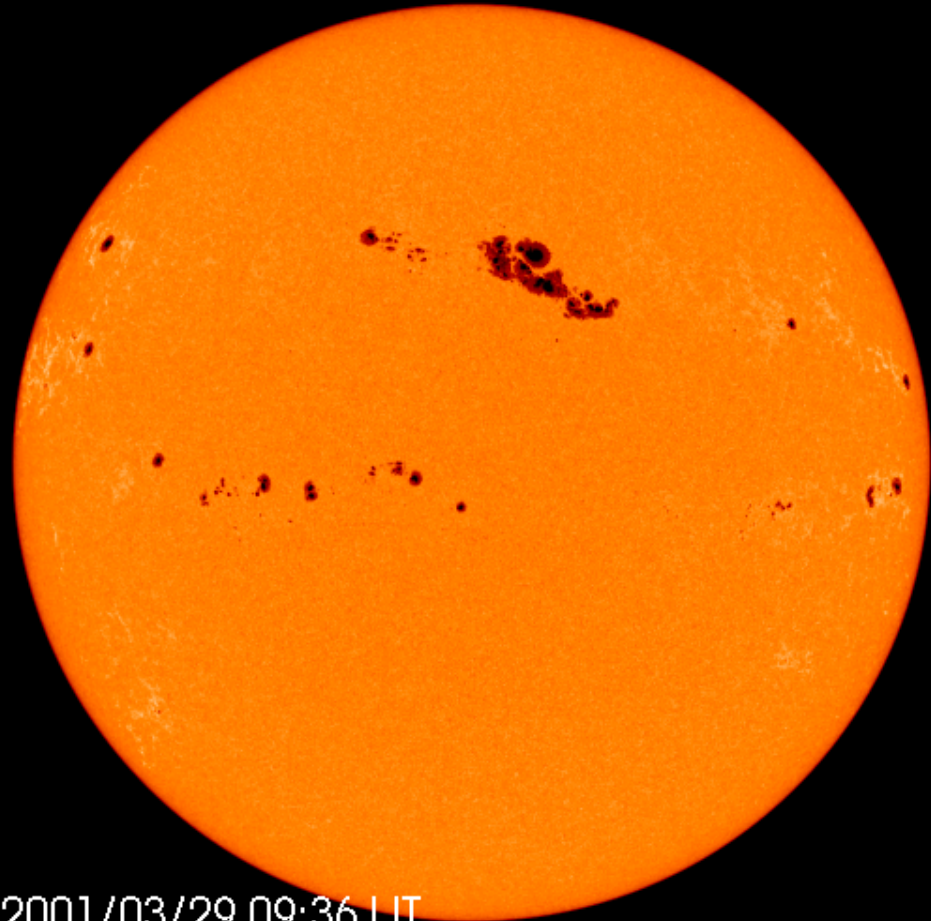


# Værmelding for verdensrommet

Arve Aksnes, Universitetet i Bergen

22. April 2009



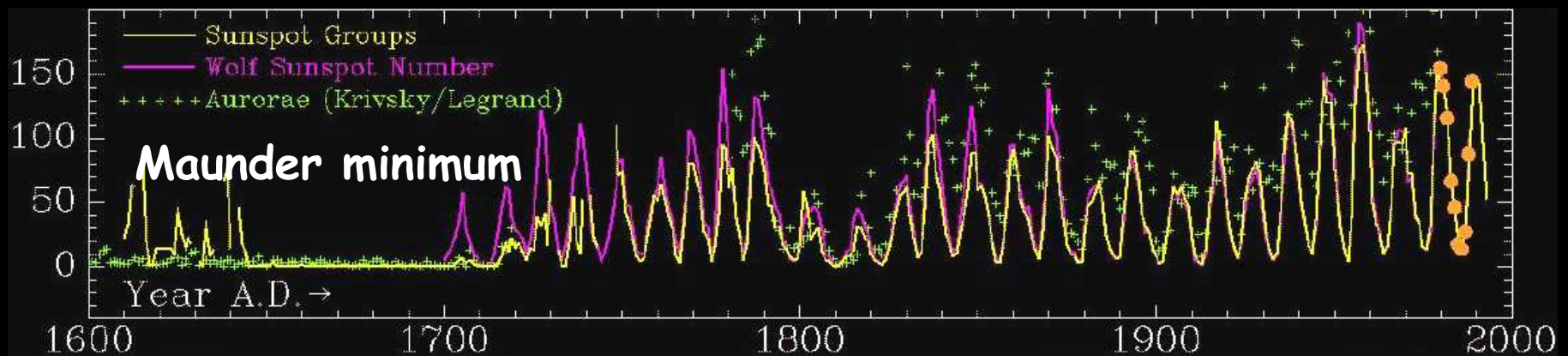
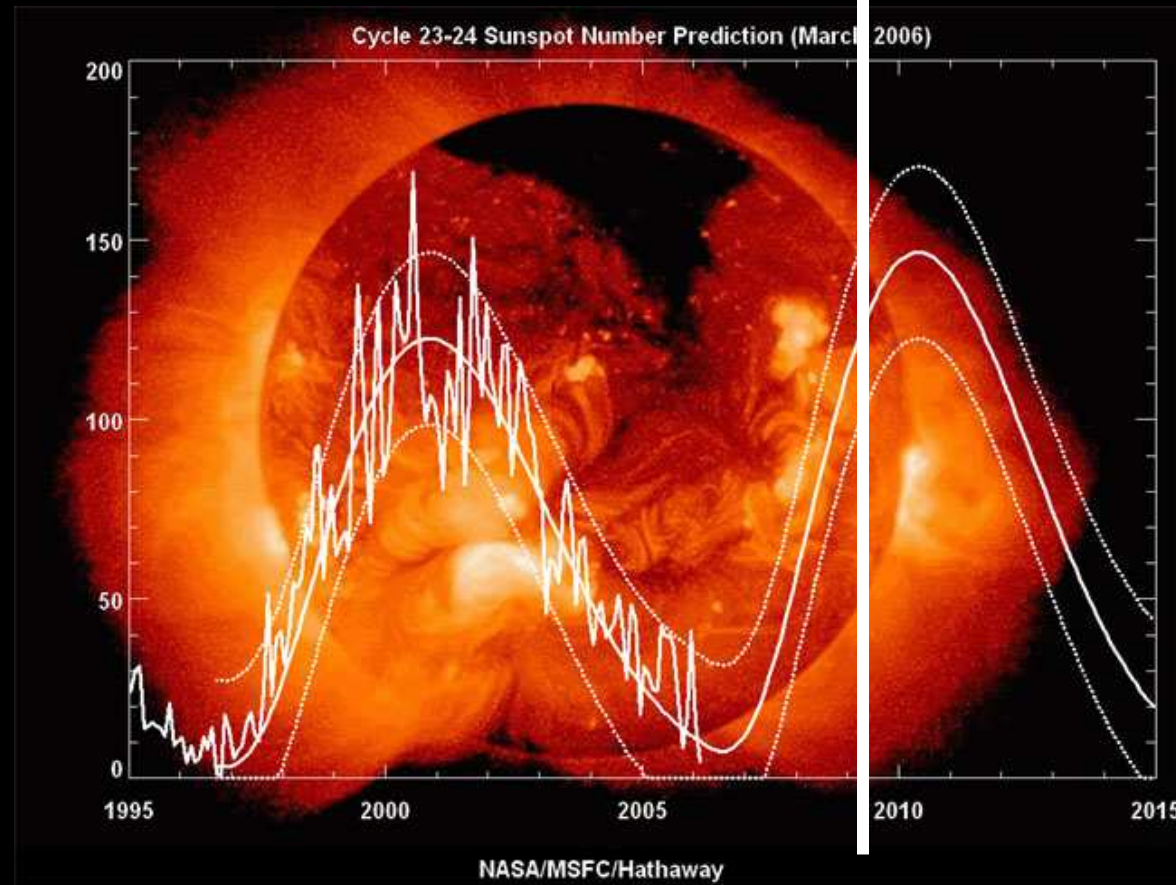


2001/03/29 09:36 UT

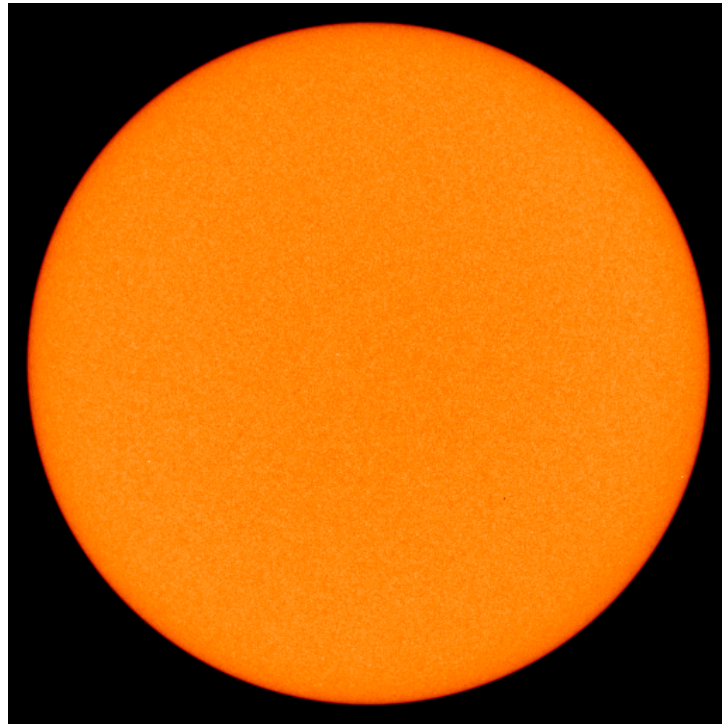


11-årig  
solsyklus  
(solflekker)

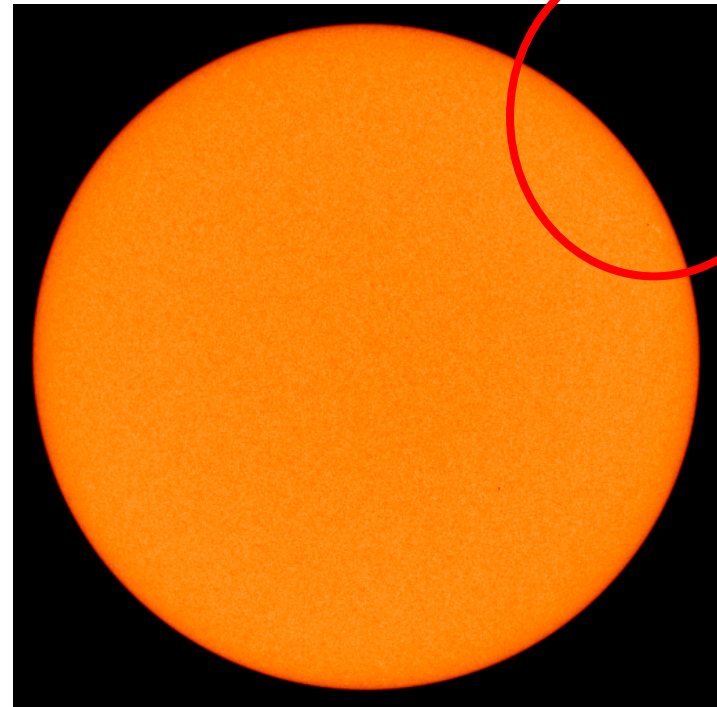
Neste  
maksimum:  
ca. 2010



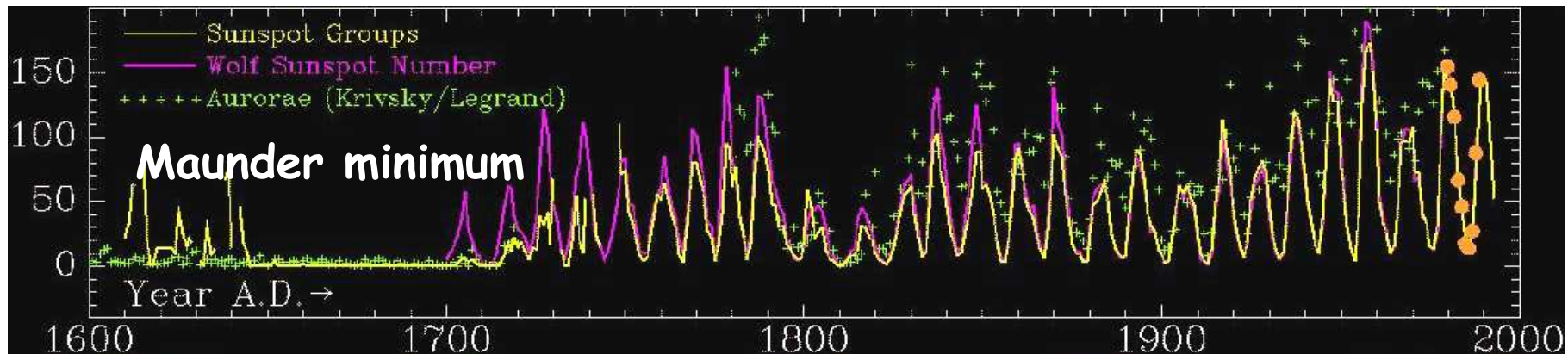
<http://spaceweather.com/>



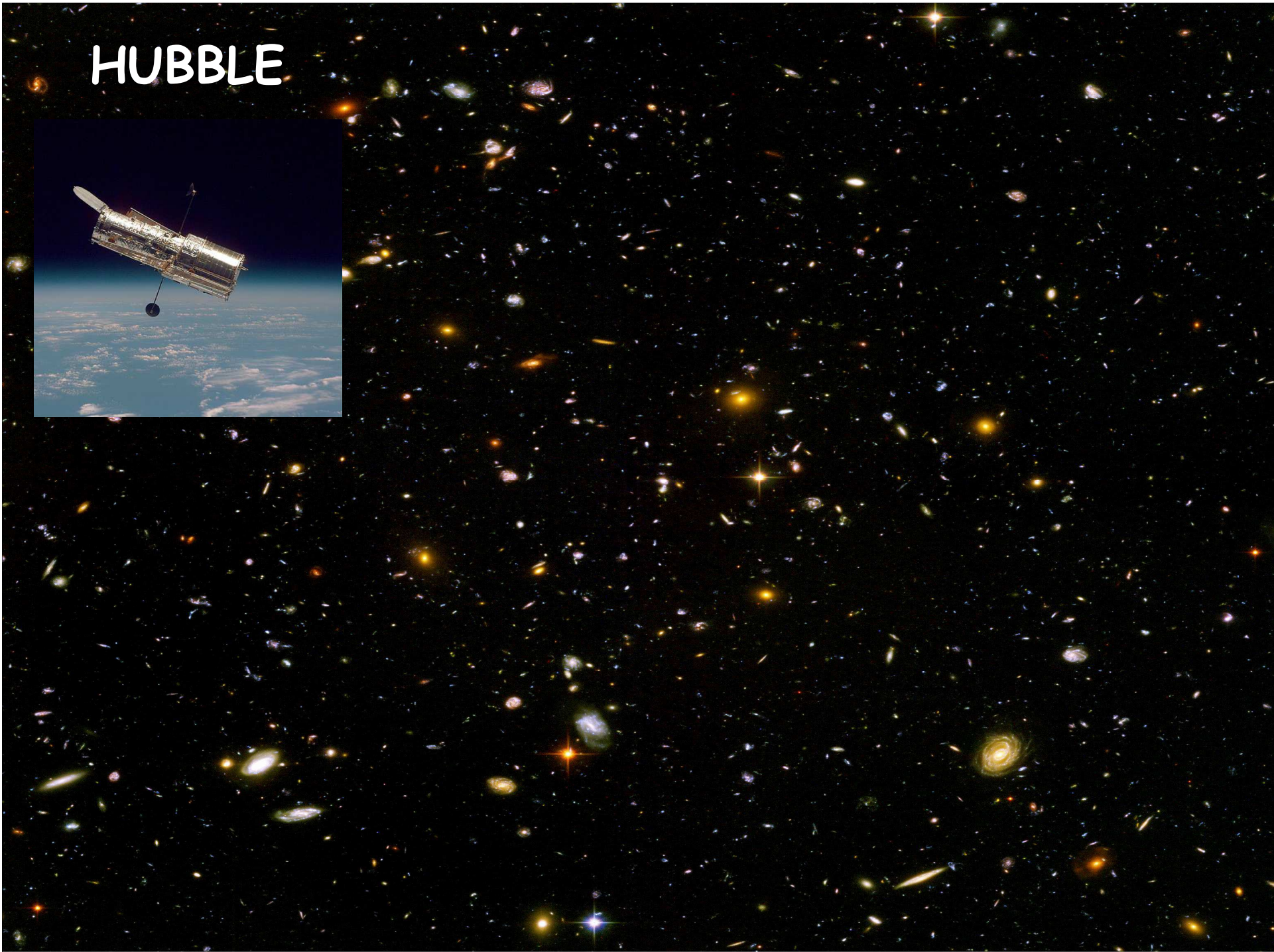
The Sun is blank - no sunspots



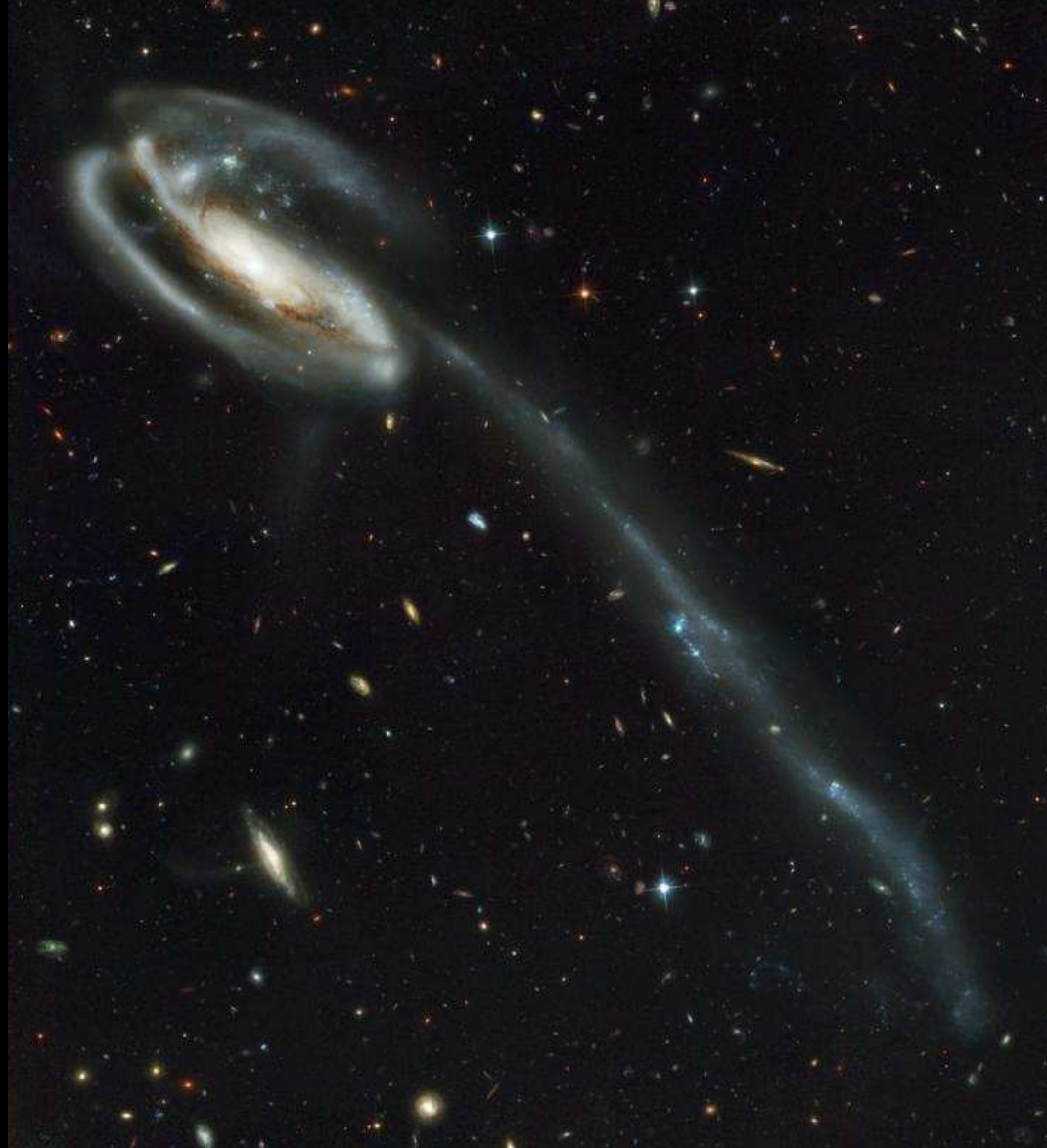
Ny solfleck i går, men omtrent vekke etter 24 timer...



# HUBBLE



Galakser fra det store verdensrom  
**Tadpole**



Galakser fra det store verdensrom  
**Messier 81**



Galakser fra det store verdensrom  
**Whirlpool og NGC 5195**

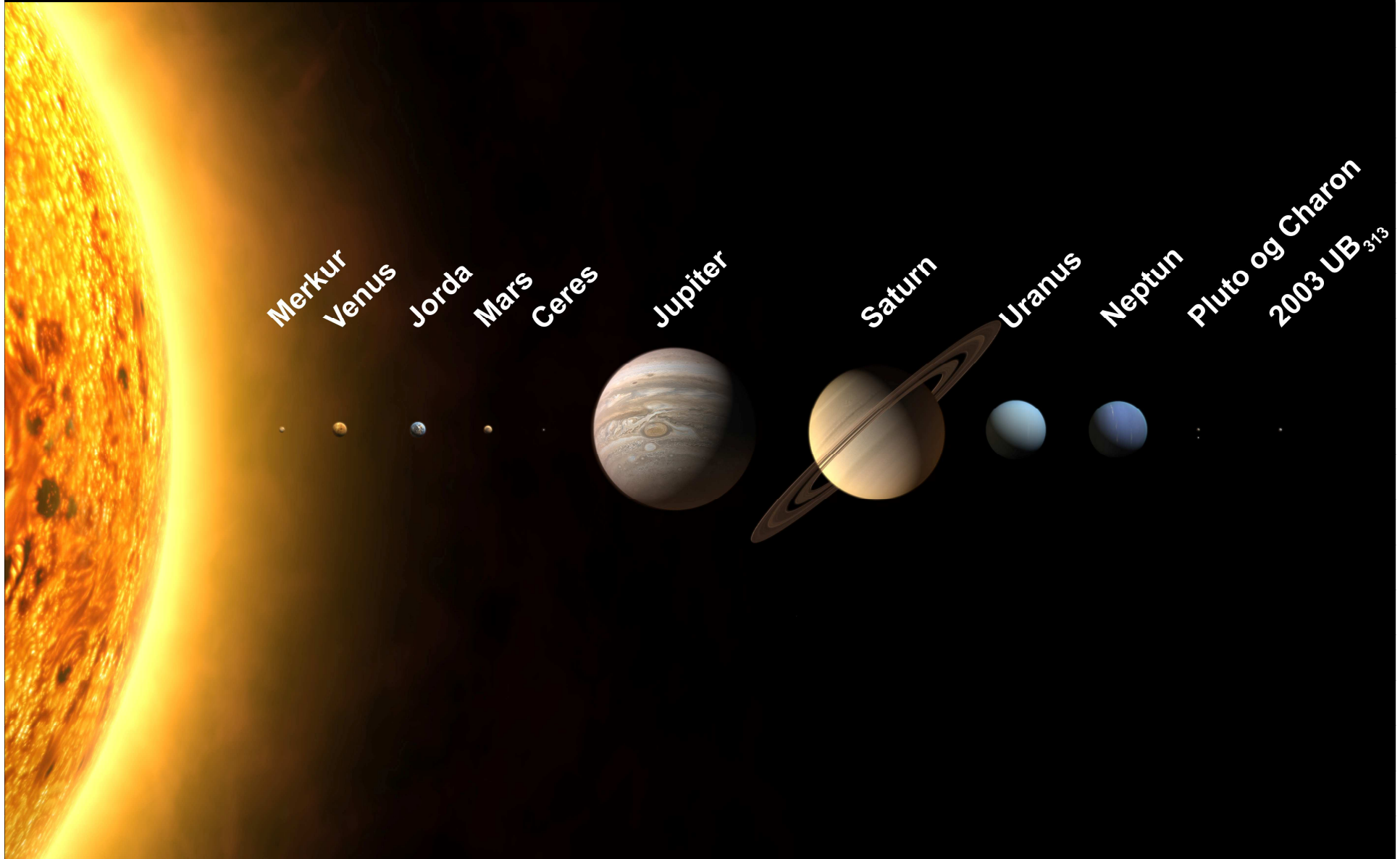




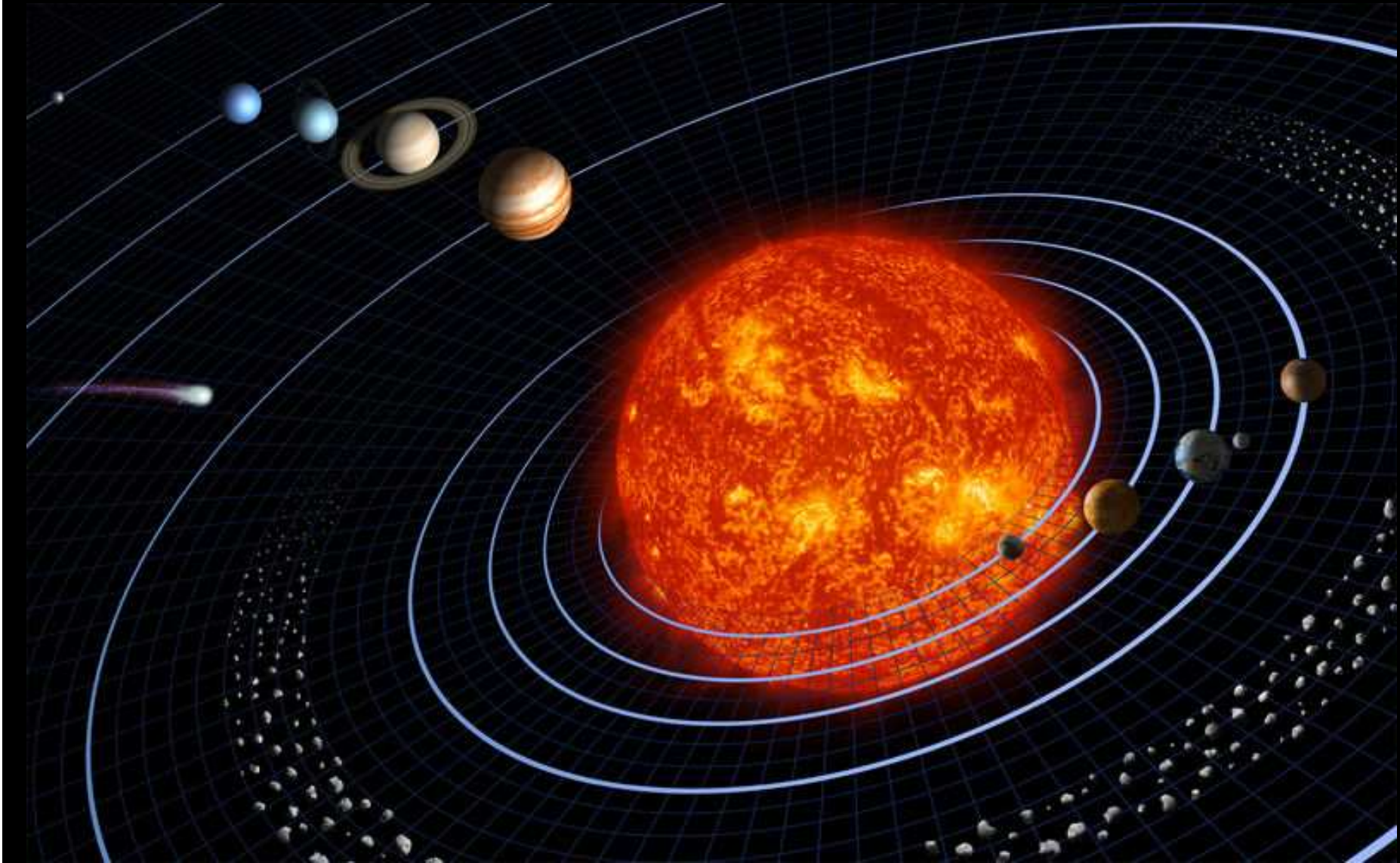
Vår egen galakse  
**Melkeveien**



# Solsystemet består av 8 planeter og 3 dvergplaneter



# Planetene går i bane rundt Solen



Jorden

Venus



Mars

Merkur

Pluto

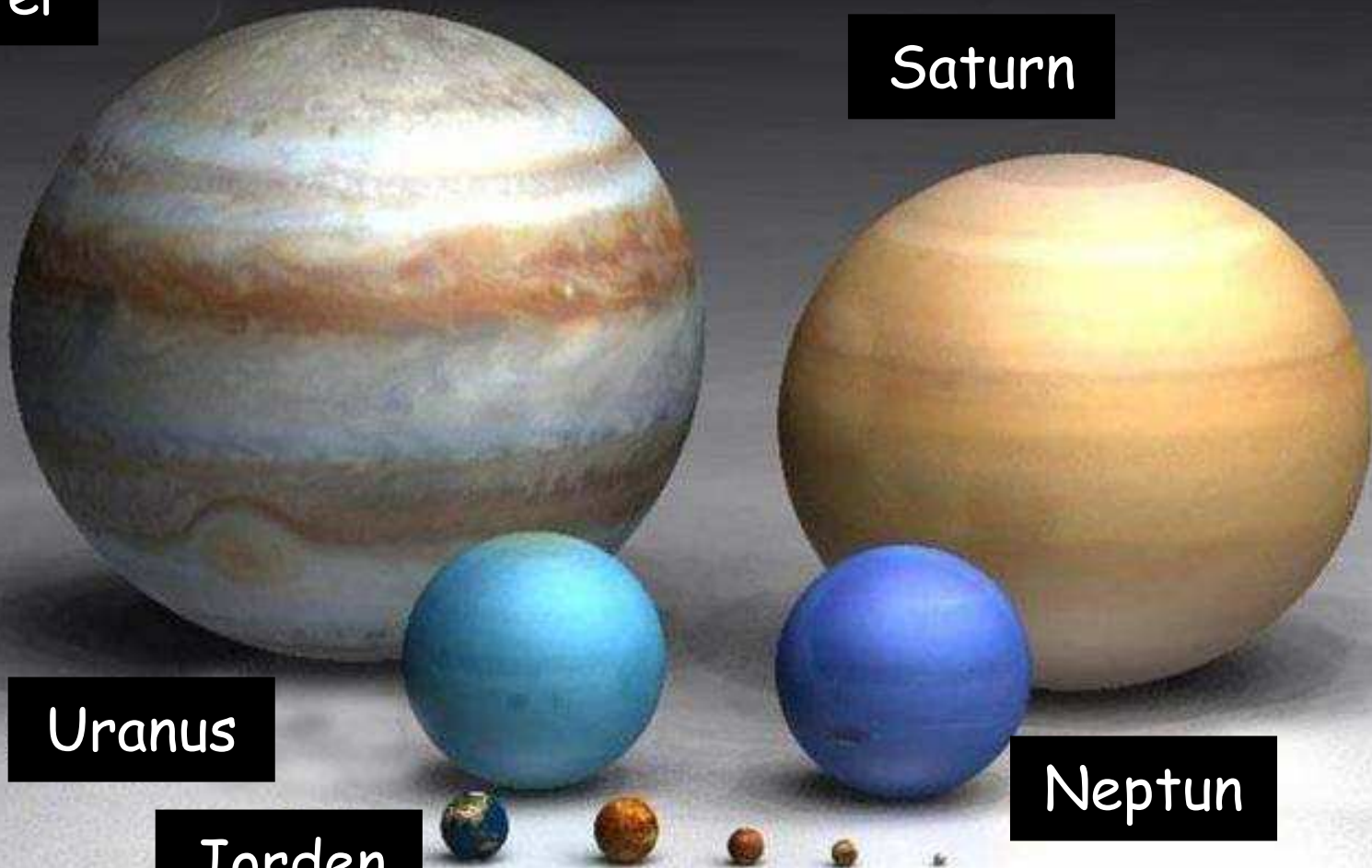
Jupiter

Saturn

Uranus

Neptun

Jorden



Solen



Jorden

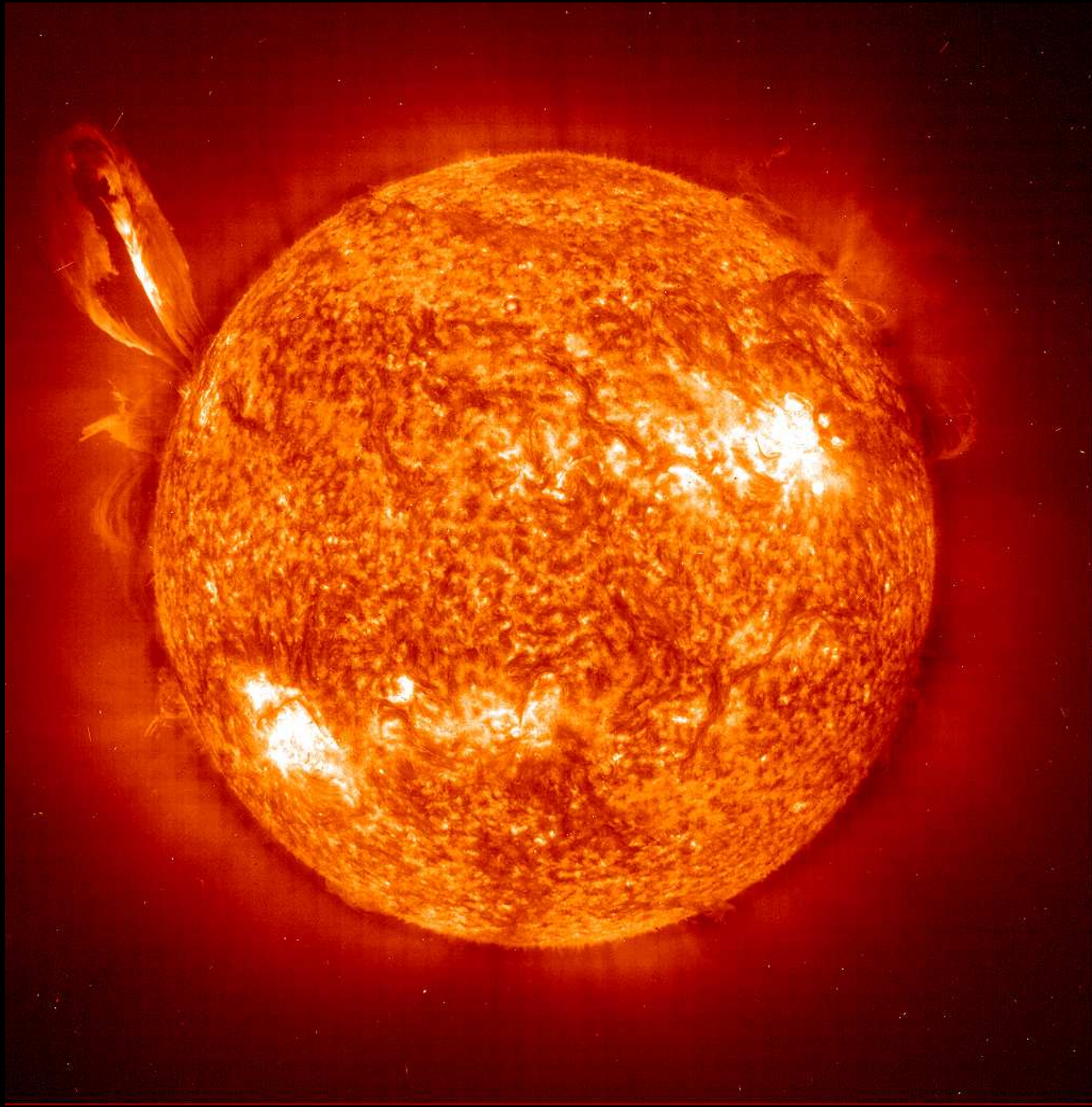




Fra Solen sendes det hele tiden ut:

1. Lys

2. Solvind





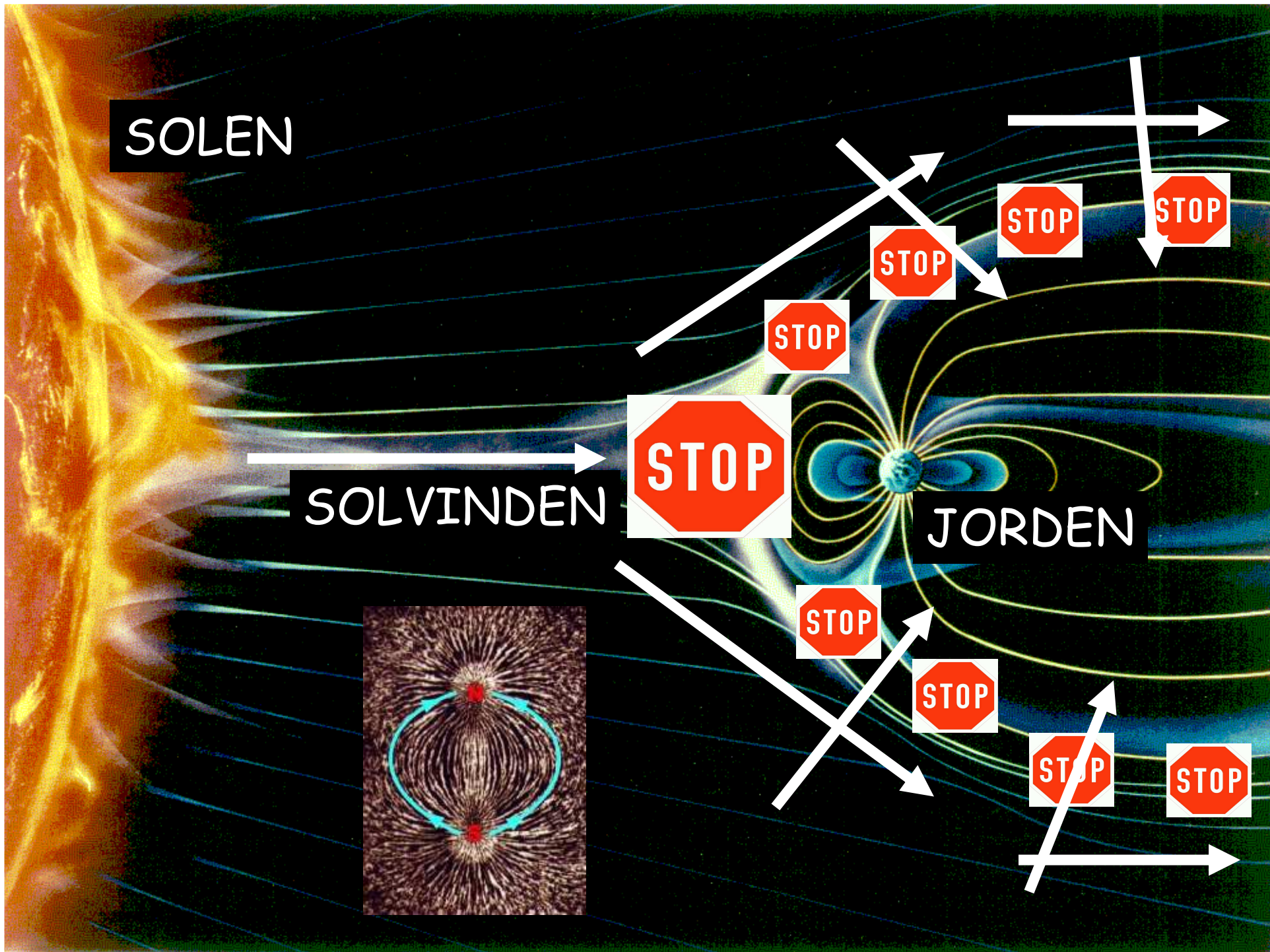
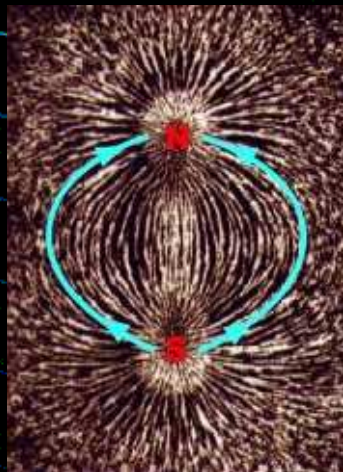
# Utbrudd på sola

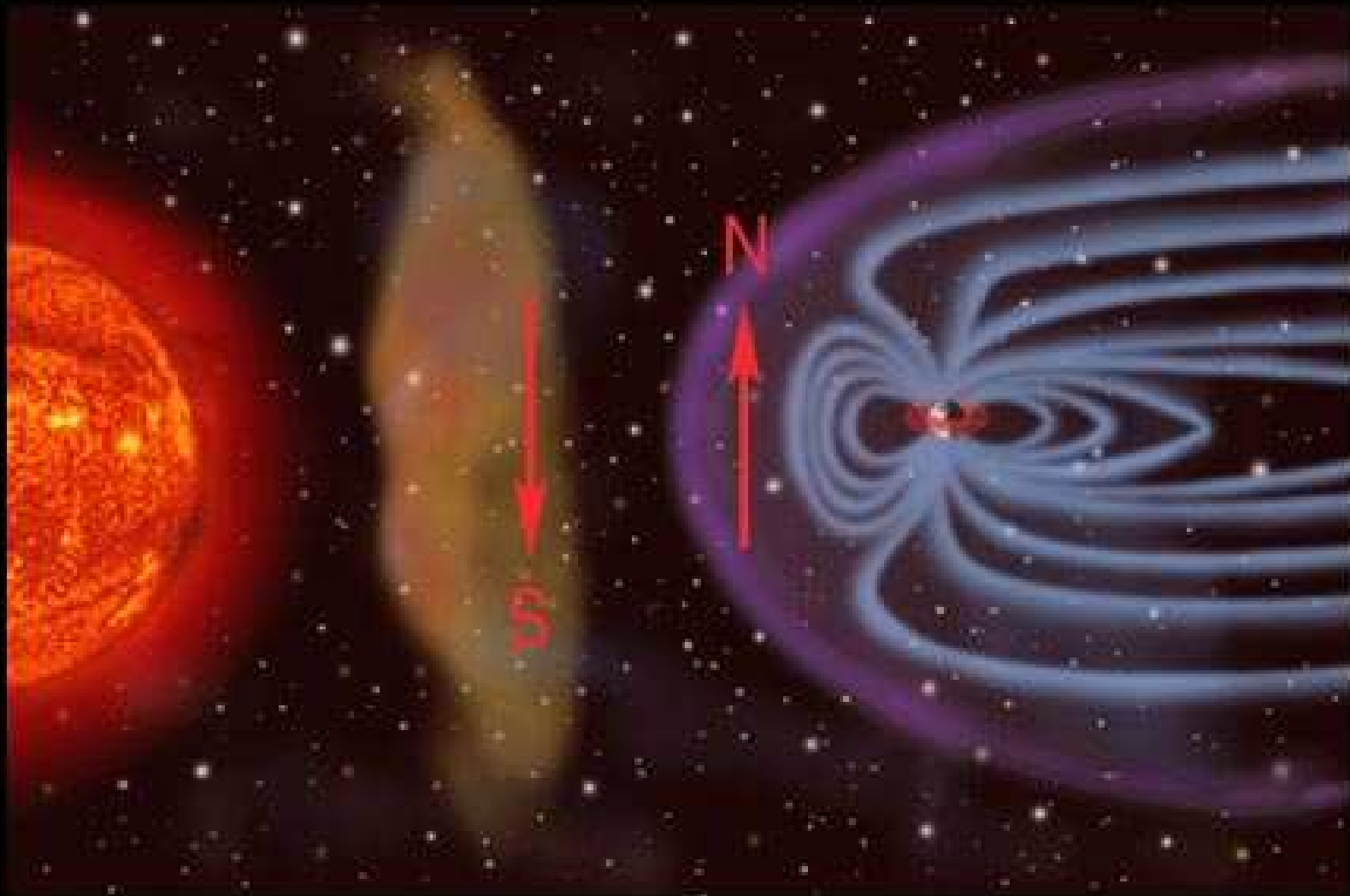


SOLEN

SOLVINDEN

JORDEN





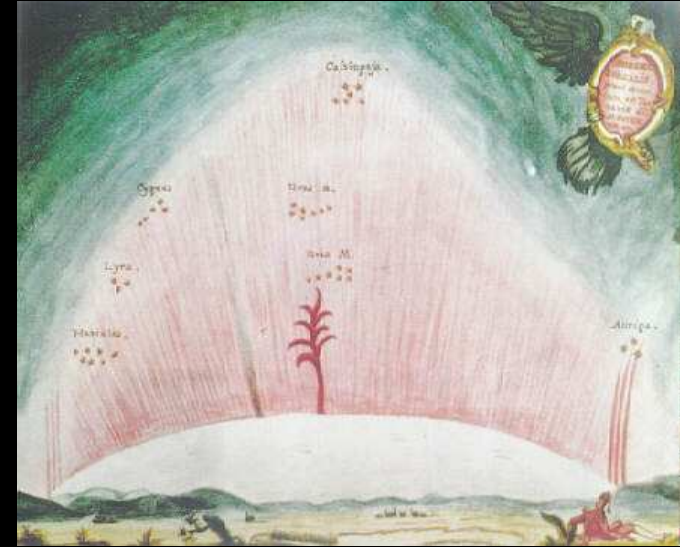




Toni Silvennoinen, Finland.



Wolf Drechel, Tyskland, 1591



Johan Fierer, Ungarn, 1778



Gerhard Munthe, Norge, 1892

# Vitenskap på en pengeseddel

- Nordlyset sett nedenfra opp mot Polarstjernen
- Store Bjørn og Lille Bjørn
- Snøkrystall - kald årstid
- Terrella-eksperiment



"Usynlig" komet

- Dagnordlyset over Svalbard
- Birkelandstrømmer



## - Solstormane lite å frykte

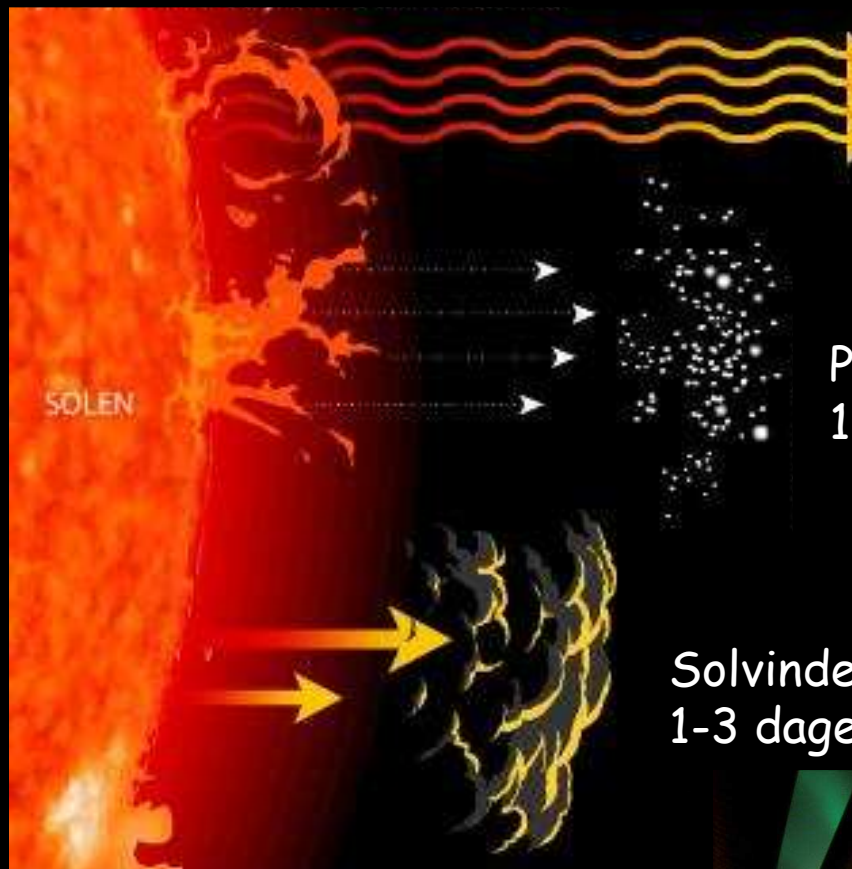
Eksplasjonane på sola den siste tida har vore historisk kraftige.

Satellittar og radiokommunikasjon er slått ut. Men påverkar eksplasjonane oss menneske utover dette? Lite, meiner romforskar.





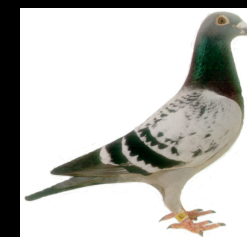
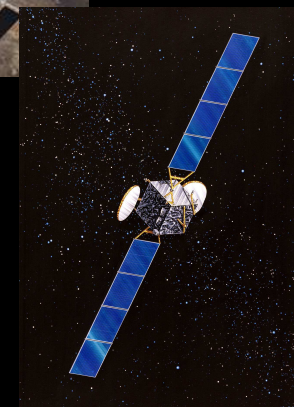
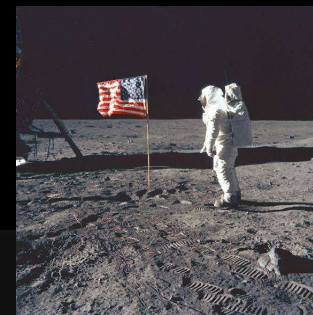
# Solen angriper!



Røntgenstråling:  
ca. 8 min

Protonskurer:  
15-60 min

Solvinden:  
1-3 dager

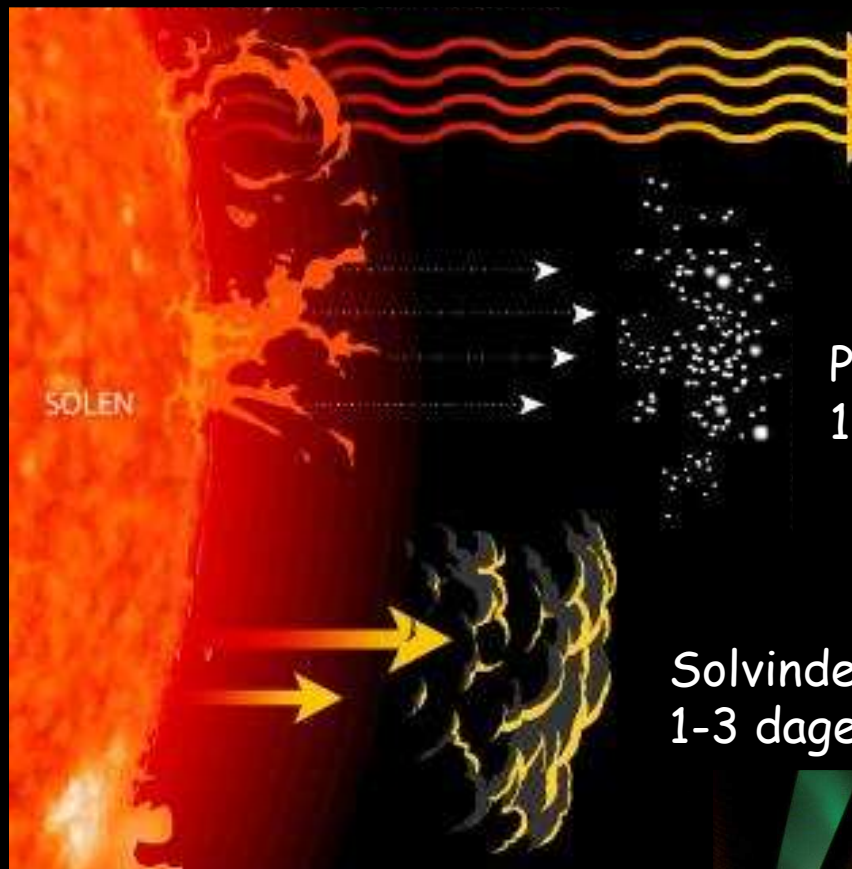




## - Gravide bør ikke fly

Det kan være lurt å ikke fly langt mens sola er så aktiv som nå, mener solforsker Brekke.

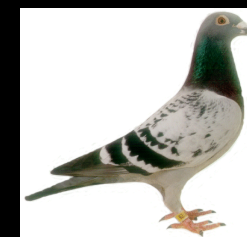
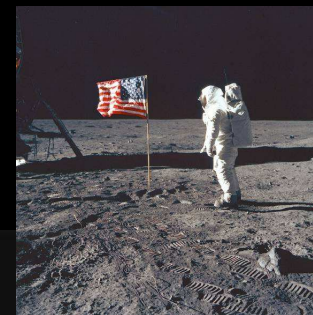
# Solen angriper!

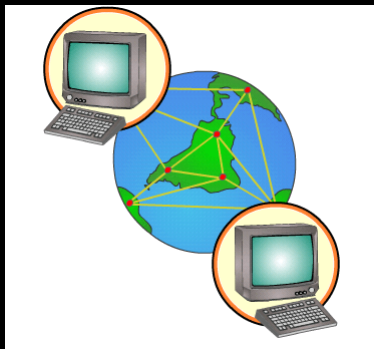
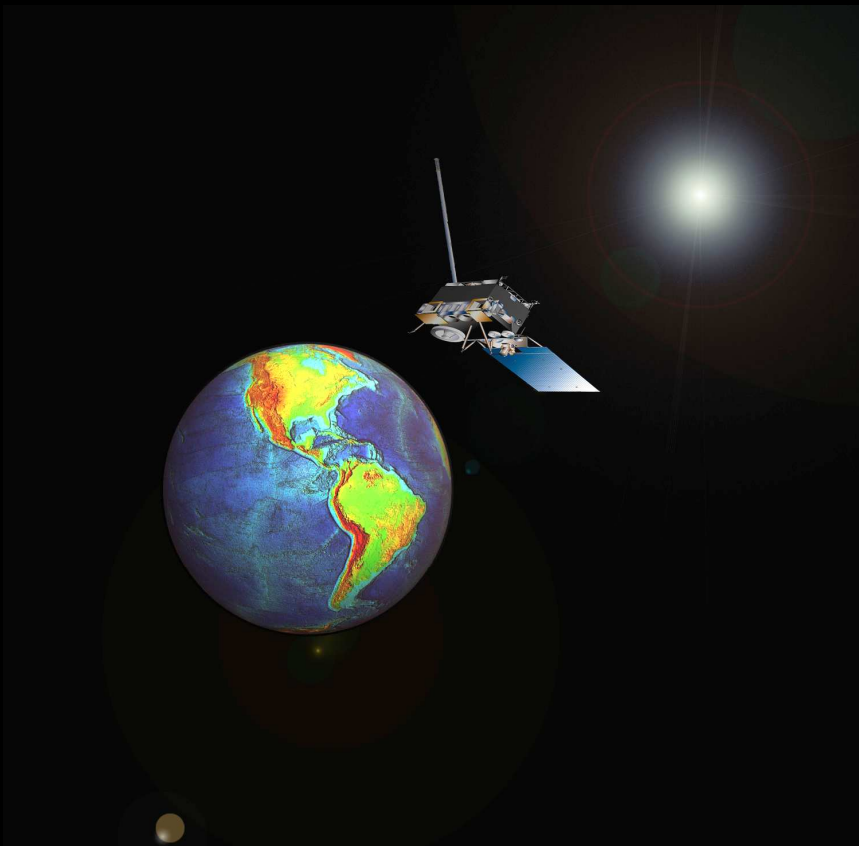


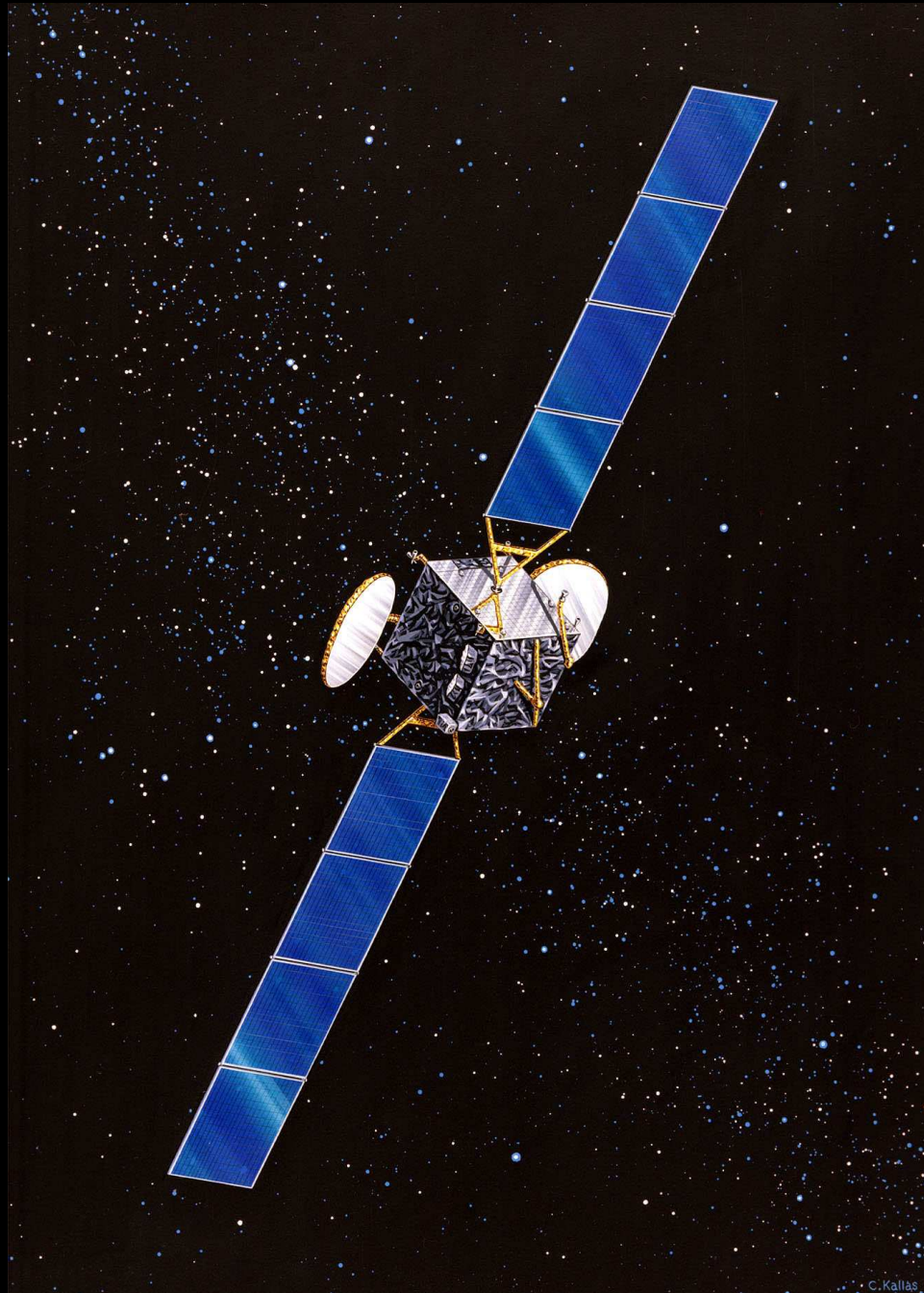
Røntgenstråling:  
ca. 8 min

Protonskurer:  
15-60 min

Solvinden:  
1-3 dager





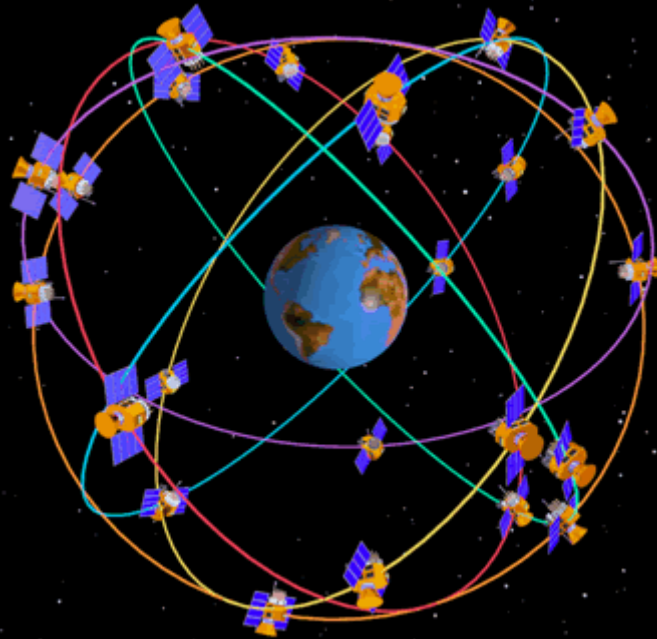


Galaxy IV ble slått ut  
av en solstorm den  
19. mai 1998

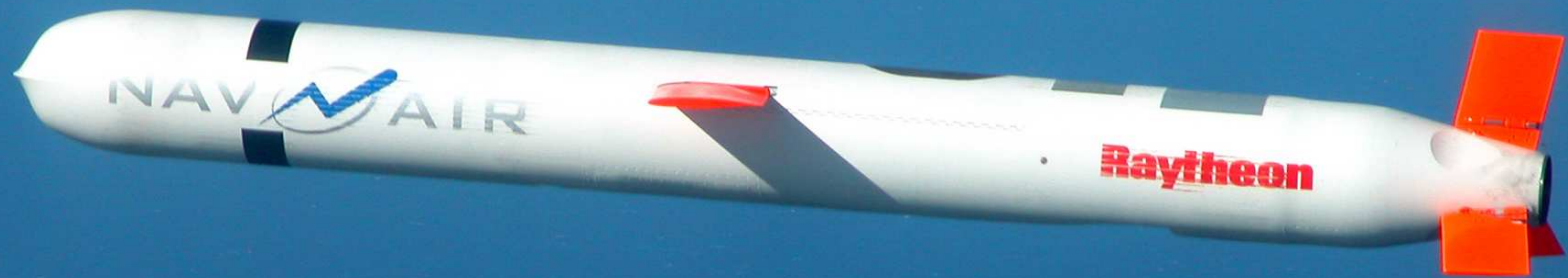
Kostnad:  
1.7 milliarder kr

Totale kostnader:  
Ca. 25-30 milliarder kr

# GPS (Global Position System) - satellitene



# GPS viktig i moderne krigføring

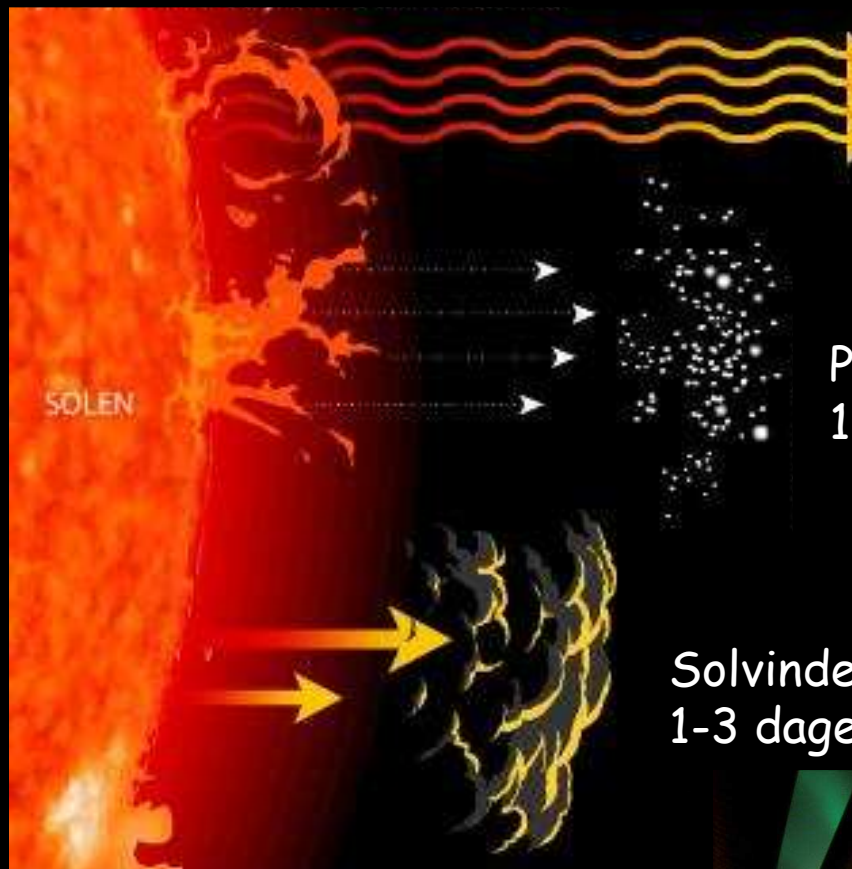


# SKYLAB - USA sin første romstasjon





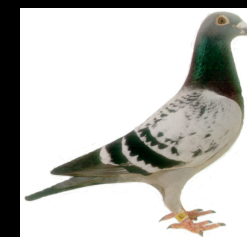
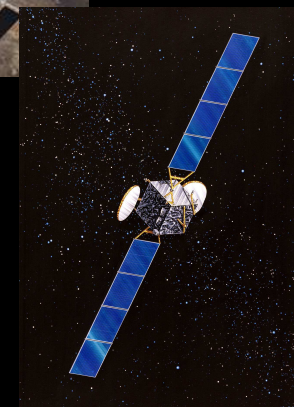
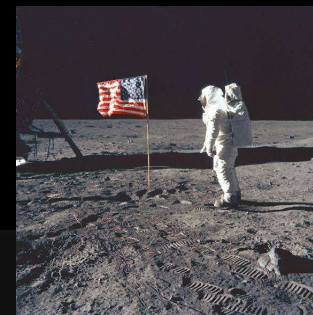
# Solen angriper!



Røntgenstråling:  
ca. 8 min

Protonskurer:  
15-60 min

Solvinden:  
1-3 dager







En solstorm den  
13. mars 1989 slo  
ut strømmen i  
Quebec, Kanada

Kostnad:  
1 milliard kr



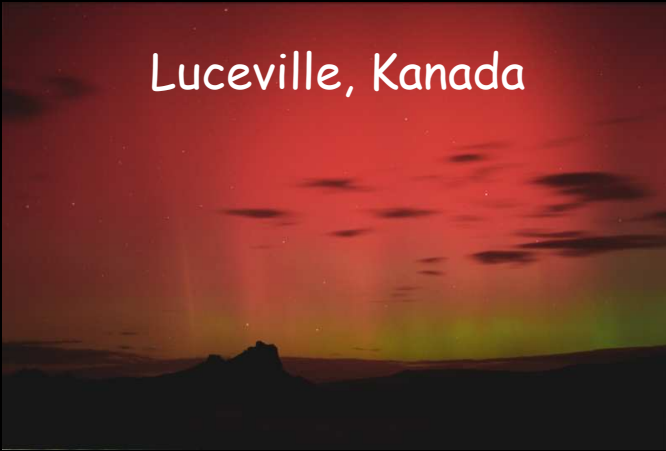
1-2 September 1859:  
Den perfekte solstorm



Stirling, Skottland



Luceville, Kanada



Stockholm, Sverige



2  
0  
0  
3

Copyright: CALVIN W. HALL  
WWW.CALVINW.HALL.COM  
Anchorage, Alaska



California



© 2003 Thad V'Soske

Fairbanks, Alaska



## Satellitt slått ut av solstormen

Den gigantiske solstormen har nettopp truffet oss. En satellitt er slått ut og det er kraftig nordlys i California.



# Solstorm stogga anleggsarbeid

Dei kraftige eksplosjonane på Sola førte i går til full stogg i anleggsarbeidet på riksveg 5 mellom Førde og Florø.

Dei magnetiske solstormane slo nemleg ut GPS-mottakarane som anleggsarbeidarane brukar til å navigere etter. Dermed hamna anleggsarbeidarane bokstavleg talt på ville vegar.



30. Oktober 2003

# Aftenposten

## Solstorm ga strøm av UFO-meldinger

Den voldsomme stormen som herjer på Solen førte natt til torsdag til en bølge av UFO-meldinger i Tyskland.

... rapporter om underlige himmelfenomener.

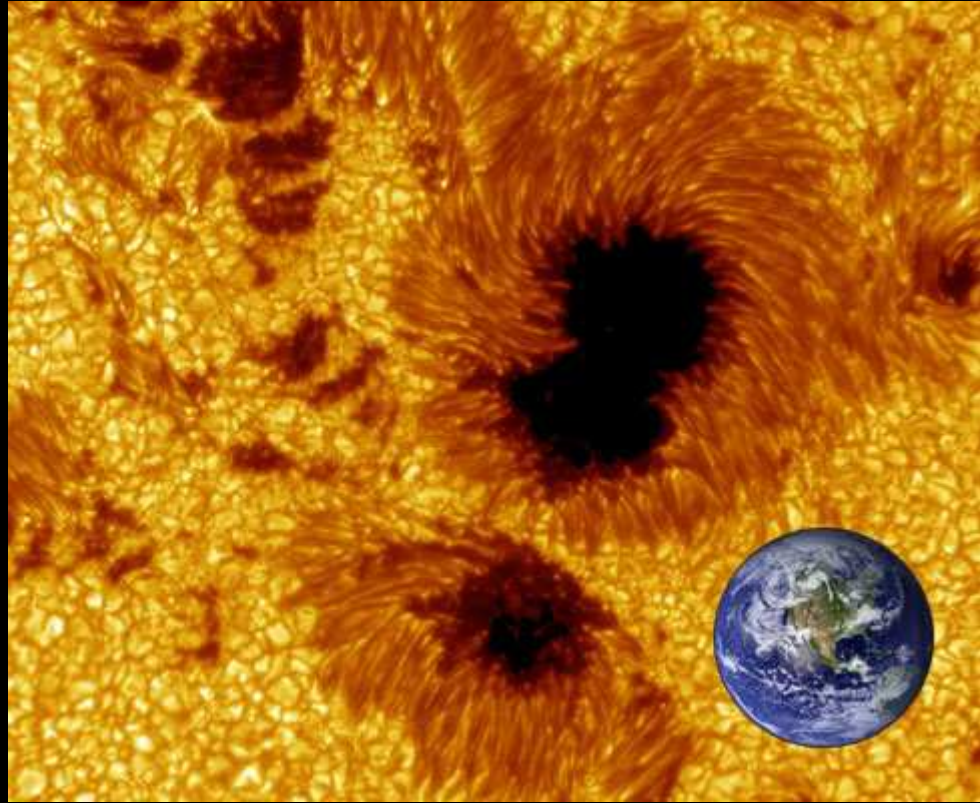




## SYDKRAFT: Solstorm kan ha forårsaket strømbrudd

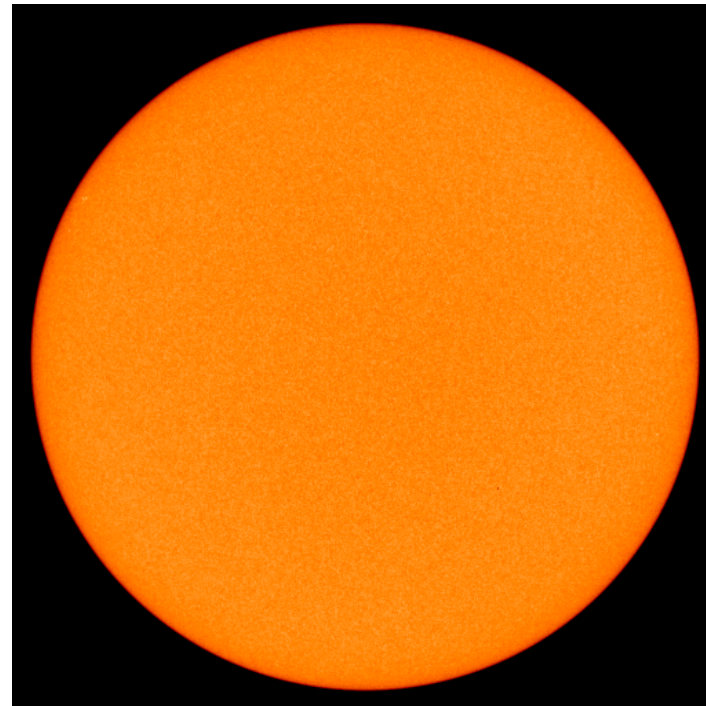
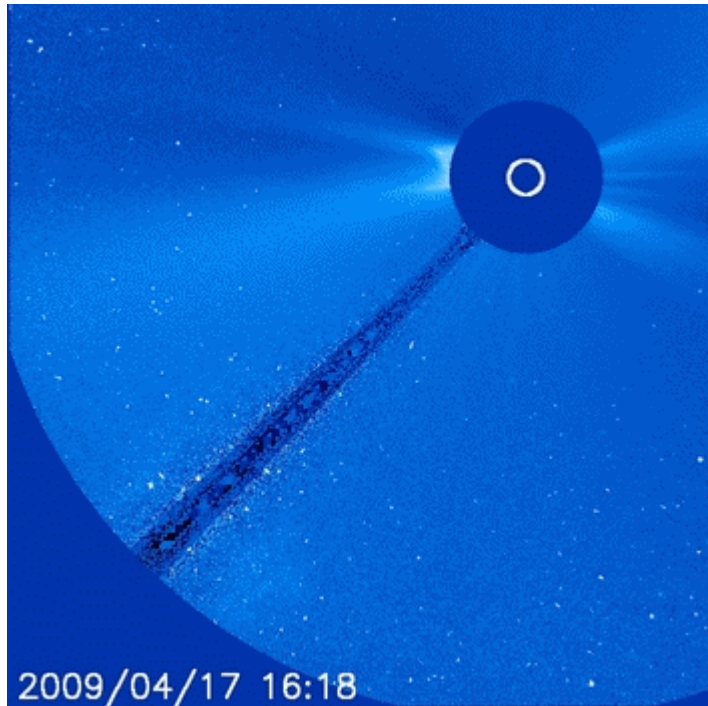
Solstormene som har herjet de siste dagene kan ha forårsaket strømbruddet som rammet 50.000 i Sør-Sverige torsdag kveld.





<http://spaceweather.com/>

**EXPLOSION ON THE SUN:** A billion-ton cloud of hot magnetized gas has just left the sun. The Solar and Heliospheric Observatory (SOHO) recorded the explosion at the end of the day on April 17th.

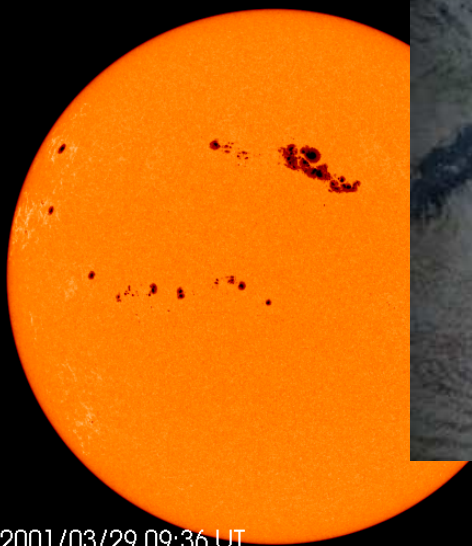
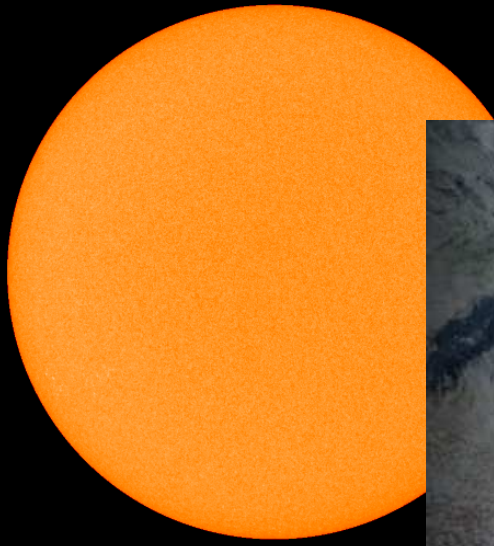


The bright coronal mass ejection (CME) is not heading for Earth, so there will be no geomagnetic effects from the explosion. But it does remind us that sunspots are not required for solar activity.



Roar Hansen, Bergen



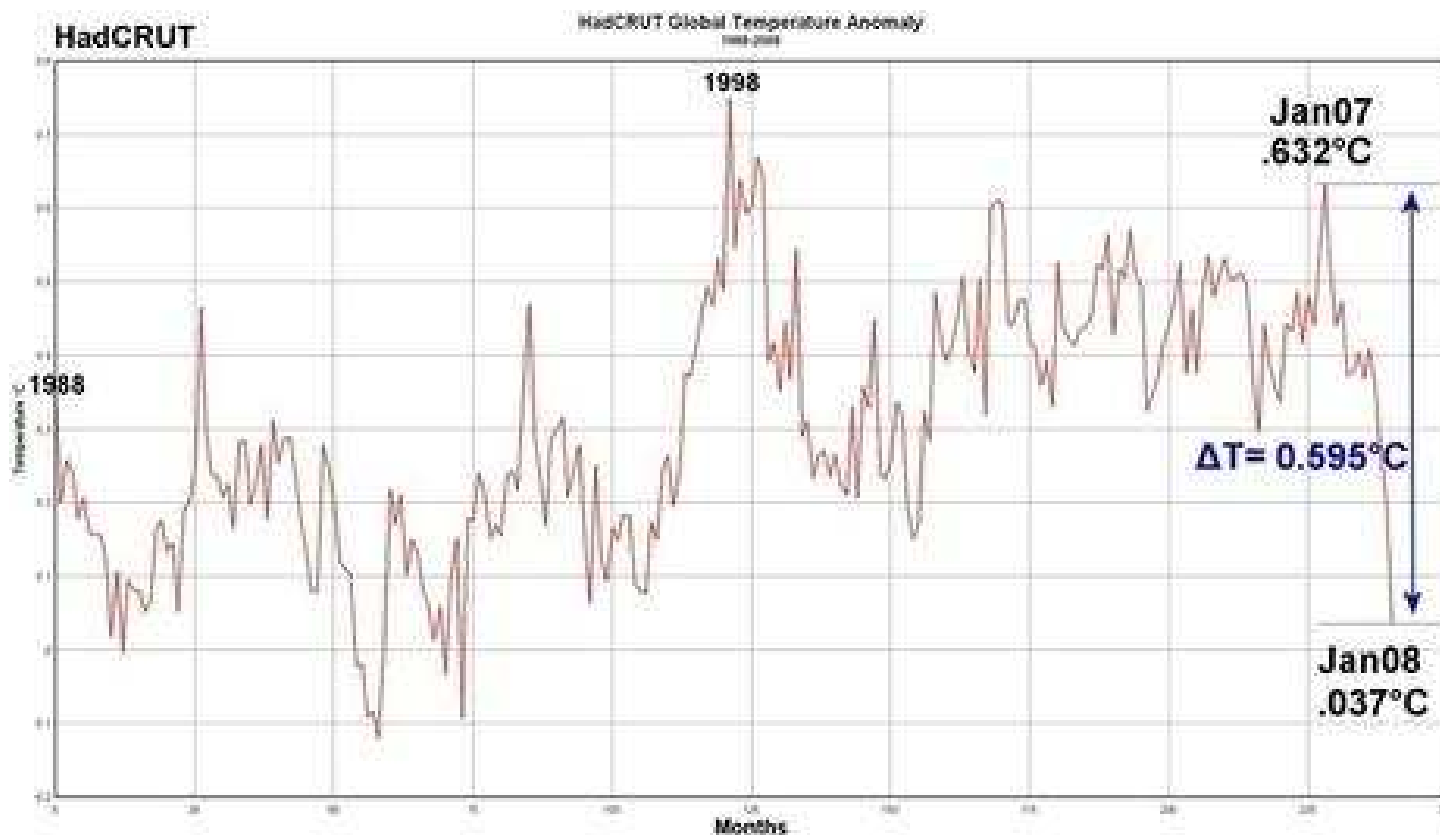


2001/03/29 09:36 UT



## Verden er blitt kaldere

Jordkloden har ikke vært kaldere siden 1994, viser nye tall. Det siste året har temperaturen falt raskere enn noen gang i før moderne tid.



## Året da Bergen var varm og verden kald

Mens 2008 ble nest varmest i Bergen på hundre år, var det kjølig på verdensbasis. Det betyr ikke at den globale oppvarmingen har stanset.





Takk for oppmerksomheten 😊

