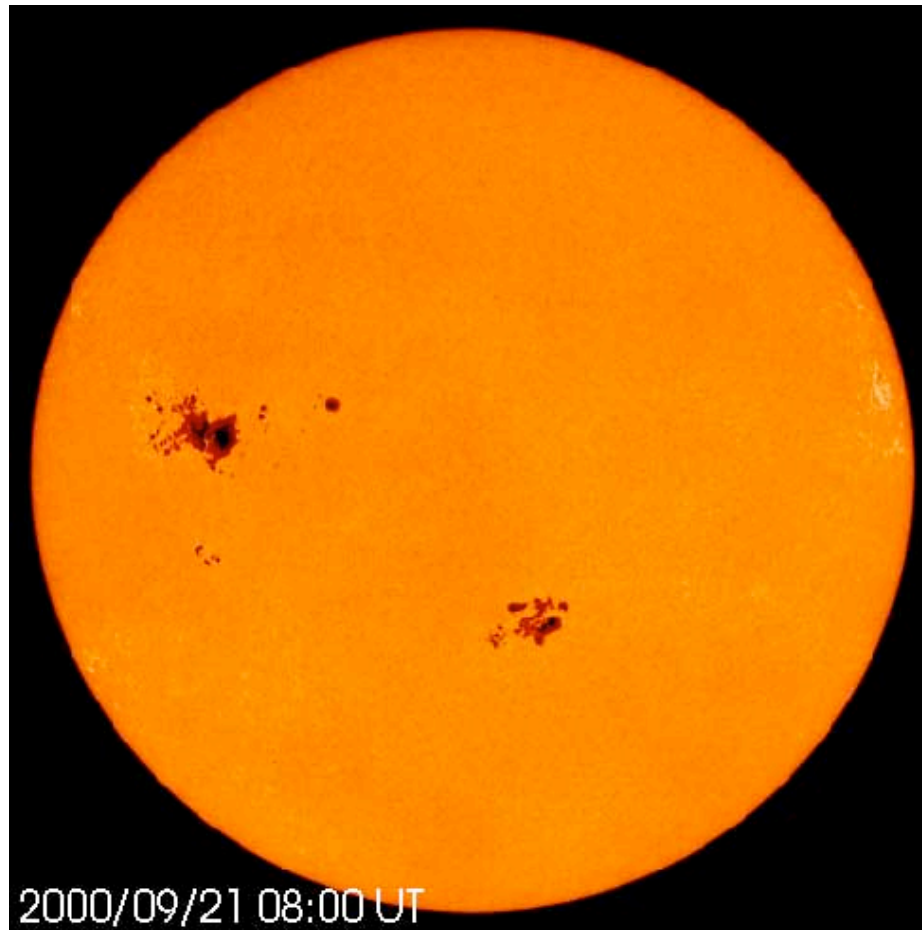


# Beta Canum Venaticorum (Beta CVn)

- Spectral type: G0V
- Temperature: 5930 K
- Luminosity (relative to Sun): 1.12
- Distance: 27.3 light years
- Judged best candidate by astronomer Margaret Turnbull to try and communicate with *them*



## Next topic: solar activity



The Sun doesn't always look like it does today



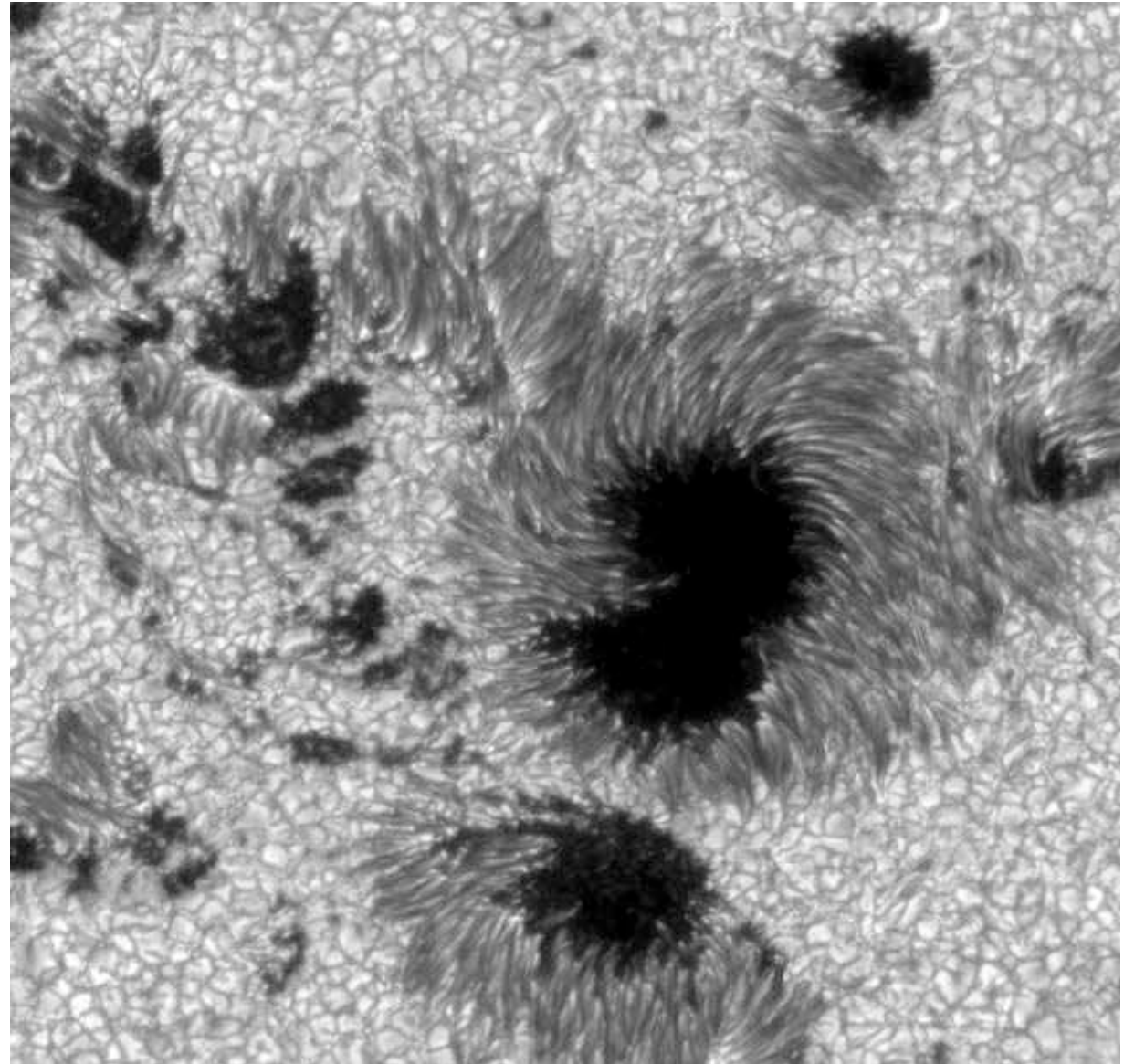
# Sunspots illustrate the rotation of the Sun

## Sunspots over several days

The Sun rotates with a period of 27 days (a good indicator of its age)

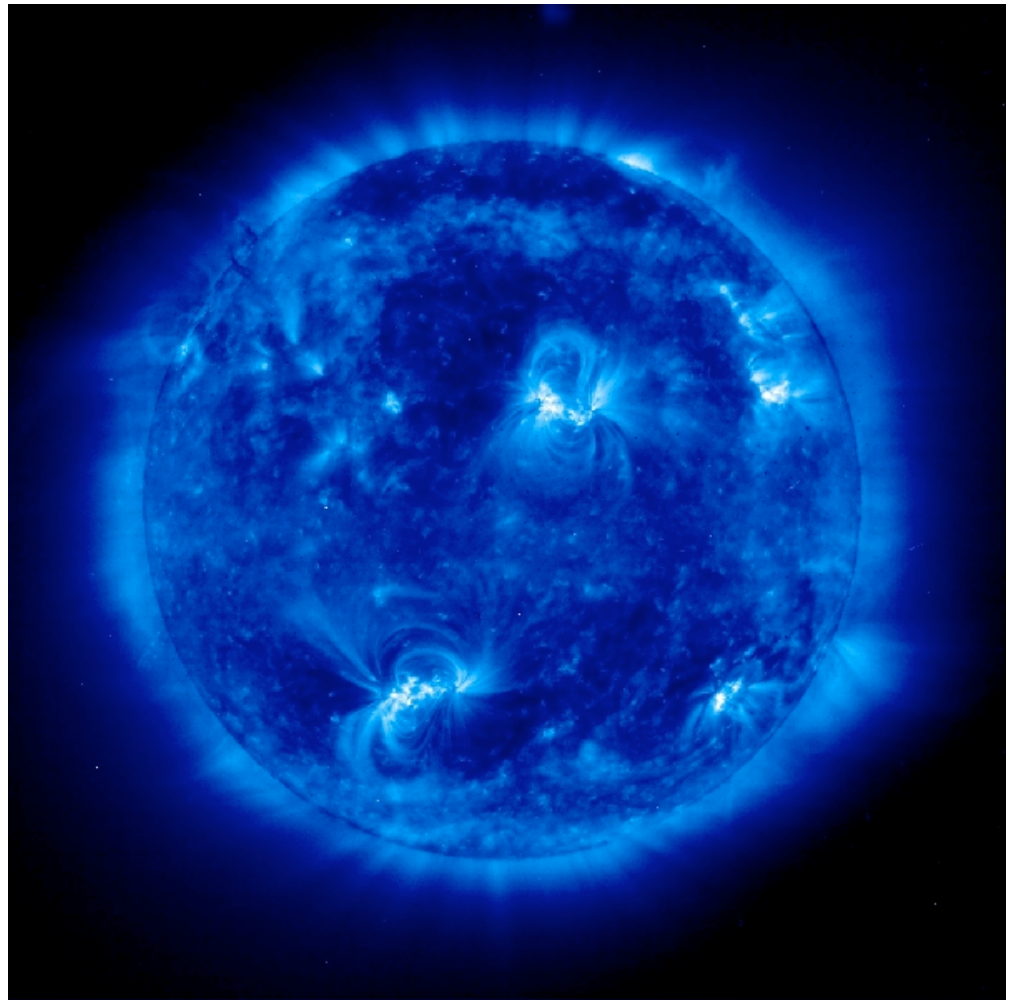
## Closeup of a sunspot

Sunspots are regions of strong magnetic fields (0.2 -0.4 Tesla)

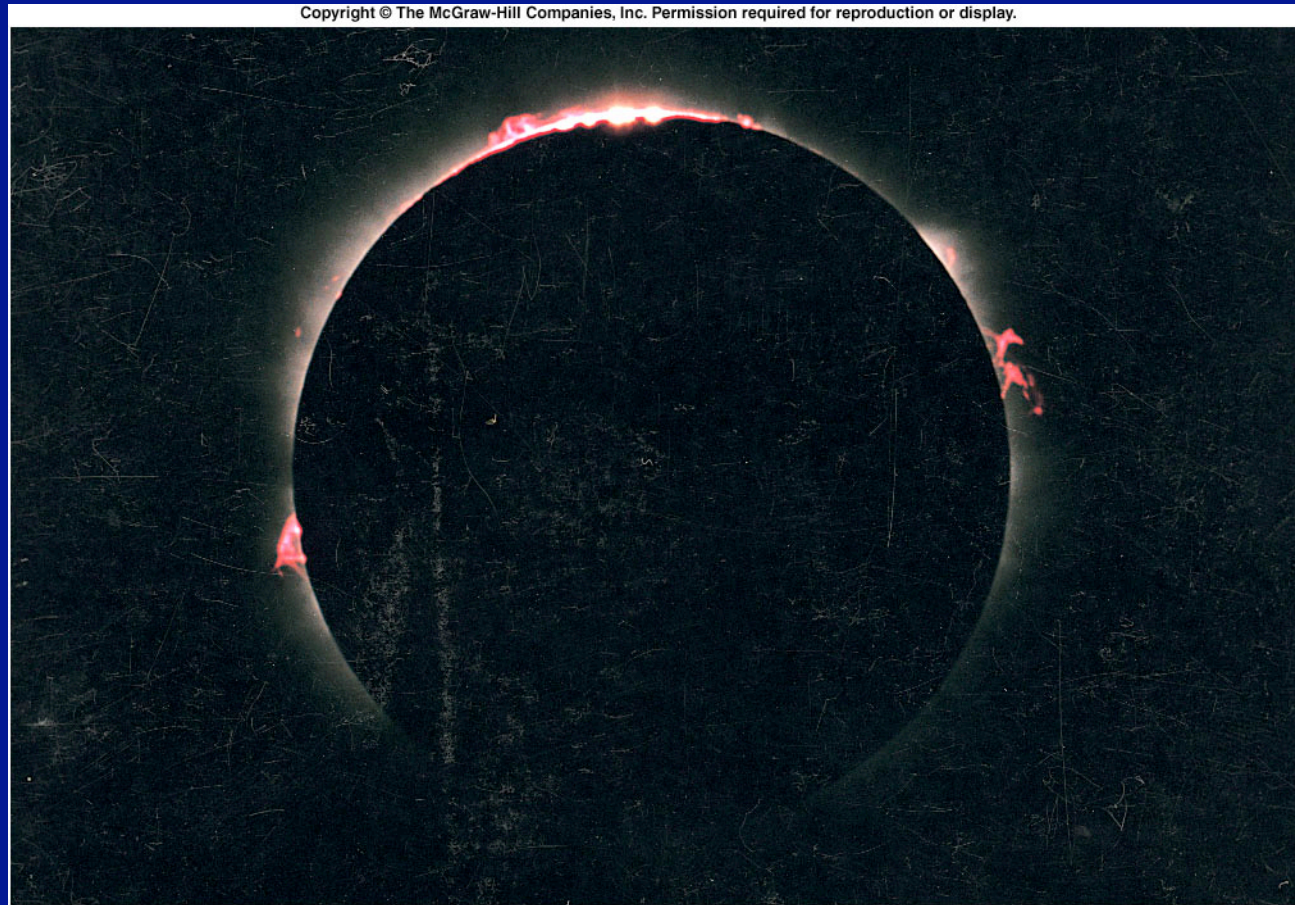


# Sunspots and their strong magnetic fields are related to more mysterious aspects of the Sun

Above the photosphere are more rarefied and hotter parts of the solar atmosphere



The Chromosphere-region above the photosphere, and substantially hotter





# The Solar Corona

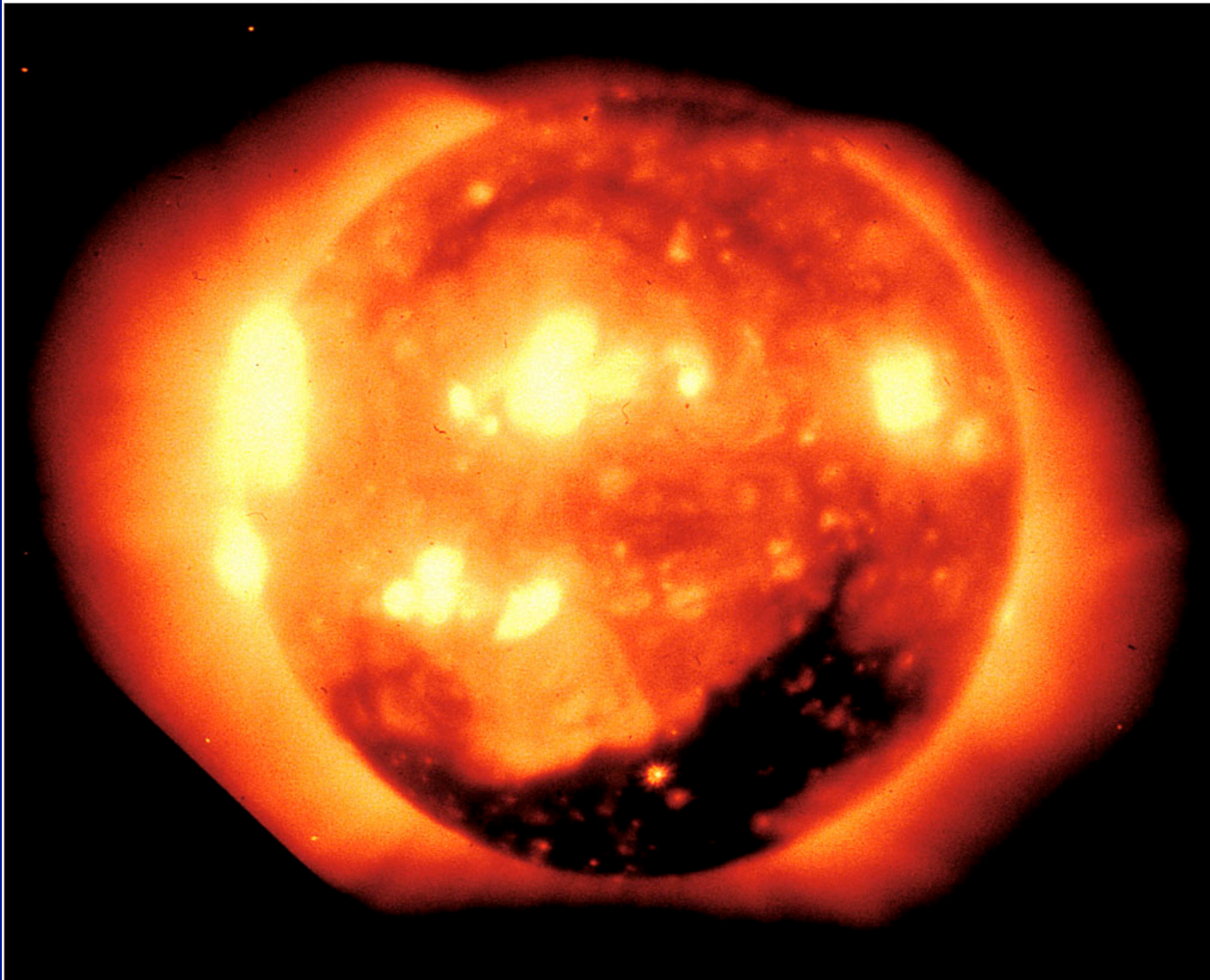


What is it? How did it get that way?

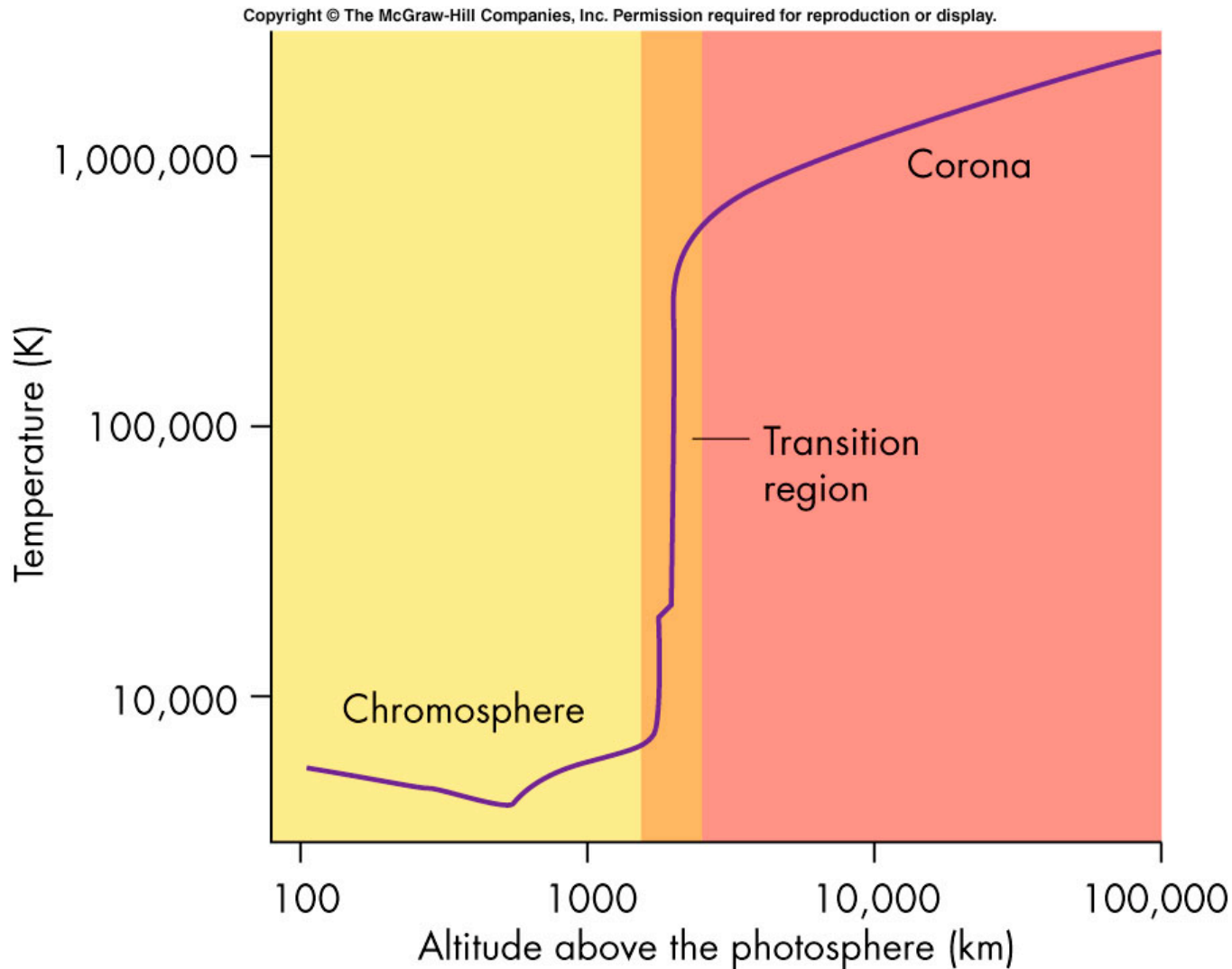


# The X-Ray Sun

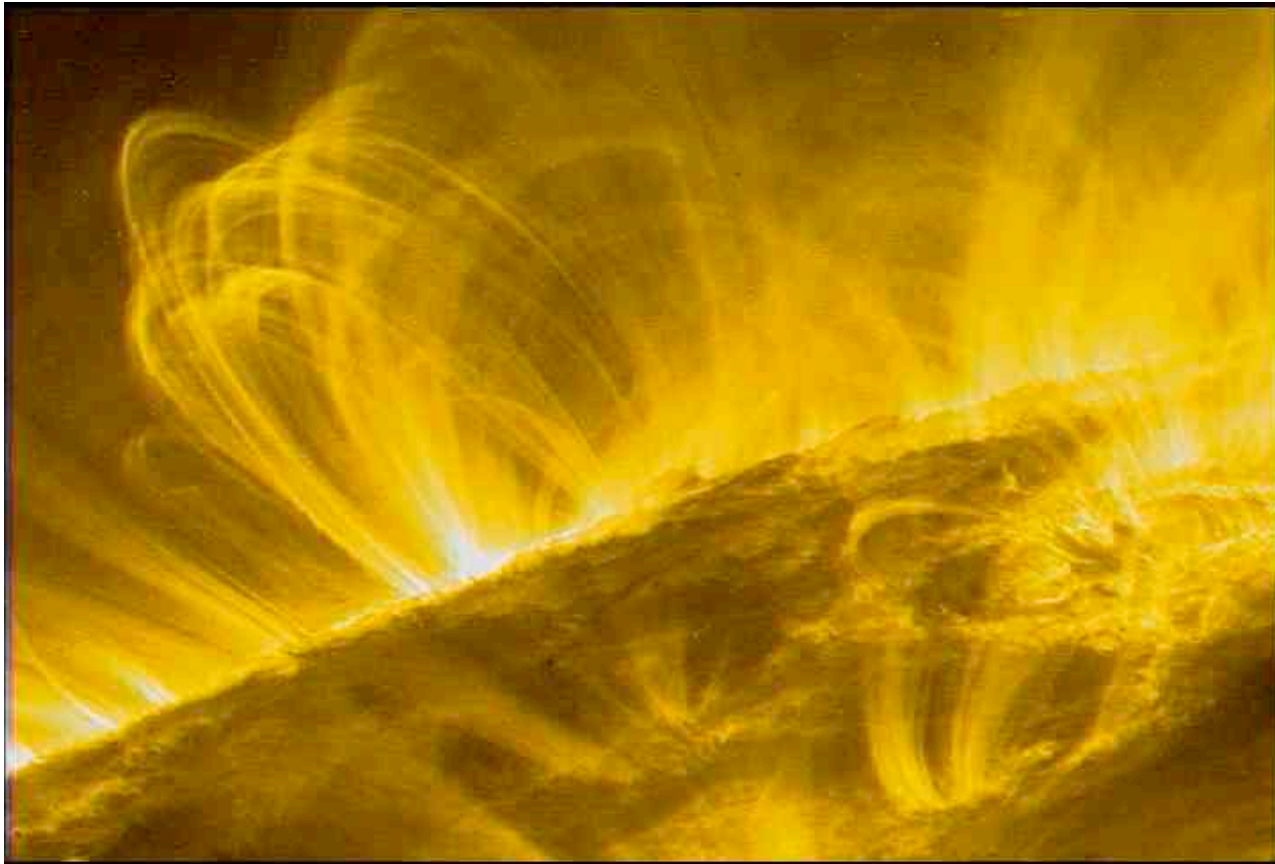
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# The Temperature Profile in the Solar Atmosphere



The process or processes responsible for heating the solar corona almost certainly involve the solar magnetic field



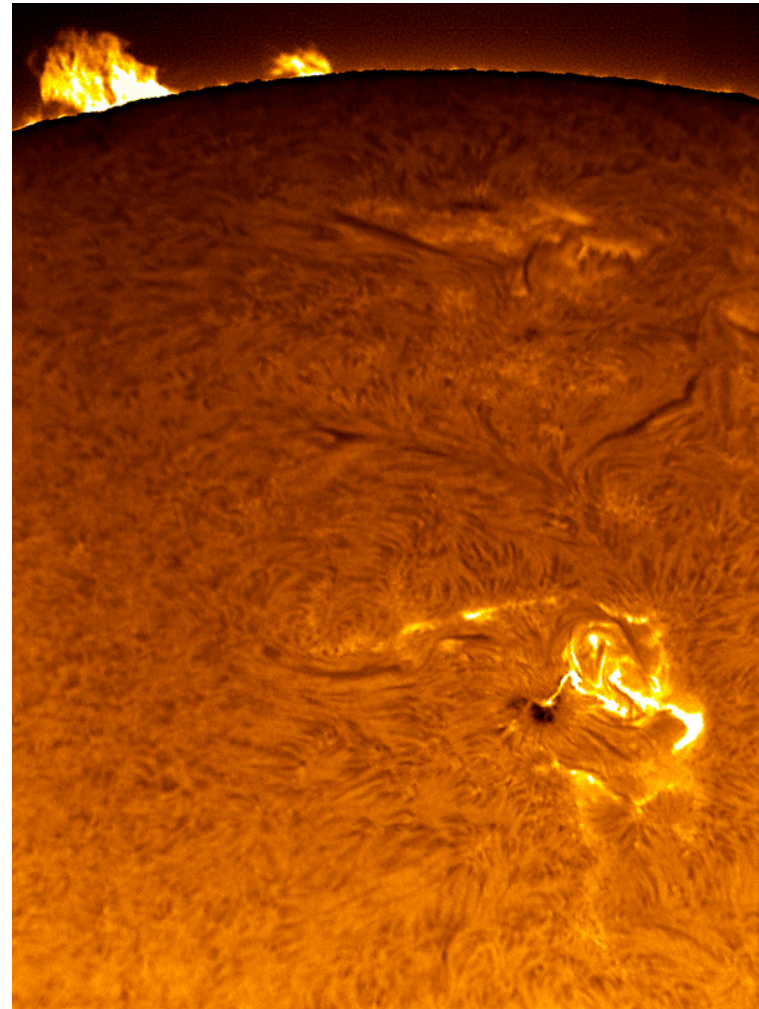
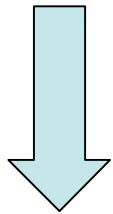
We just don't know how

The hot, rarefield, magnetically-dominated parts of the solar atmosphere show continual activity and energy release

[erupting solar prominence...April 21, 2010](#)

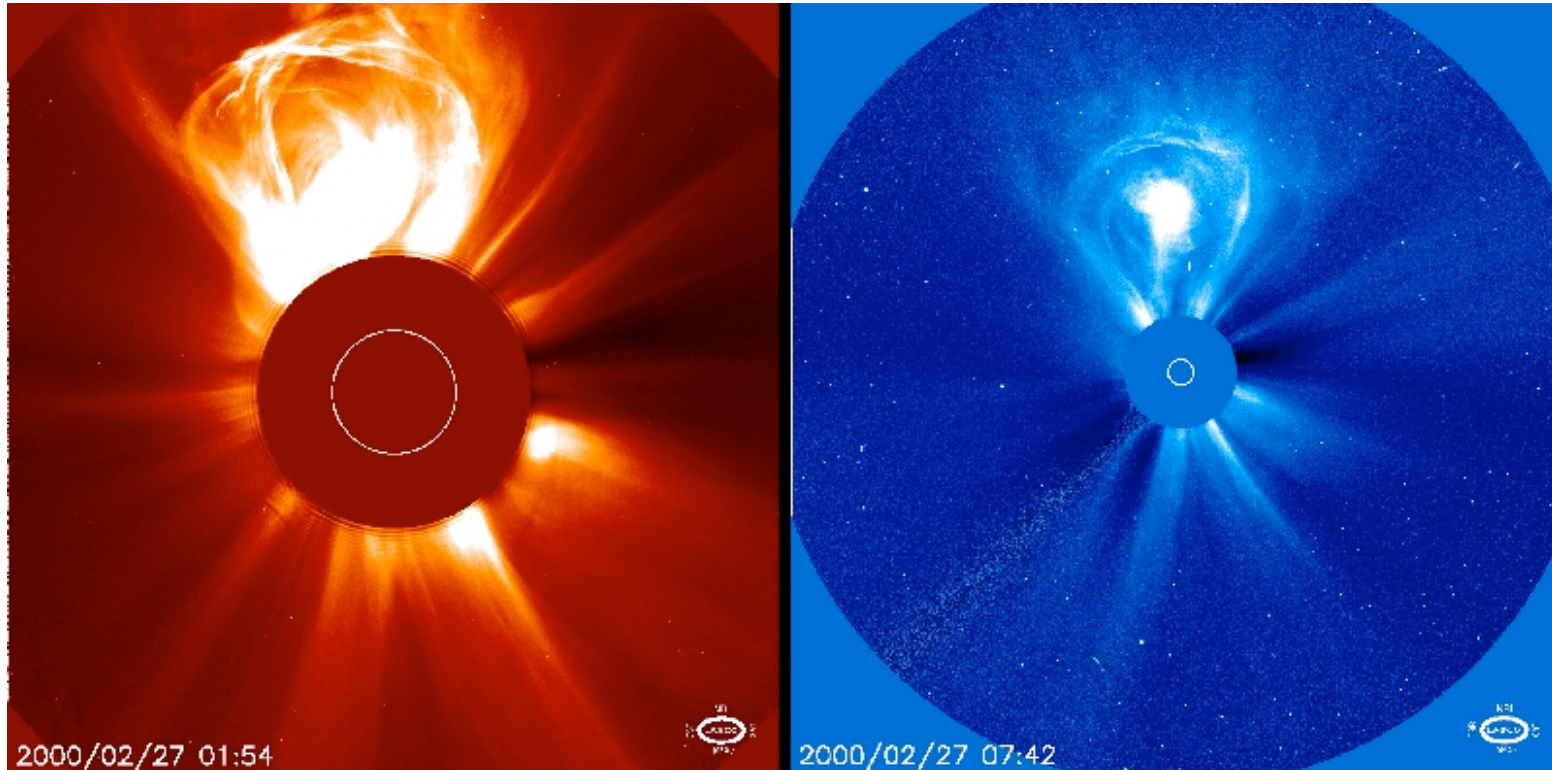
# Solar activity includes two violent types of events

- Solar flares →
- Coronal mass ejections



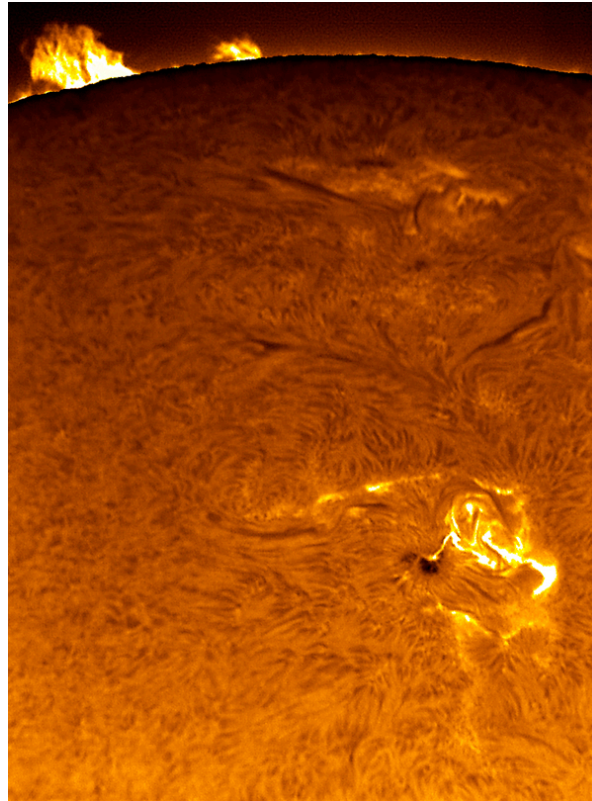


# Coronal mass ejections



A loop of matter “blasts off” from the Sun

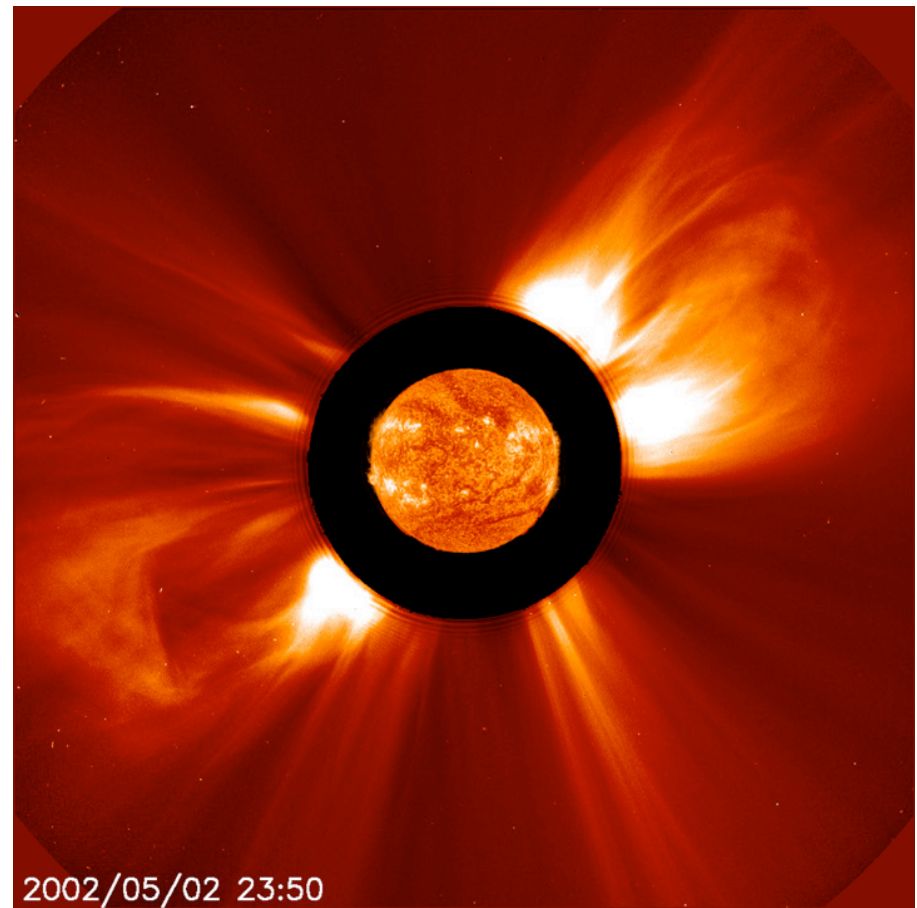
## Solar flare...the movie



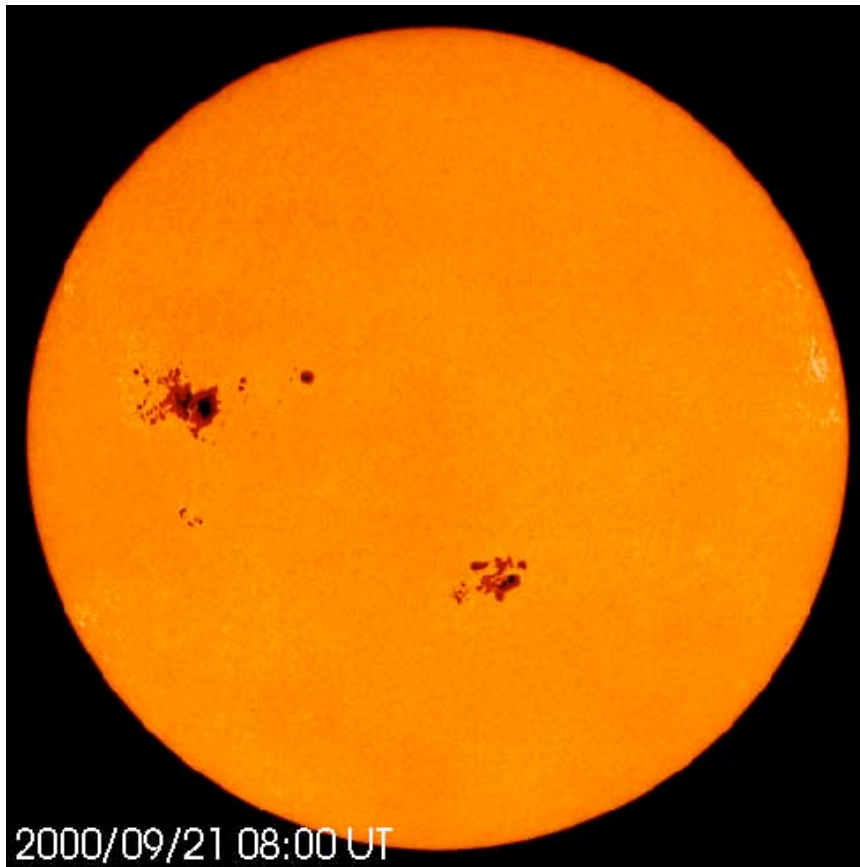
The solar flare of April 21, 2002, shown on  
Astronomy Picture of Day for November 6,  
2007

## Why are flares and coronal mass ejections important?

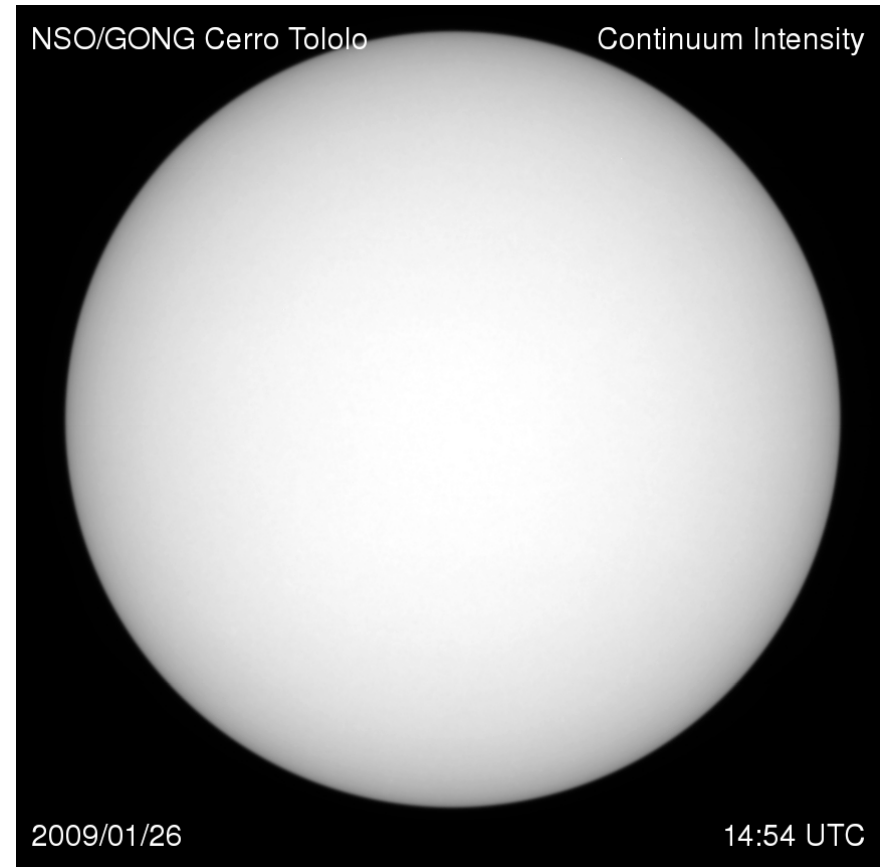
- They are dangerous! They can generate levels of radiation in interplanetary space that are lethal
- They are part of, and play a role in, the development of the **solar wind**



# Sunspots and solar activity: they come and go



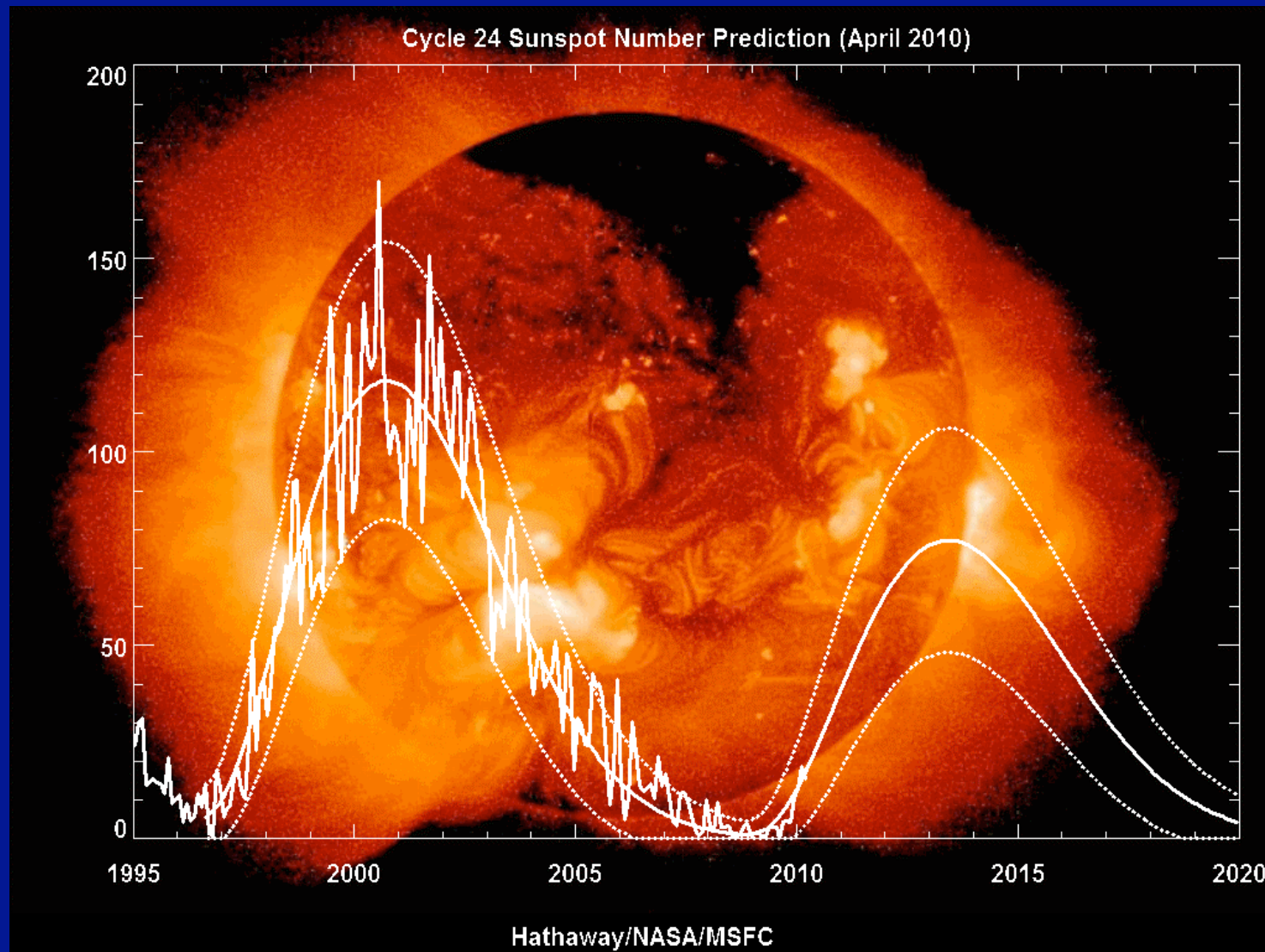
Sept. 21, 2000



Jan. 26, 2008

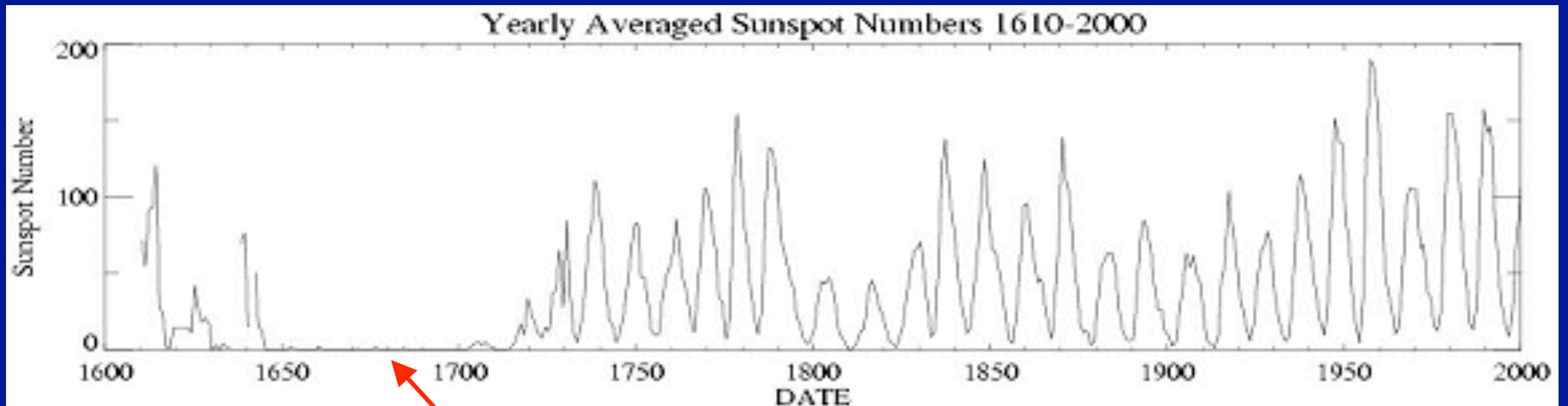


# The 11 year solar cycle: where are we now?





# The 11 year solar cycle goes back to the time of Galileo



Maunder Minimum