

# *Het weer in de ruimte*

*D. Berghmans  
Koninklijke Sterrenwacht van België*



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# Delays on the railways could be caused by solar storms, say scientists

Researchers from Lancaster University said a storm could affect electrical circuits and change signals from red to green.

Genevieve Holl-Allen • Wednesday 13 July 2022 19:37



Solar storms could potentially change railway signals from red to green, scientists say (Chris Radbourn/PA) (PA Archive)



# Delays on the railways could be caused by solar storms, say scientists

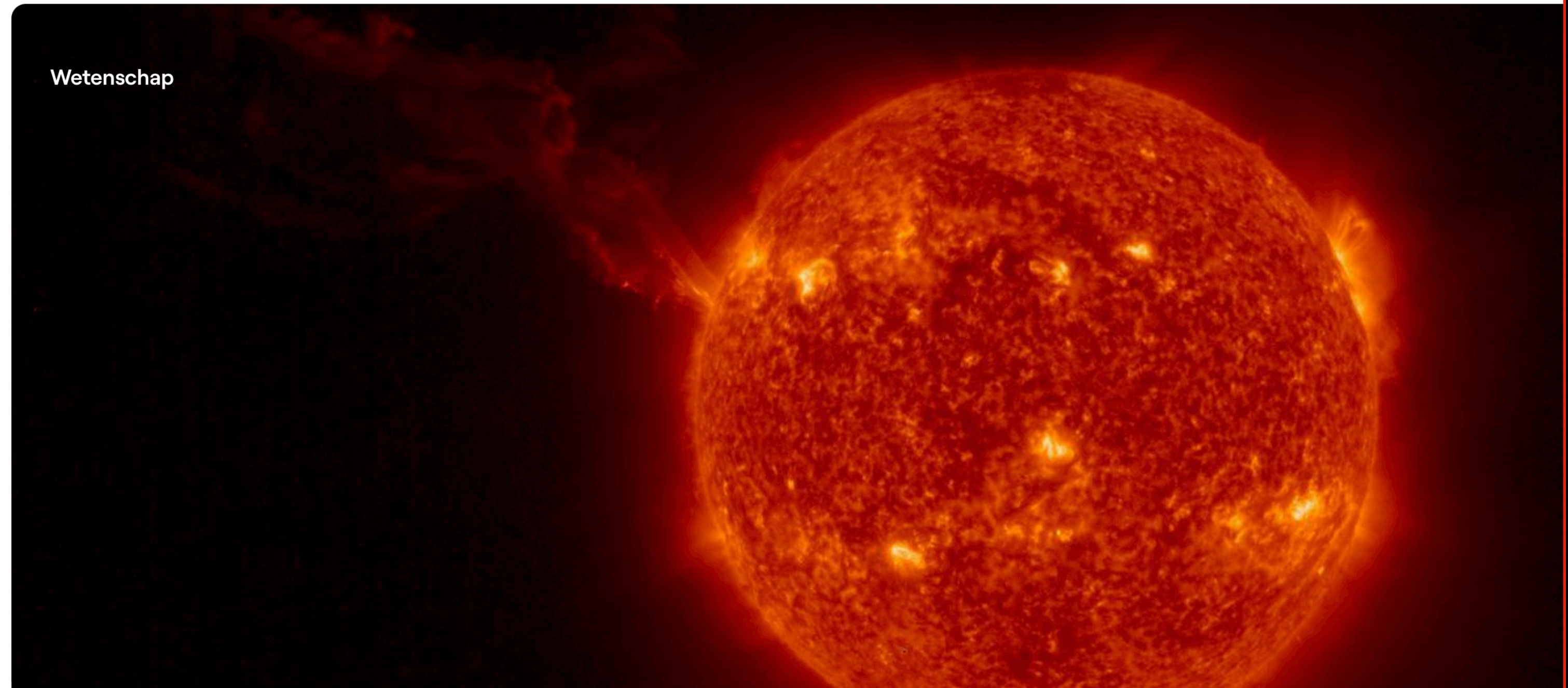
Researchers from Lancaster University said a storm could affect electricity from red to green.

Genevieve Holl-Allen • Wednesday 13 July 2022 19:37



Solar storms could potentially change railway signals from red to green, scientists say (Chris Radbourn/PA)

Wetenschap



Grote uitbarsting op de zon begin dit jaar

## Hevig ruimteweer kan vandaag navigatie en communicatie verstoren: "Gaan we komende jaren wel meer zien"

De aarde wordt vandaag mogelijk getroffen door een matige tot zelfs sterke geomagnetische storm. Hierdoor kunnen navigatie- en communicatiemiddelen verstoord raken. "We gaan de komende jaren meer dergelijke stormen zien", zegt professor in de plasma-astrofysica Stefaan Poedts (KU Leuven) in "De ochtend" op Radio 1.

Pieterjan Huyghebaert

do 18 aug 10:10



# Delays on caused by

Researchers from Lanca  
from red to green.

Genevieve Holl-Allen • Wedn



Solar storms could potentially chang

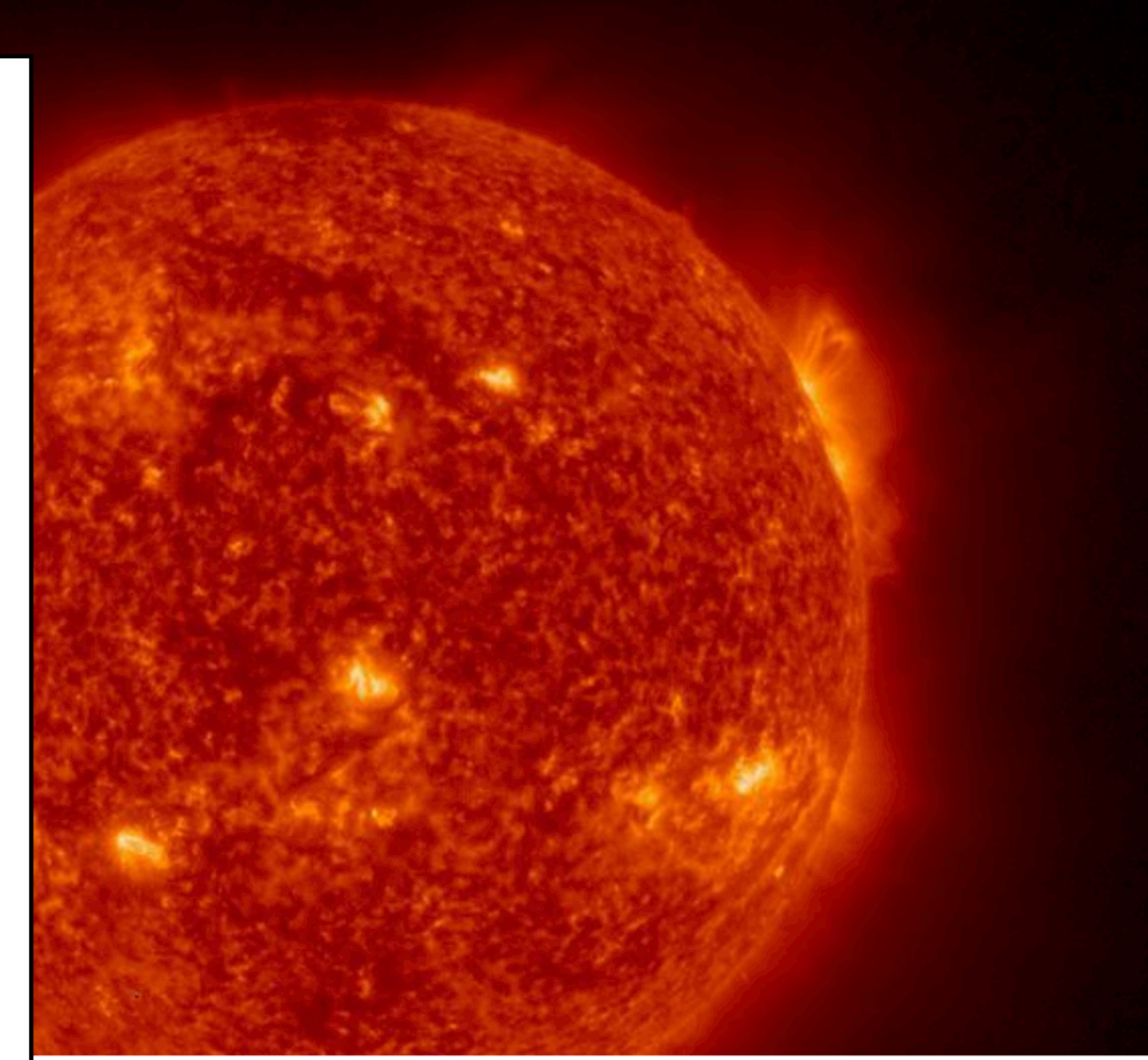
SPACE

## The computer errors from outer space



By Chris Baraniuk 12th October 2022

The Earth is subjected to a hail of subatomic particles from the Sun and beyond our solar system which could be the cause of glitches that afflict our phones and computers. And the risk is growing as microchip



## laag navigatie en Gaan we komende jaren wel

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Wed, Oct 12, 2022

# Newsweek

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## TECH & SCIENCE

# 'Destruction Event' From Sun Annihilated Dozens of SpaceX Satellites

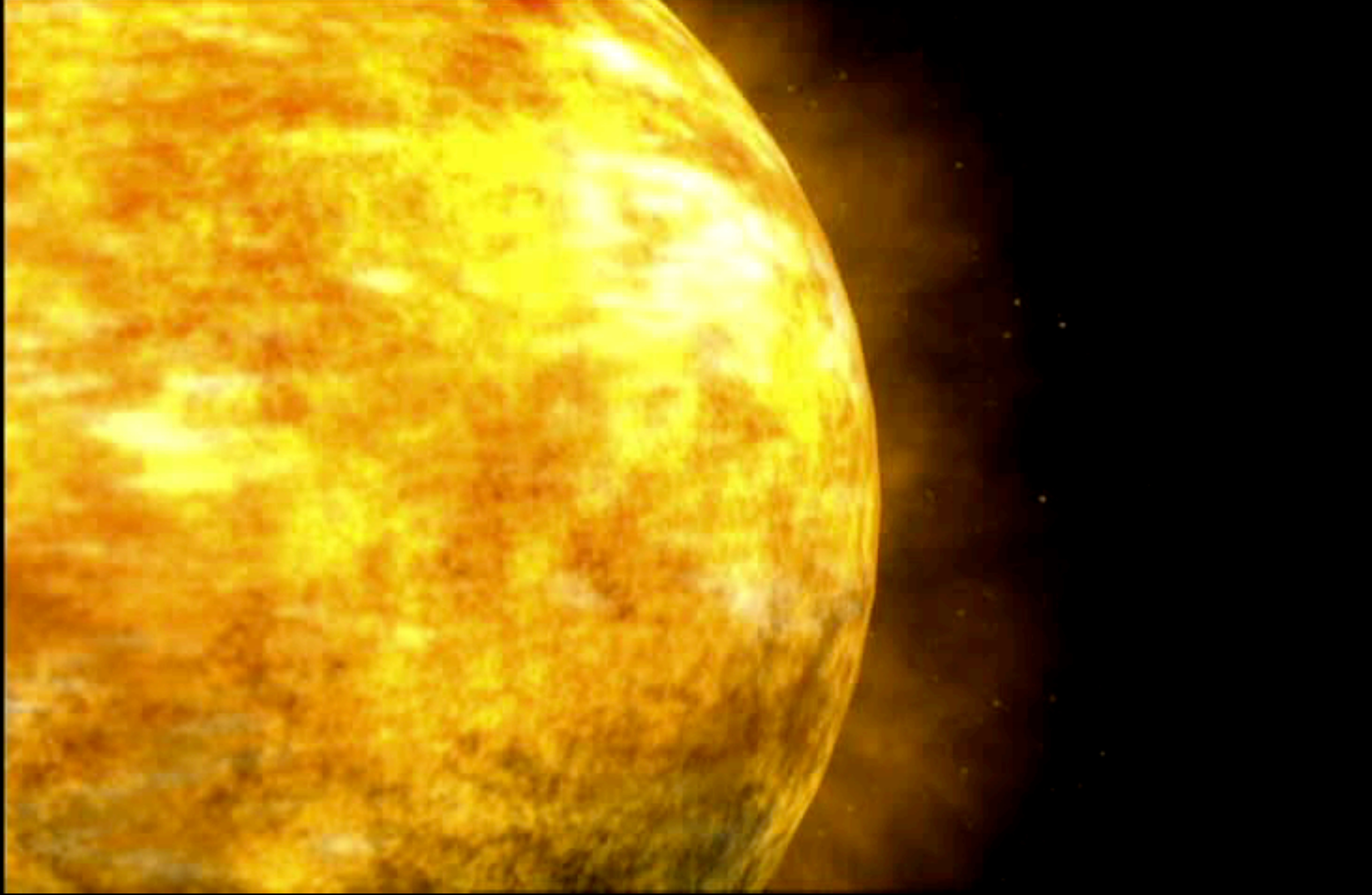
BY ED BROWNE ON 9/16/22 AT 5:38 AM EDT



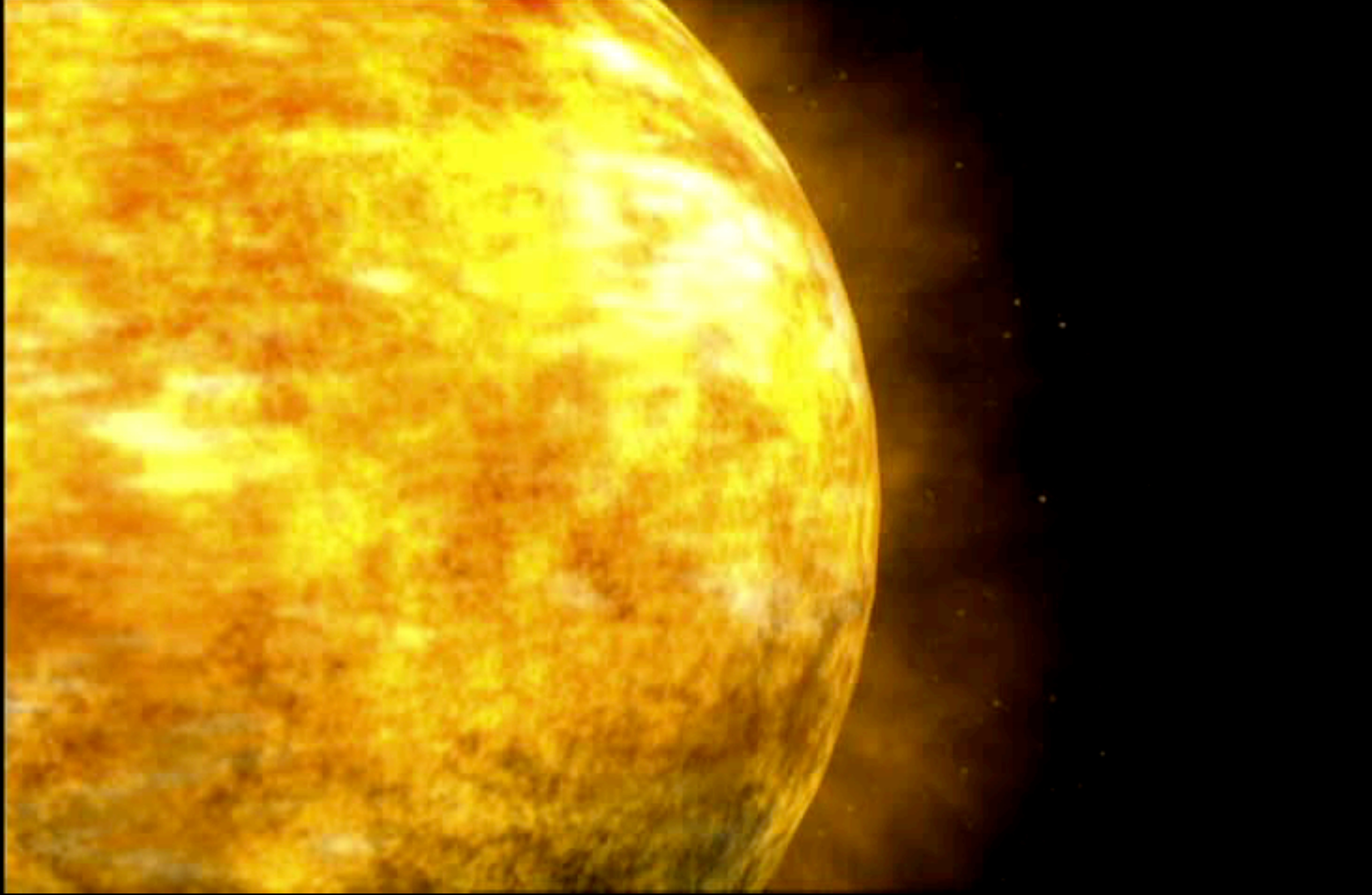




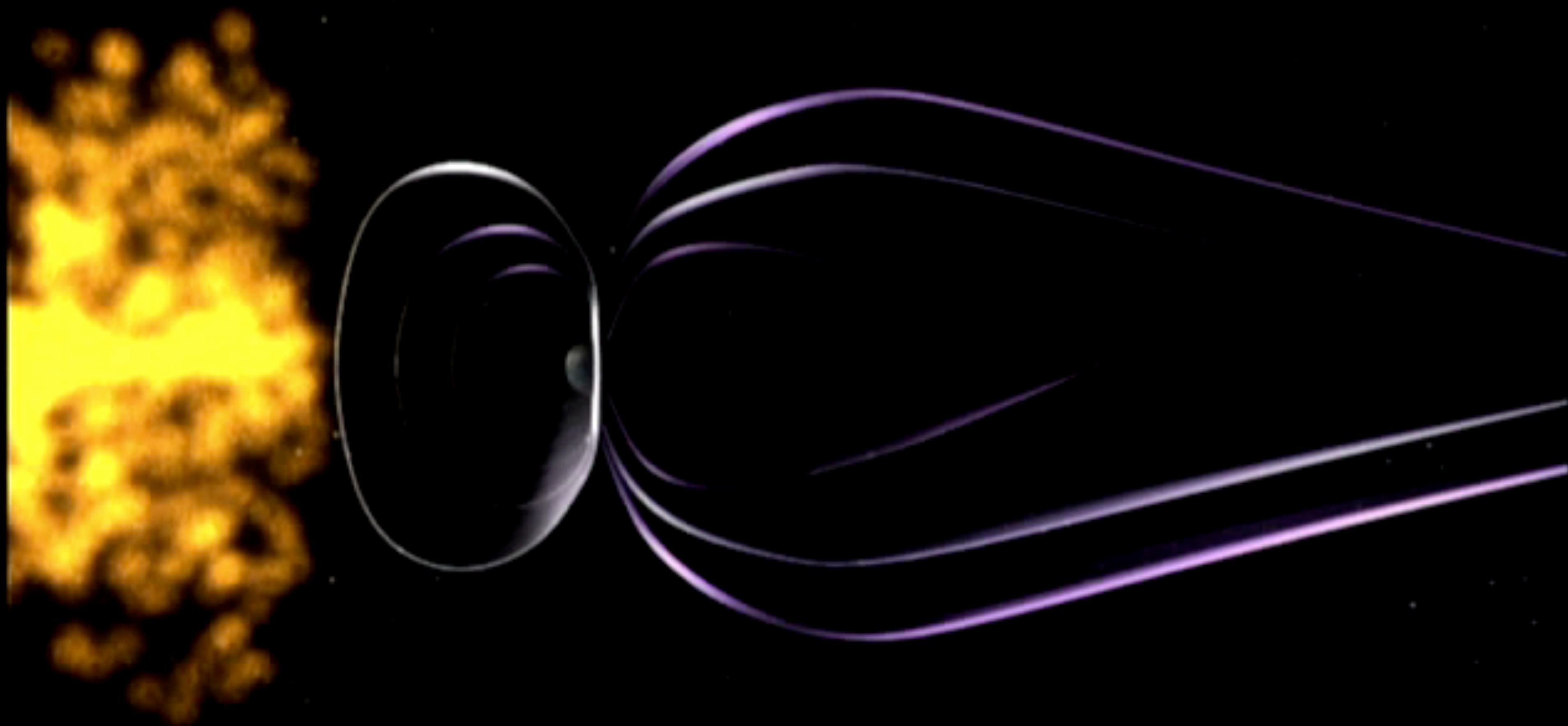








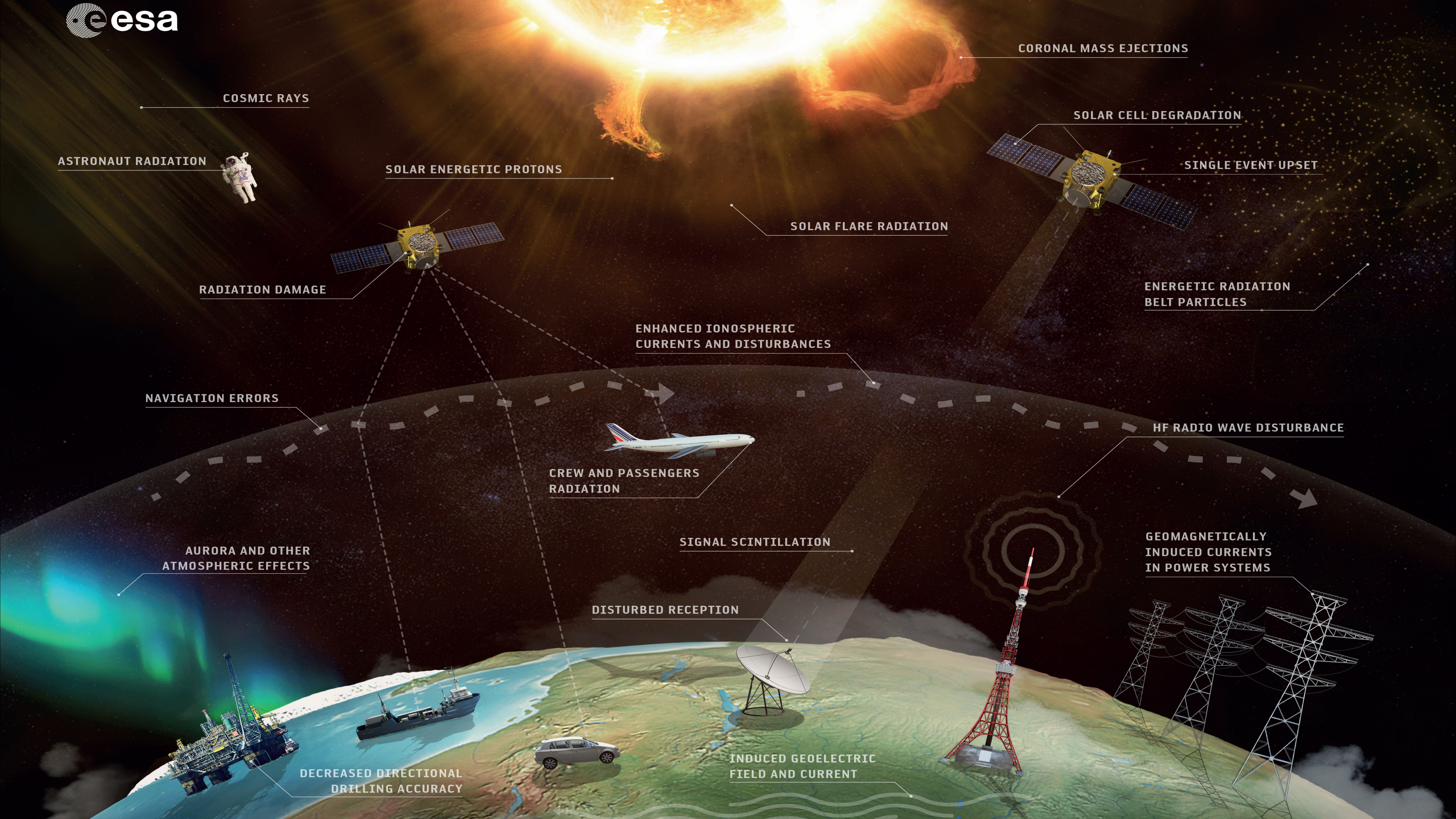












CORONAL MASS EJECTIONS

COSMIC RAYS

ASTRONAUT RADIATION

SOLAR ENERGETIC PROTONS

SOLAR CELL DEGRADATION

SINGLE EVENT UPSET

SOLAR FLARE RADIATION

RADIATION DAMAGE

ENERGETIC RADIATION  
BELT PARTICLES

ENHANCED IONOSPHERIC  
CURRENTS AND DISTURBANCES

NAVIGATION ERRORS

CREW AND PASSENGERS  
RADIATION

HF RADIO WAVE DISTURBANCE

AURORA AND OTHER  
ATMOSPHERIC EFFECTS

SIGNAL SCINTILLATION

GEOMAGNETICALLY  
INDUCED CURRENTS  
IN POWER SYSTEMS

DISTURBED RECEPTION

INDUCED GEOELECTRIC  
FIELD AND CURRENT

DECREASED DIRECTIONAL  
DRILLING ACCURACY



COSMIC RAYS

ASTRONAUT RADIATION



SOLAR ENERGETIC PROTONS

RADIATION DAMAGE





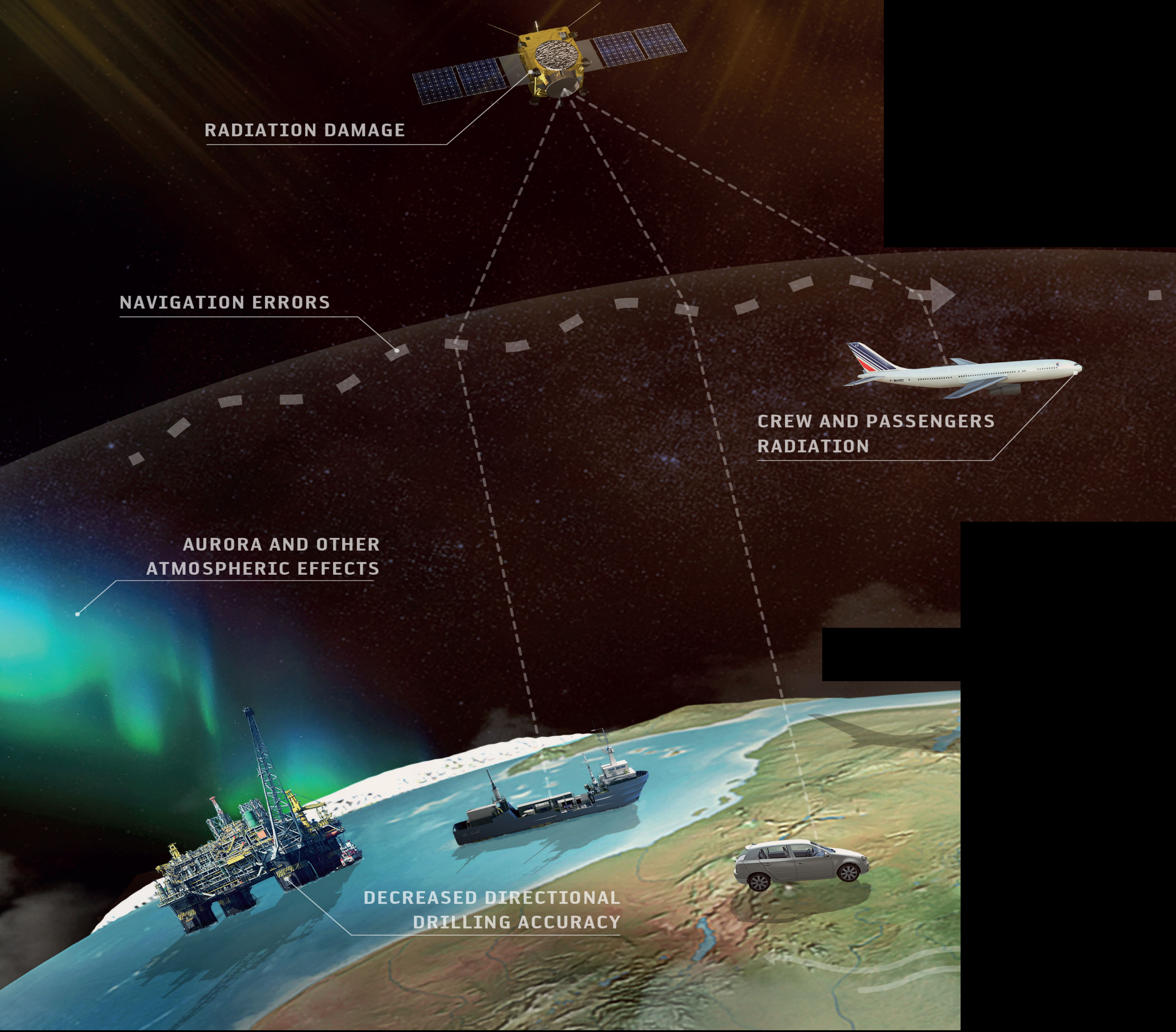
**RADIATION DAMAGE**

**NAVIGATION ERRORS**

**CREW AND PASSENGERS  
RADIATION**

**AURORA AND OTHER  
ATMOSPHERIC EFFECTS**

**DECREASED DIRECTIONAL  
DRILLING ACCURACY**



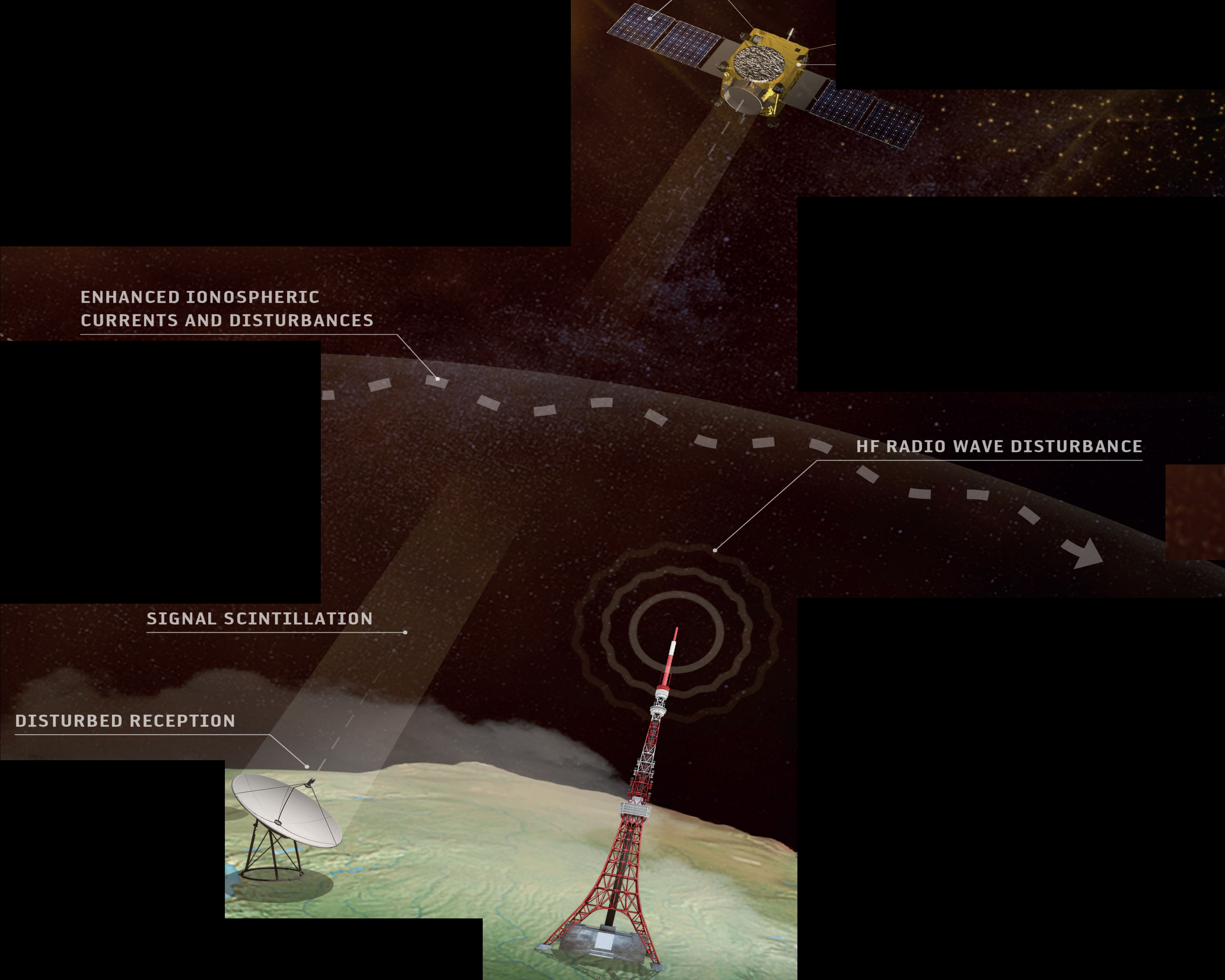


ENHANCED IONOSPHERIC  
CURRENTS AND DISTURBANCES

HF RADIO WAVE DISTURBANCE

SIGNAL SCINTILLATION

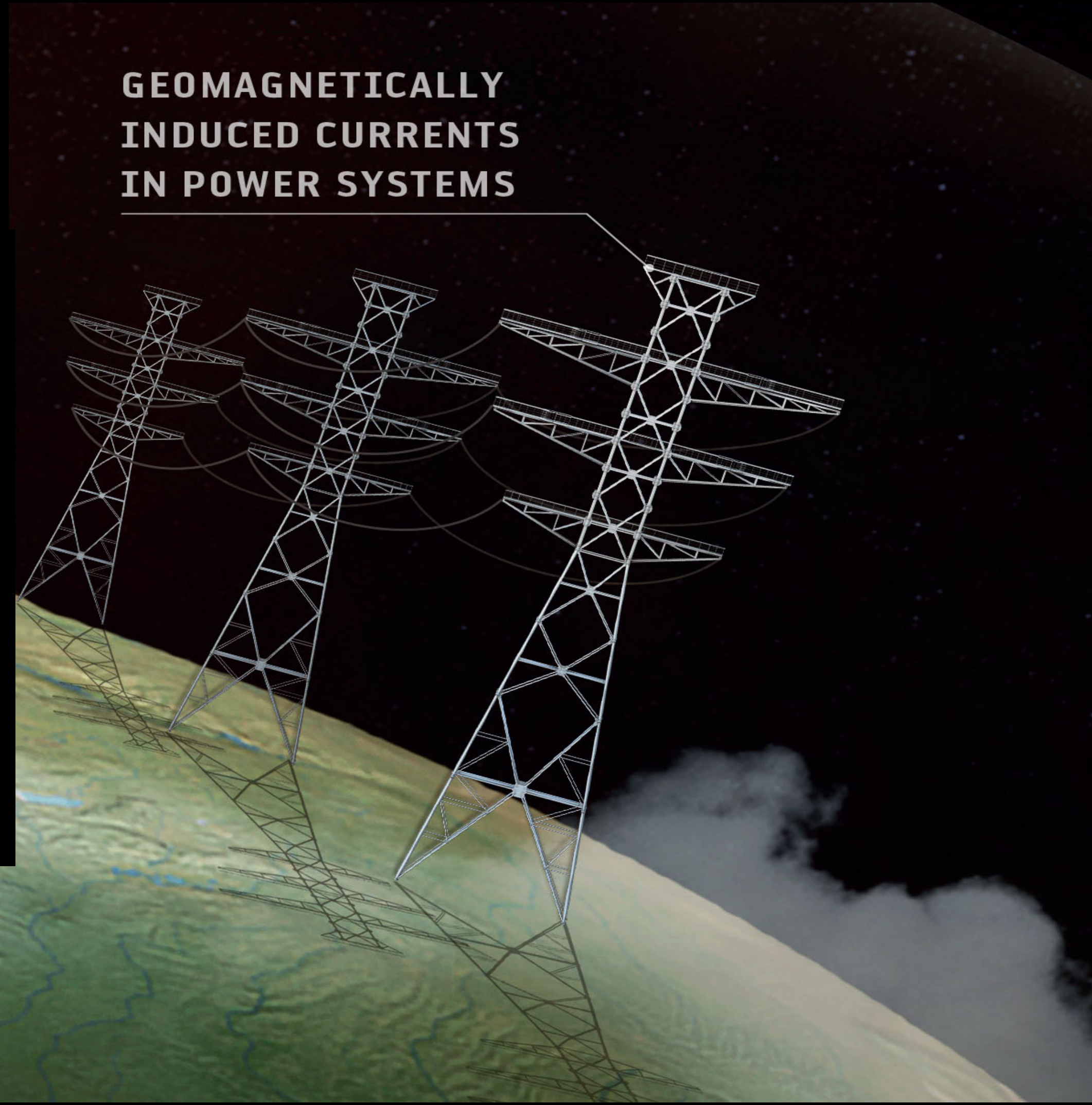
DISTURBED RECEPTION





**INDUCED GEOELECTRIC  
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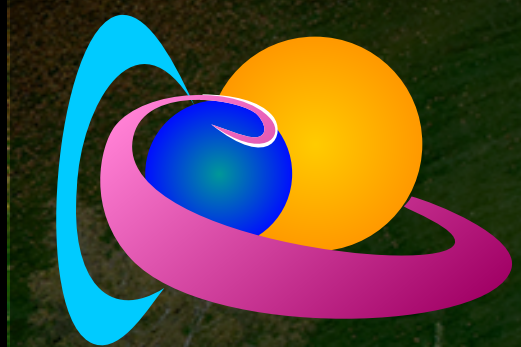
**GEOMAGNETICALLY  
INDUCED CURRENTS  
IN POWER SYSTEMS**







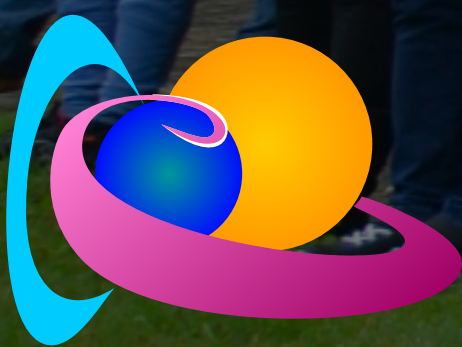




*Zonnewacht*

SOLAR-TERRESTRIAL CENTRE OF EXCELLENCE

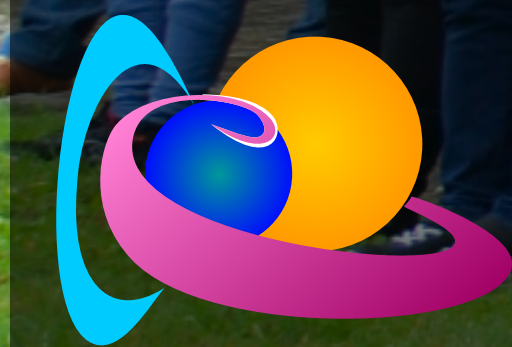
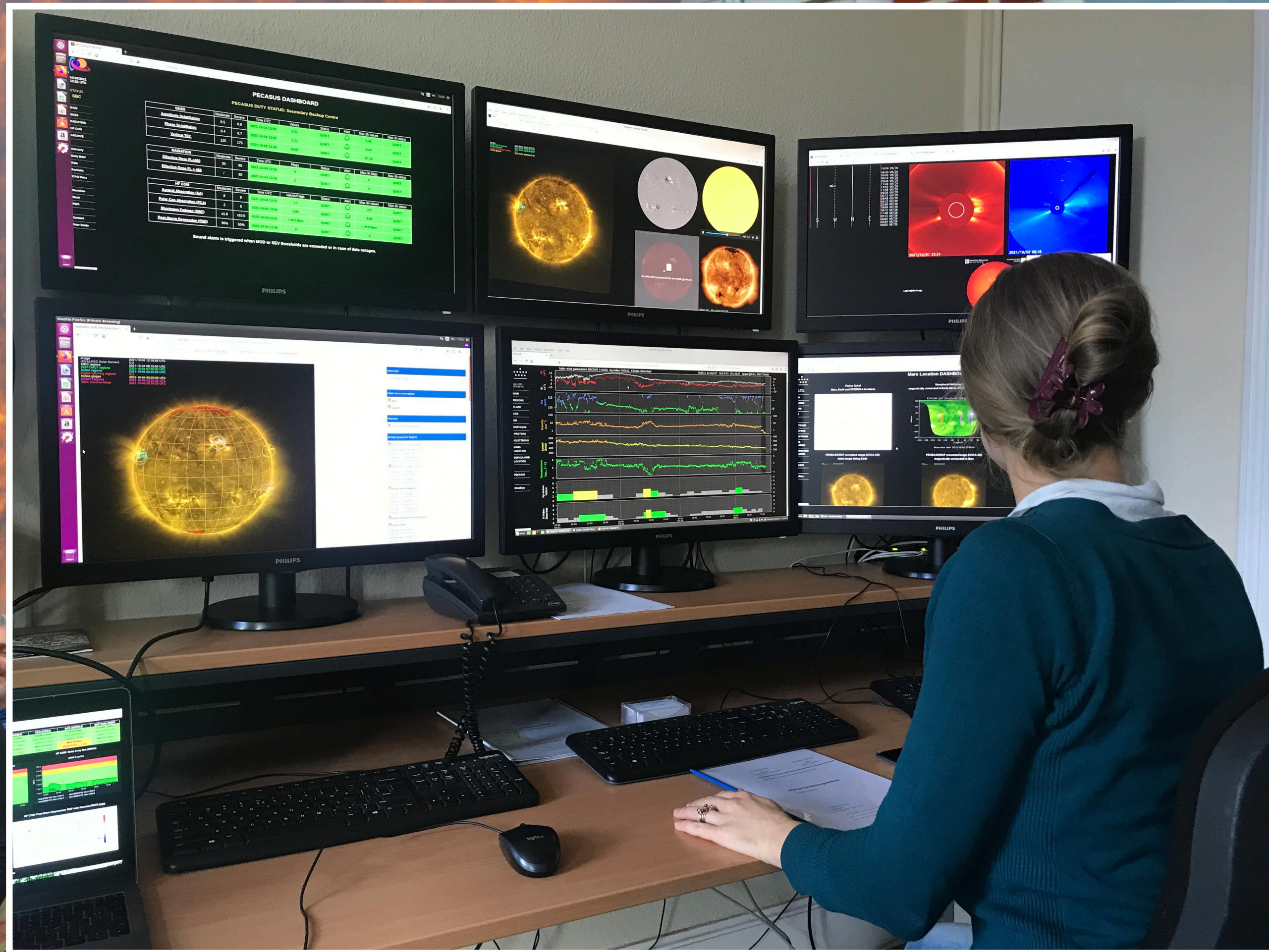




Zonnewacht

SOLAR-TERRESTRIAL CENTRE OF EXCELLENCE





Zonnewacht

SOLAR-TERRESTRIAL CENTRE OF EXCELLENCE



Image 2022-10-16 13:13:37 UTC  
SIDC regions 2022-10-16 08:20:00 UTC  
INAF/OACT regions 2022-10-11 07:00:00 UTC  
NOAA regions 2022-10-16 00:00:00 UTC  
NOAA returning regions 2022-10-16 00:00:00 UTC  
NOAA plages 2022-10-16 00:00:00 UTC  
SIDC Coronal Holes 2022-10-16 08:00:05 UTC

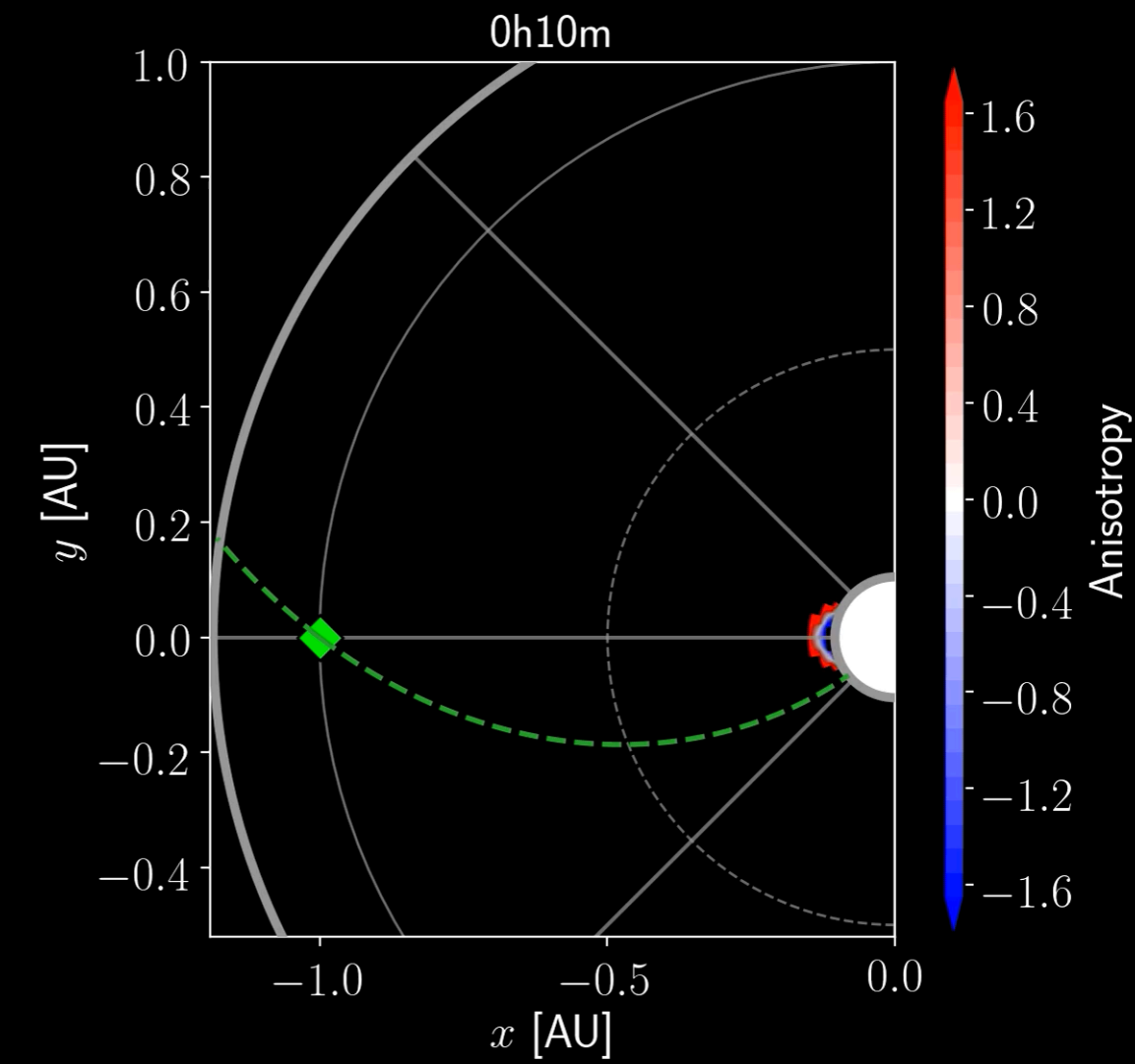
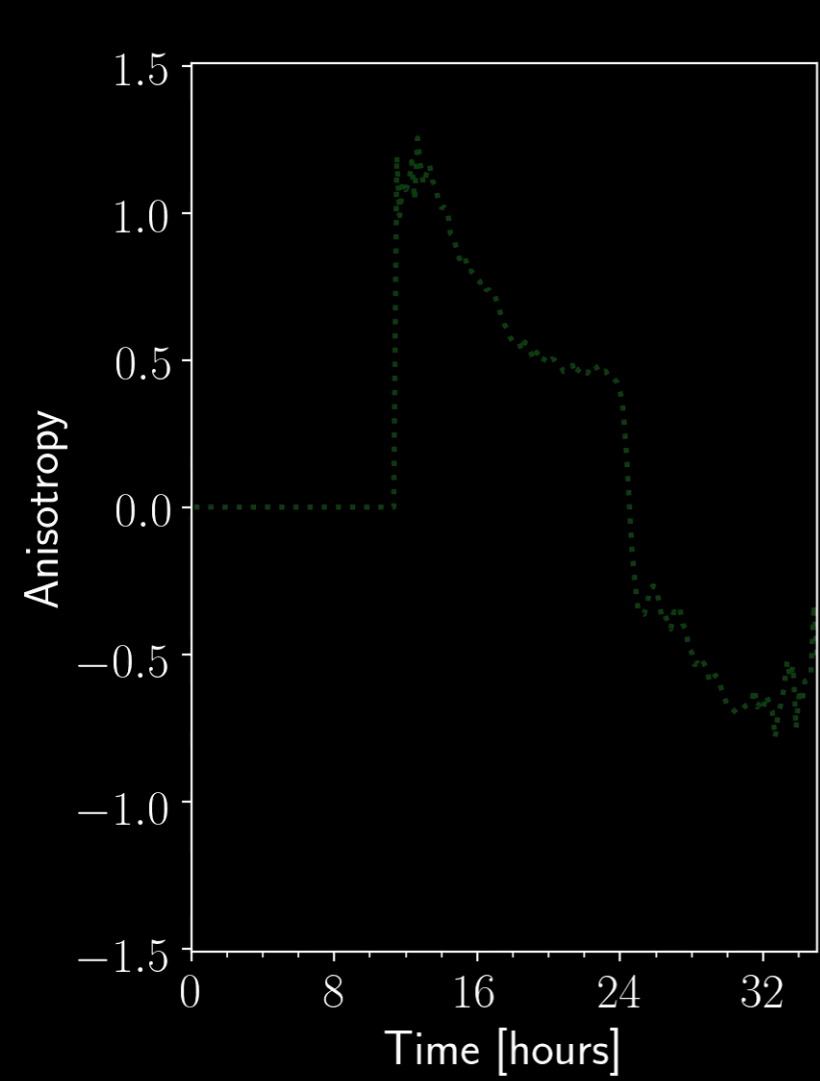
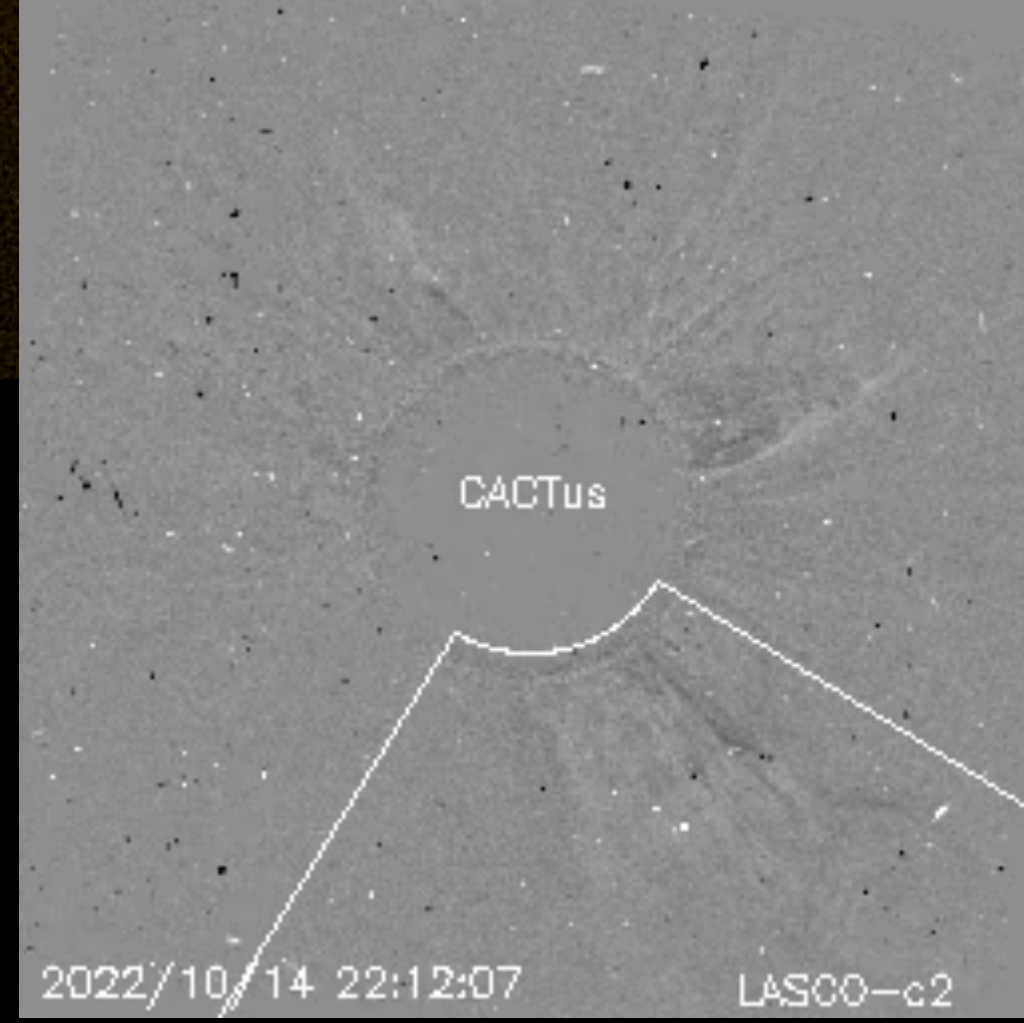
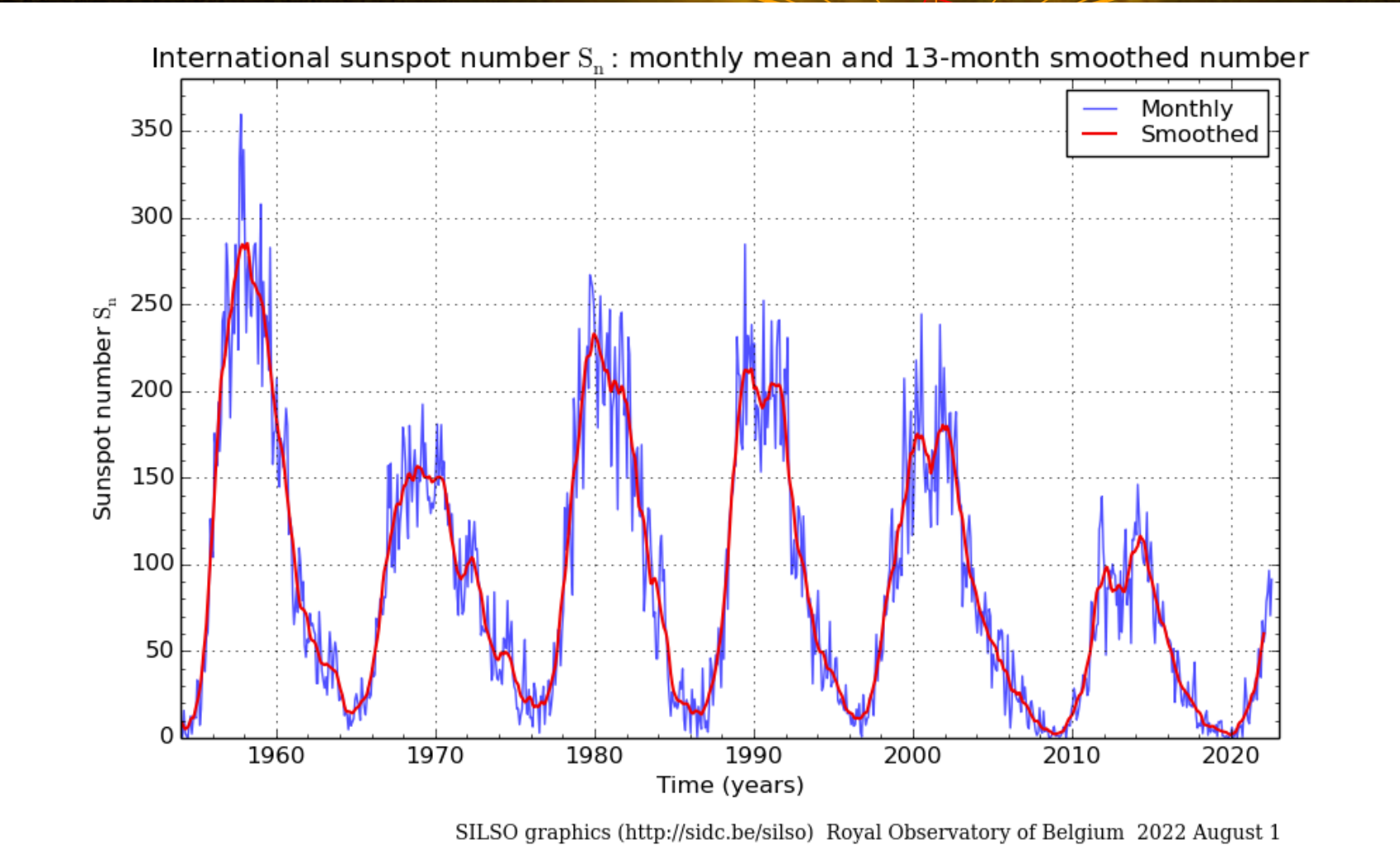
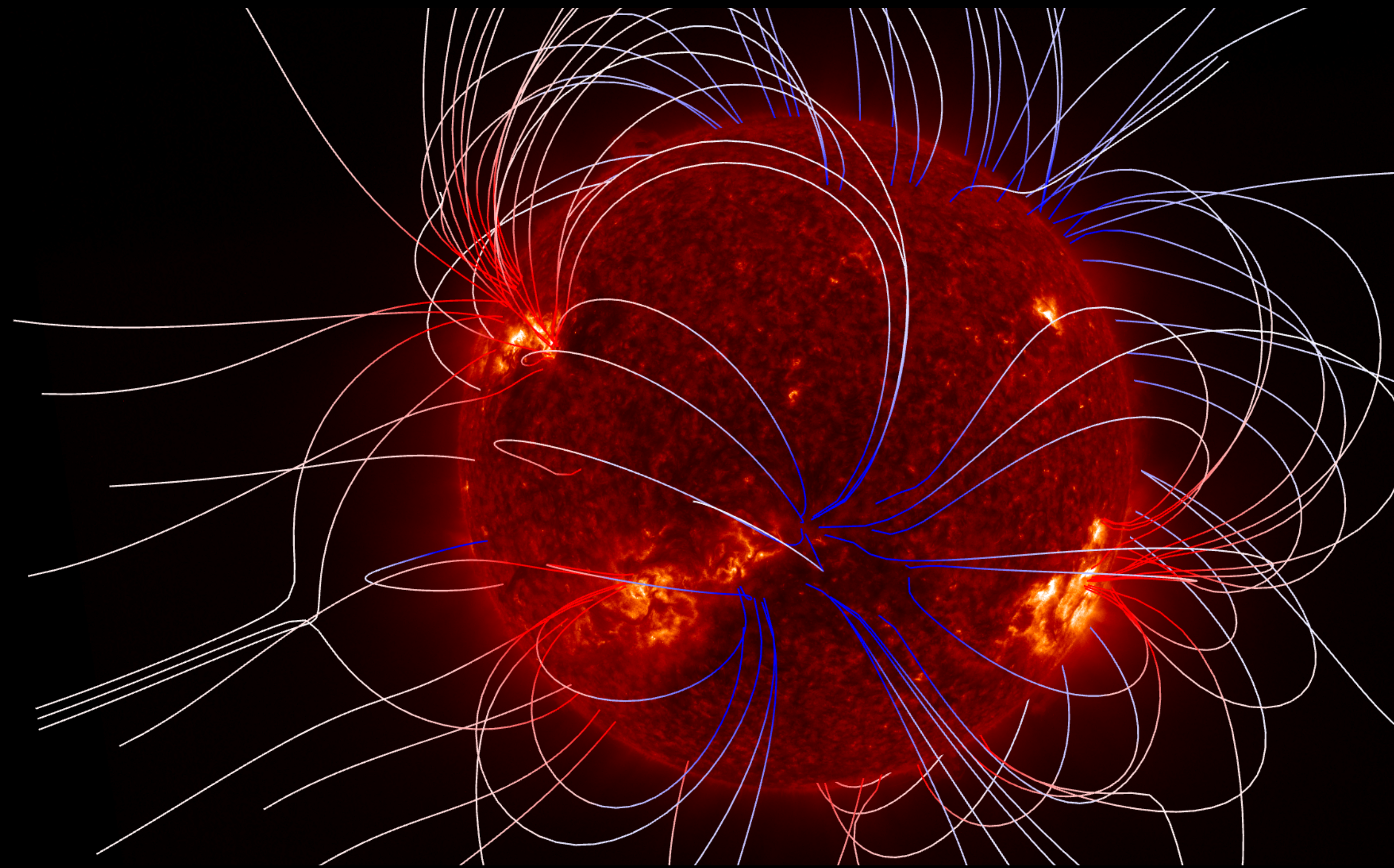
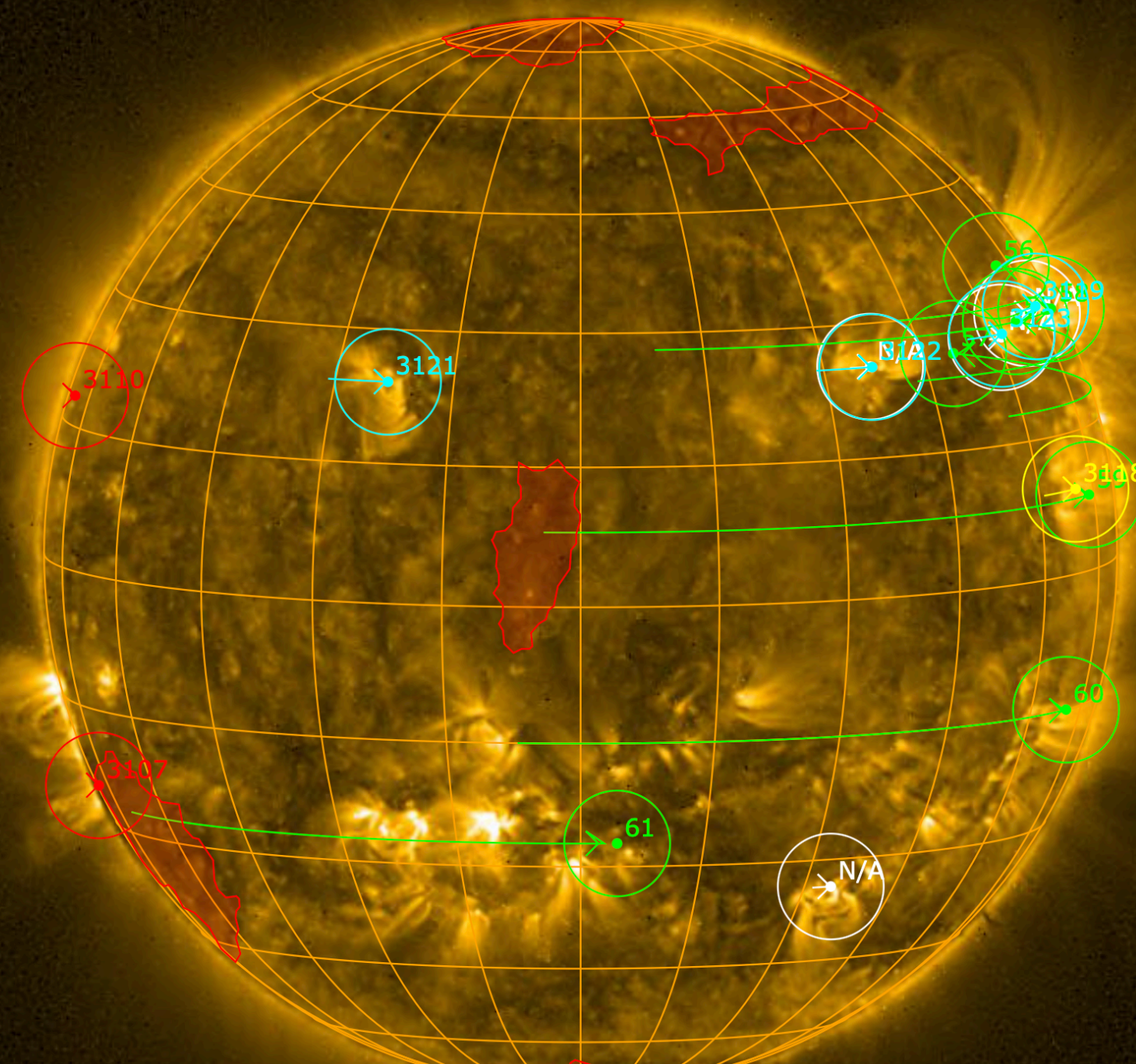




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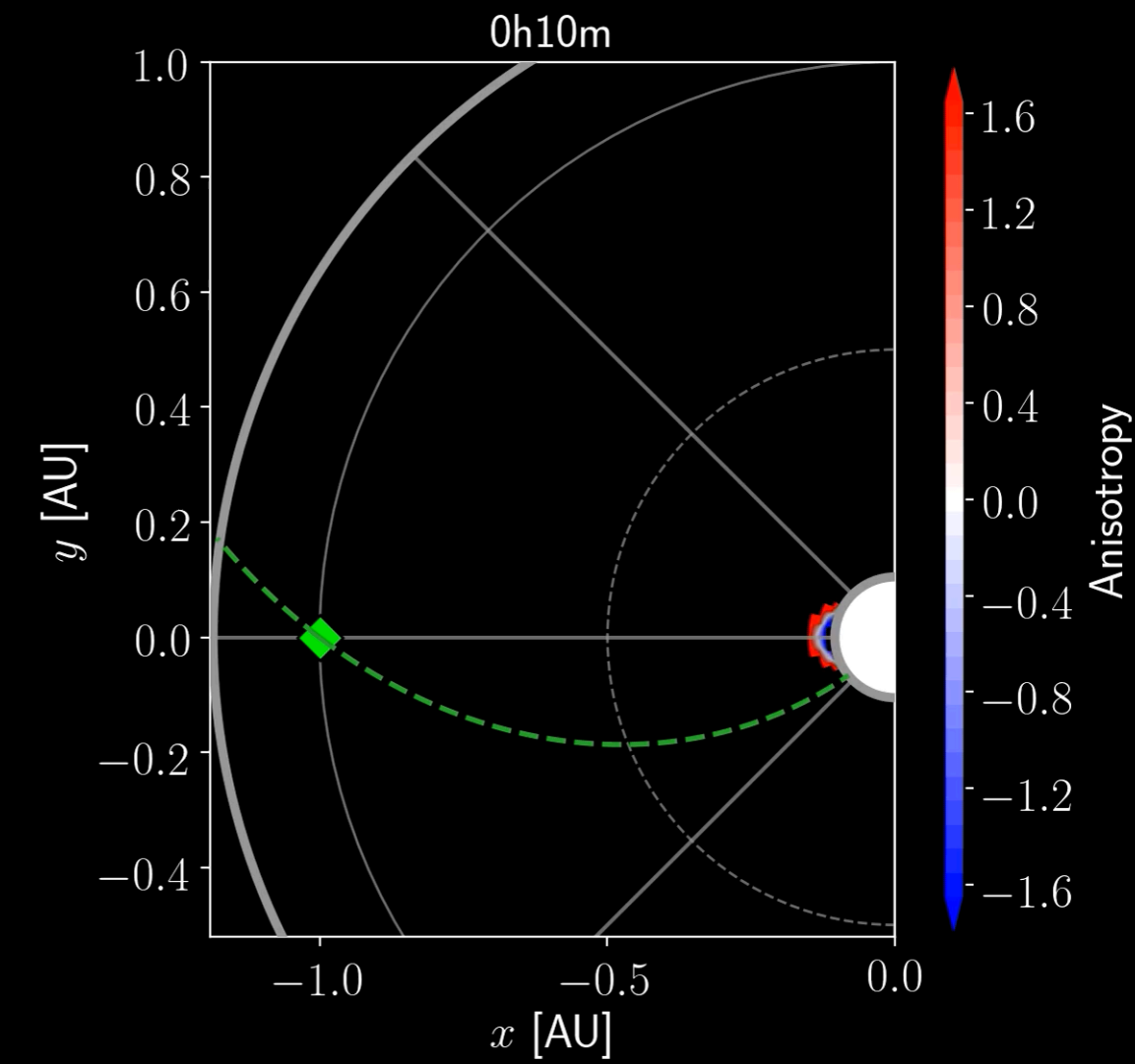
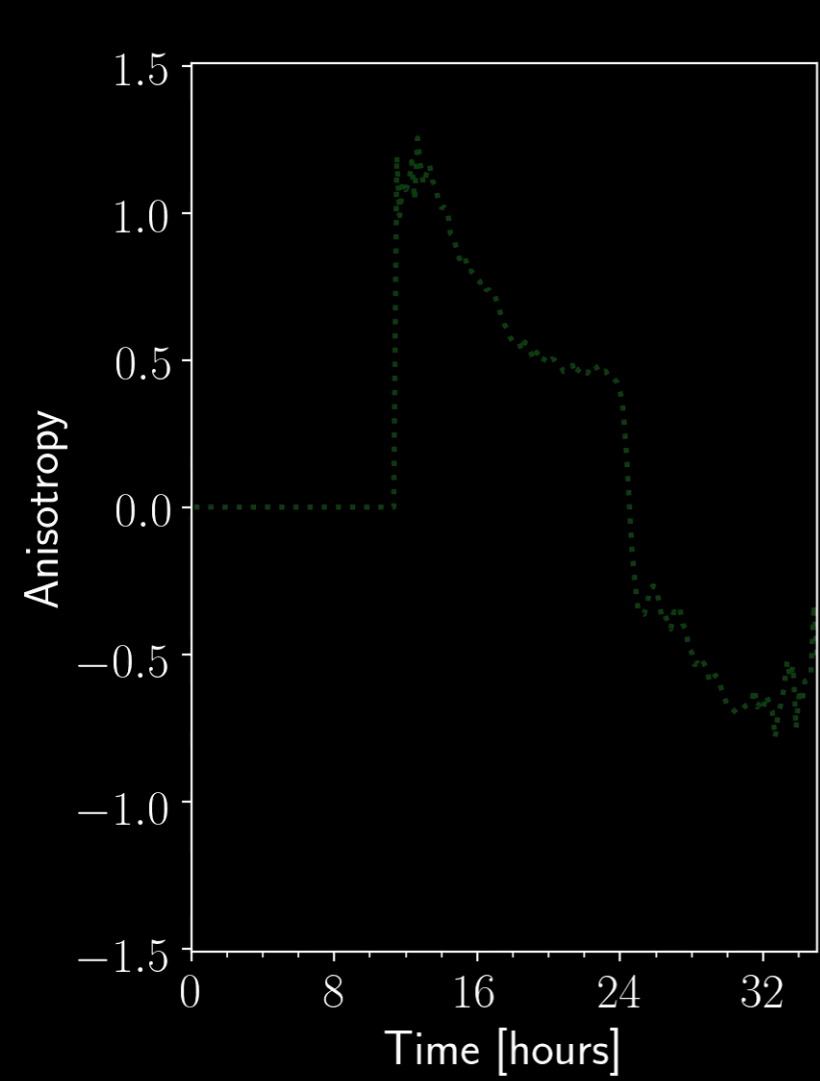
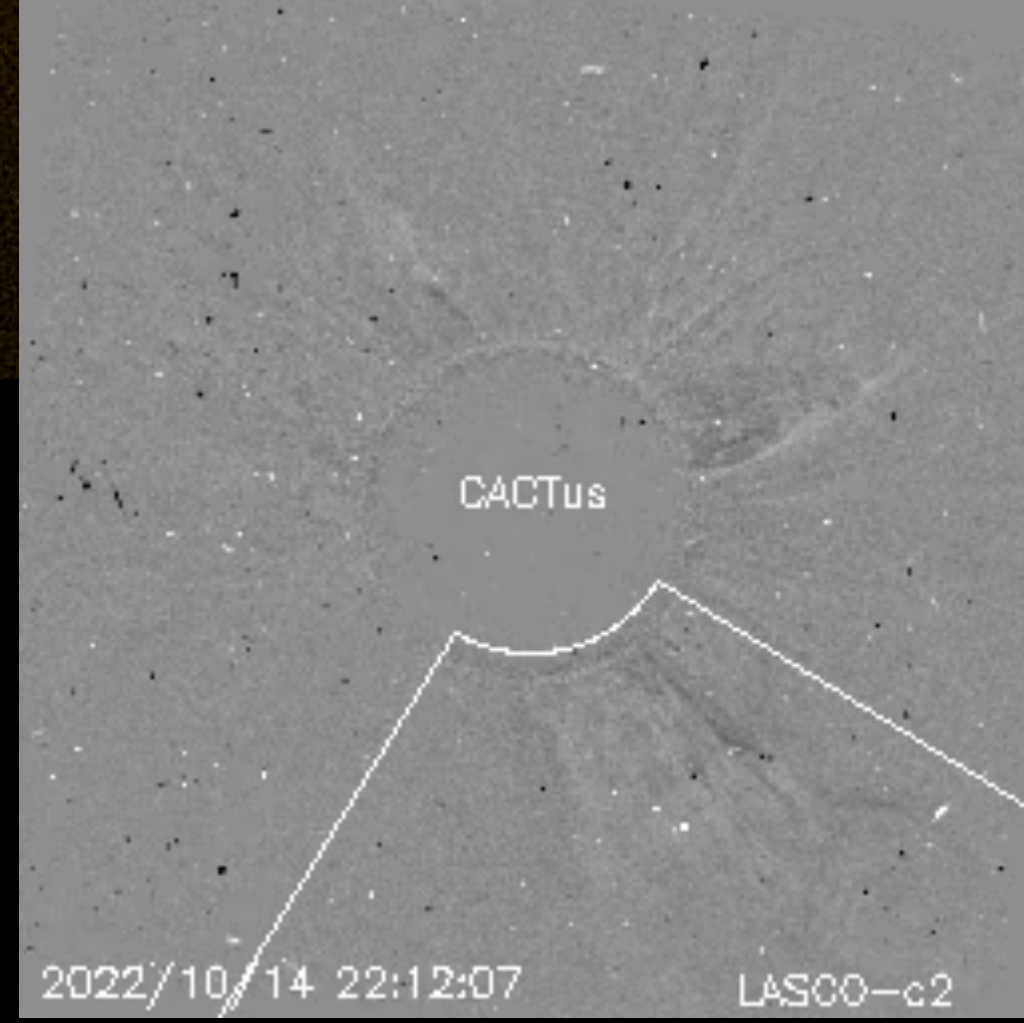
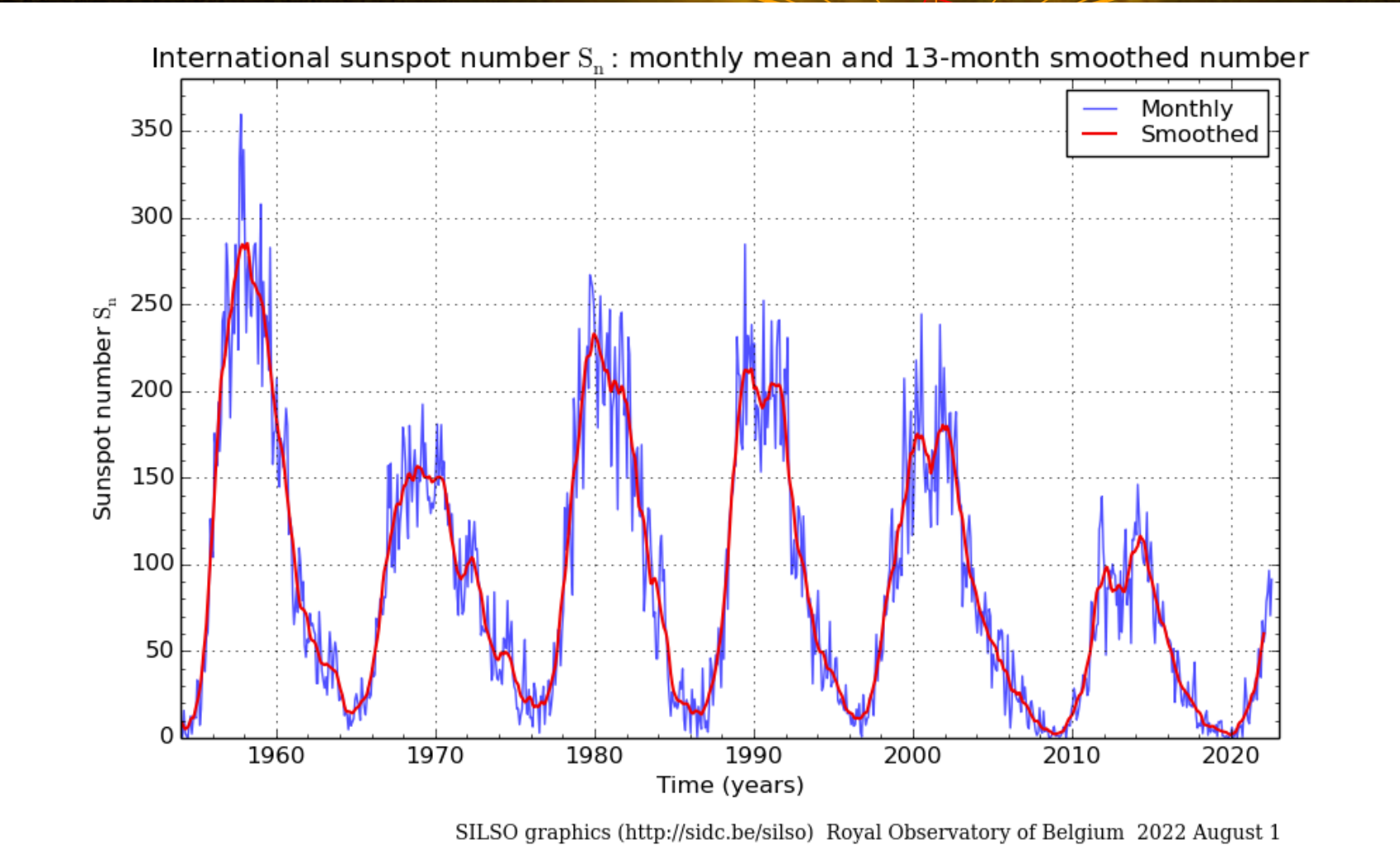
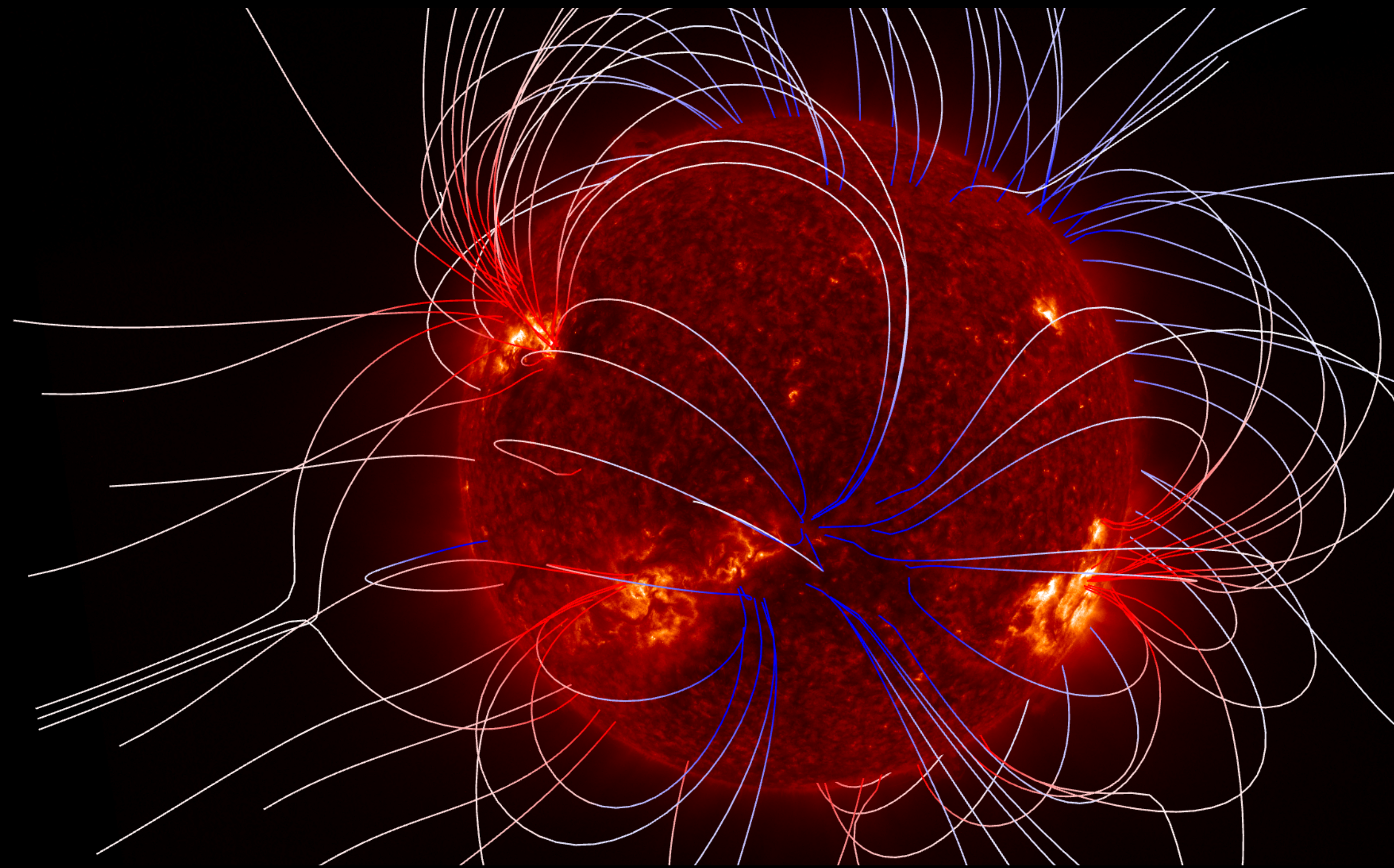
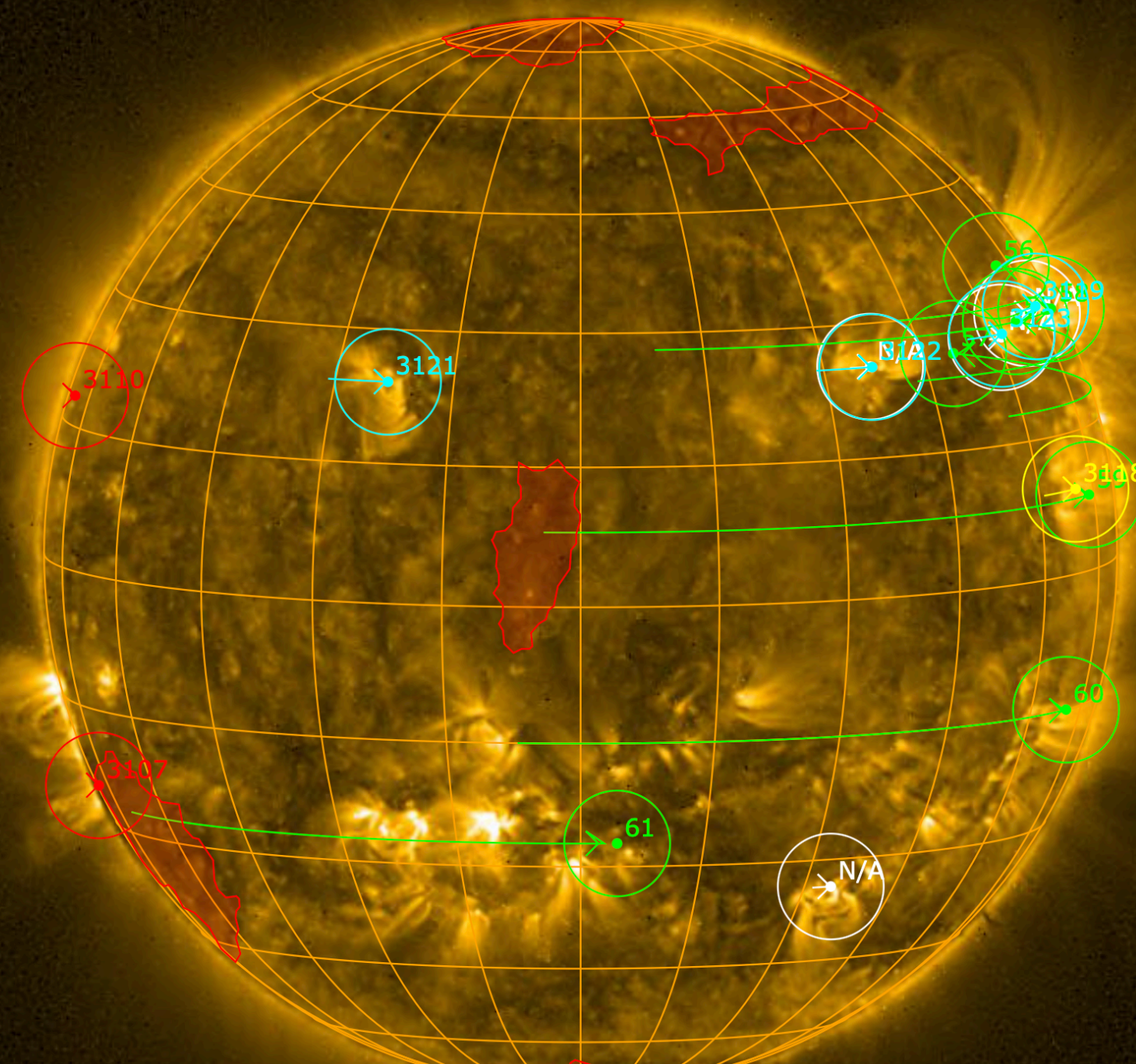
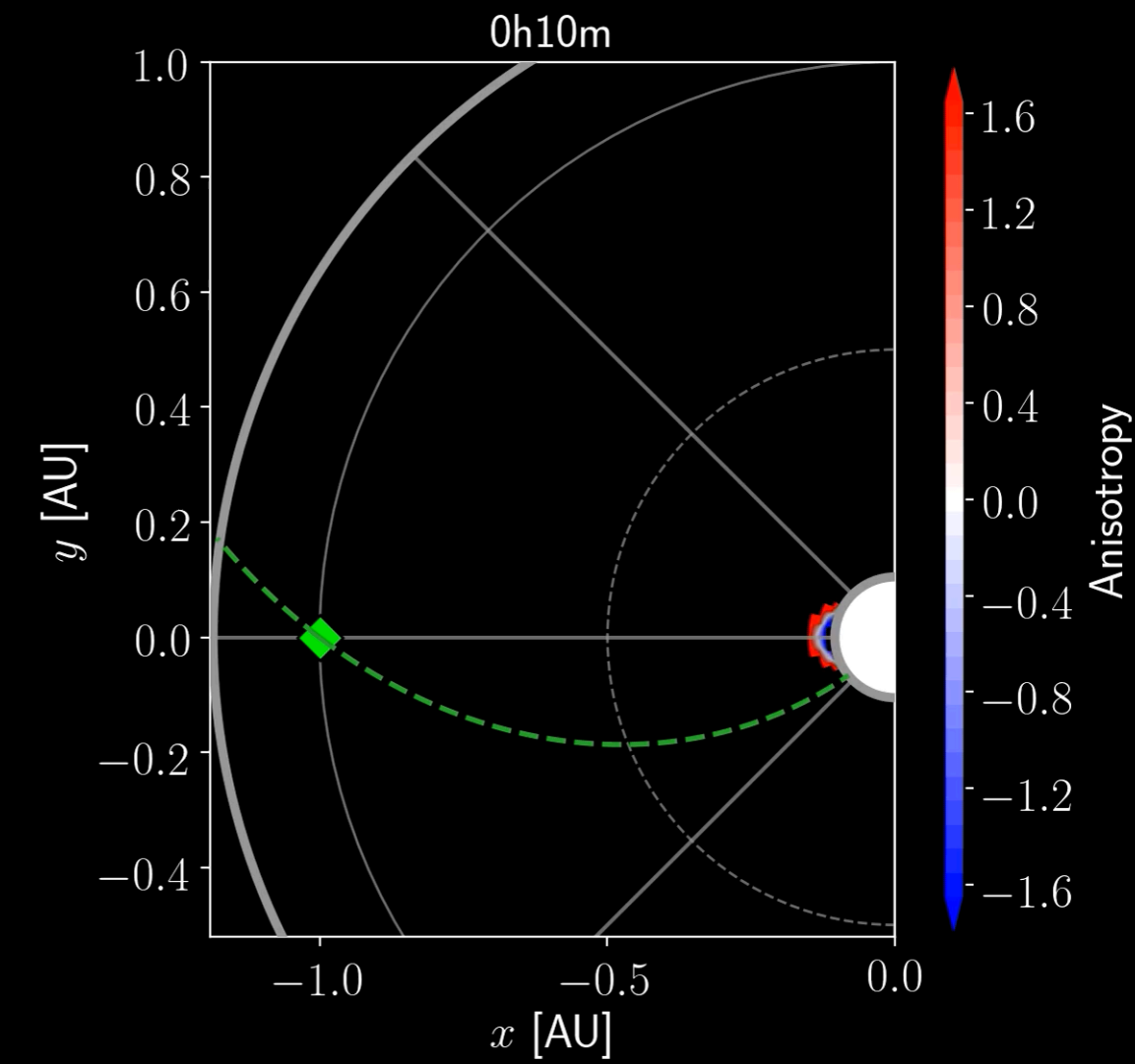
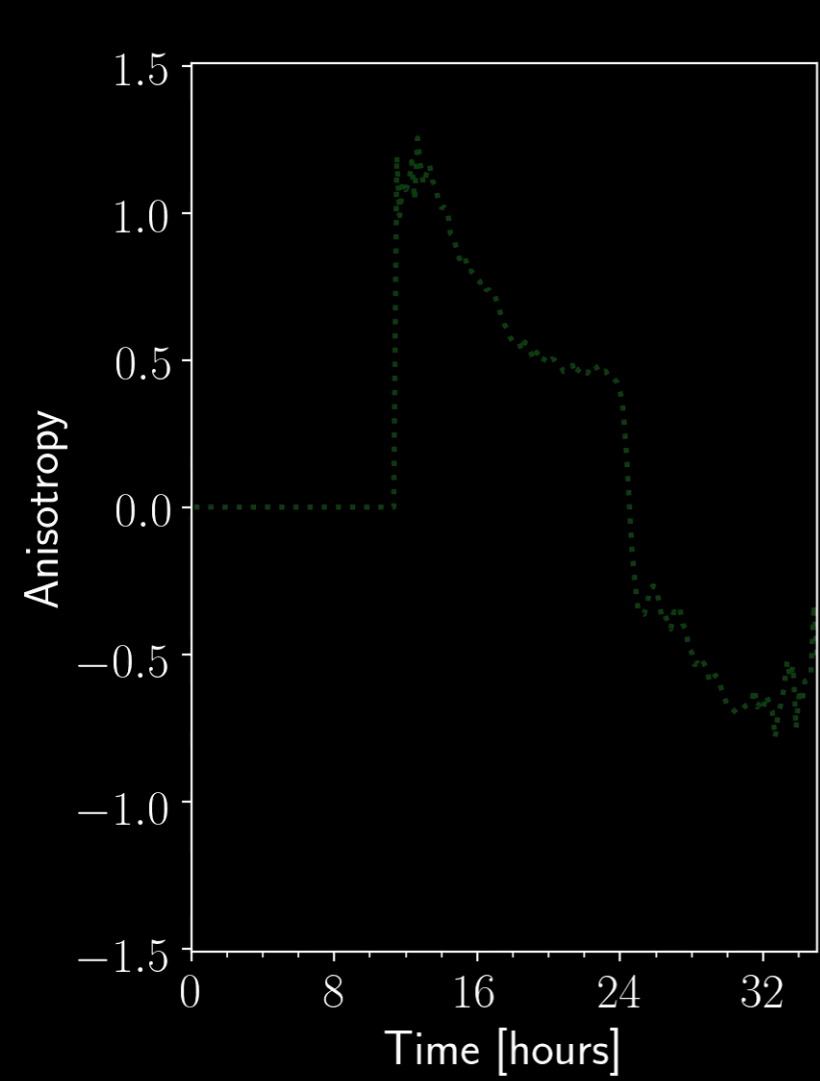
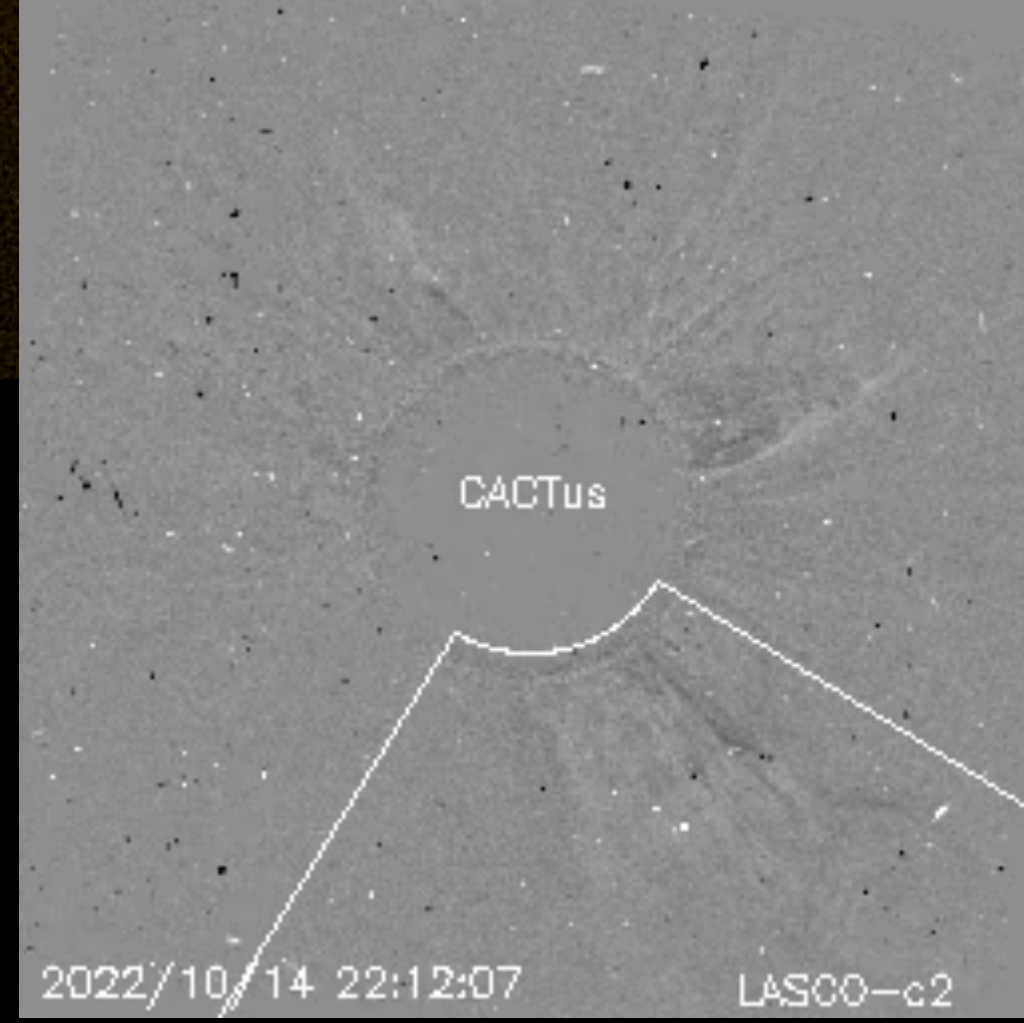
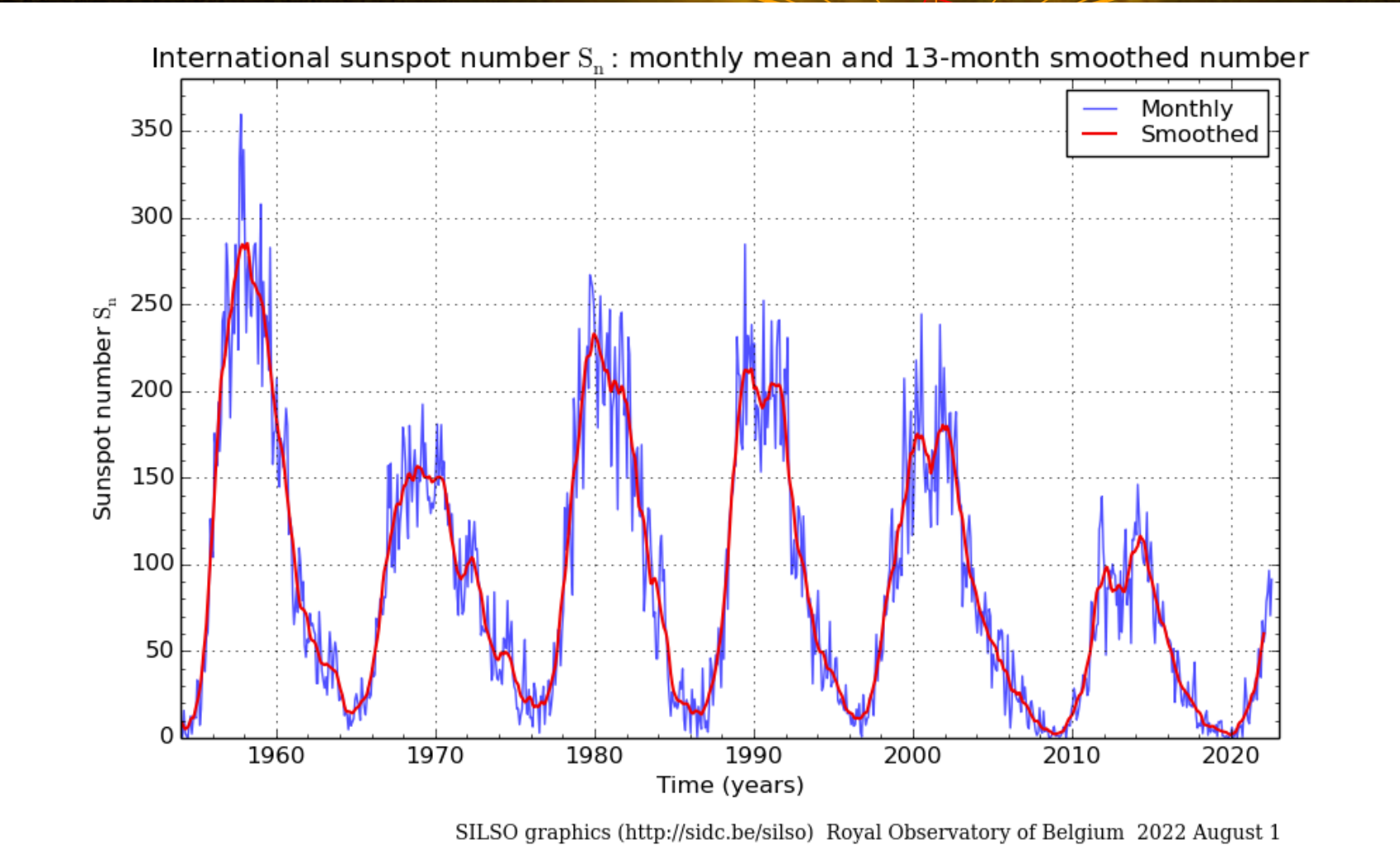
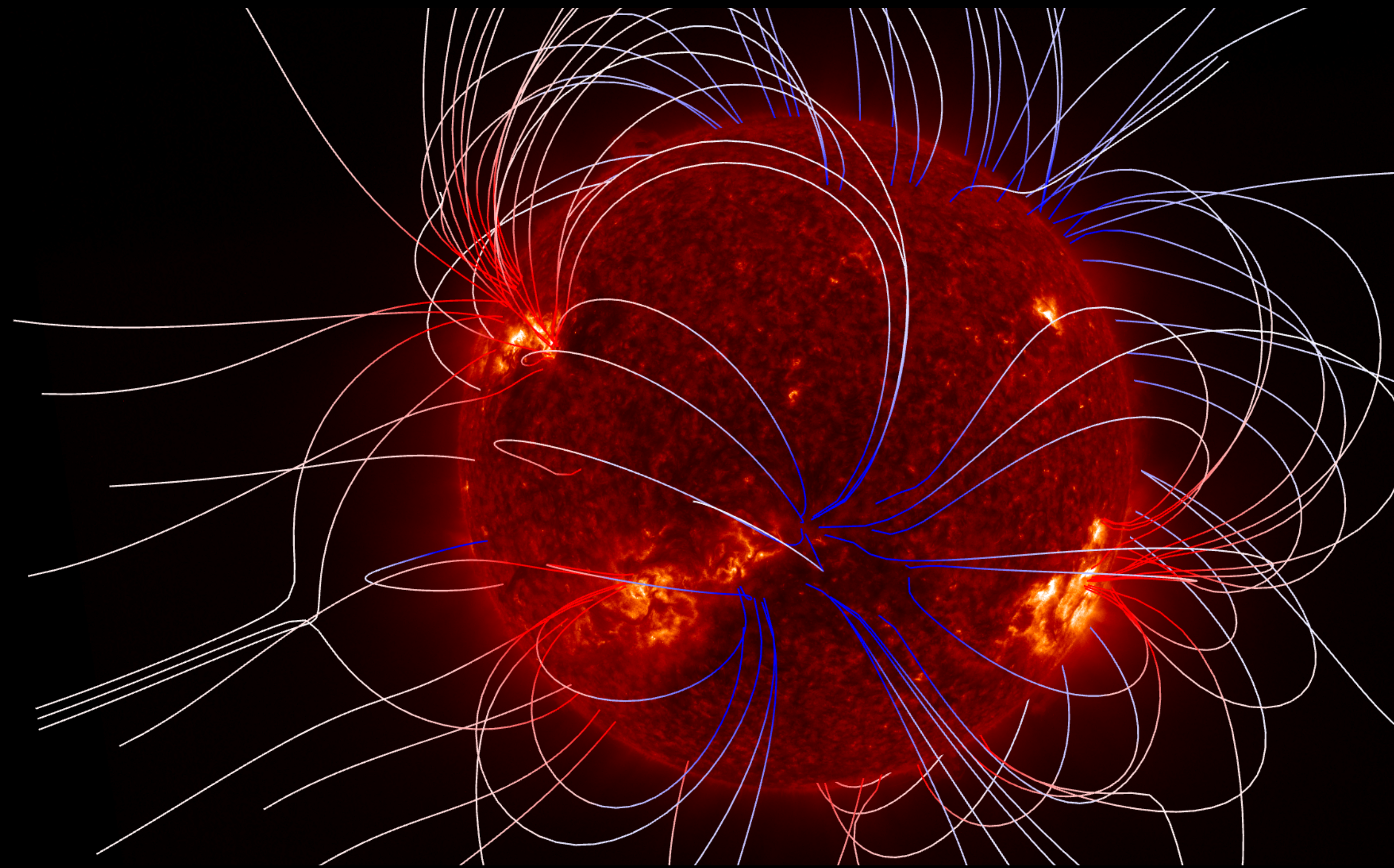
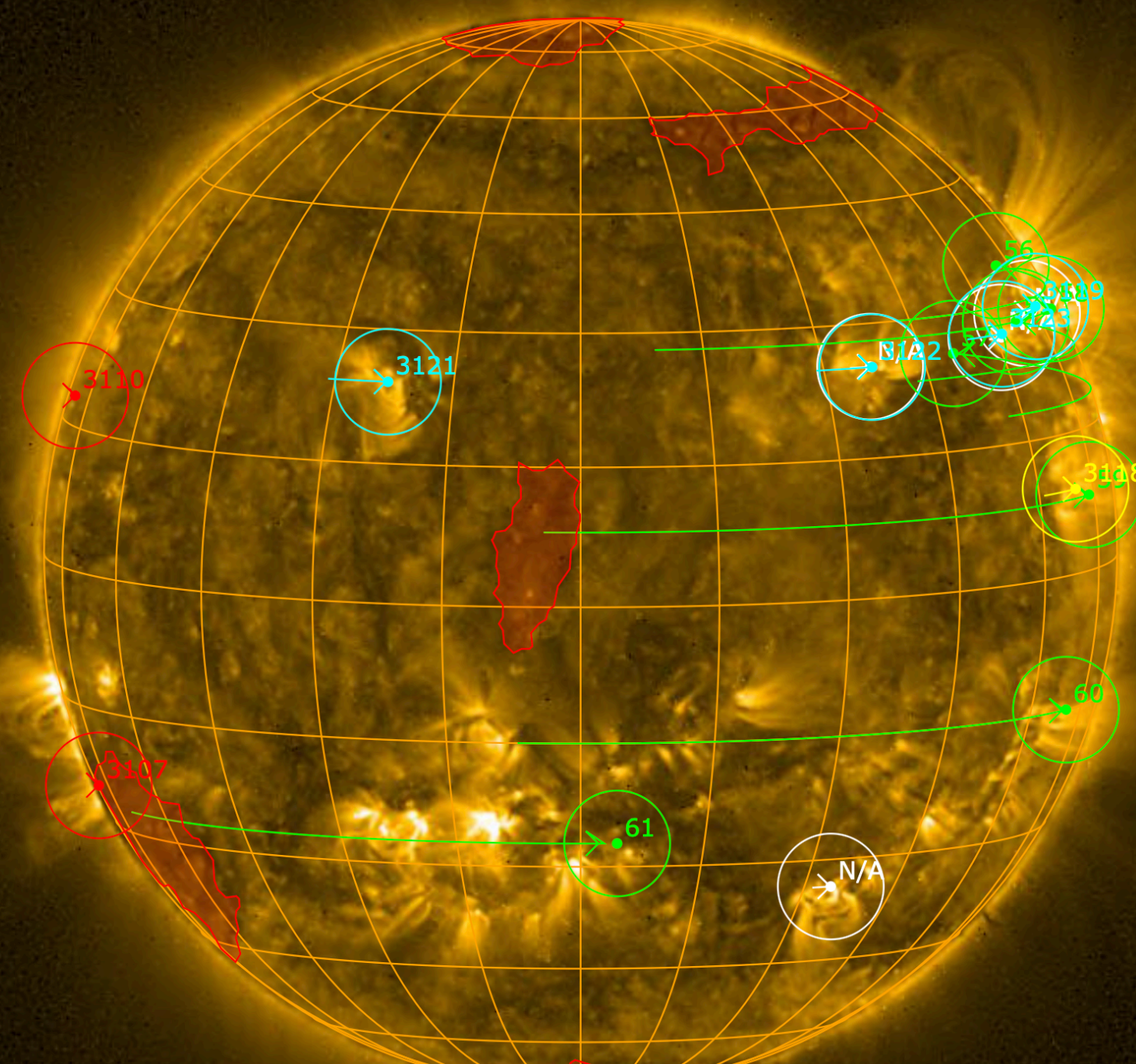
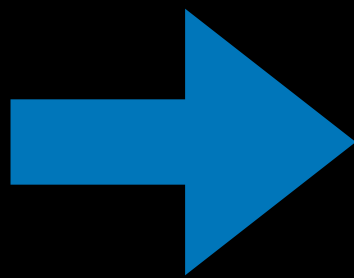
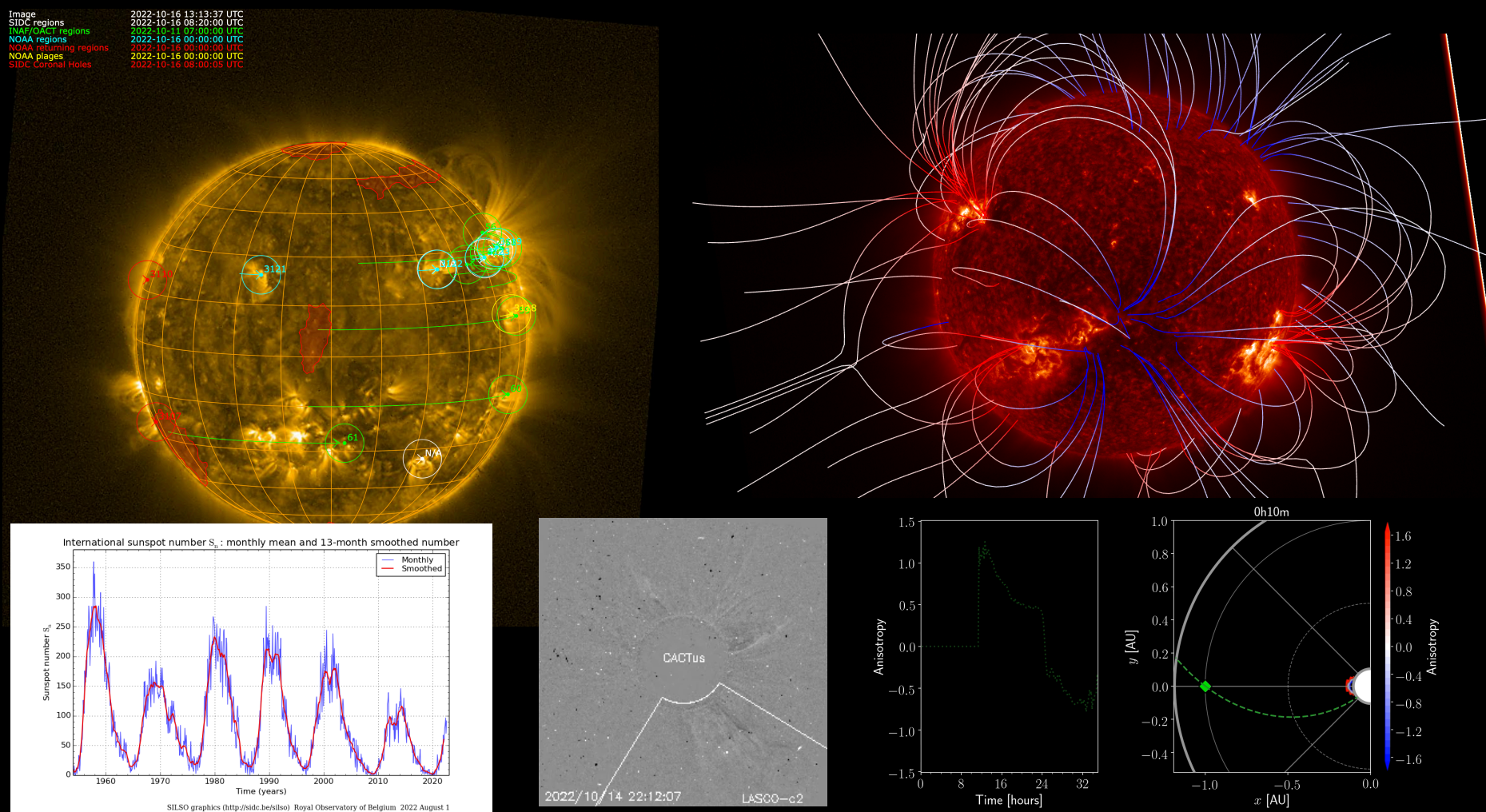




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SIDC Coronal Holes 2022-10-16 08:00:05 UTC







:Issued: 2022 Oct 20 1231 UTC  
:Product: documentation at <http://www.sidc.be/products/meu>  
#-----#  
# DAILY BULLETIN ON SOLAR AND GEOMAGNETIC ACTIVITY from the SIDC #  
# (RWC Belgium) #  
#-----#

SIDC URSIGRAM 21020  
SIDC SOLAR BULLETIN 20 Oct 2022, 1230UT  
SIDC FORECAST (valid from 1230UT, 20 Oct 2022 until 22 Oct 2022)  
SOLAR FLARES : C-class flares expected, (probability >=50%)  
GEOMAGNETISM : Quiet (A<20 and K<4)  
SOLAR PROTONS : Quiet  
PREDICTIONS FOR 20 Oct 2022 10CM FLUX: 113 / AP: 012  
PREDICTIONS FOR 21 Oct 2022 10CM FLUX: 110 / AP: 006  
PREDICTIONS FOR 22 Oct 2022 10CM FLUX: 109 / AP: 005  
COMMENT: Solar flaring activity was at low levels, with flare of largest X-ray output being the C5.3-class flare from NOAA Active Region (AR) 3122, peak time 20 October 03:26 UTC. NOAA AR 3126 has slightly developed over the past 24 hours. For the next 24 hours, C-class flares are expected while M-class flares are possible.

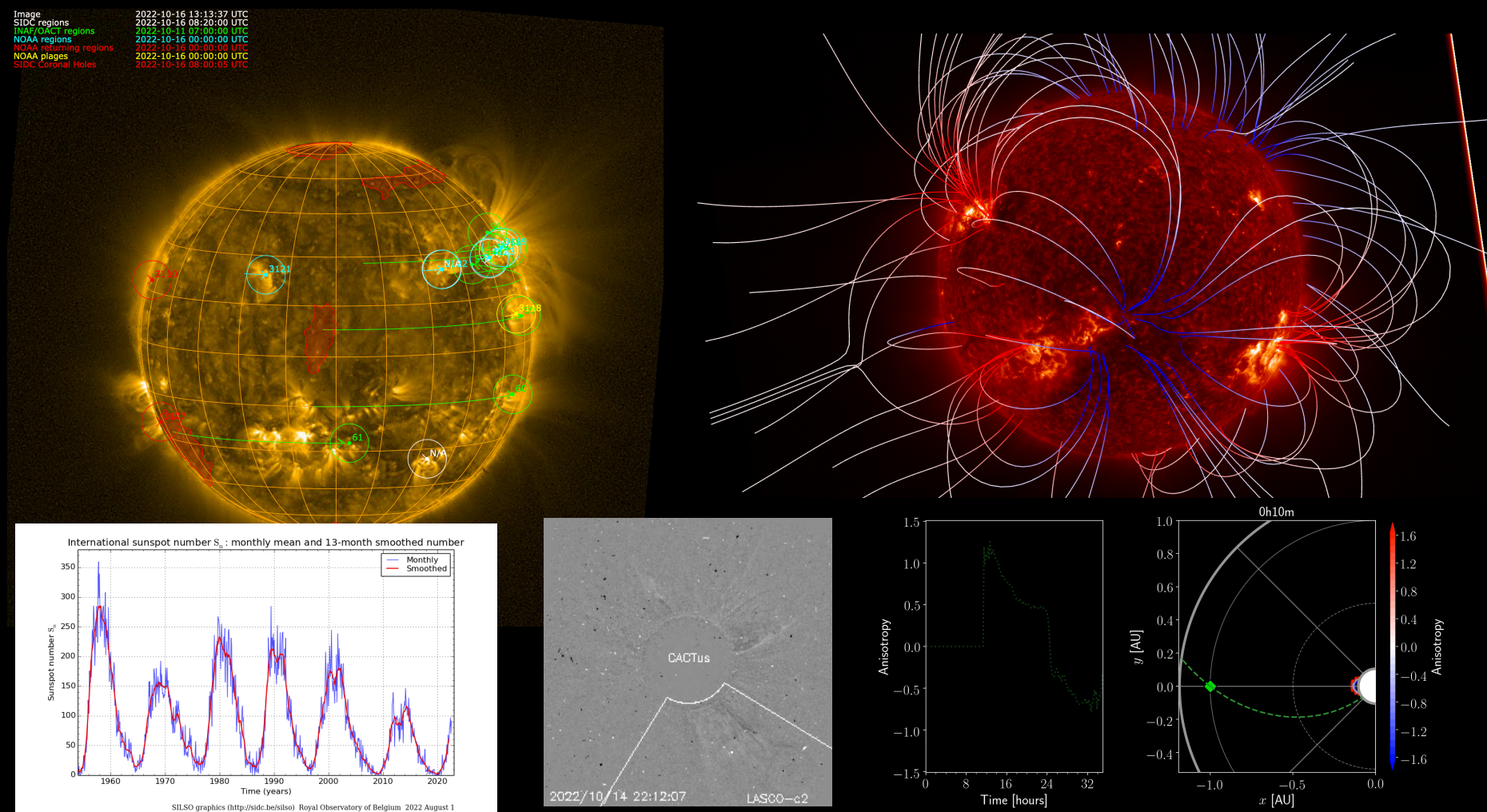
From the Coronal Mass Ejections observed in the last 24 hours none is currently believed to be Earth-directed. The southern coronal hole with negative polarity is currently at the solar meridian. An associated high speed stream can be expected about 23-24 October.

The greater than 10 MeV proton flux was at nominal levels over the past 24 hours and is expected to remain so for the next 24 hours. The greater than 2 MeV electron flux below the 1000 pfu alert threshold over the past 24 hours. It is expected to be about threshold during the next 24 hours. The 24h electron fluence was at nominal levels over the past 24 hours and is expected to remain at this level in the next 24 hours.

The Solar Wind (SW) parameters continued the gradual return to background levels. The SW speed gradually dropped further 390 km/s over the last 24 hours. The total magnetic field (Bt) was around 5 nT, while its Bz component ranged between -5 to 4 nT. The interplanetary magnetic field phi angle was directed towards the Sun. The solar wind parameters could become enhanced over the next 24 hours, in the possibility the the high speed stream associated with the coronal hole that crossed central meridian on 17 October arrives.

Geomagnetic conditions were at quiet levels (NOAA Kp and K Dourbes 0-2) over the last 24 hours. In the next 24 hours the conditions are expected to be quiet to unsettled, with a very slight chance of active conditions.





:Issued: 2022 Oct 20 1231 UTC  
:Product: documentation at <http://www.sidc.be/products/meu>  
#-----#  
# DAILY BULLETIN ON SOLAR AND GEOMAGNETIC ACTIVITY from the SIDC #  
# (RWC Belgium) #  
#-----#

SIDC URSIGRAM 21020  
SIDC SOLAR BULLETIN 20 Oct 2022, 1230UT  
SIDC FORECAST (valid from 1230UT, 20 Oct 2022 until 22 Oct 2022)  
SOLAR FLARES : C-class flares expected, (probability >=50%)  
GEOMAGNETISM : Quiet (A<20 and K<4)  
SOLAR PROTONS : Quiet  
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PREDICTIONS FOR 22 Oct 2022 10CM FLUX: 109 / AP: 005  
COMMENT: Solar flaring activity was at low levels, with flare of largest X-ray output being the C5.3-class flare from NOAA Active Region (AR) 3122, peak time 20 October 03:26 UTC. NOAA AR 3126 has slightly developed over the past 24 hours. For the next 24 hours, C-class flares are expected while M-class flares are possible.

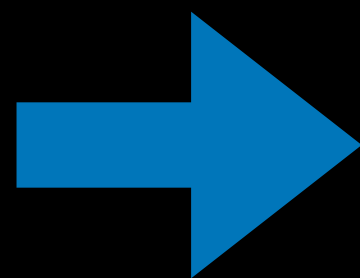
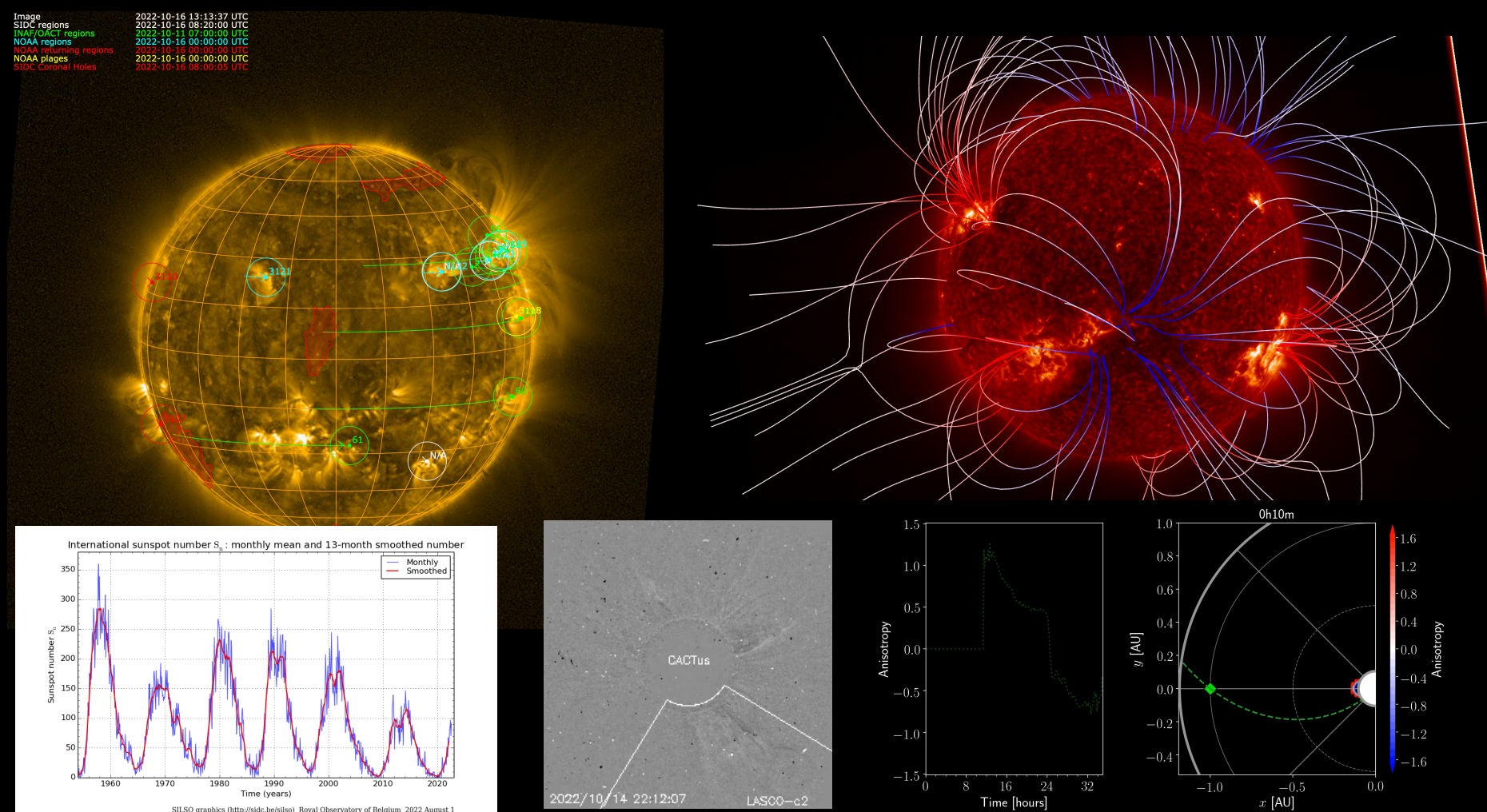
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International sunspot number  $S_n$  : monthly mean and 13-month smoothed number

