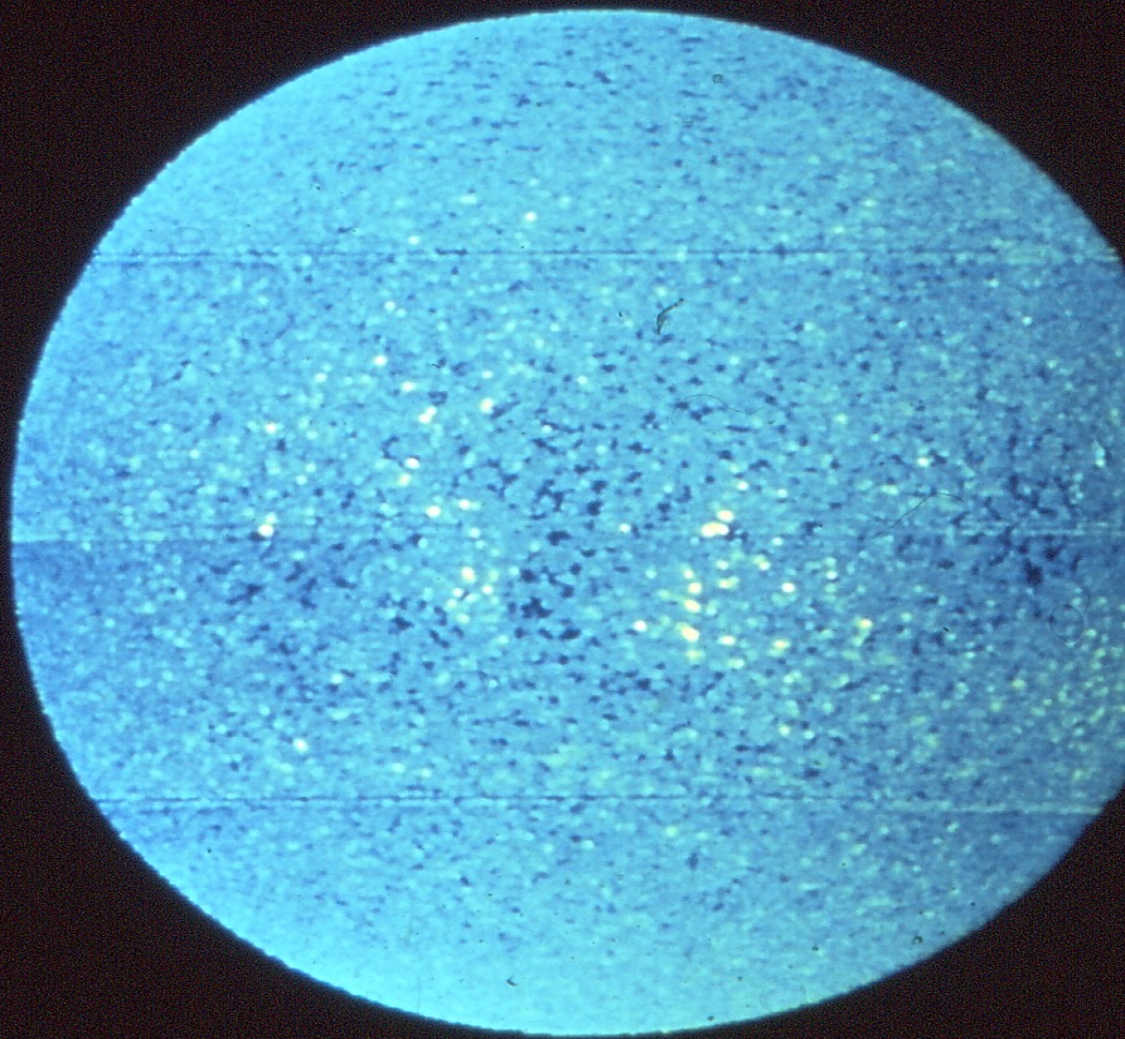
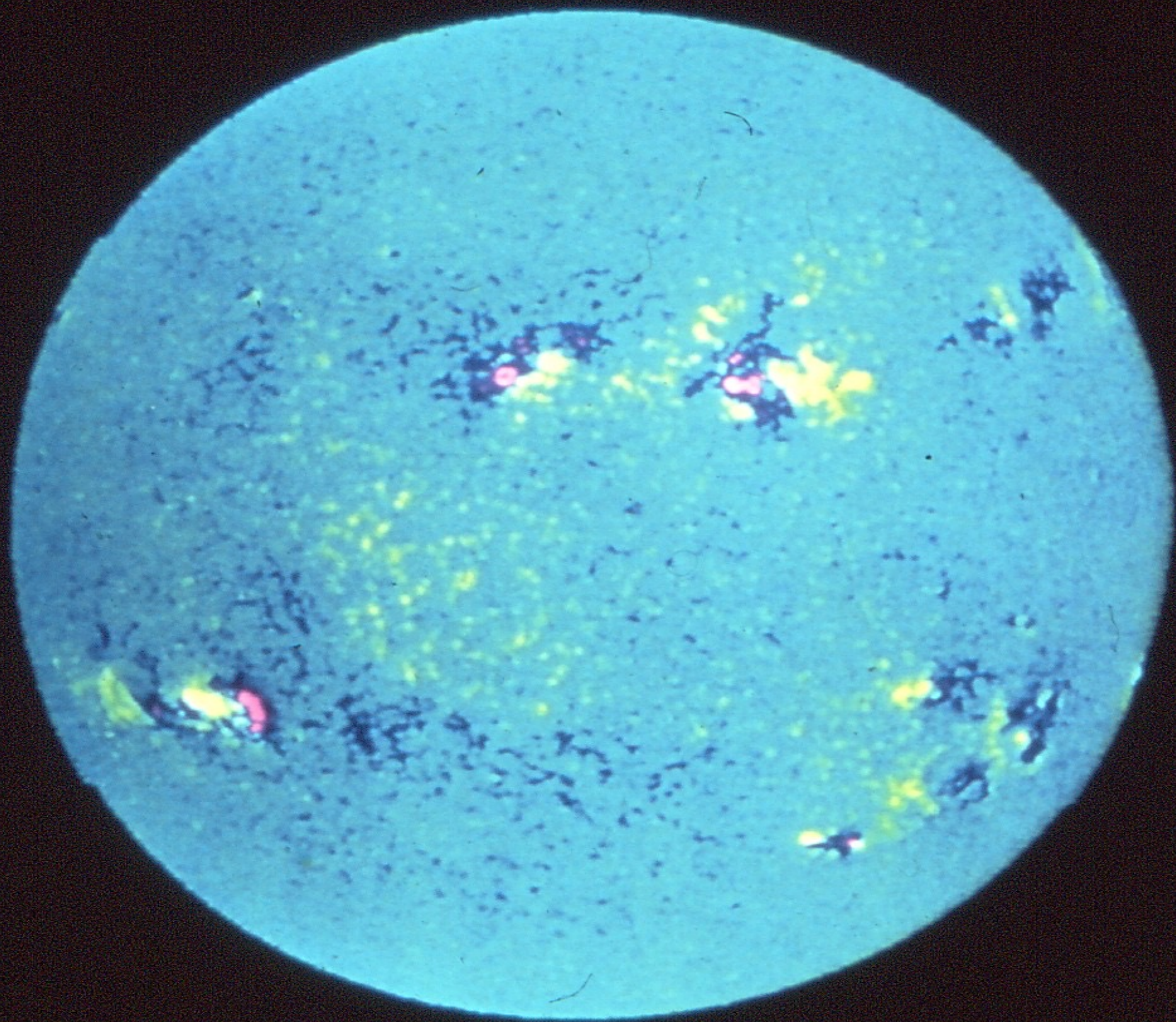
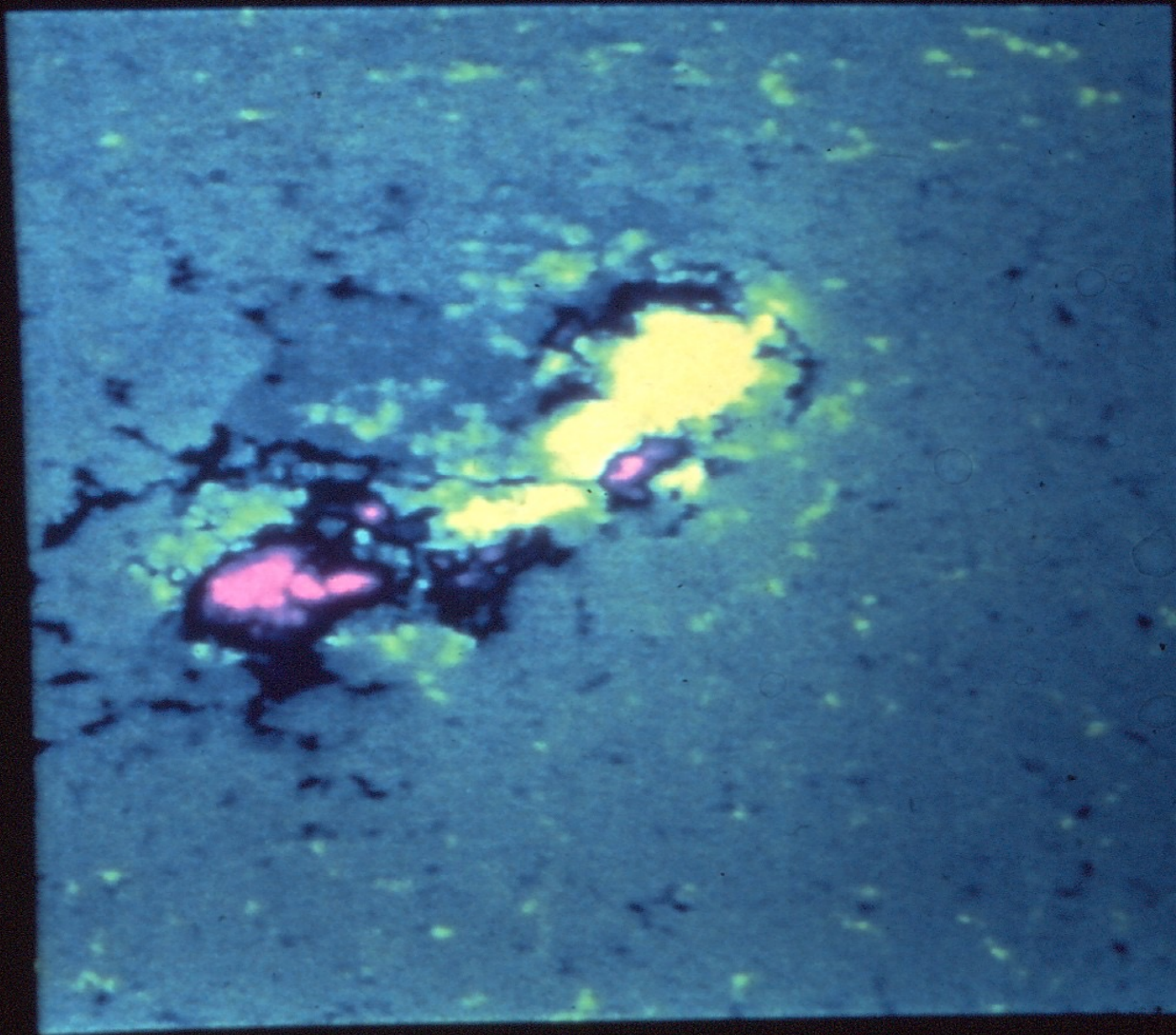
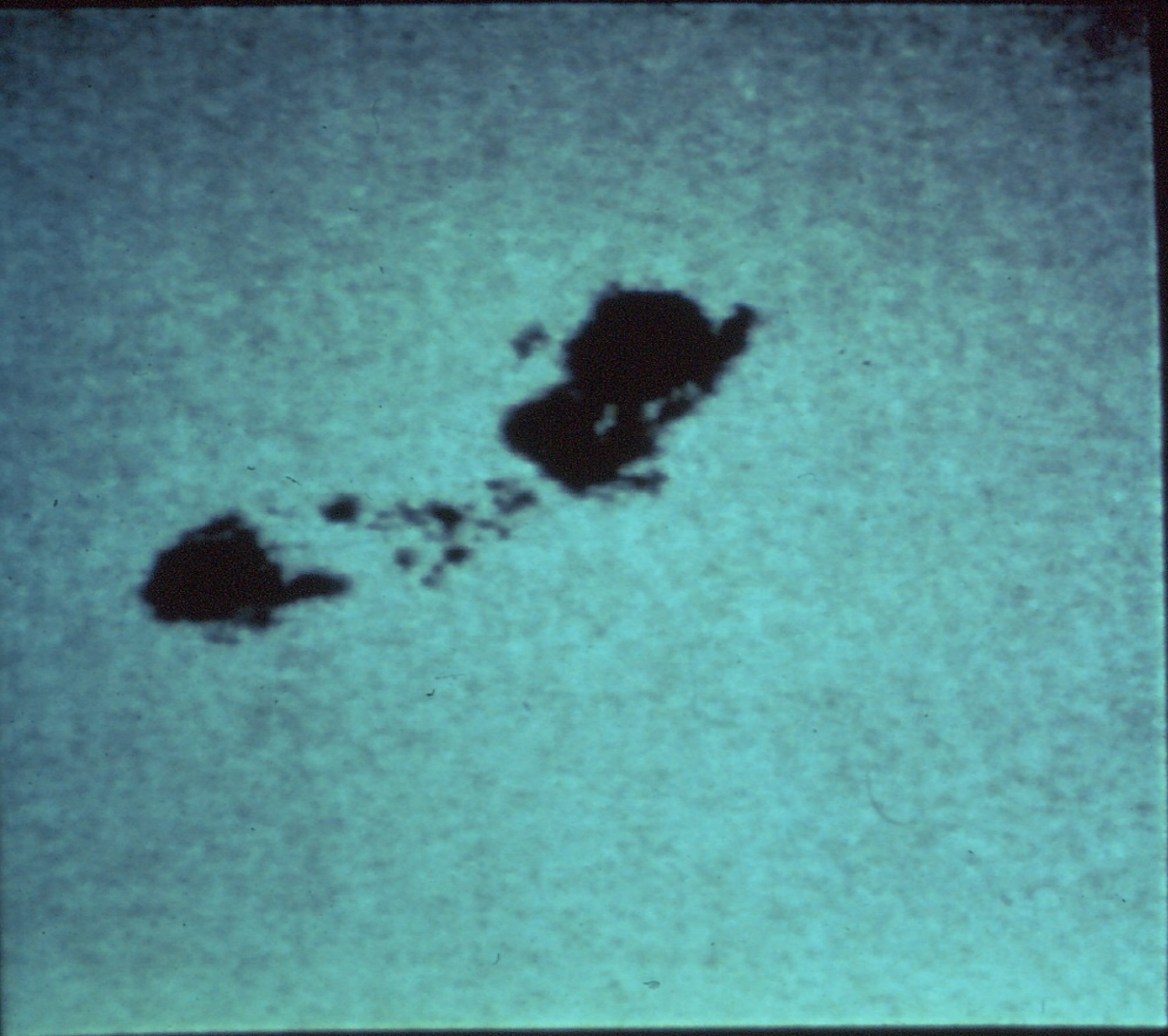
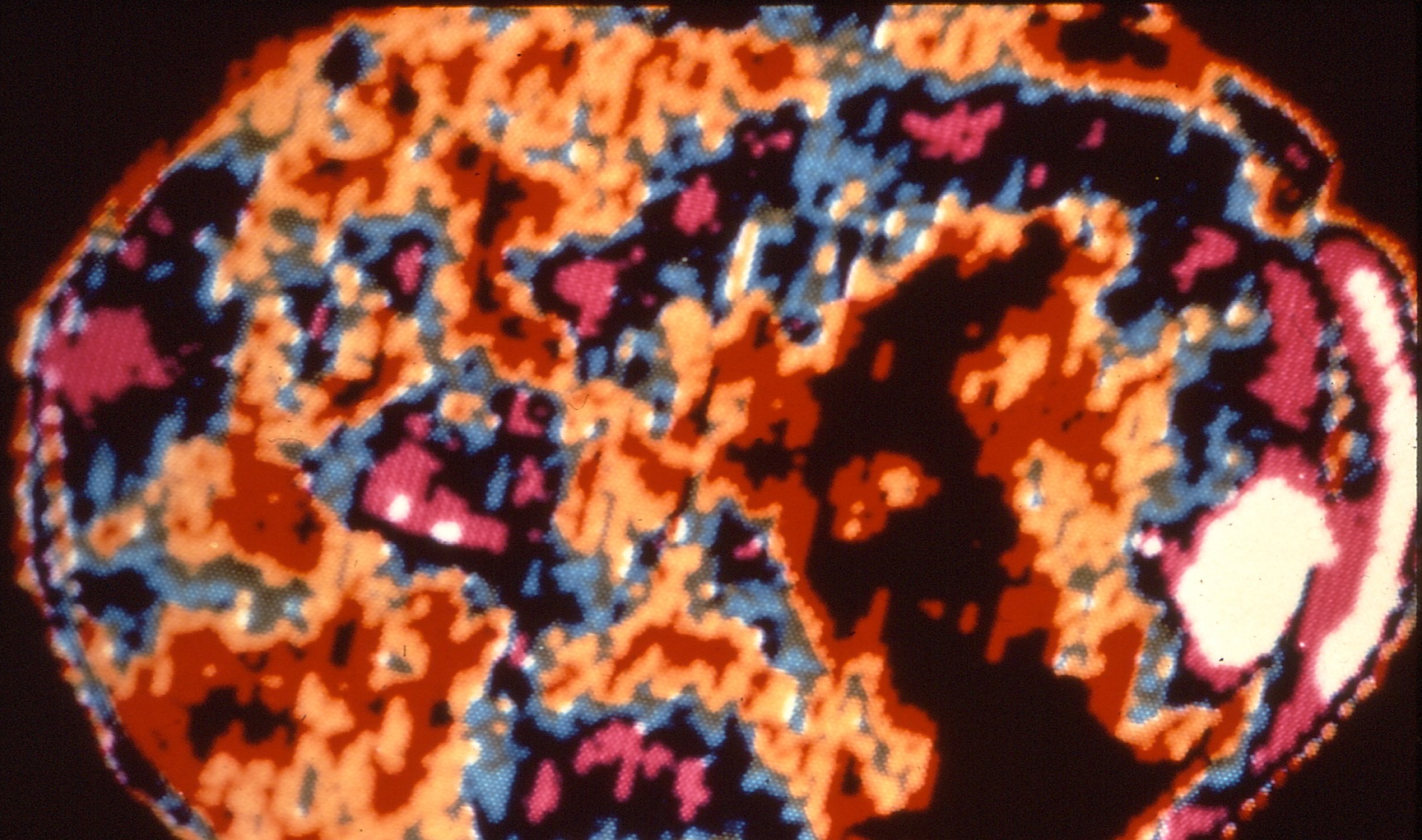


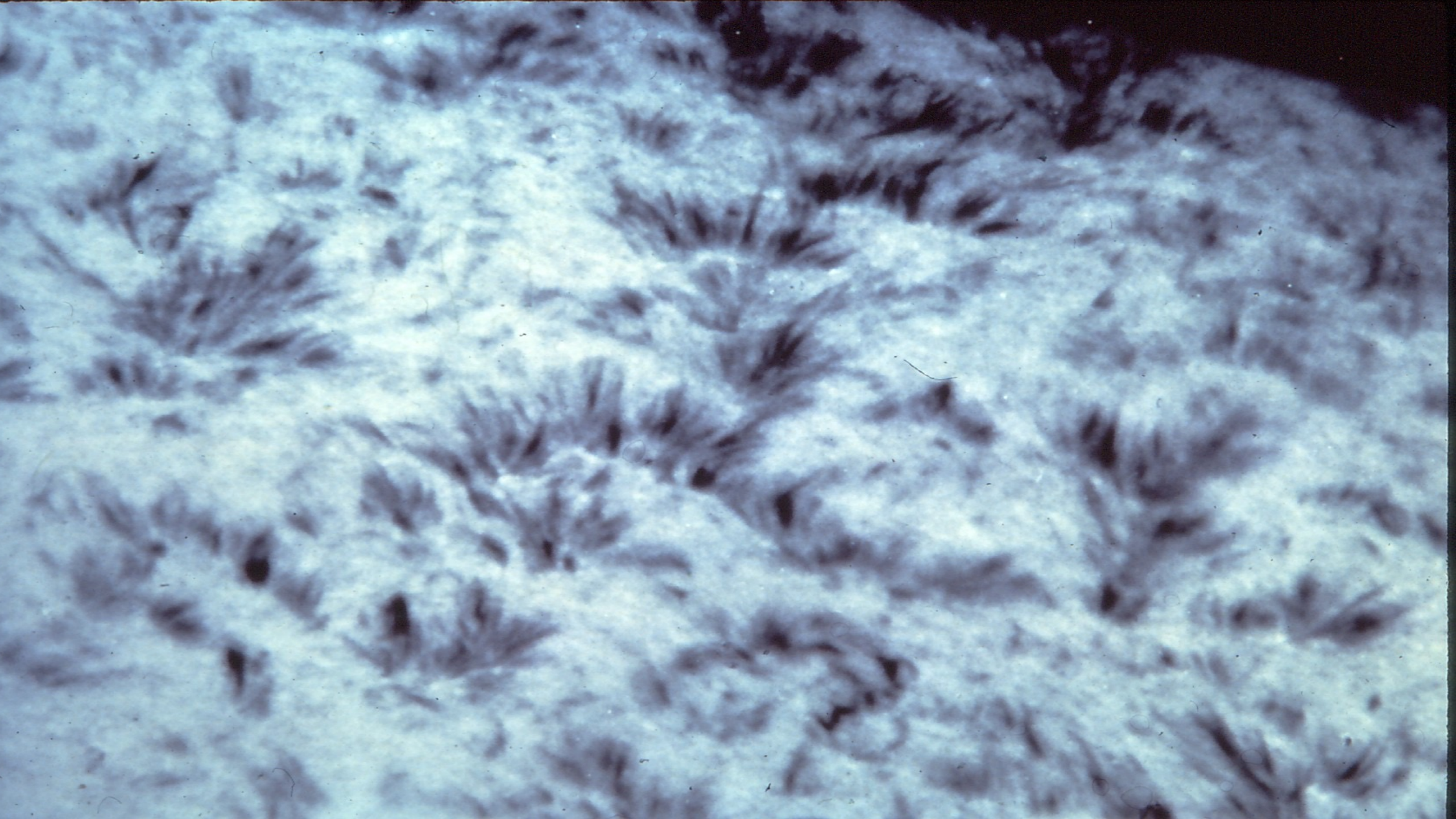
# Evolution of the Earth System

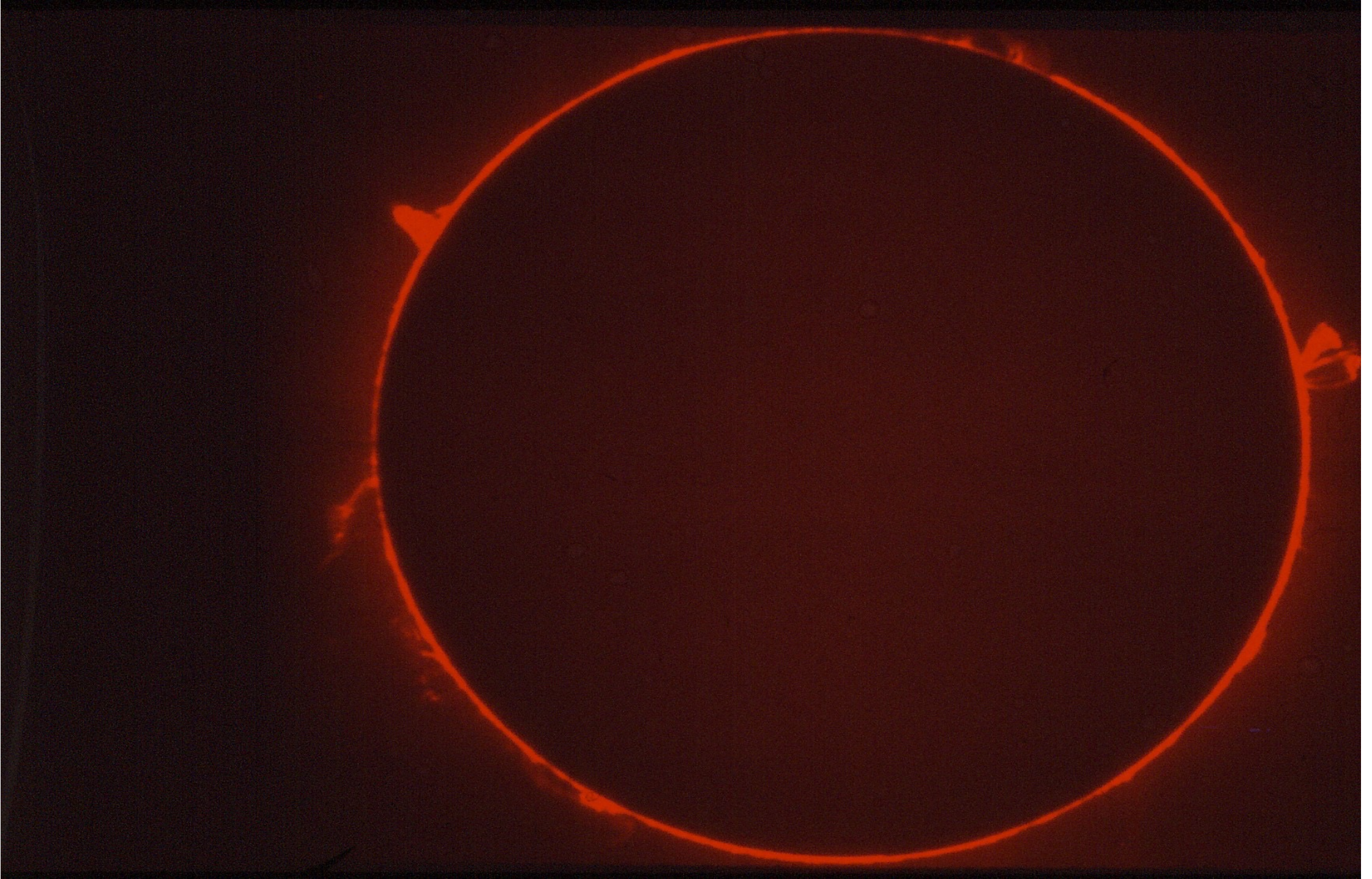
- History of the universe
- Role of the sun in the climate system
  
- Continental drift
- Volcanic emissions versus present atmospheric composition

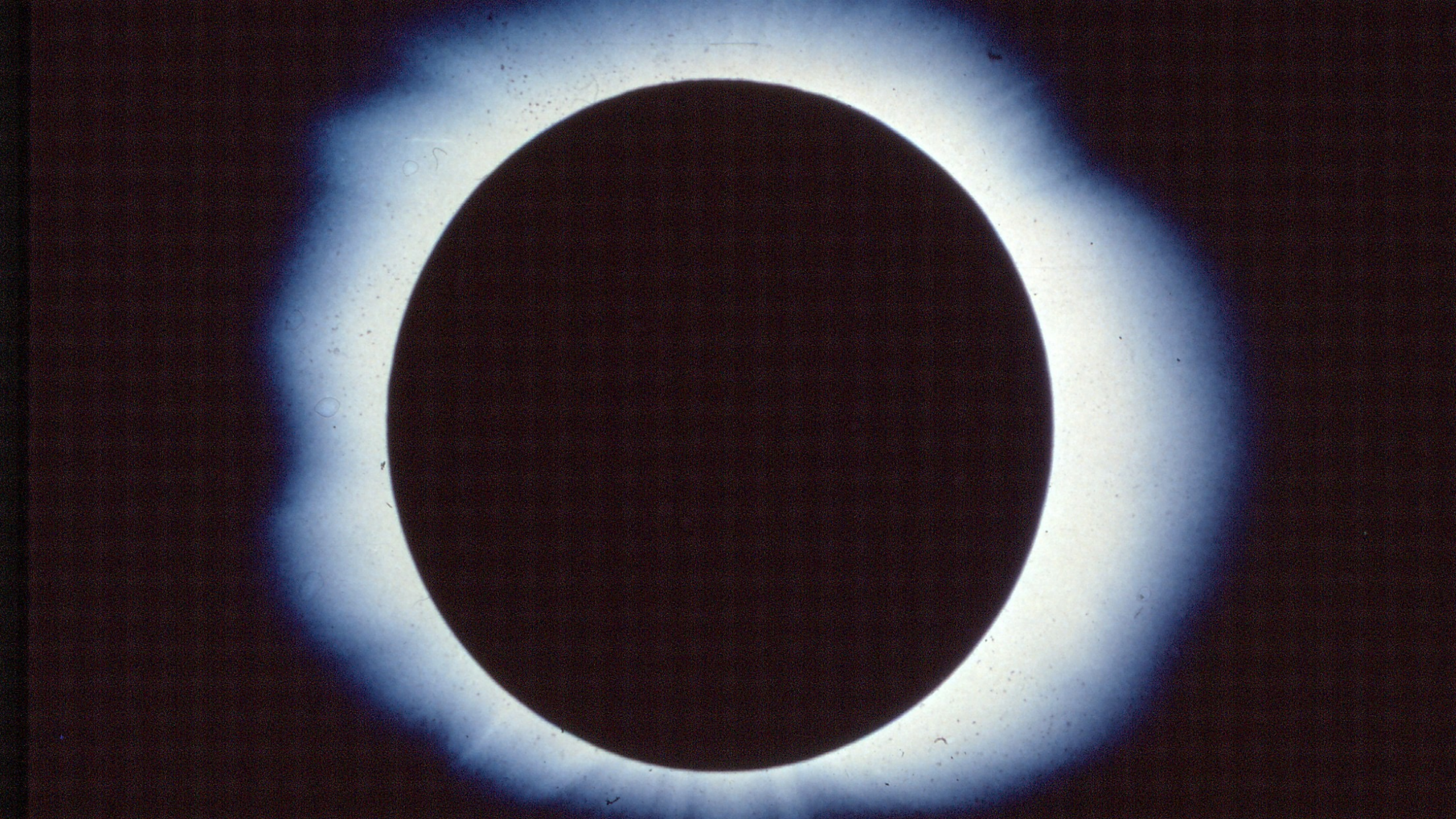


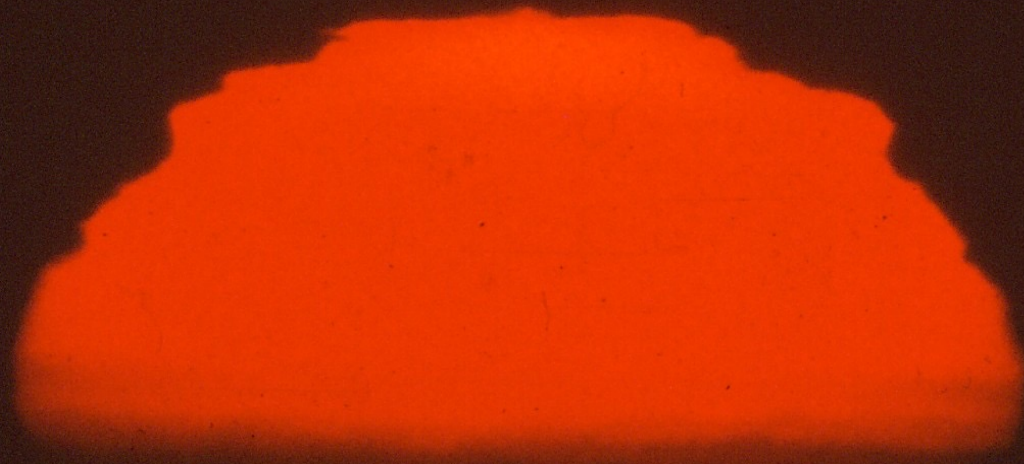










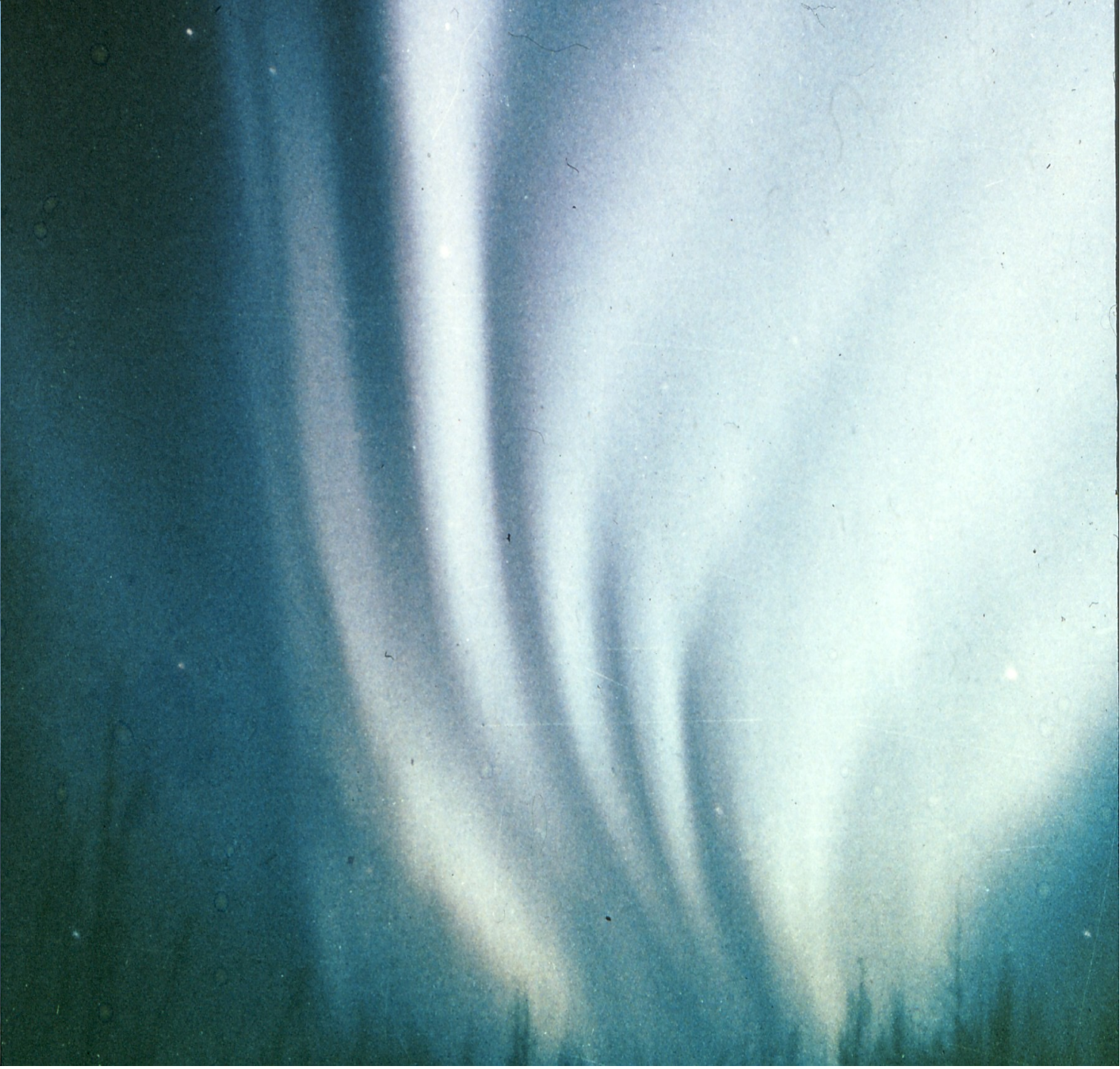


In one of nature's most elusive displays, a green flash caps the solar disk as the atmosphere scatters last light over a Norwegian woods. If predictions of extreme





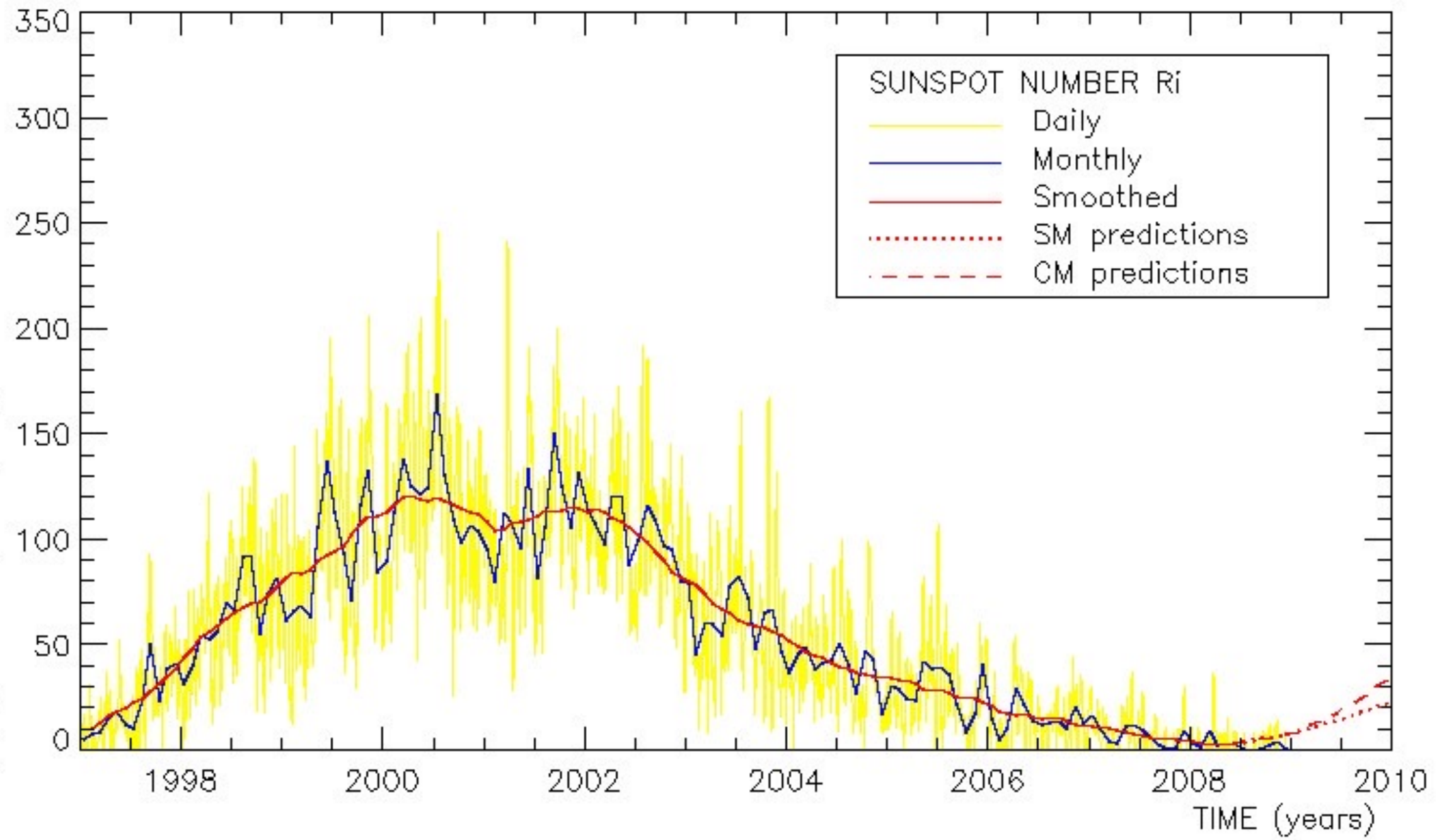


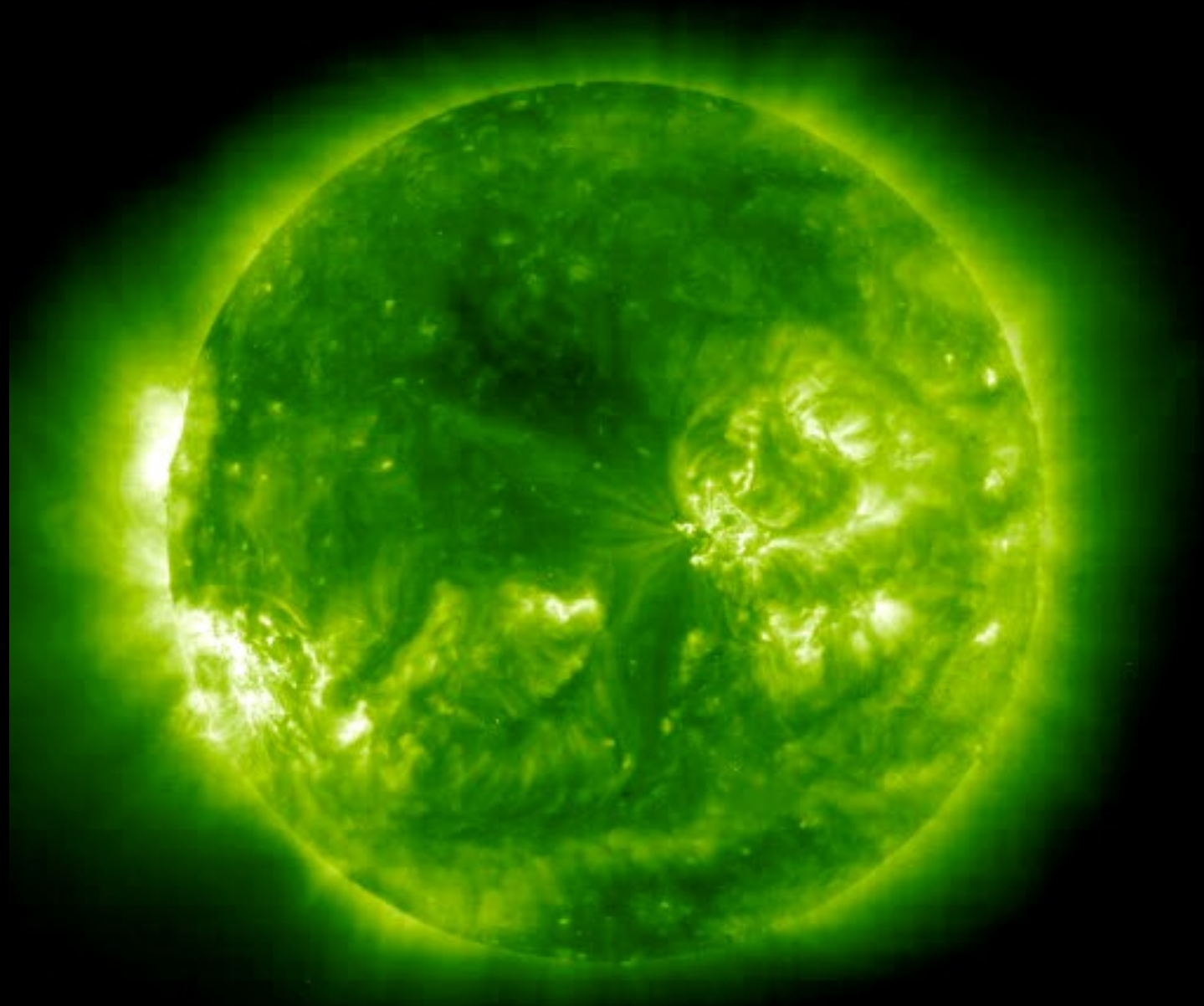




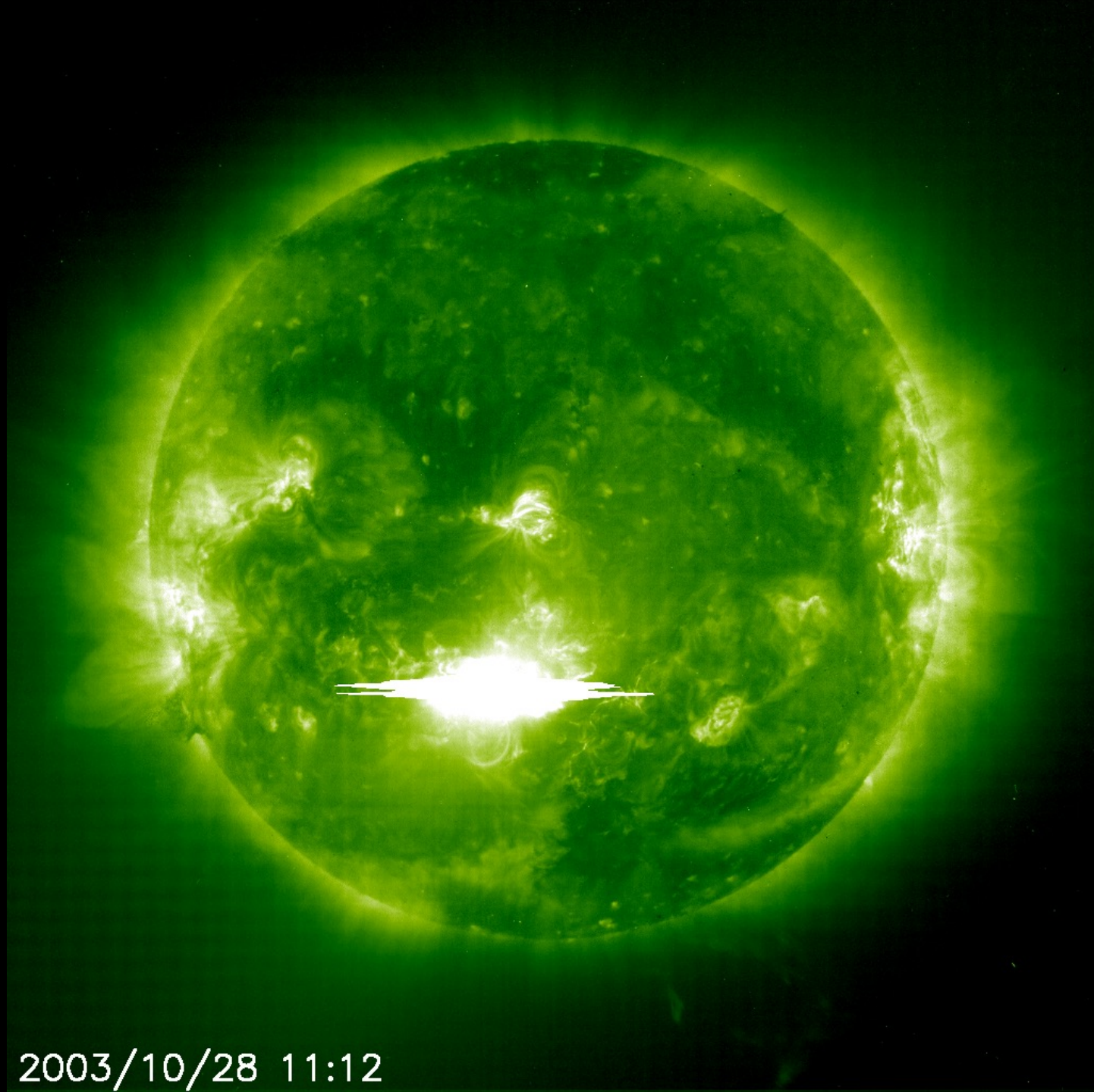


(<http://www.sidc.be>, Jan 1, 2009)





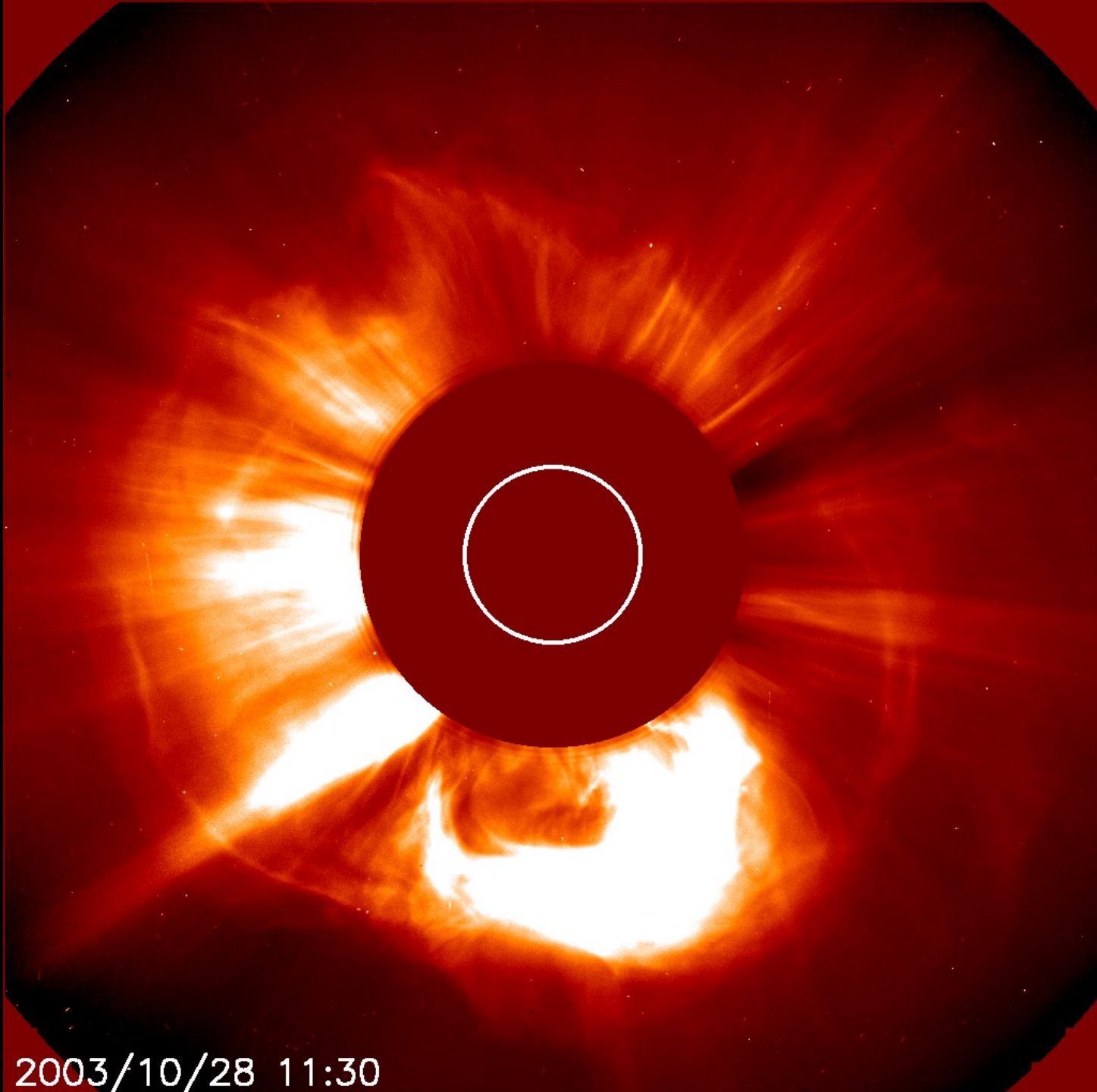
2003/10/25 01:48



SOHO  
Solar  
Heliospheric  
Observatory

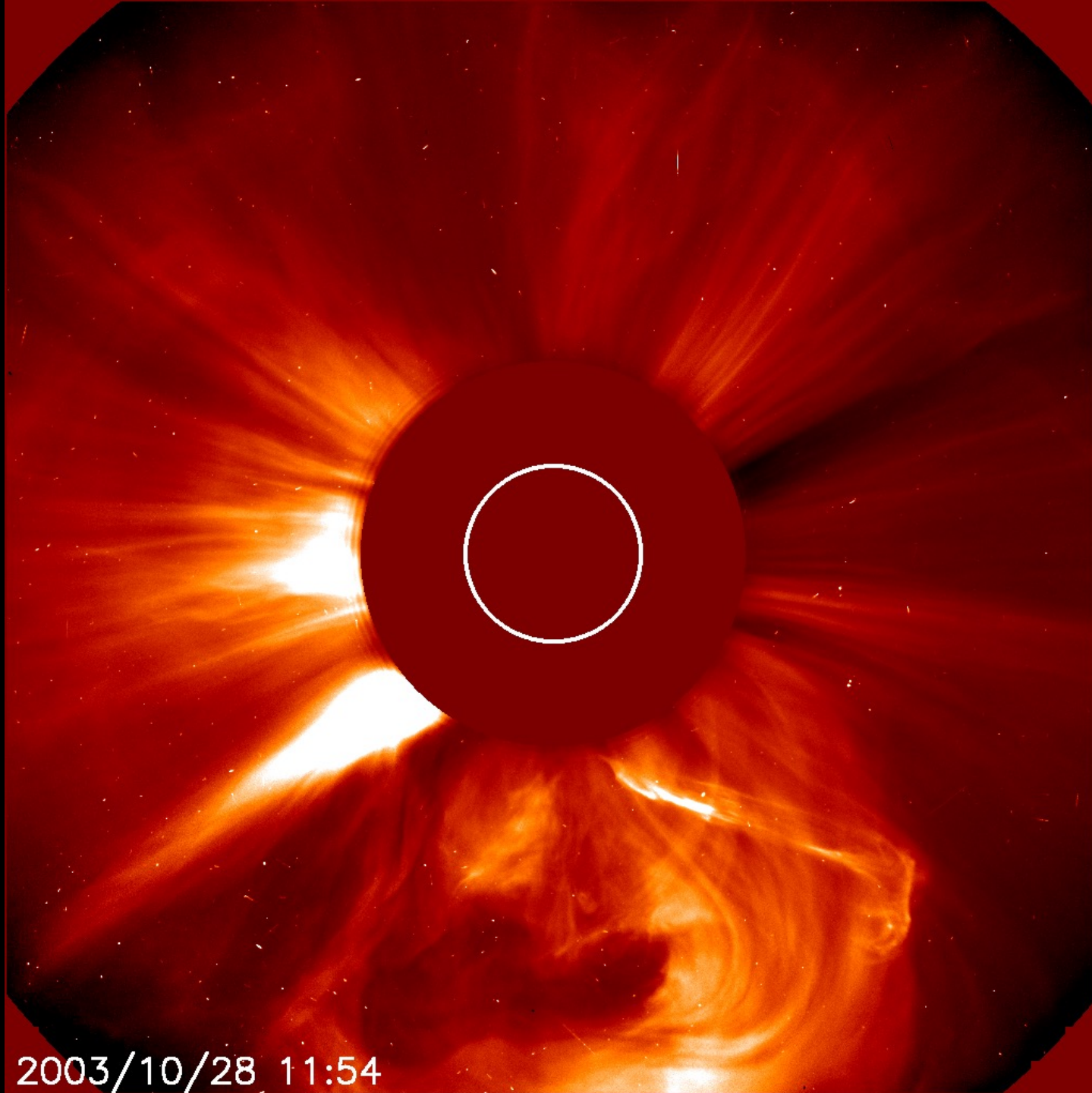
2003/10/28 11:12



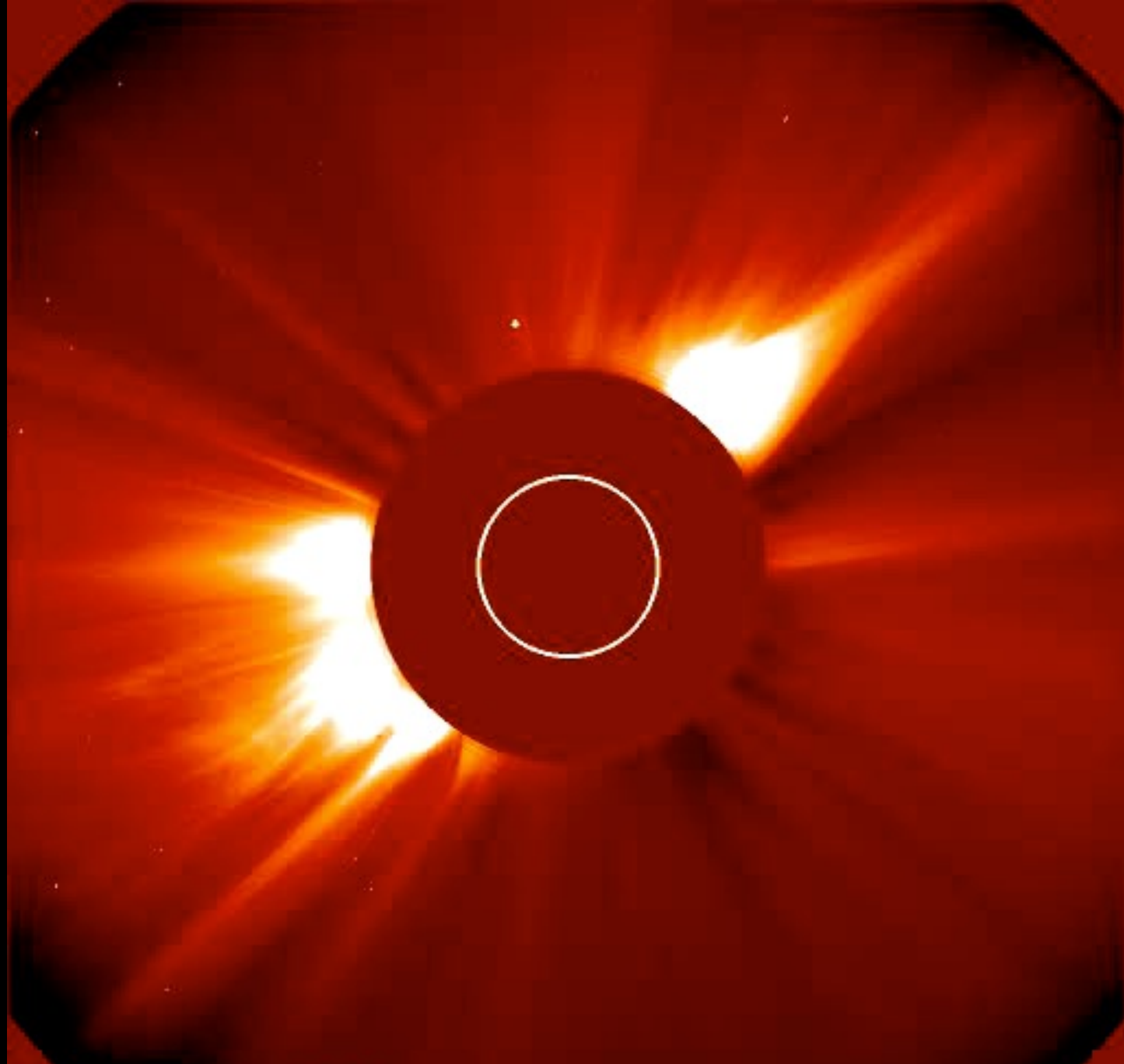


Mk4  
Mauna Loa  
Solar  
Observatory

2003/10/28 11:30



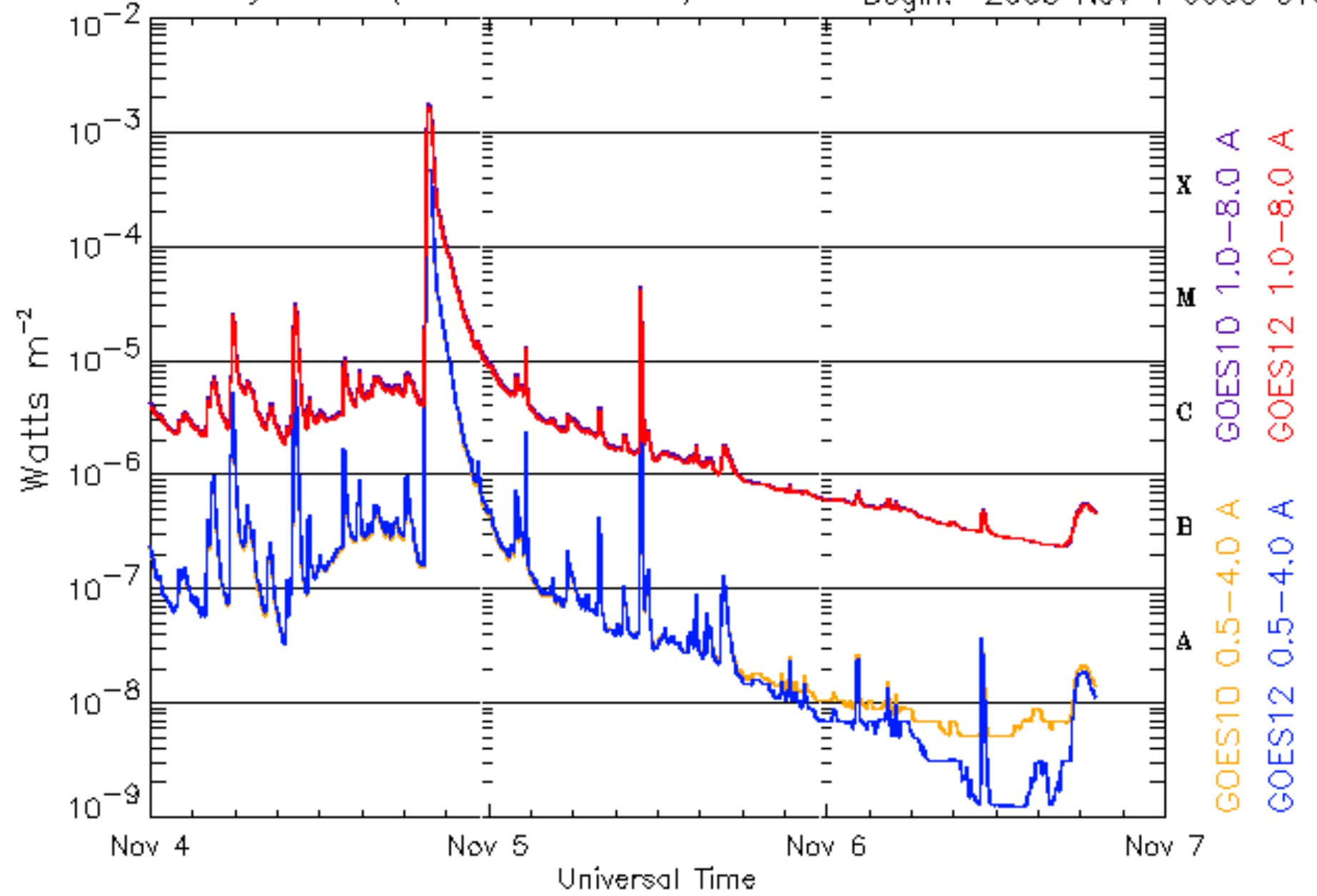
2003/10/28 11:54

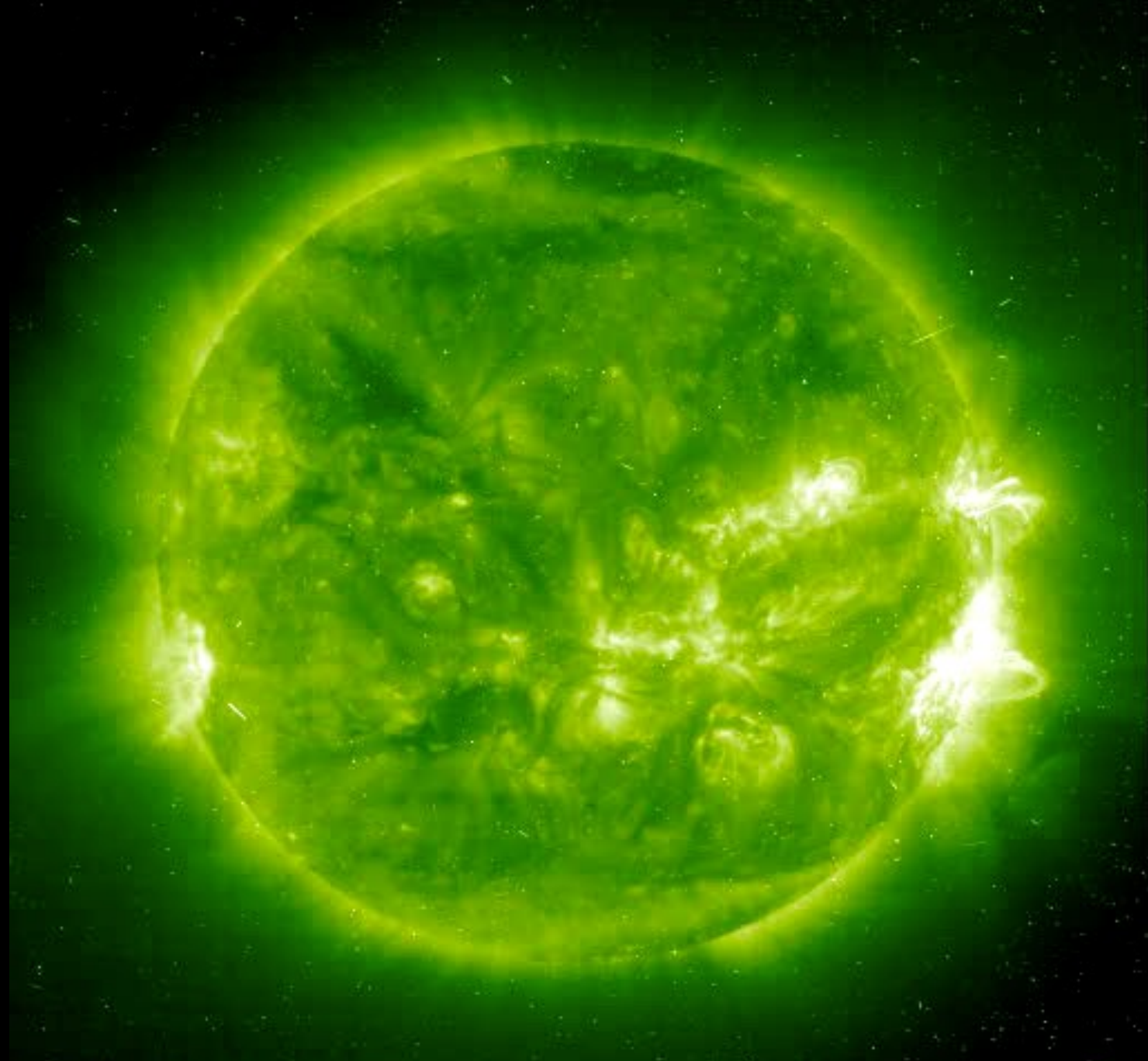


2003/10/25 00:06

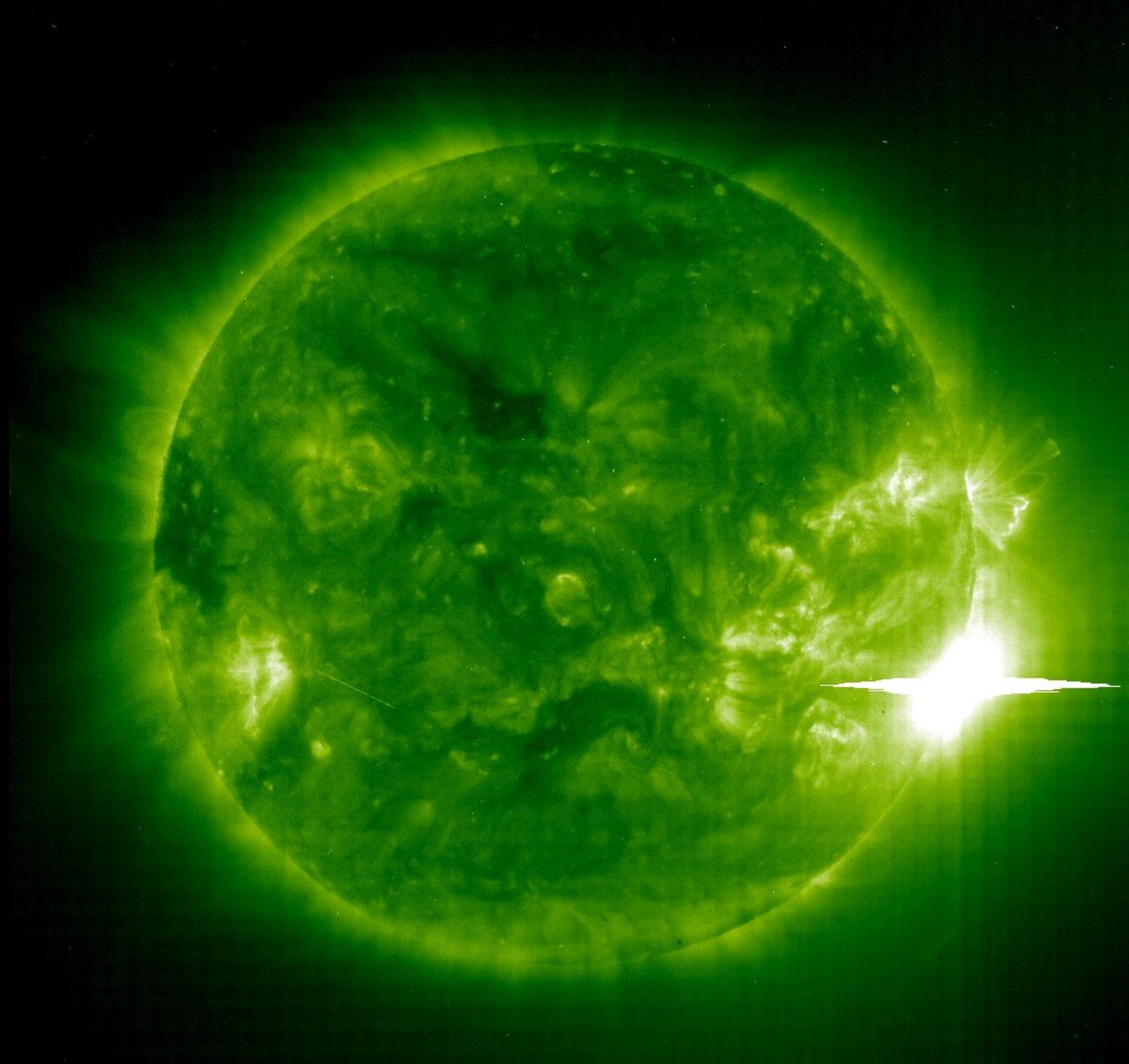
# GOES Xray Flux (5 minute data)

Begin: 2003 Nov 4 0000 UTC

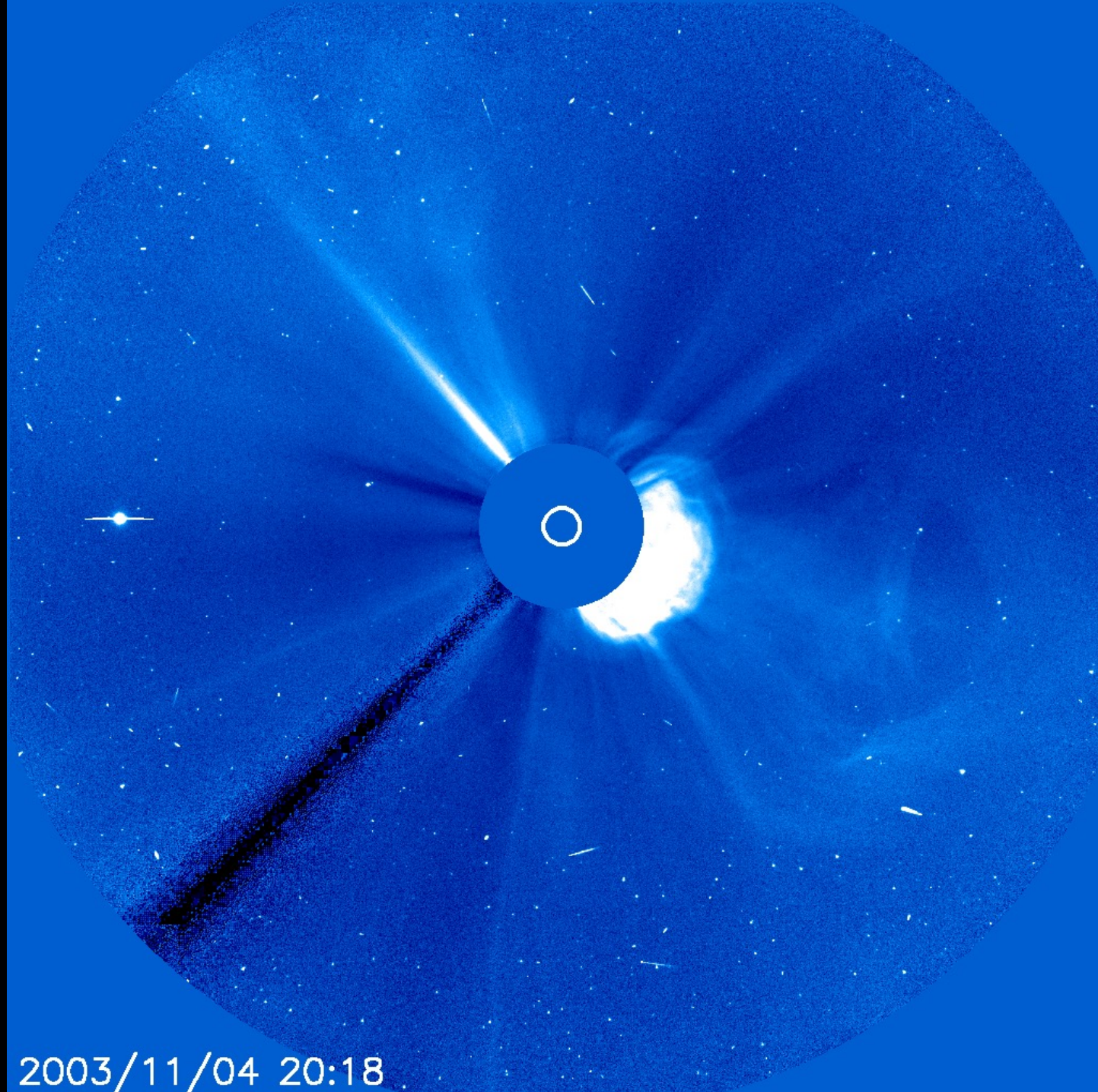




2003/11/03 09:00

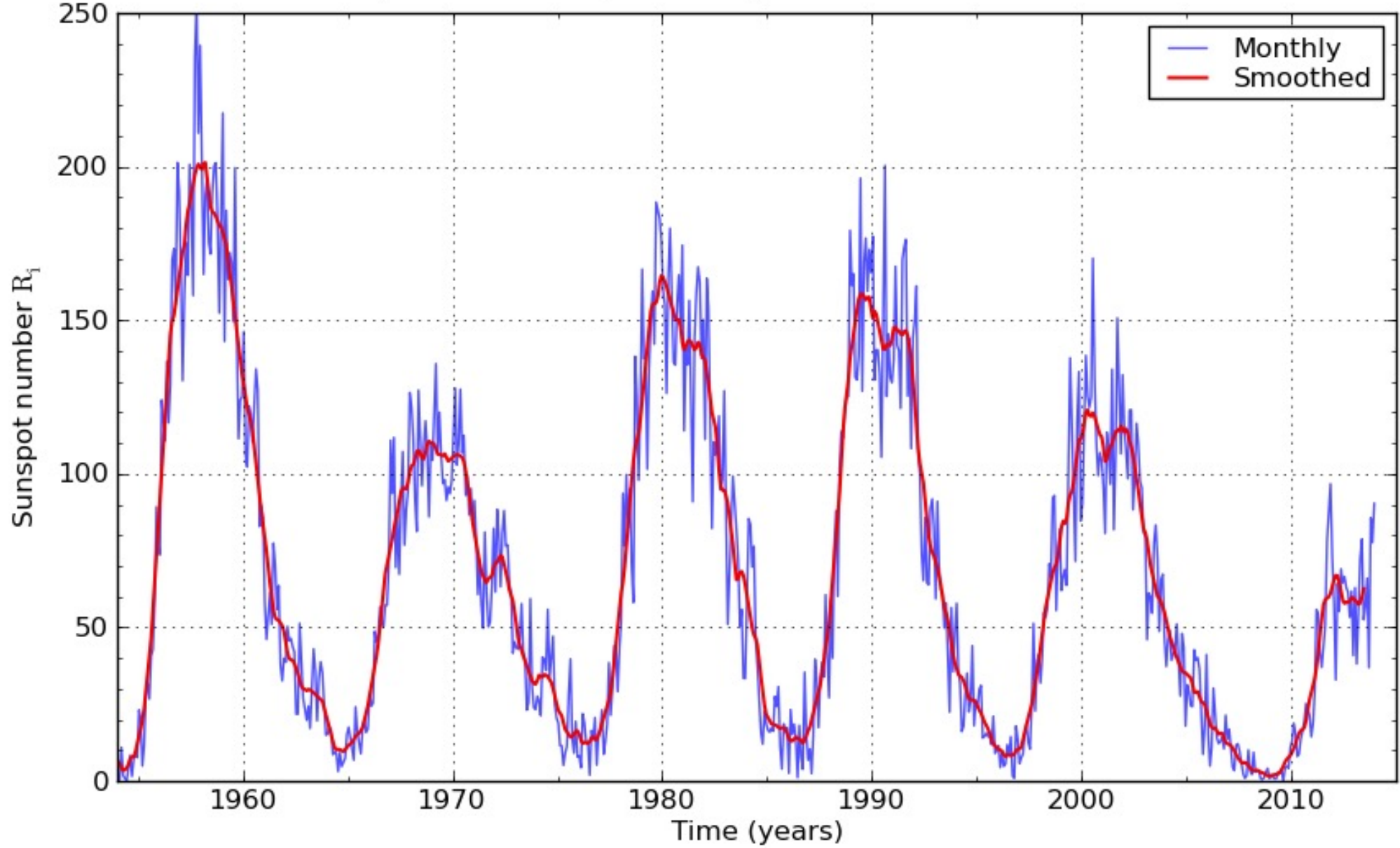


2003/11/04 19:48

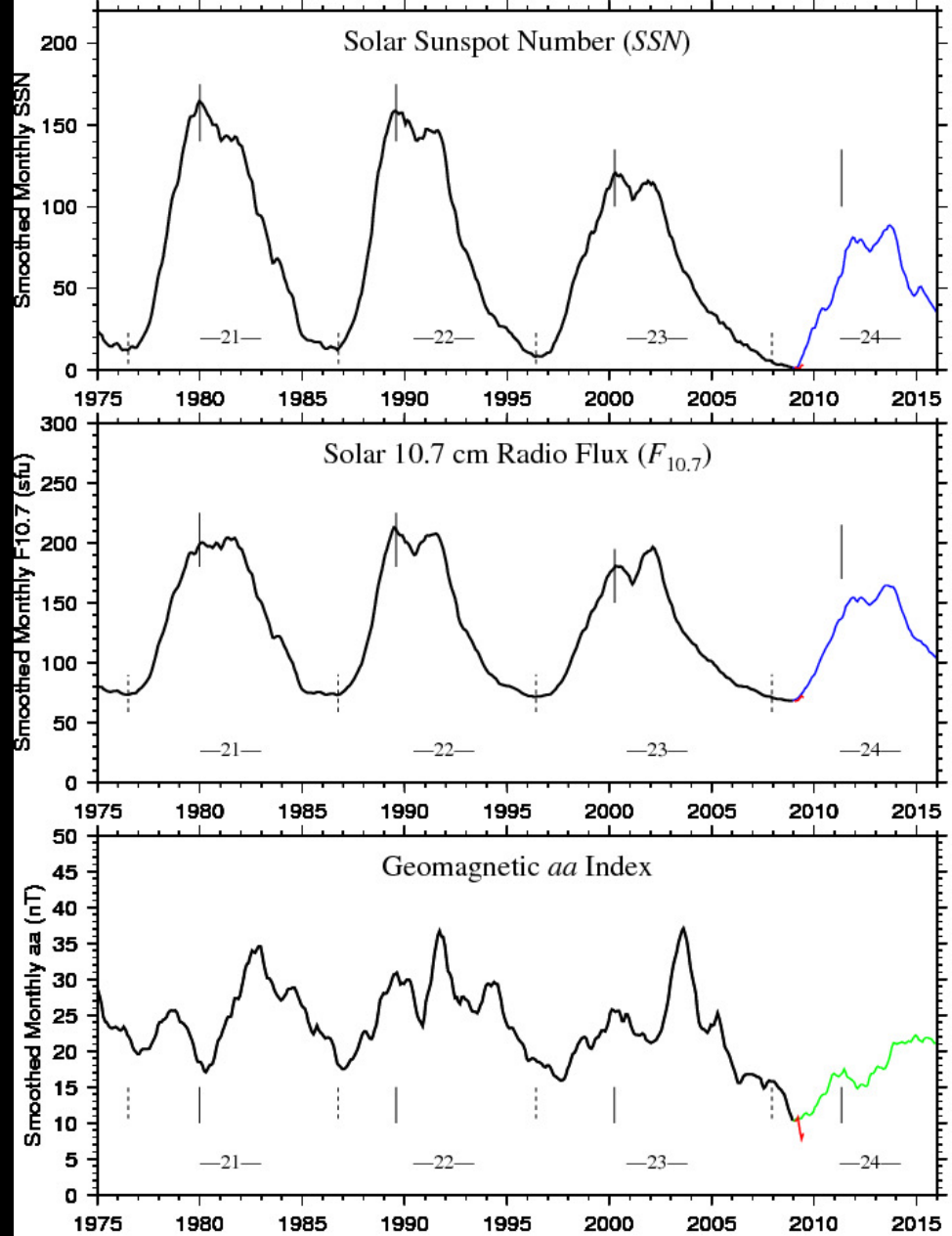


2003/11/04 20:18

International sunspot number  $R_i$ : monthly mean and 13-month smoothed number



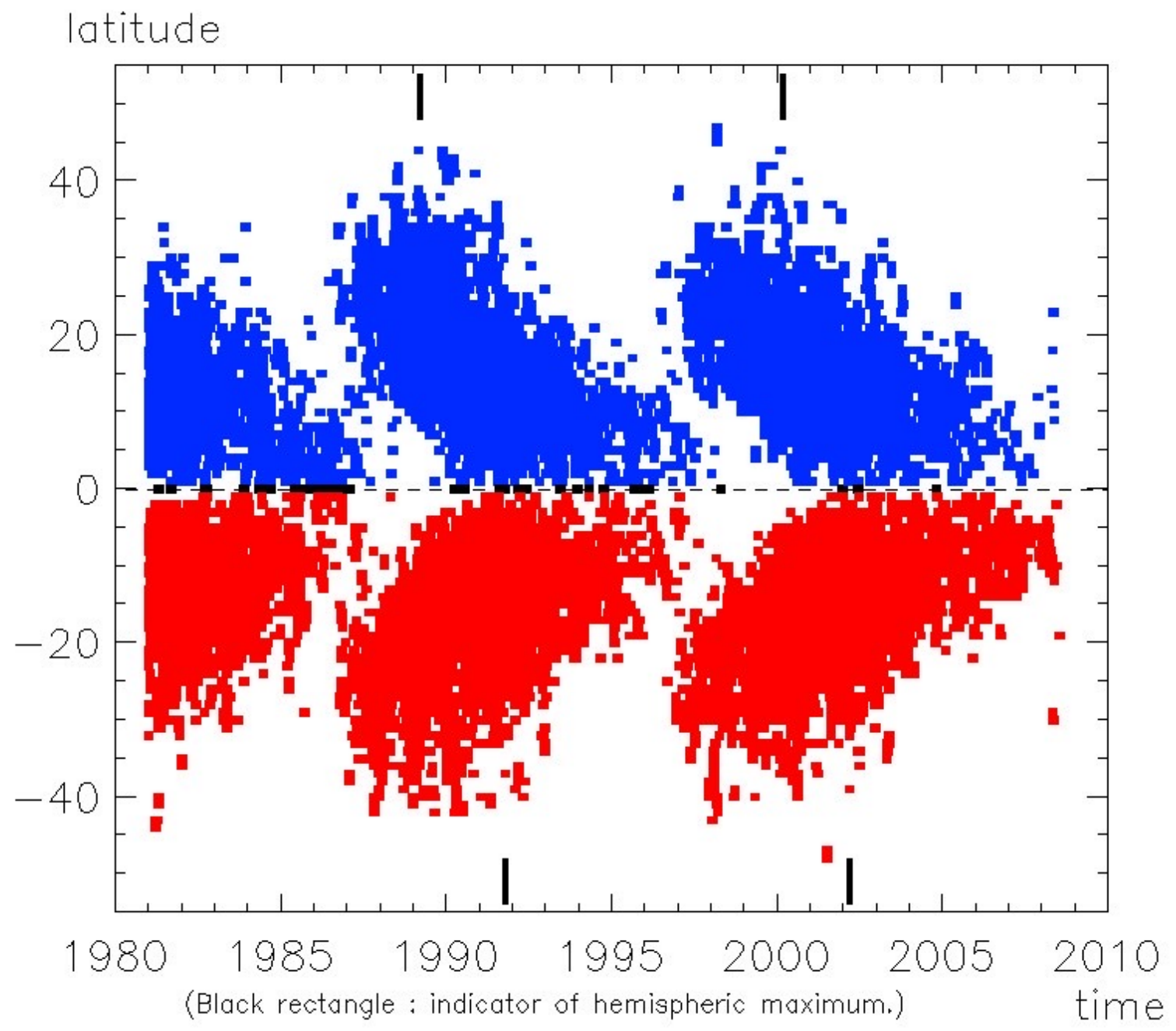




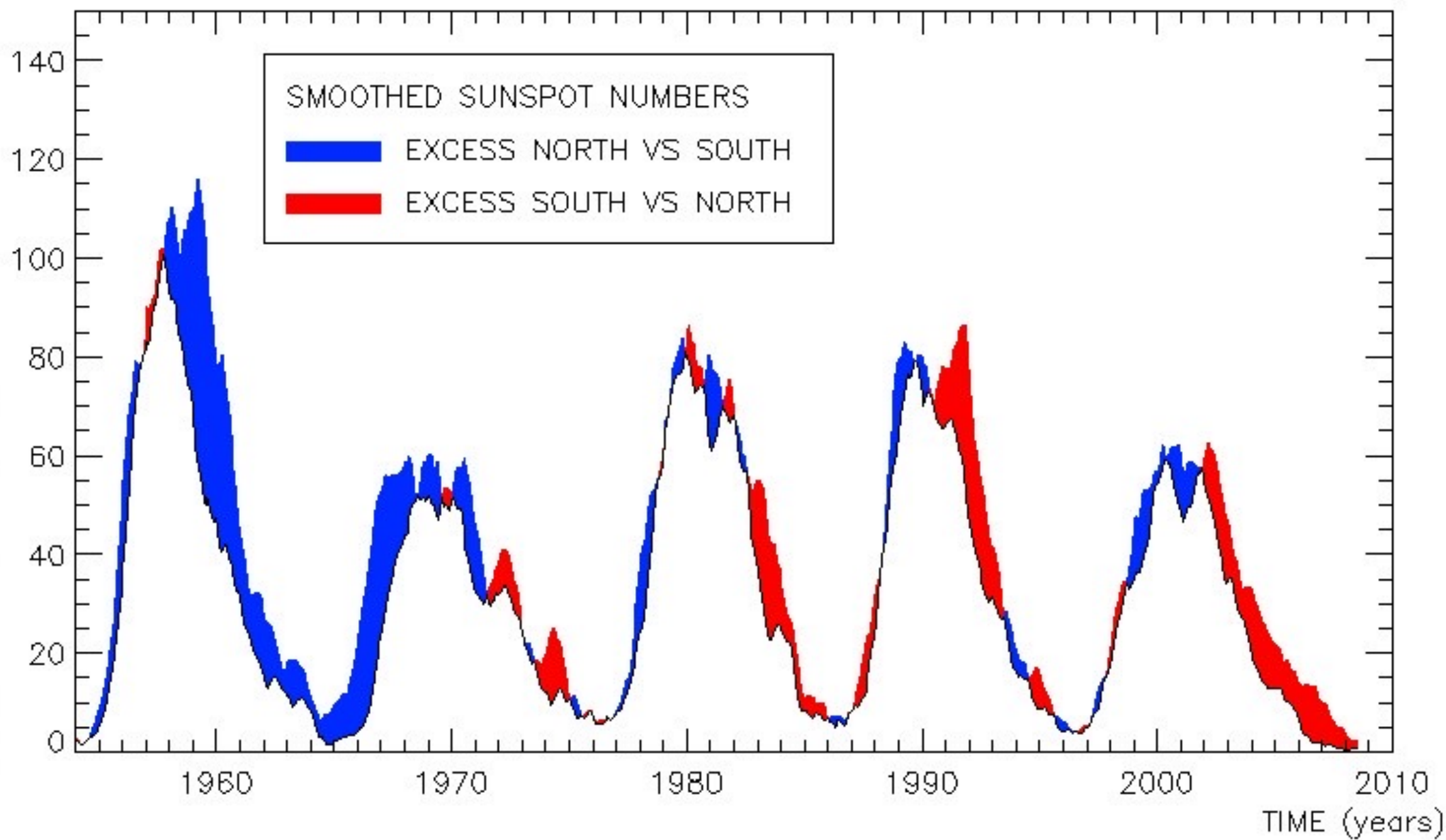
Predicted 13-Month Smoothed Solar and Geomagnetic Activity Indices

BGS Predictions Use A Modified McNish-Lincoln Method Based on Activity Cycles Since Cycle 12 (Green) or 18 (Blue)  
 Black Indicates Smoothed Monthly Data and Red Indicates Last 6 Months of Unsmoothed Monthly Averages  
 Solar Cycles are Numbered and Sunspot Maxima and Minima are Marked by Vertical Solid and Dashed Lines

(<http://www.sidc.be>, Jan 1, 2009)

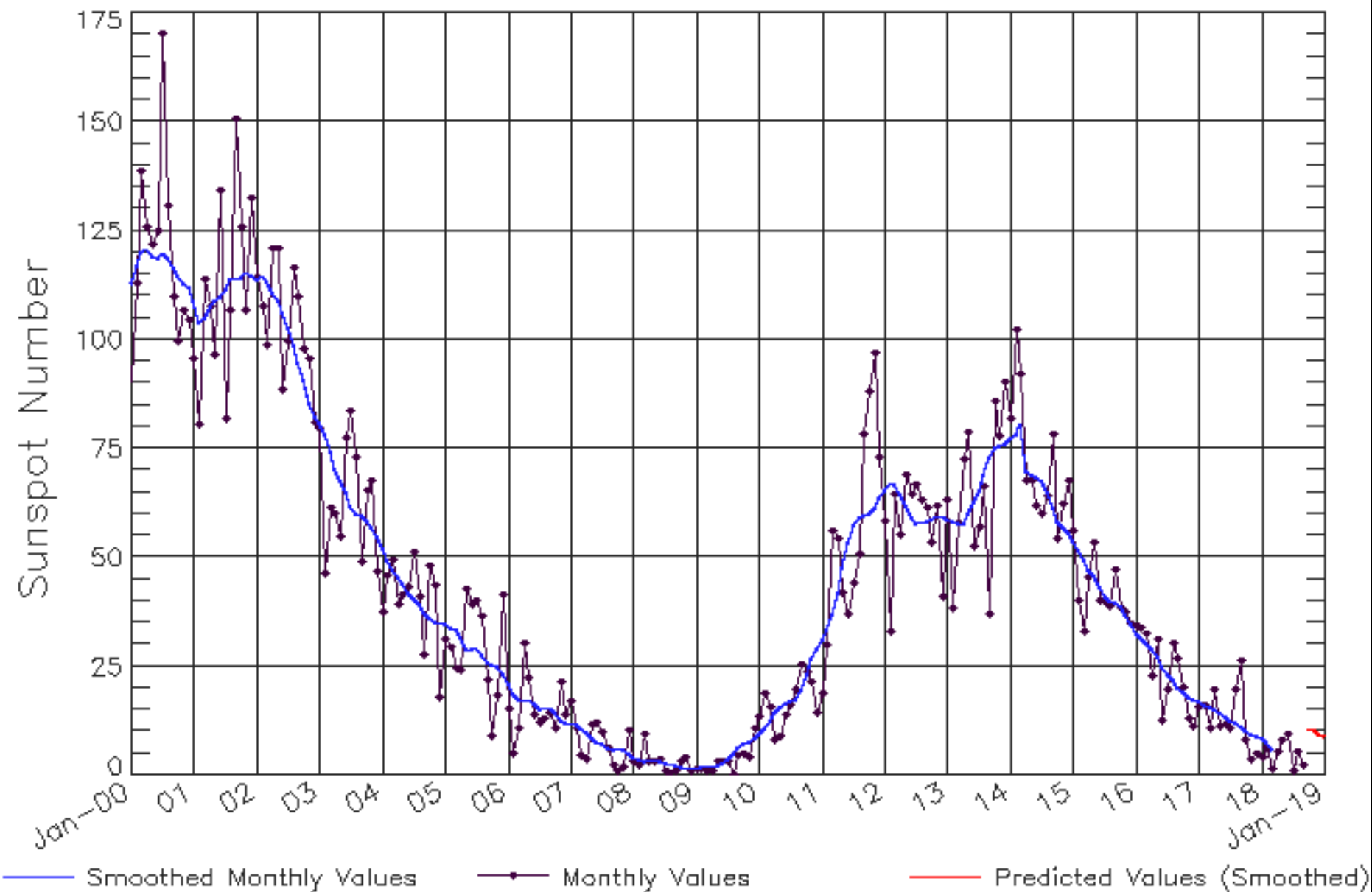


(<http://www.sidc.be>, Jan 1, 2009)

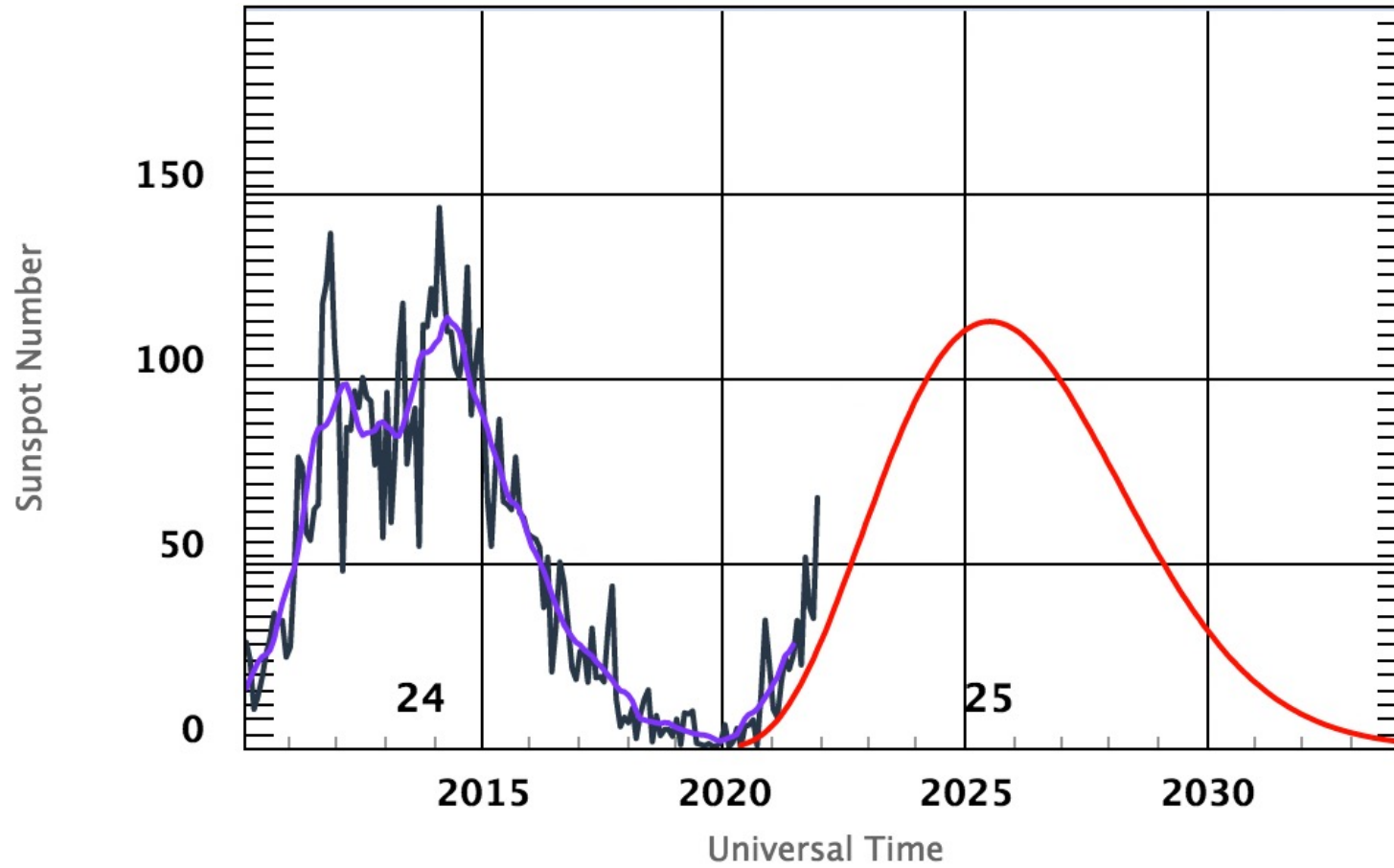


# ISES Solar Cycle Sunspot Number Progression

Observed data through Sep 2018



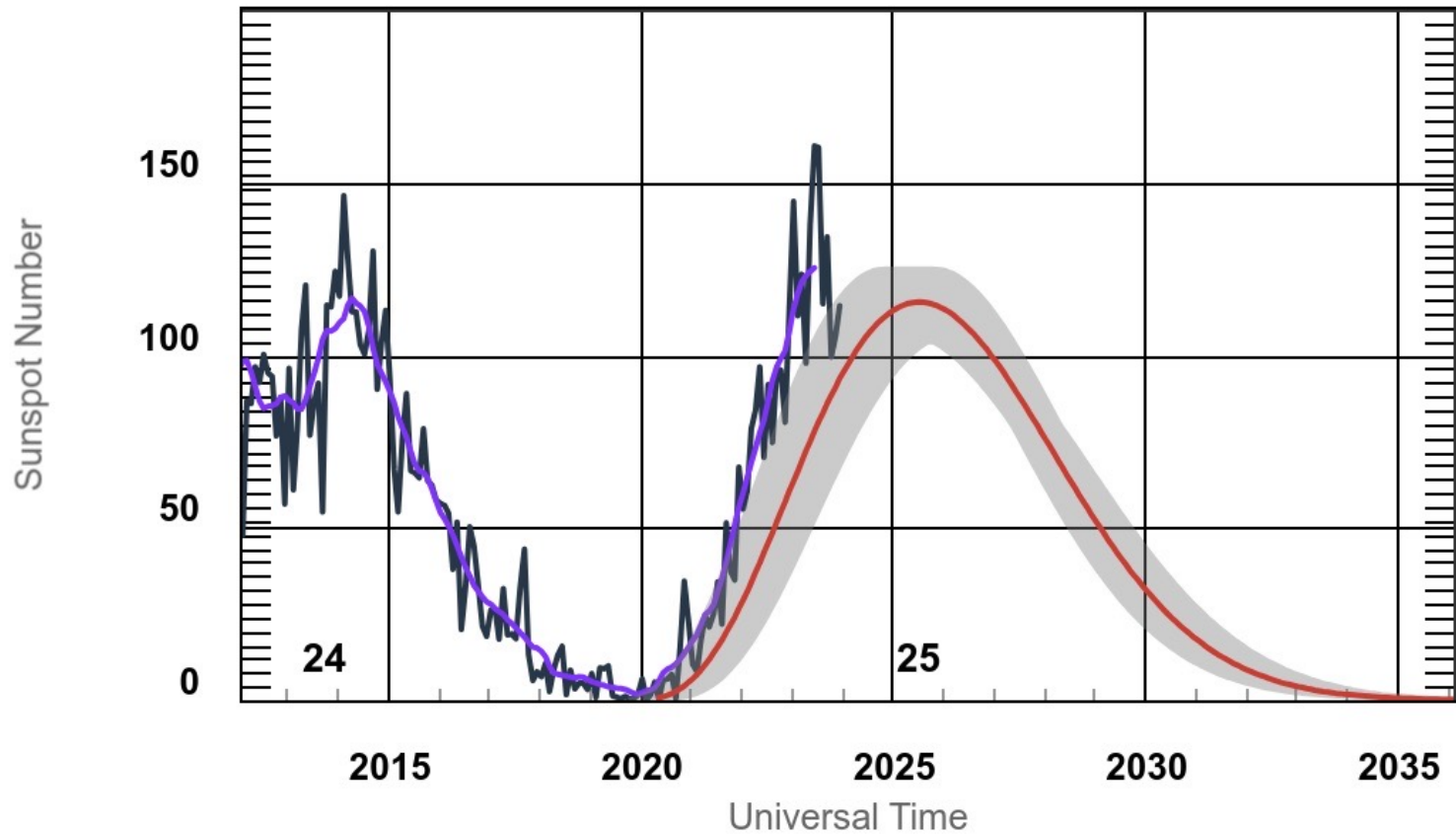
# ISES Solar Cycle Sunspot Number Progression



◆ Monthly Values    — Smoothed Monthly Values    — Predicted Values  
Space Weather Prediction Center

# ISES Solar Cycle Sunspot Number Progression

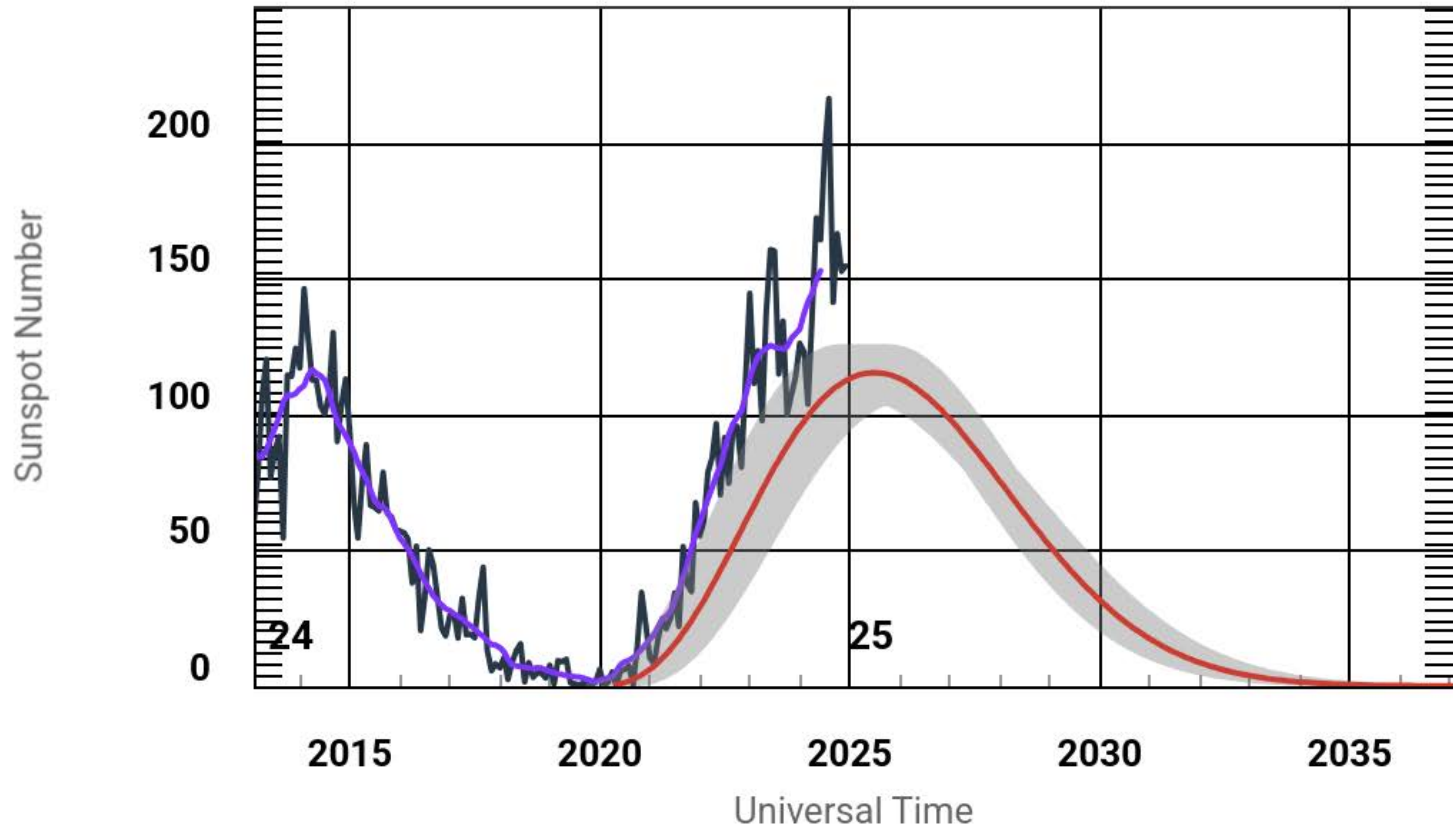
Zoom:



- ◆ Monthly Values
- Smoothed Monthly Values
- Predicted Values
- Predicted Range

# ISES Solar Cycle Sunspot Number Progression

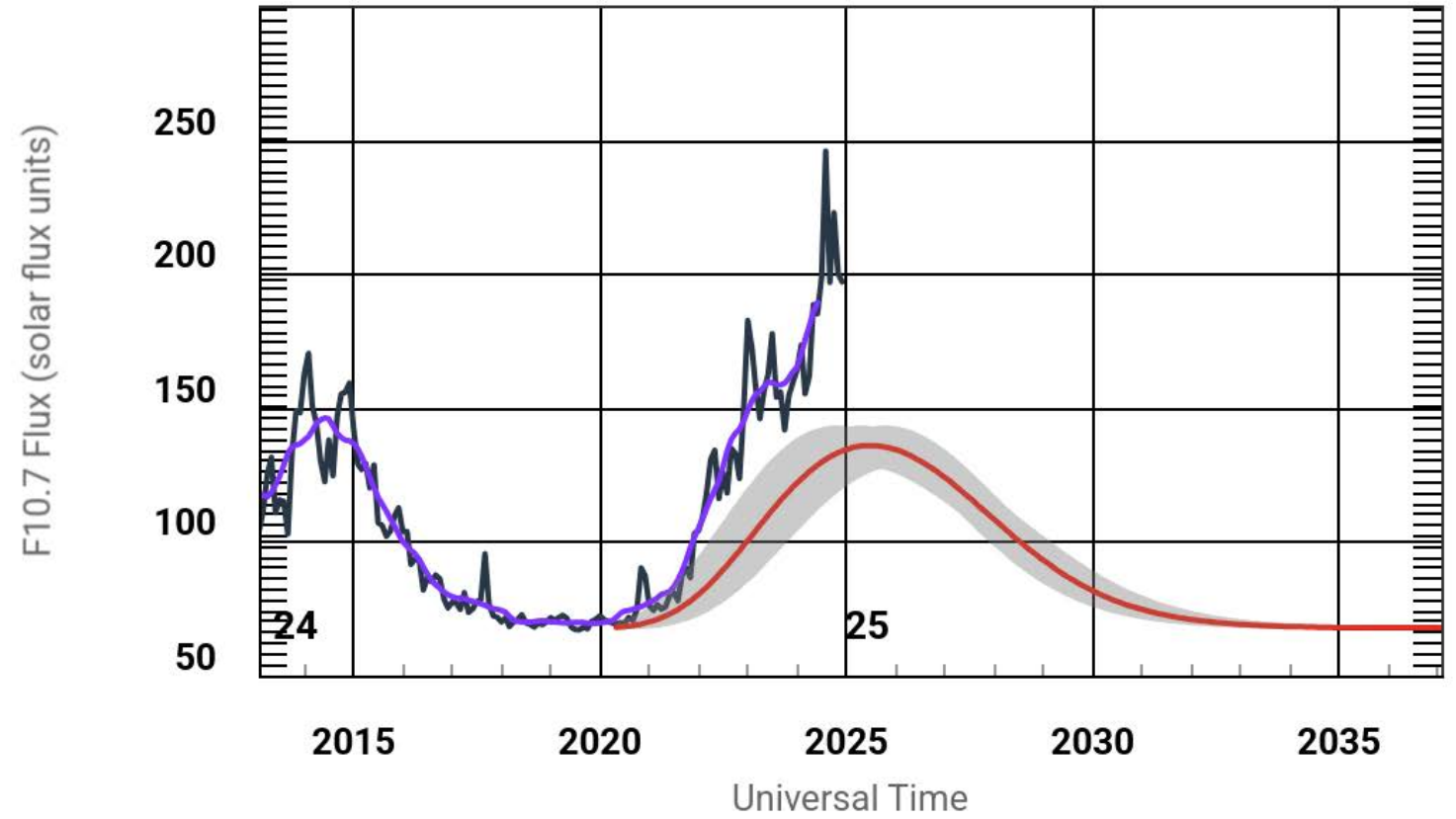
Zoom:



- ◆ Monthly Values
- Smoothed Monthly Values
- Predicted Values
- Predicted Range

# ISES Solar Cycle F10.7cm Radio Flux Progression

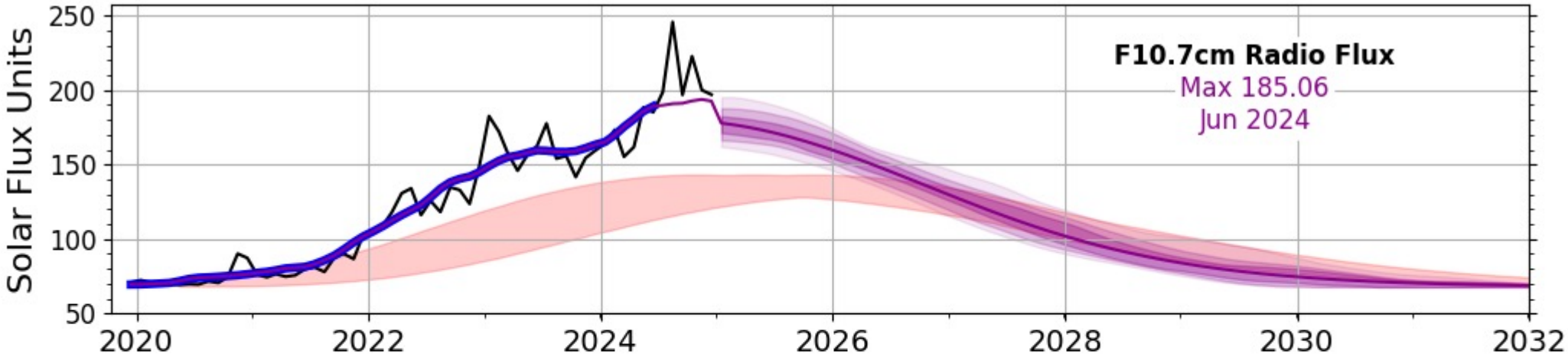
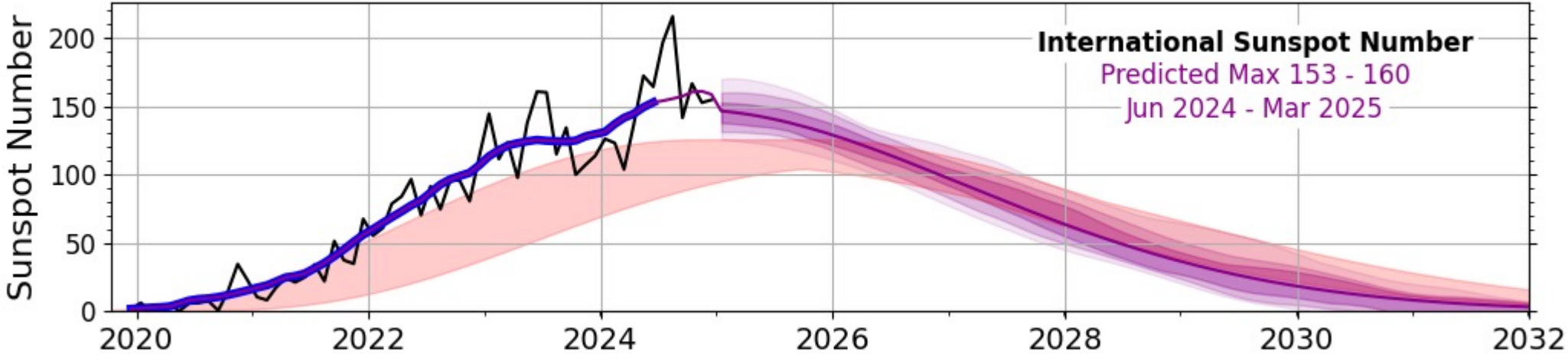
Zoom:



- ◆ Monthly Values
- ◆ Smoothed Monthly Values
- Predicted Values
- Predicted F10.7 Range



# Experimental Solar Cycle 25 Prediction



Years



Space Weather Prediction Testbed  
issued 2 Jan 2025

- Monthly observations
- Smoothed monthly observations
- 2019 NOAA/NASA/ISES Panel Prediction (range)

- Experimental Prediction
- 25% quartile
- 50% quartile
- 75% quartile

