

— 19 décembre 2023 —
Astronef

La météo de l'espace ou l'impact du Soleil sur la Terre



Manon Jarry



28 août 1859
Mer des Caraïbes



28 août 1859

Mer des Caraïbes

Des phénomènes étranges surviennent

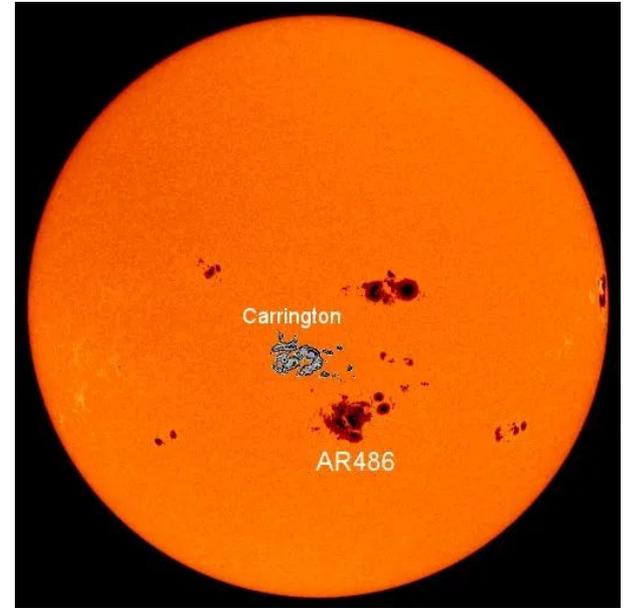
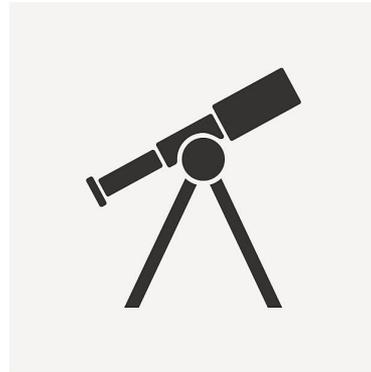


1 septembre 1859
Richard Carrington



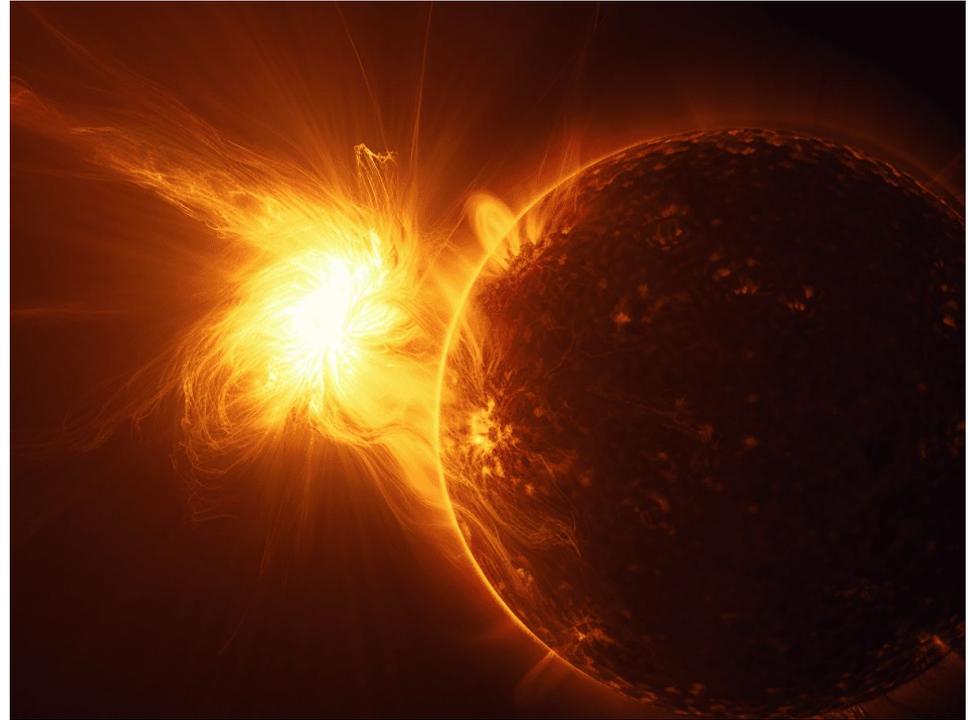
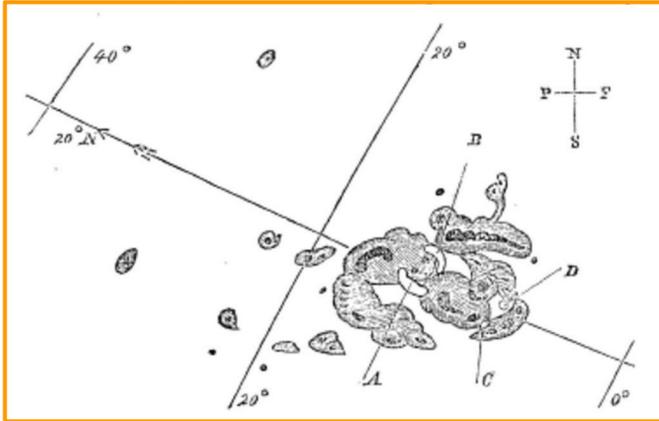
1 septembre 1859

Richard Carrington pointe son télescope sur le Soleil



1 septembre 1859

Un éclair très intense provient d'un groupe de tâches au centre du Soleil





17 heures plus tard
Hawaï



17 heures plus tard
Hawaï

Panama





17 heures plus tard
Hawaï

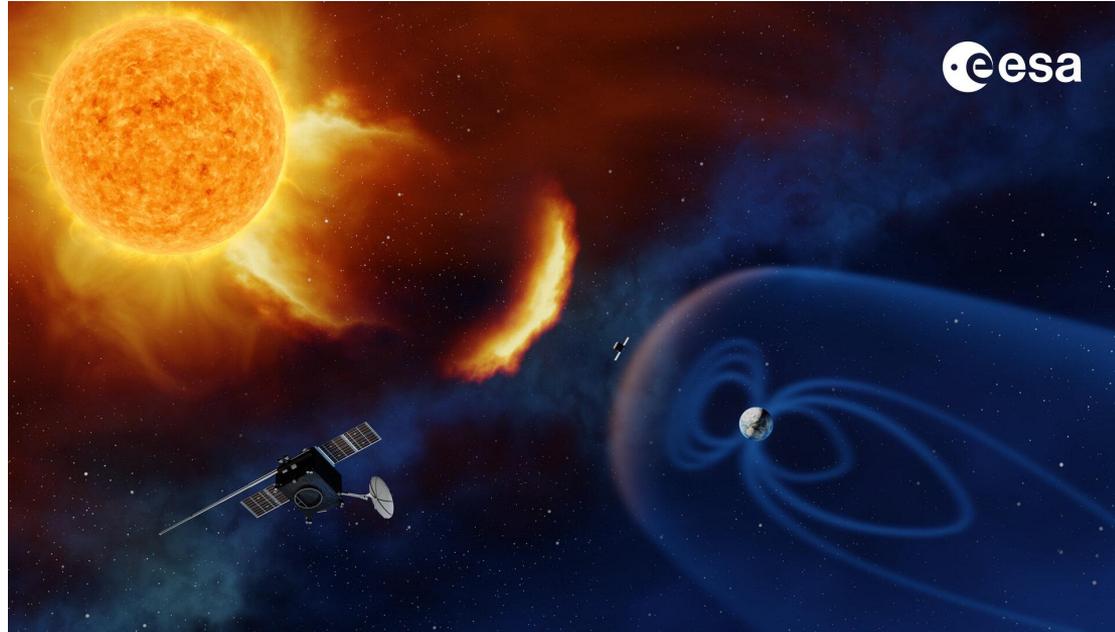
Panama



Le 3 septembre 1859, le *Baltimore American and Commercial Advertiser* :

« Ceux qui sont sortis tard jeudi soir ont eu l'occasion d'assister à un autre magnifique spectacle de lumières aurorales. Le phénomène était très similaire à celui de dimanche soir, bien que la lumière ait parfois été plus brillante et les teintes prismatiques plus variées et plus belles. La lumière semblait couvrir tout le firmament, comme un nuage lumineux, à travers lequel brillaient indistinctement les étoiles de plus grande magnitude. La lumière était plus forte que celle de la Lune à sa pleine puissance, mais elle avait une douceur et une délicatesse indescriptibles qui semblaient envelopper tout ce sur quoi elle reposait. Entre minuit et 1 heure, lorsque le spectacle était à son apogée, les rues tranquilles de la ville reposant sous cette étrange lumière revêtaient une apparence aussi belle que singulière. »

Que s'est-il passé ?



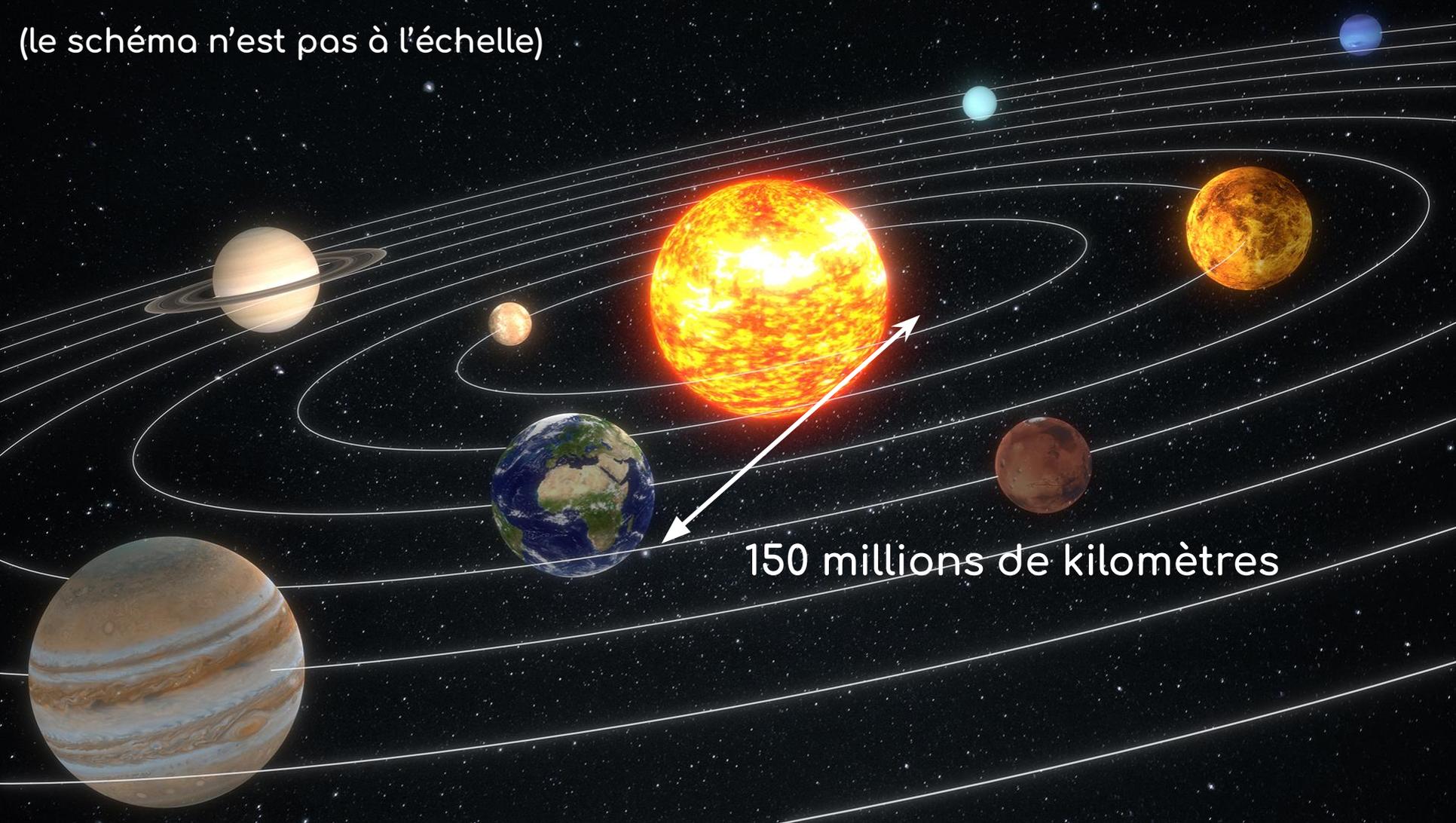
On met nos lunettes de
chercheurs





- lumières en altitude
- différentes couleurs
- plutôt du côté nuit
- variations dans les mesures du champ magnétique terrestre local
- corrélation entre un phénomène solaire et une aurore

(le schéma n'est pas à l'échelle)

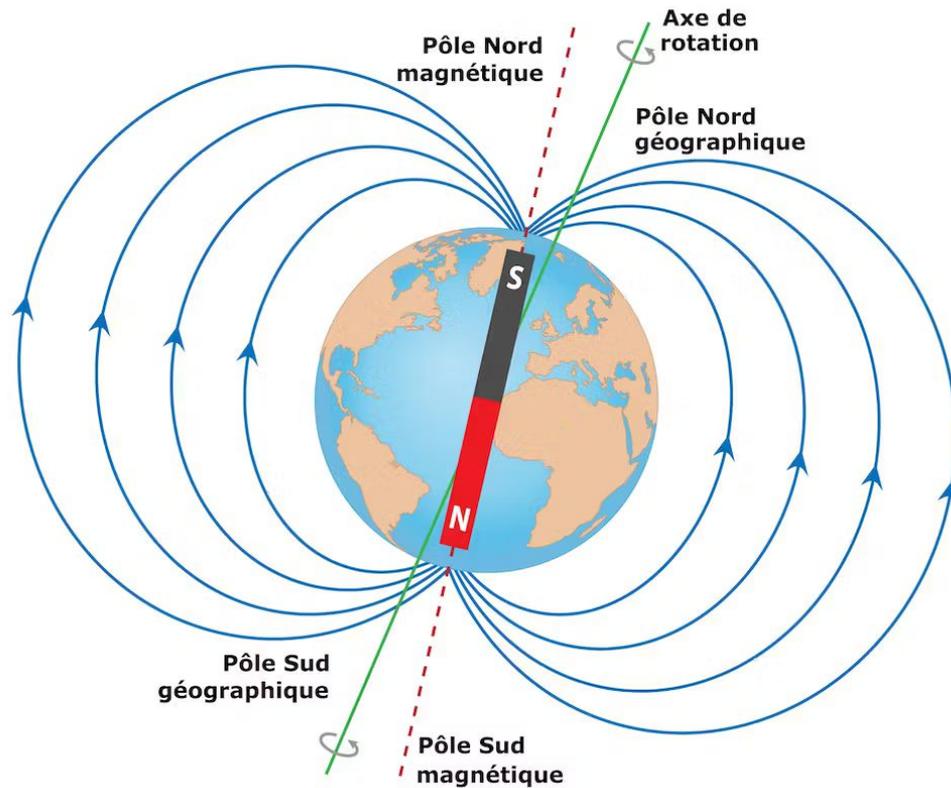


150 millions de kilomètres

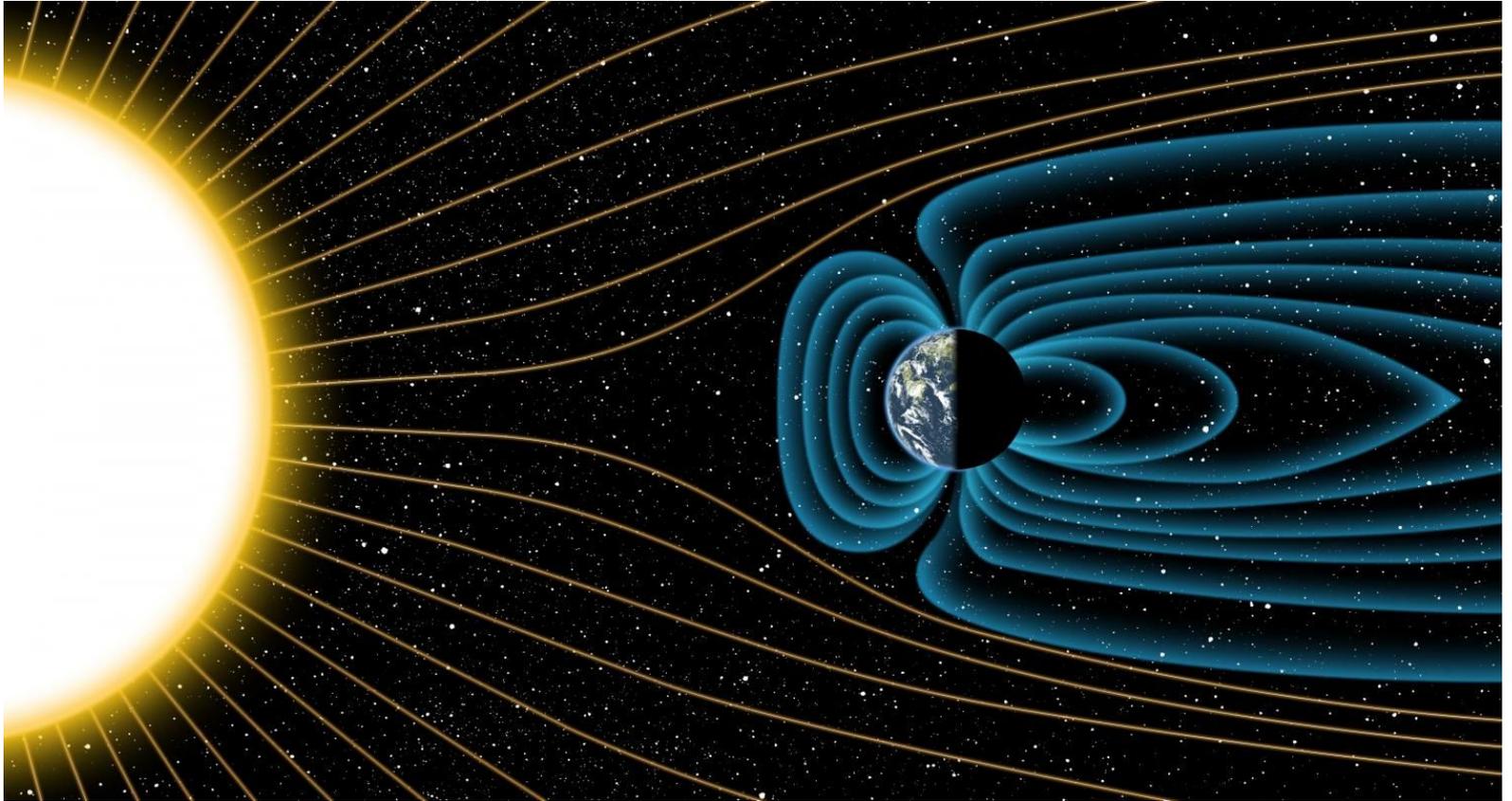
Explications

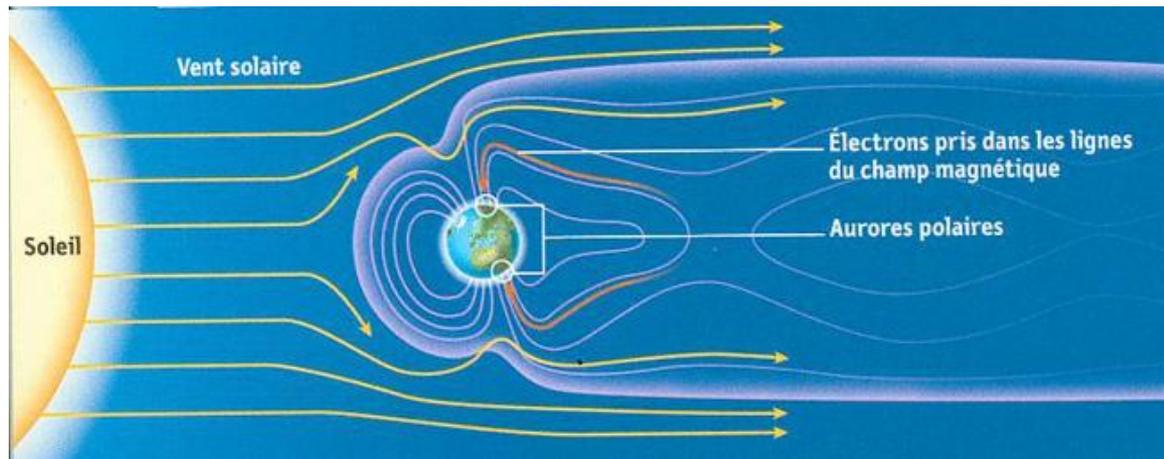
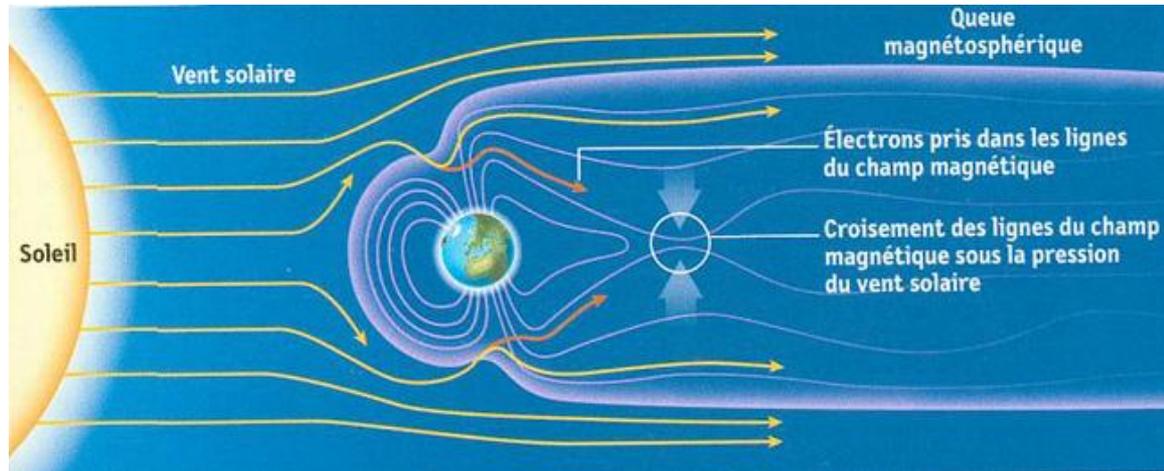


Le champ magnétique

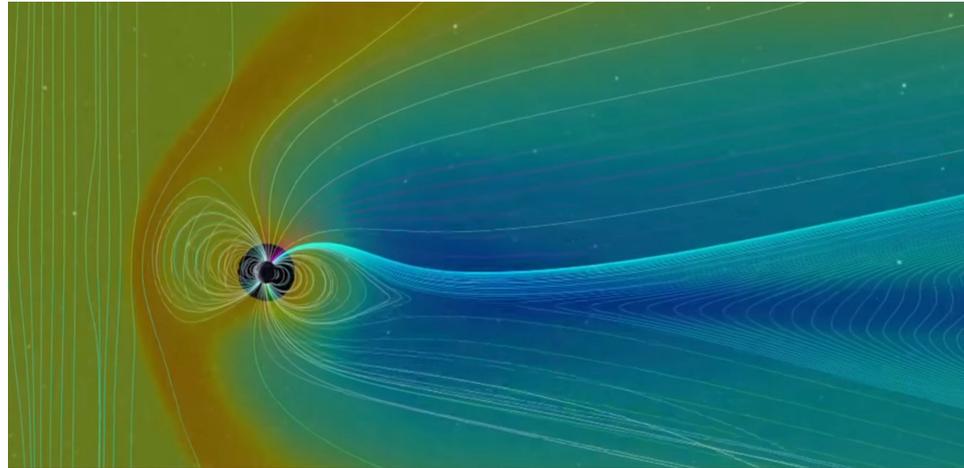


Le champ magnétique

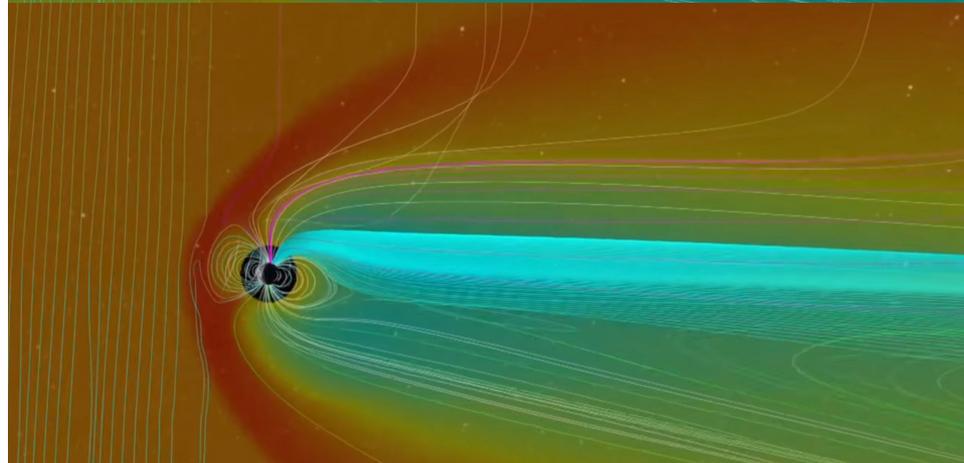




Retour sur l'événement Carrington

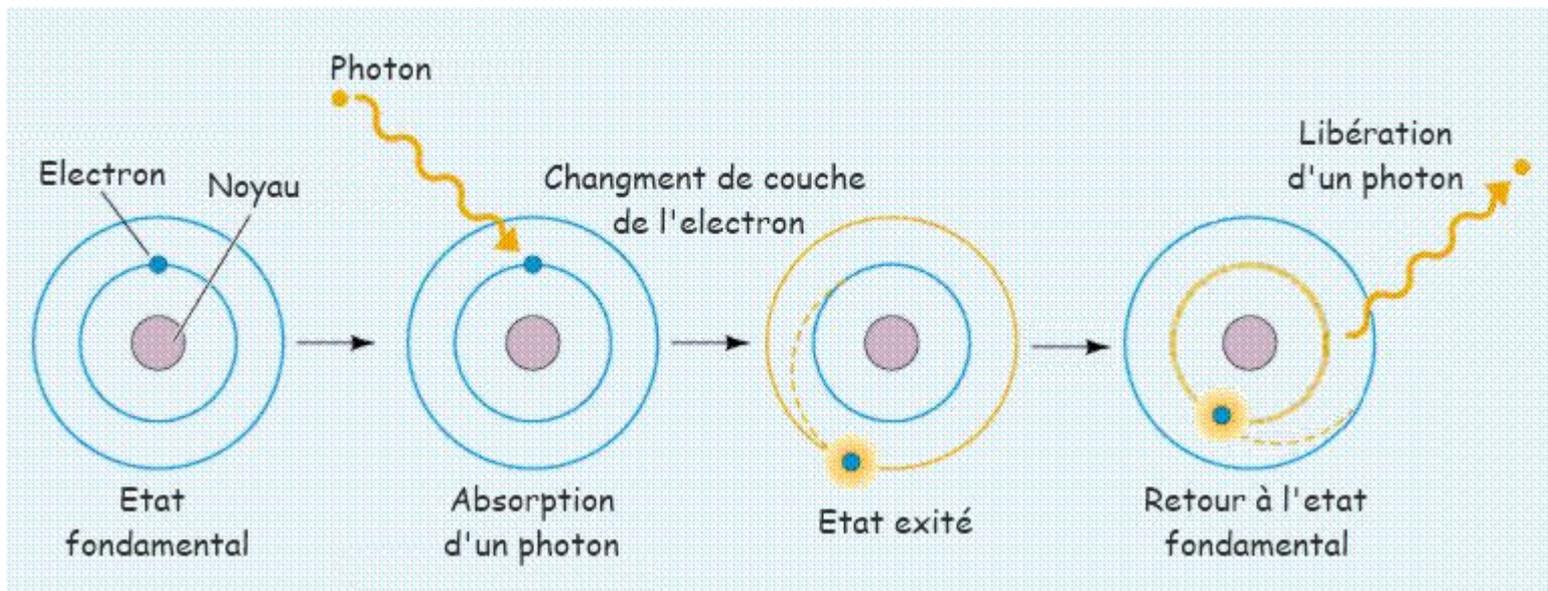


avant



pendant

L'excitation des atomes

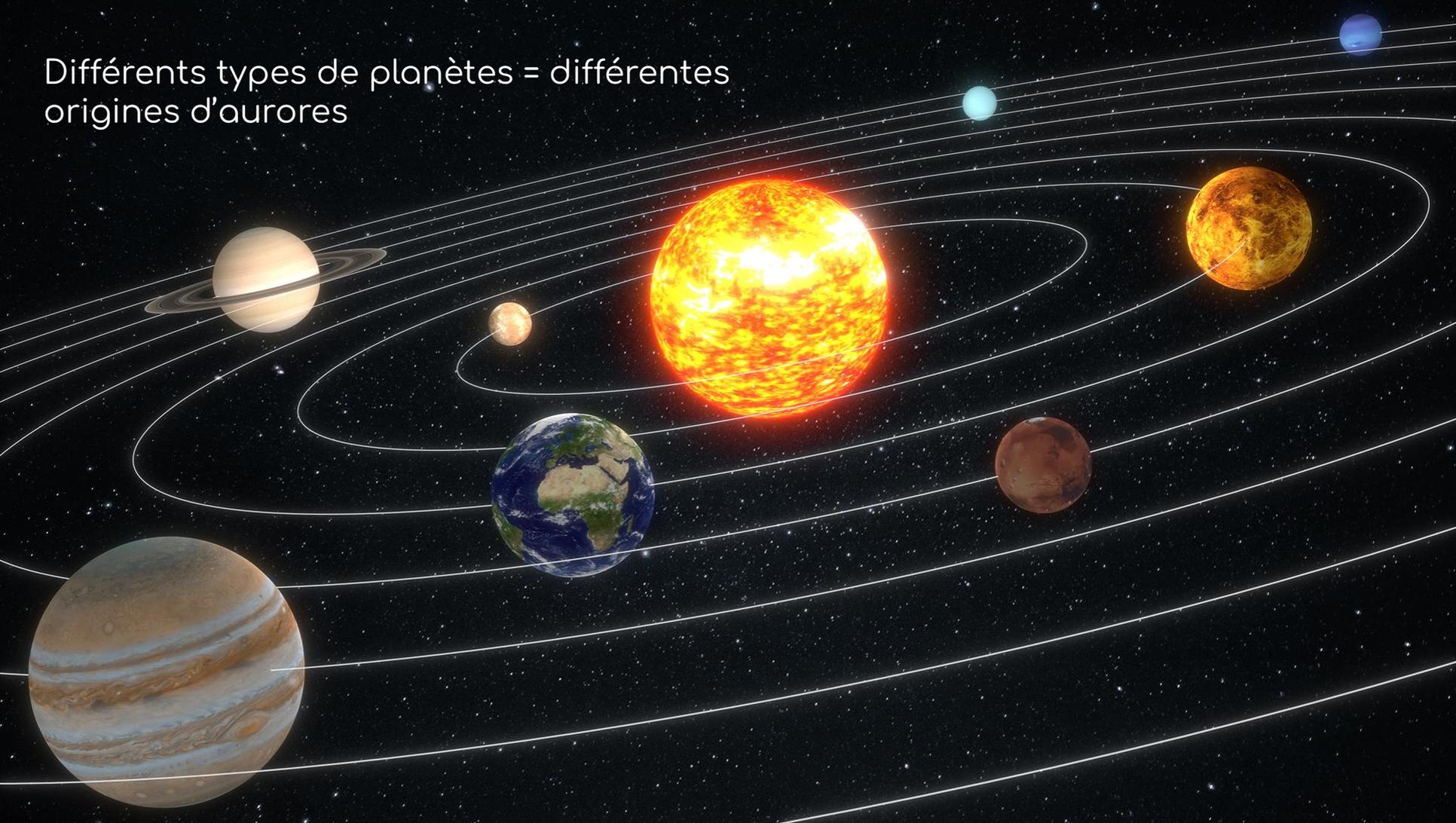




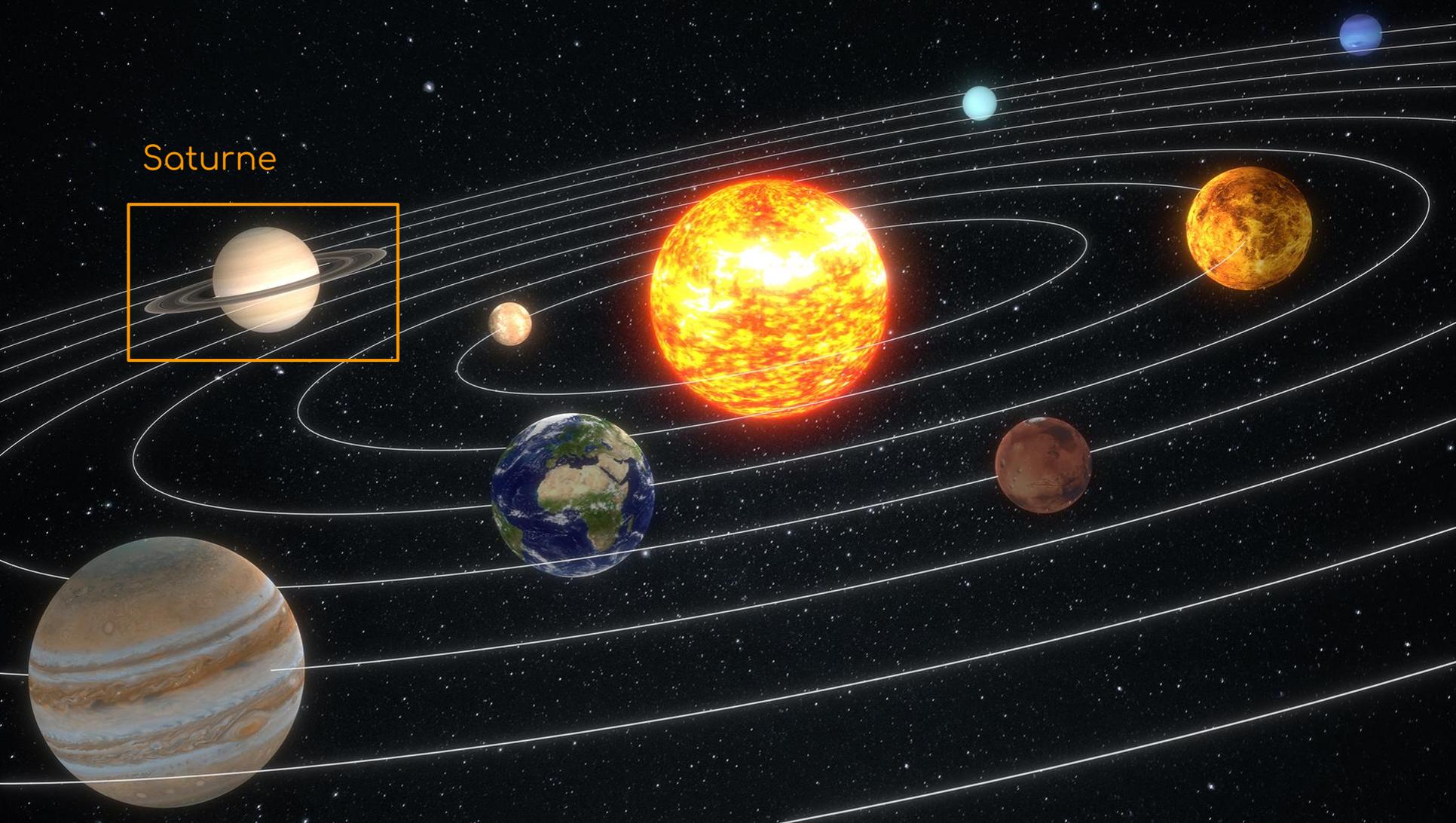
Mais ça devrait arriver sur
d'autres planètes Jamy ?



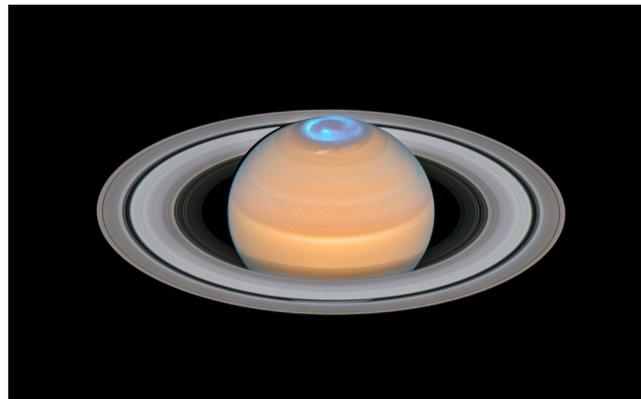
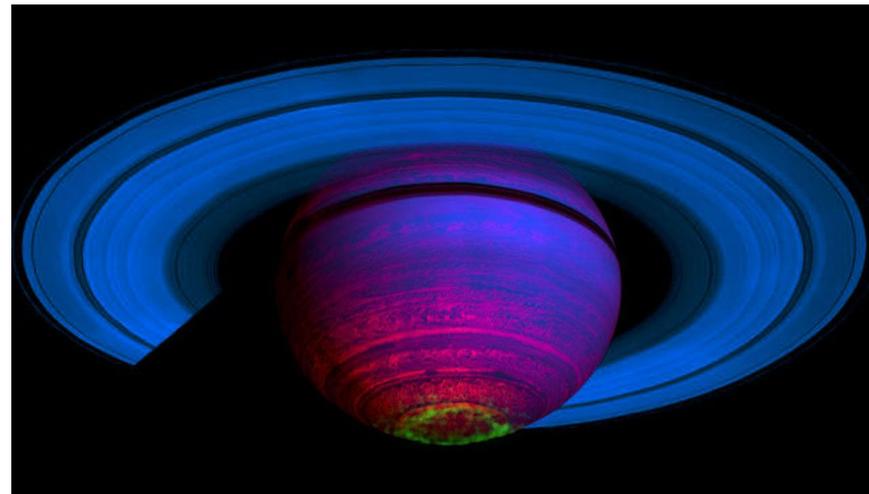
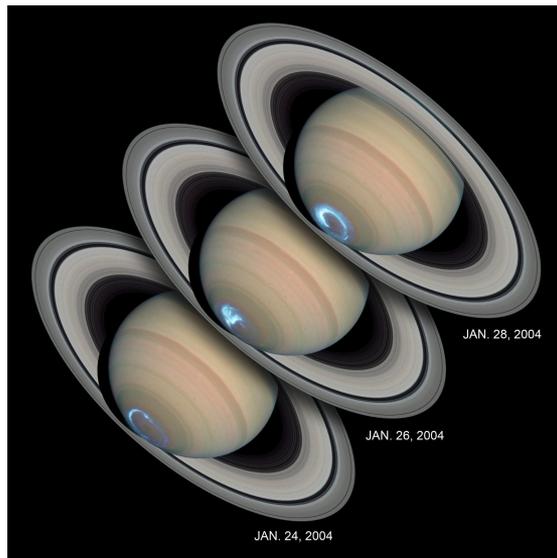
Différents types de planètes = différentes origines d'aurores

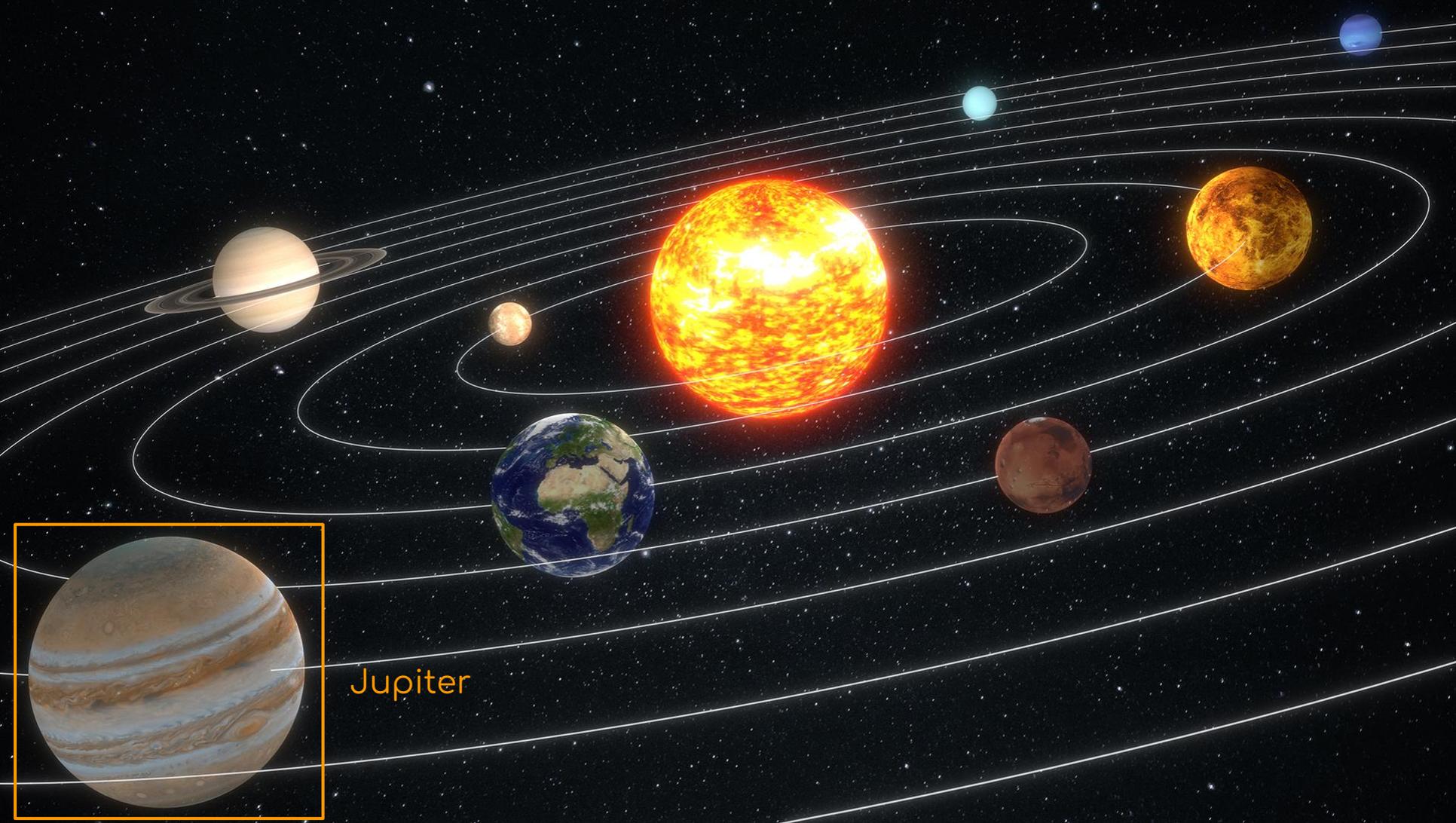


Saturne



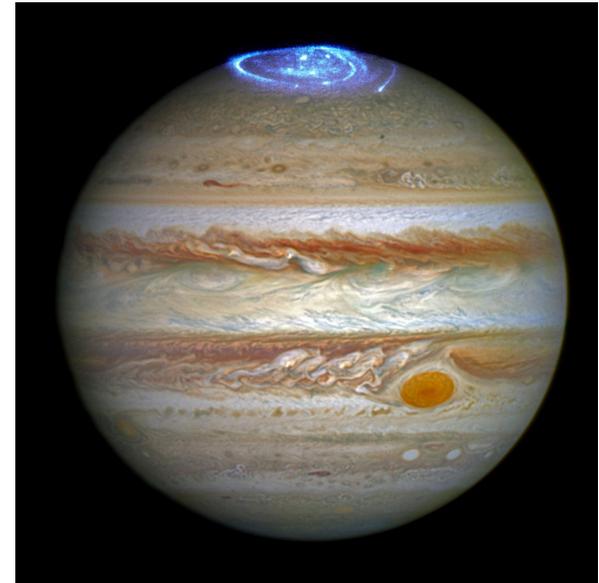
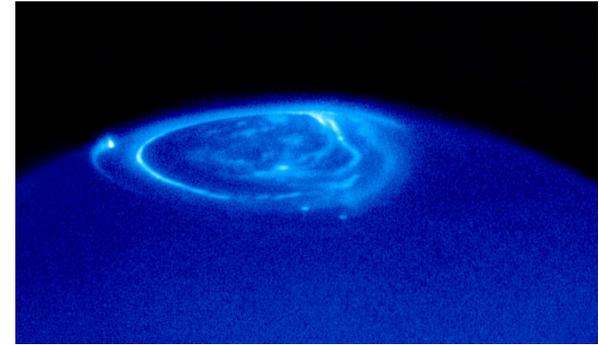
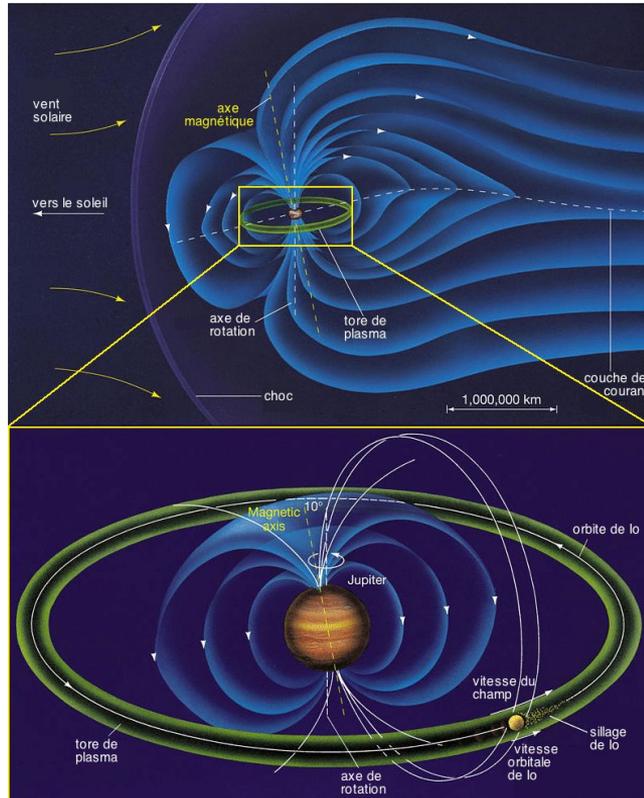
Saturne possède un champ magnétique

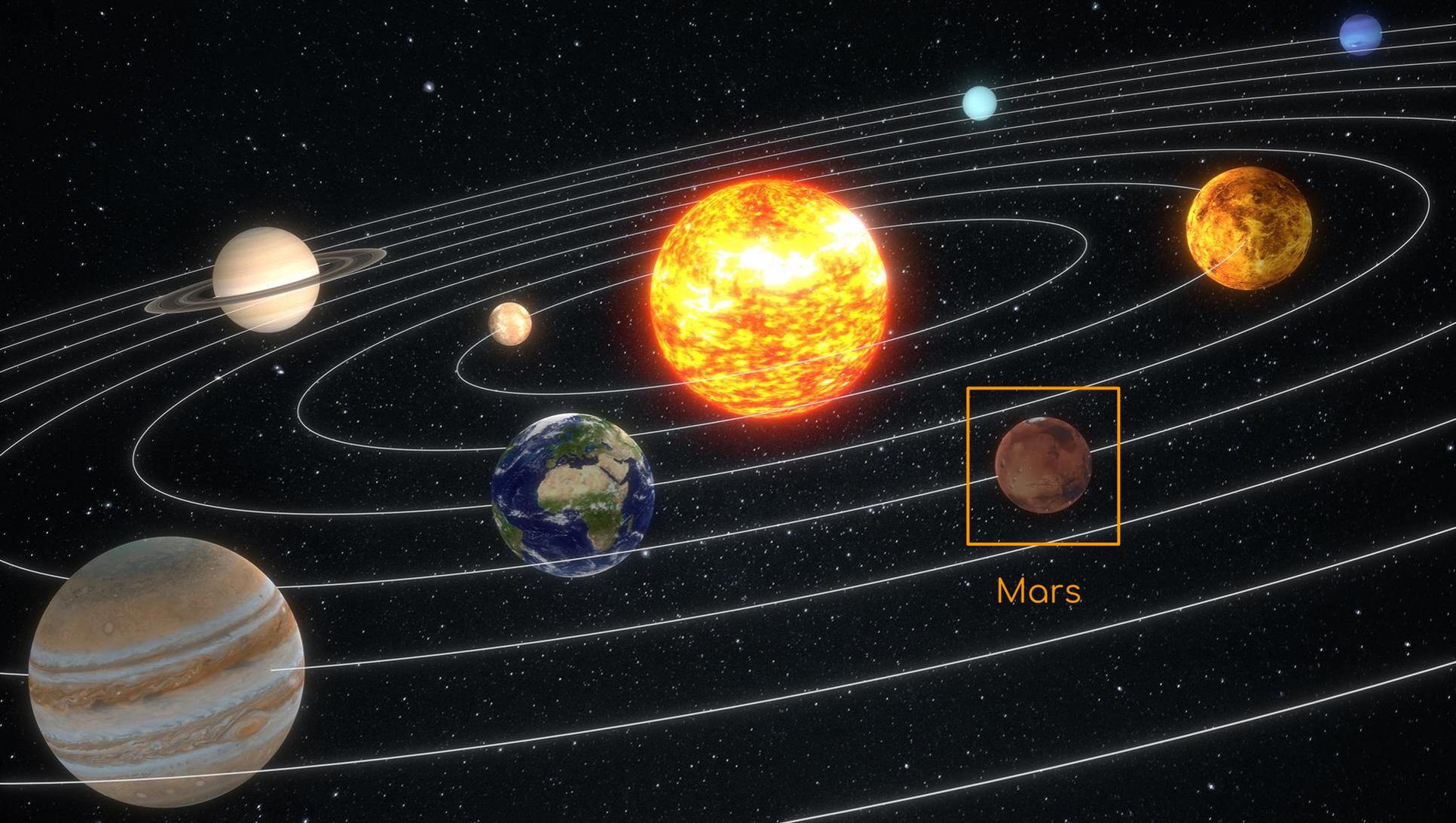




Jupiter

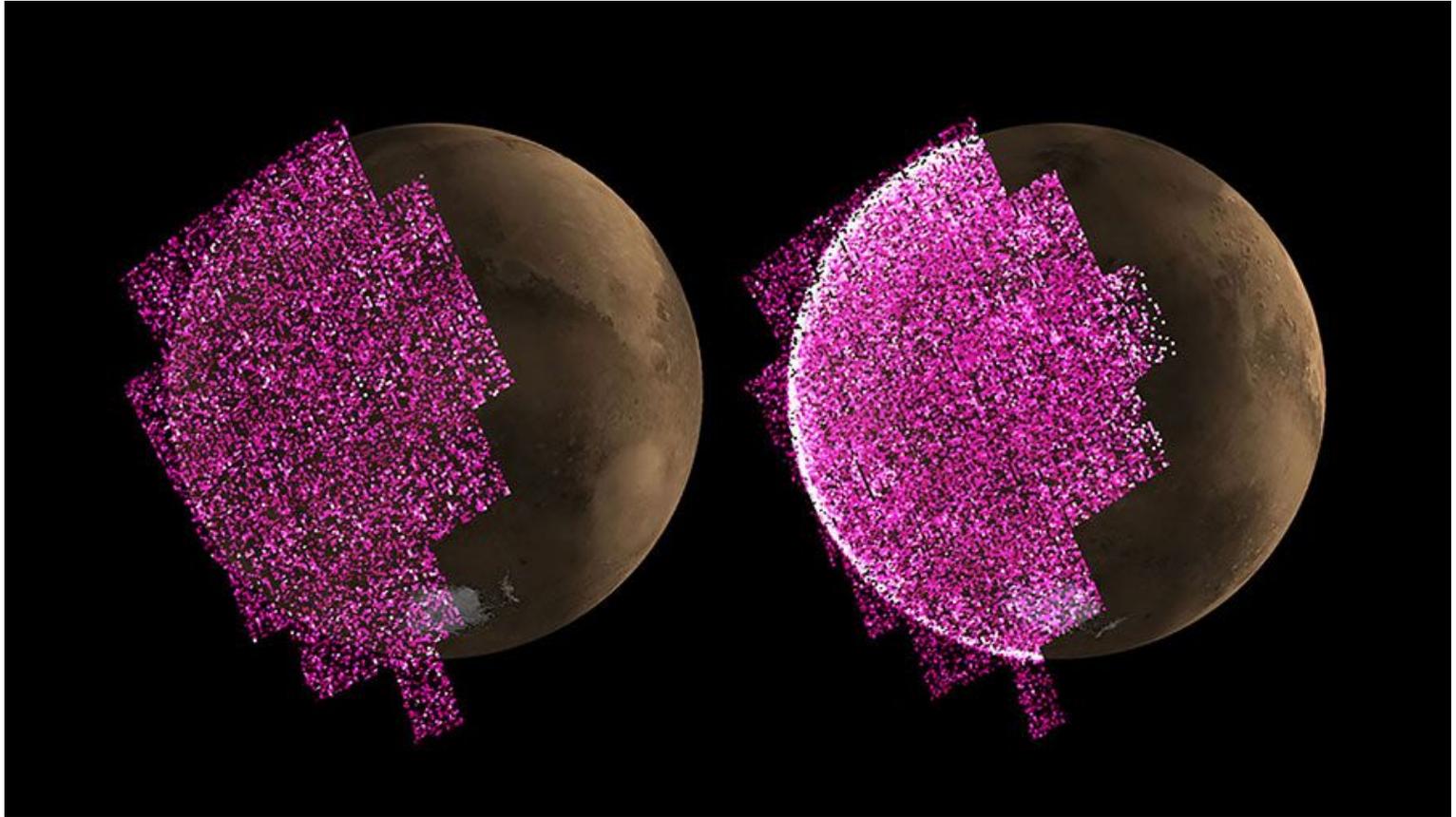
- 100 fois plus intenses que sur Terre
- permanentes
- les particules proviennent de Io



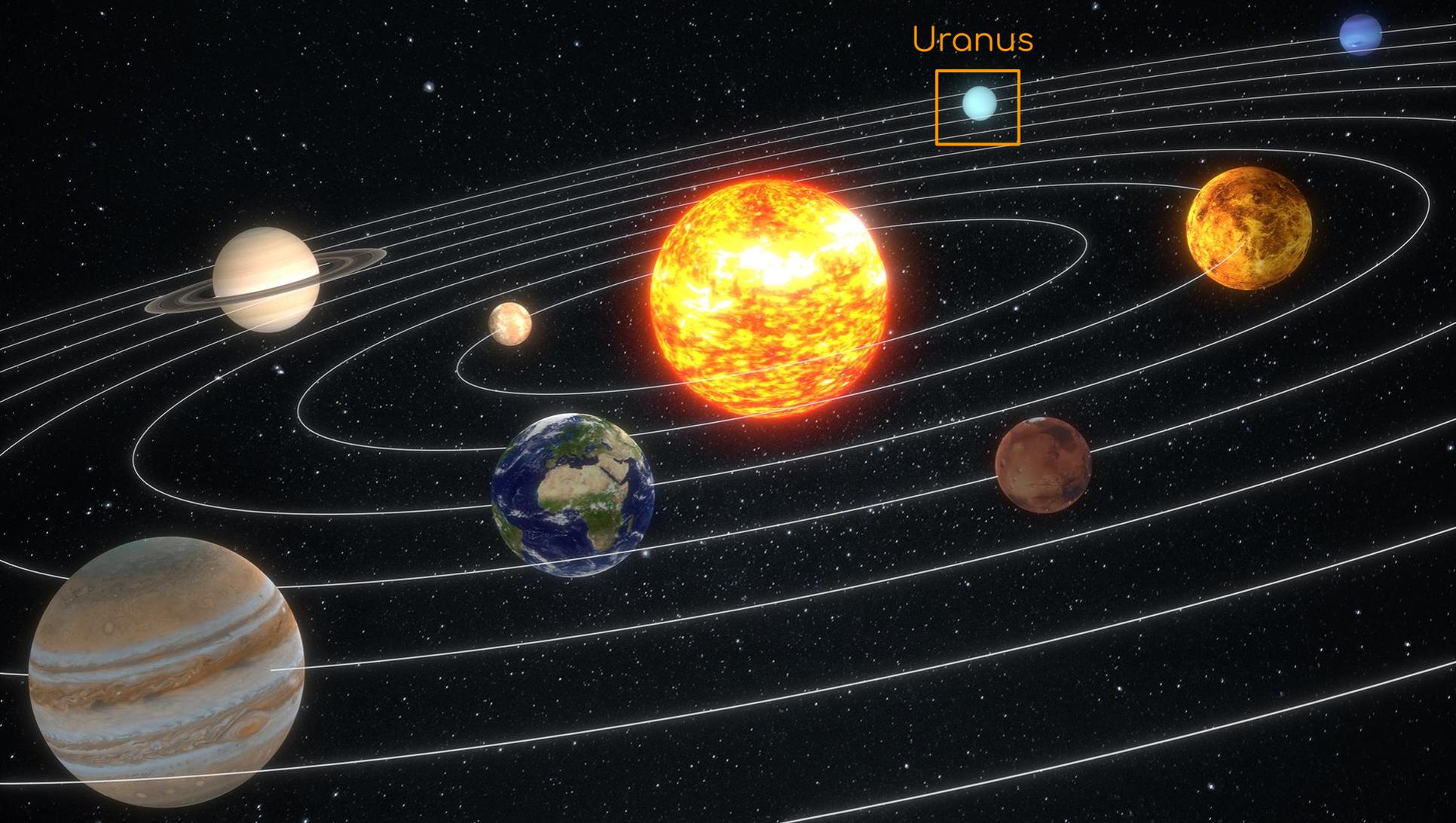
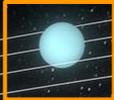


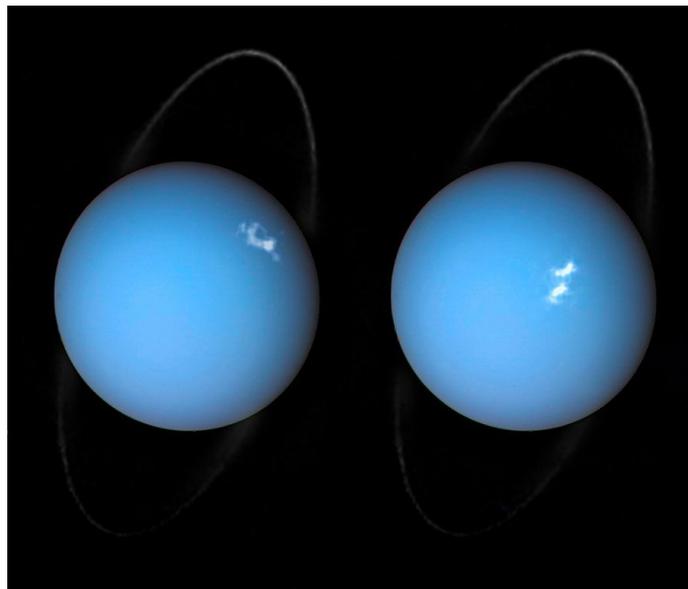
Mars

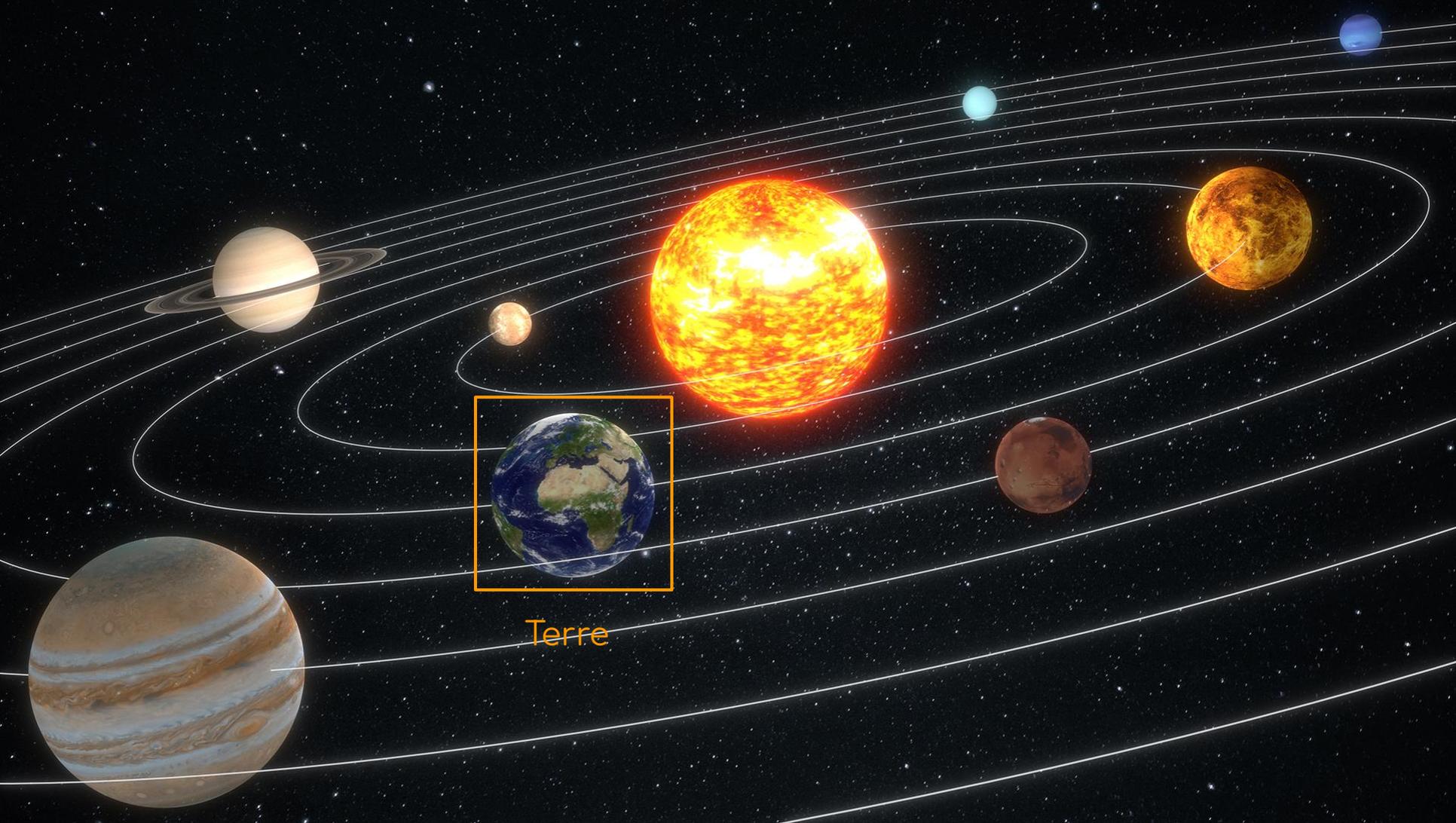
pas de champ magnétique global, mais un champ local fossile



Uranus



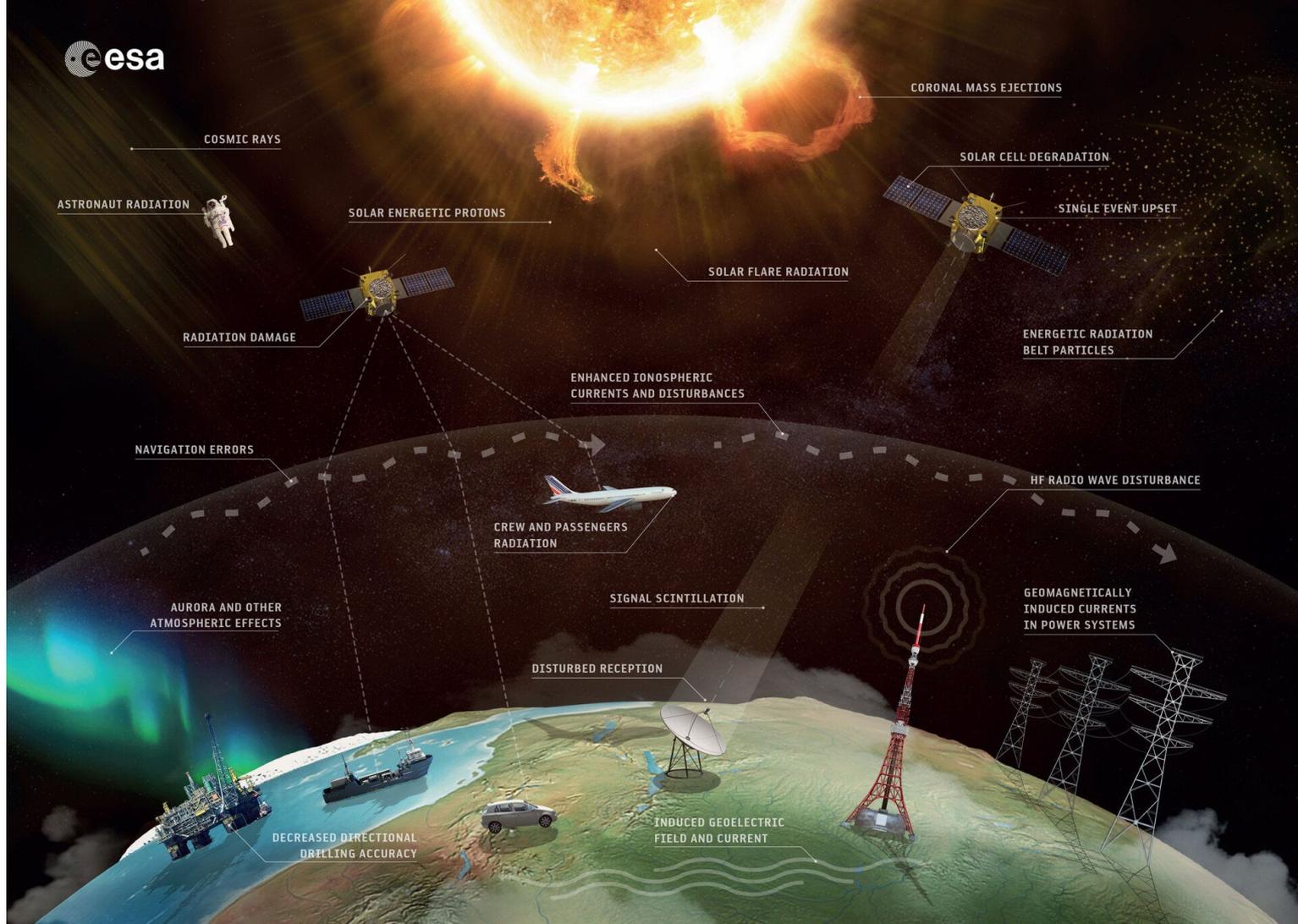




Terre

Pourquoi on s'intéresse à la météo de l'espace ?





COSMIC RAYS

ASTRONAUT RADIATION

SOLAR ENERGETIC PROTONS

CORONAL MASS EJECTIONS

SOLAR CELL DEGRADATION

SINGLE EVENT UPSET

SOLAR FLARE RADIATION

RADIATION DAMAGE

ENERGETIC RADIATION
BELT PARTICLES

ENHANCED IONOSPHERIC
CURRENTS AND DISTURBANCES

NAVIGATION ERRORS

HF RADIO WAVE DISTURBANCE

CREW AND PASSENGERS
RADIATION

AURORA AND OTHER
ATMOSPHERIC EFFECTS

SIGNAL SCINTILLATION

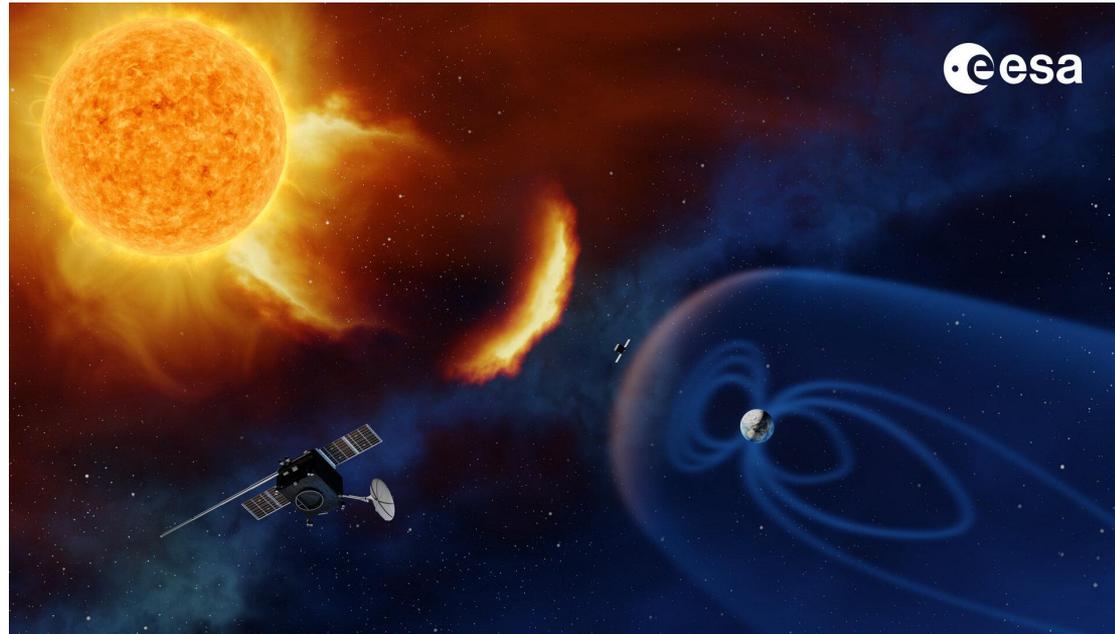
GEOMAGNETICALLY
INDUCED CURRENTS
IN POWER SYSTEMS

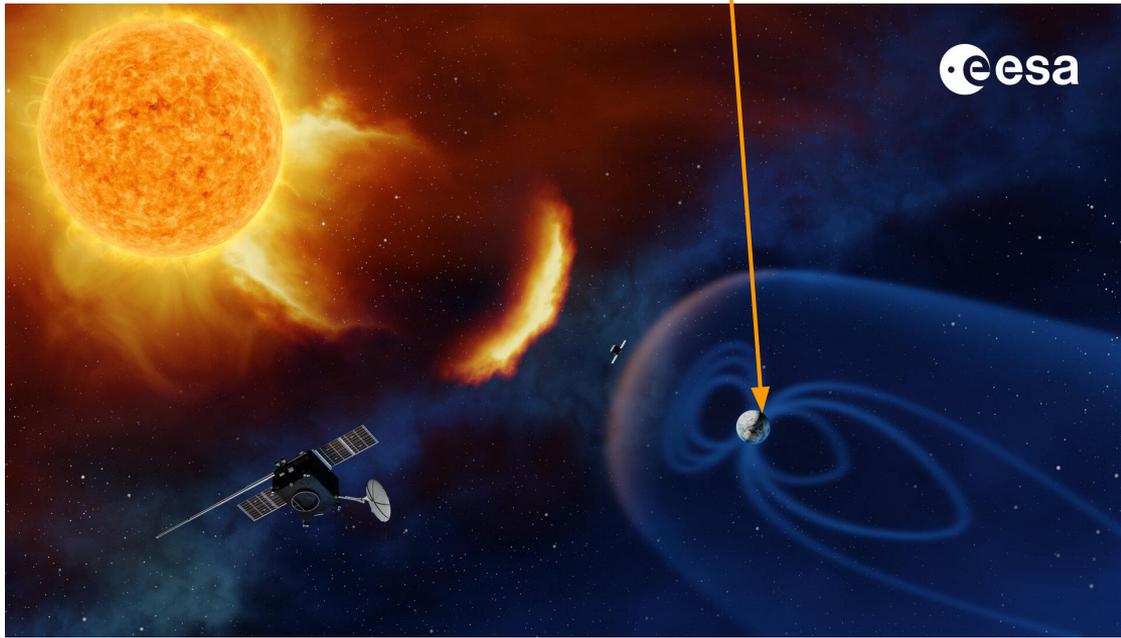
DISTURBED RECEPTION

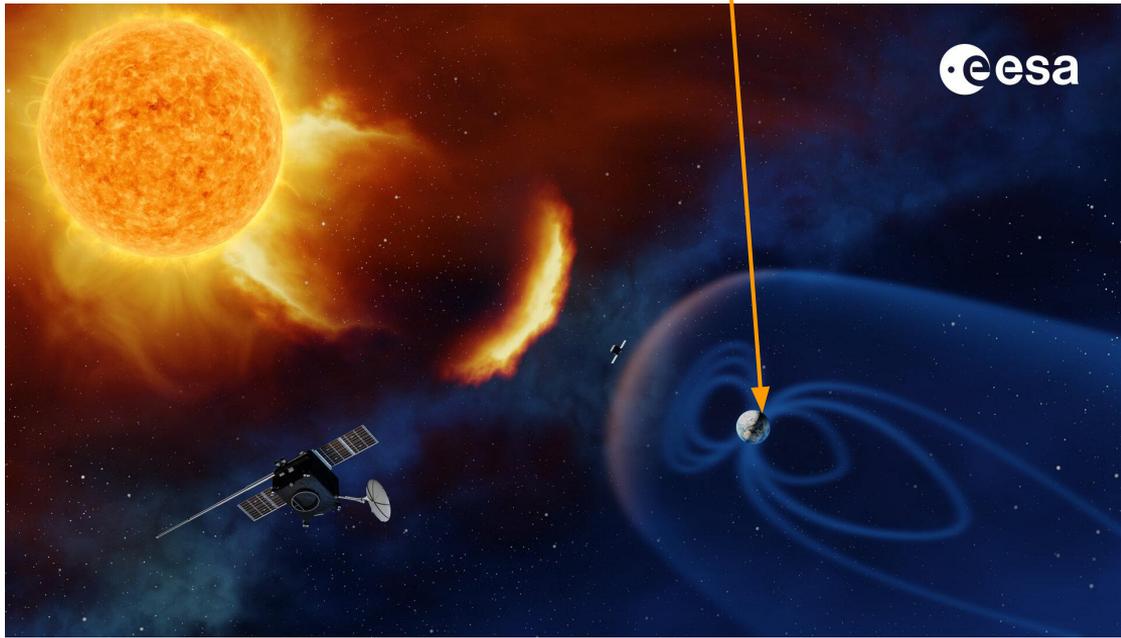
DECREASED DIRECTIONAL
DRILLING ACCURACY

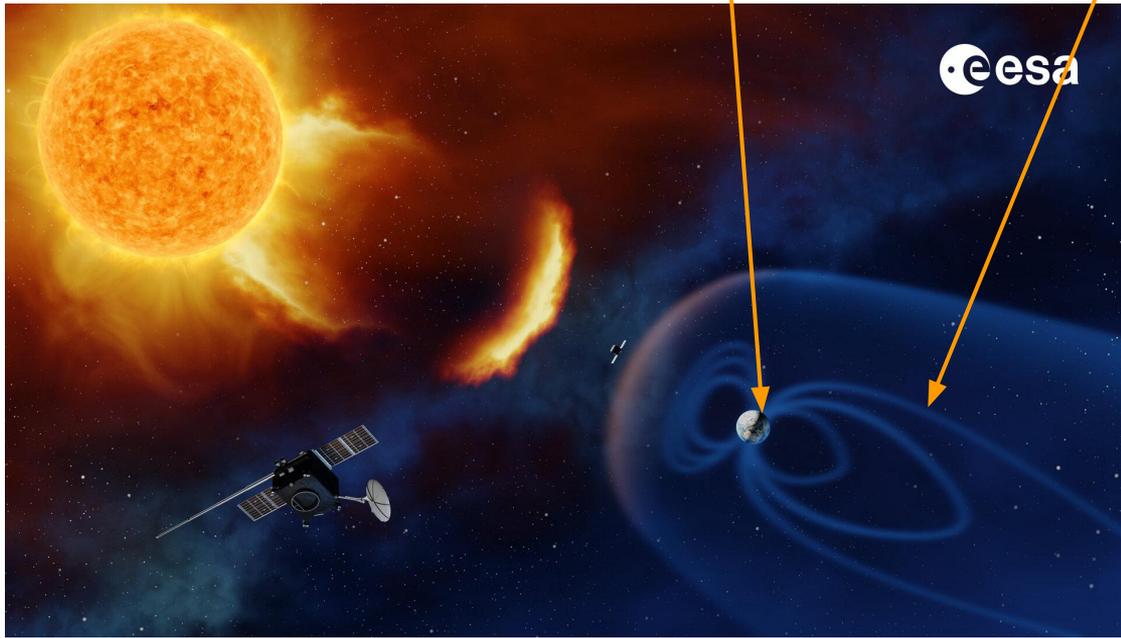
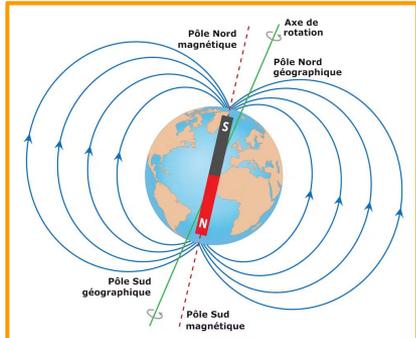
INDUCED GEOELECTRIC
FIELD AND CURRENT

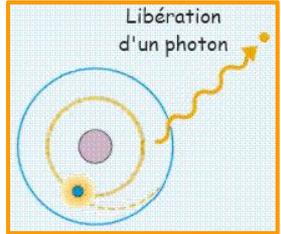
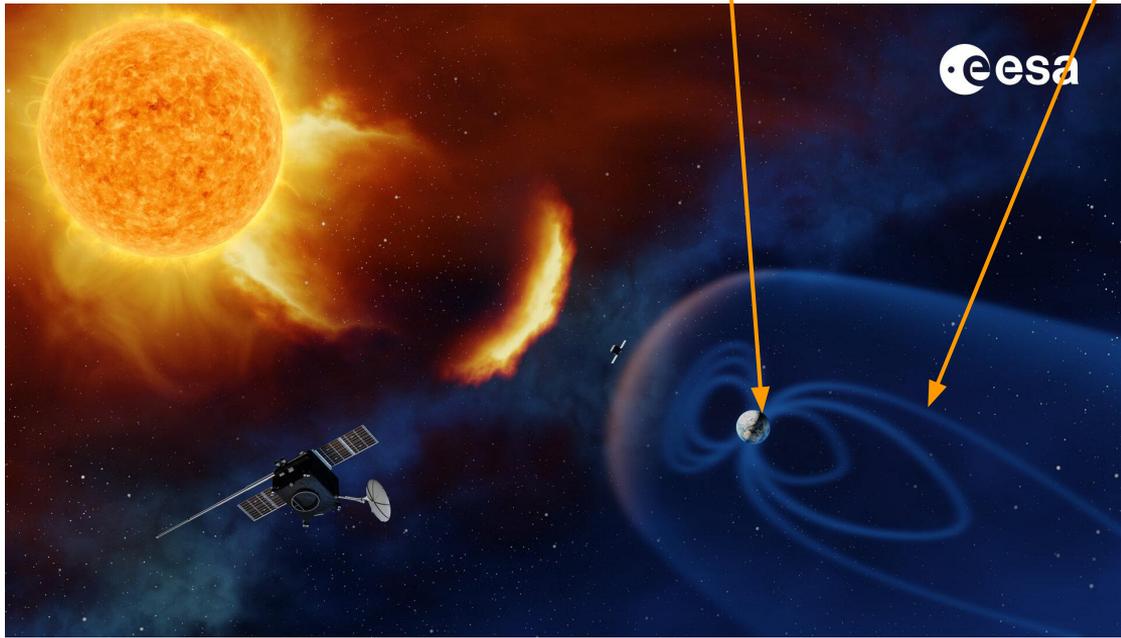
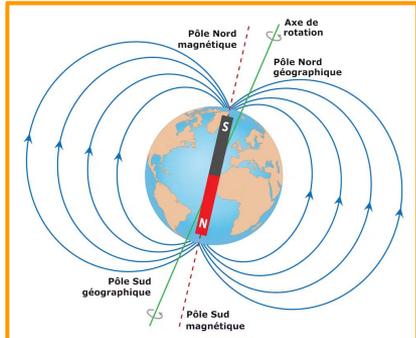
Récapitulons





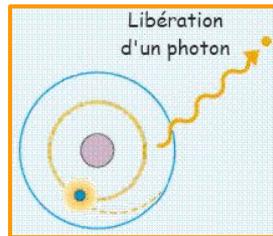
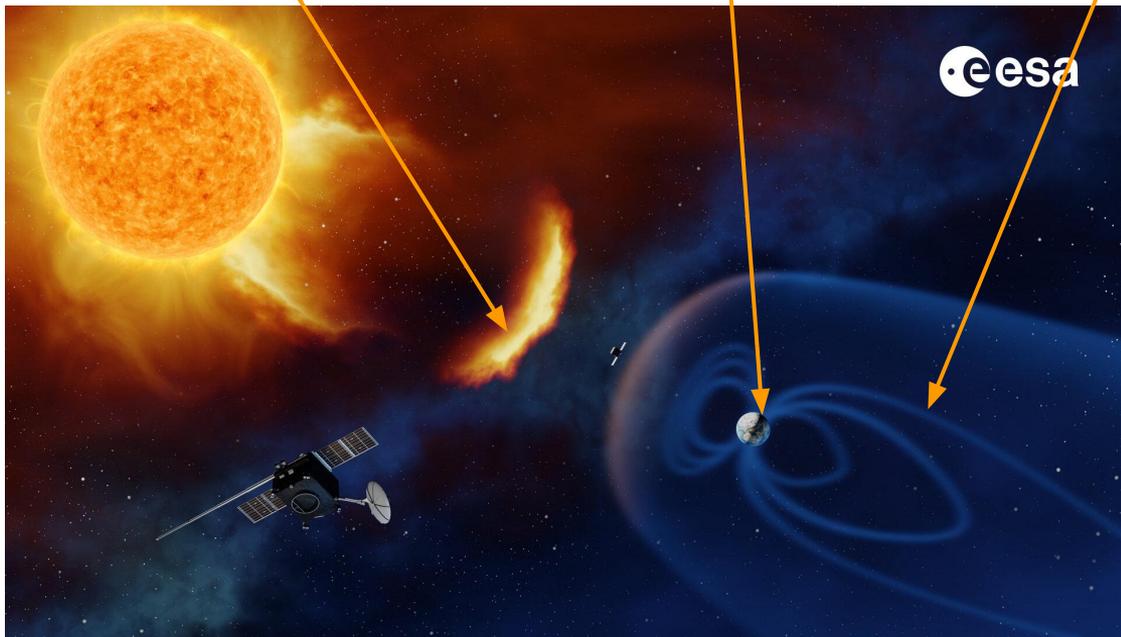
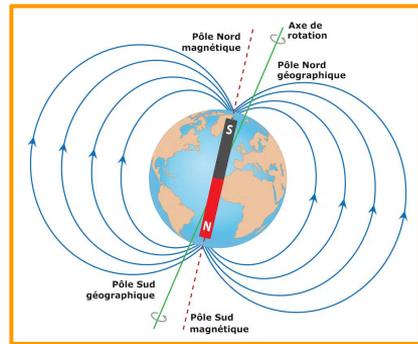




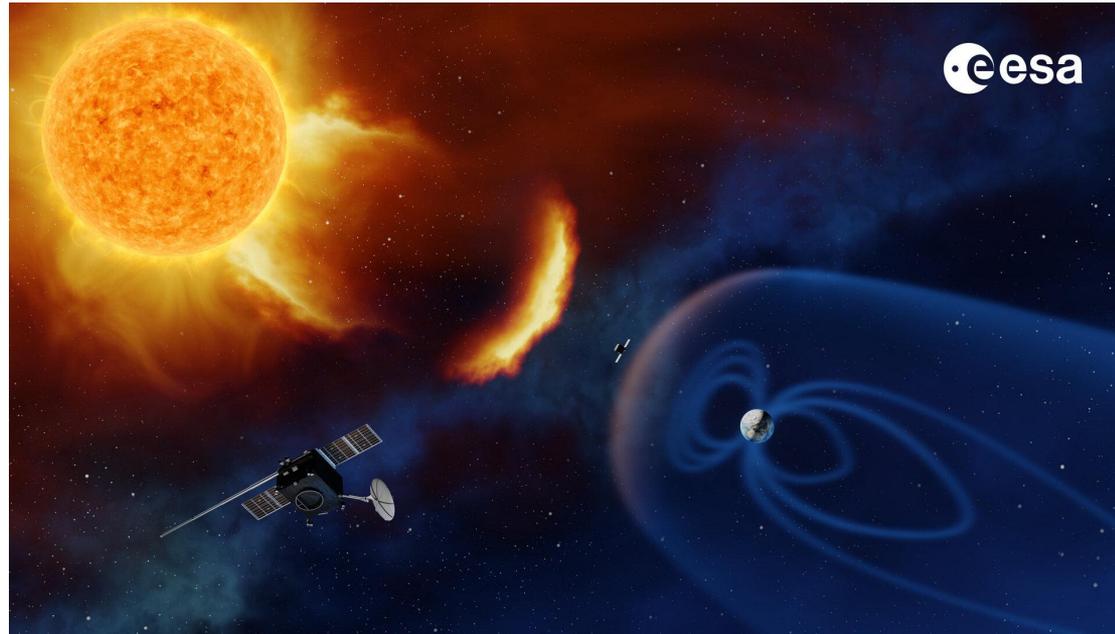




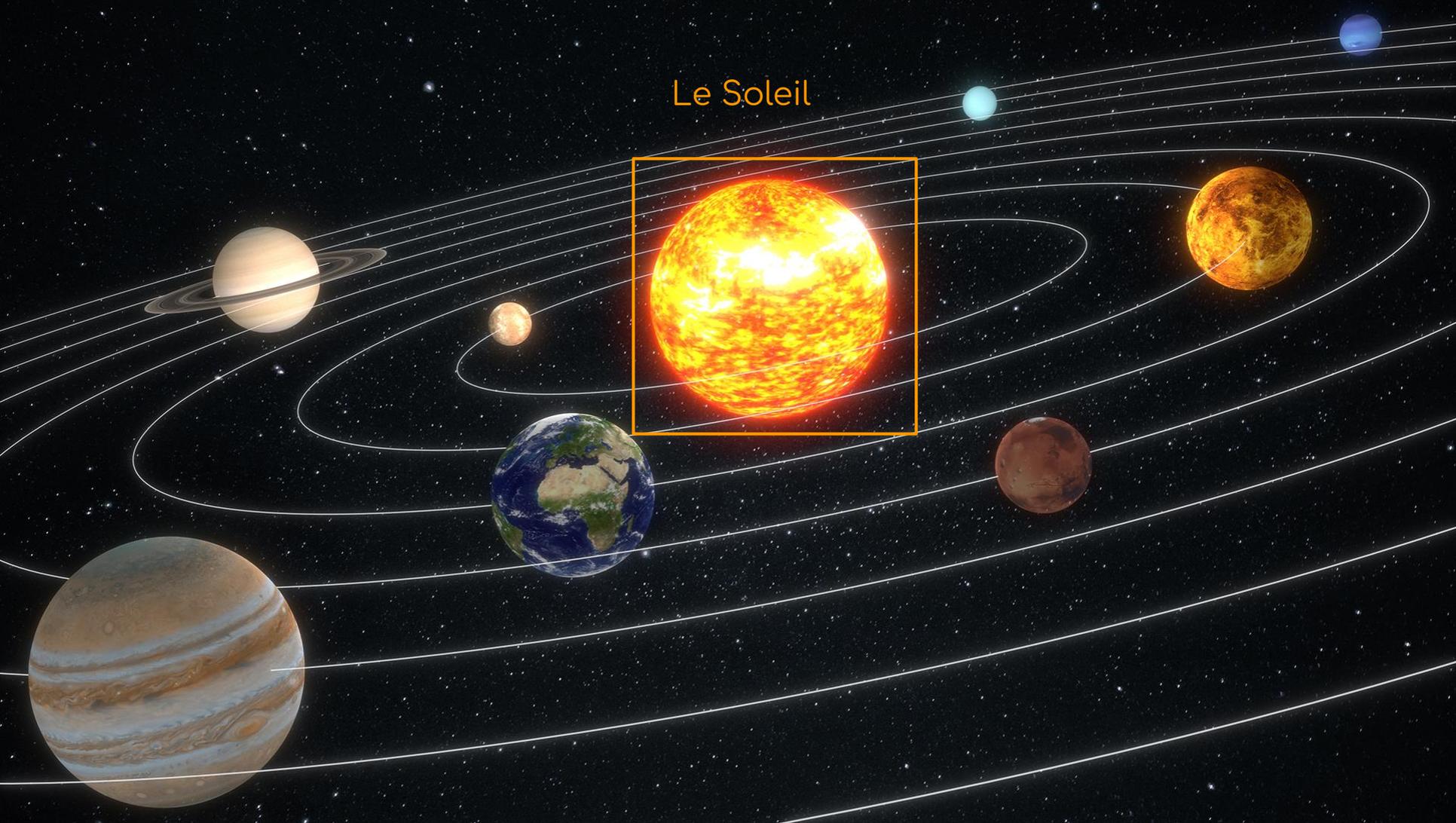
?



Qu'est ce qui accélère les
particules du Soleil jusqu'à nous ?

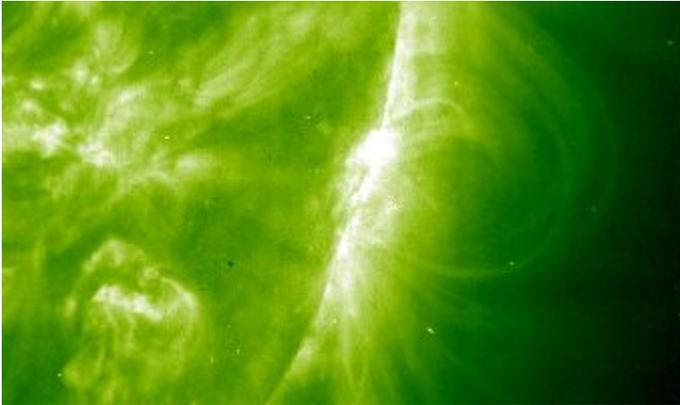
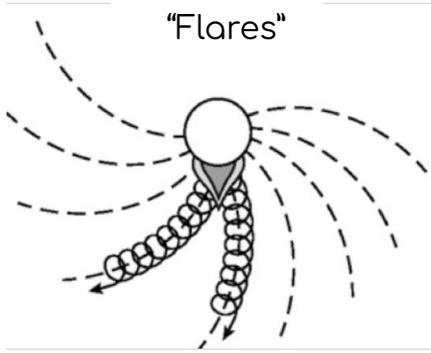


Le Soleil

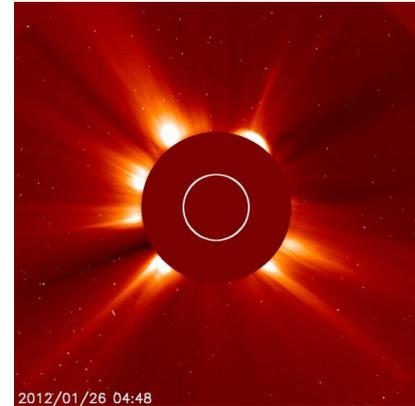
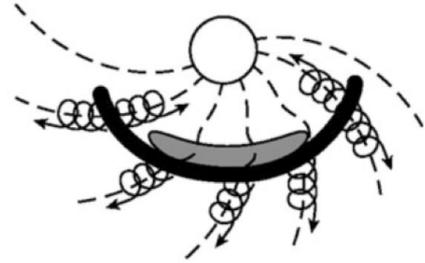


Deux sources d'accélération principales

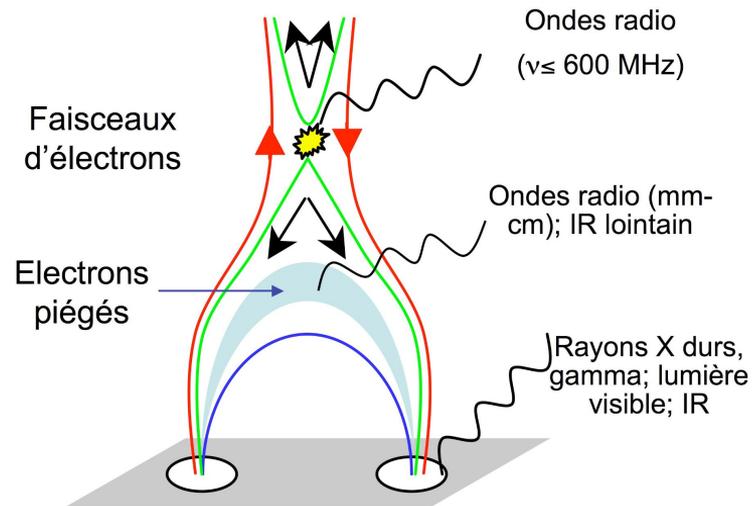
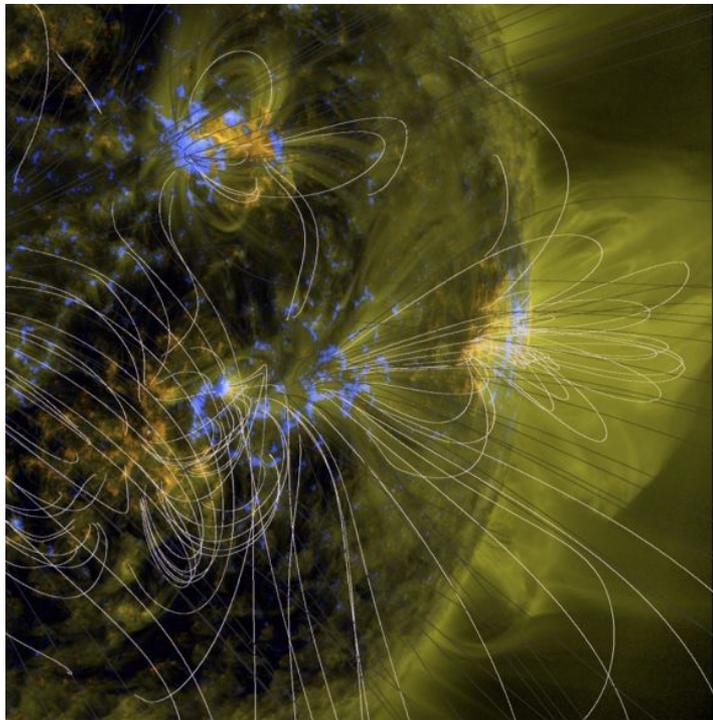
"Flores"



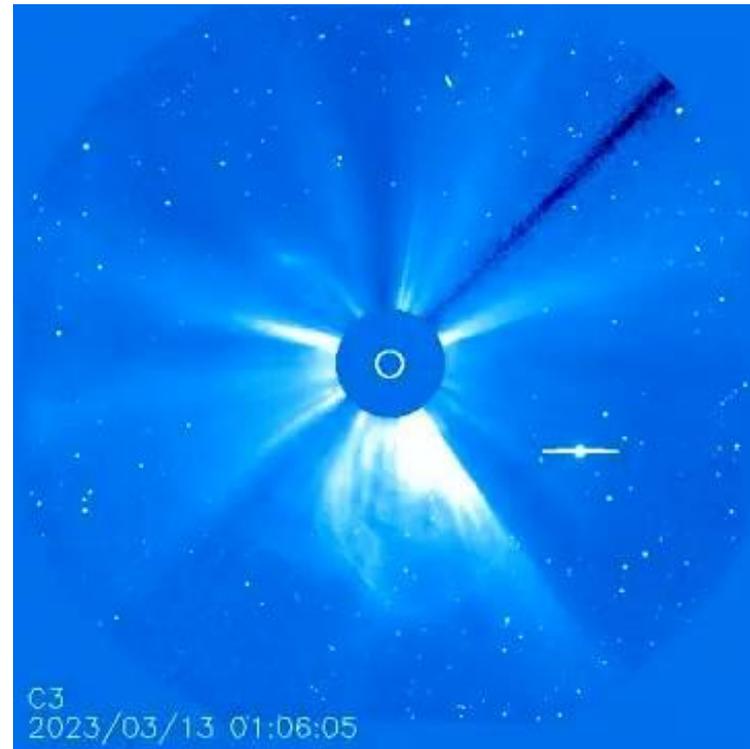
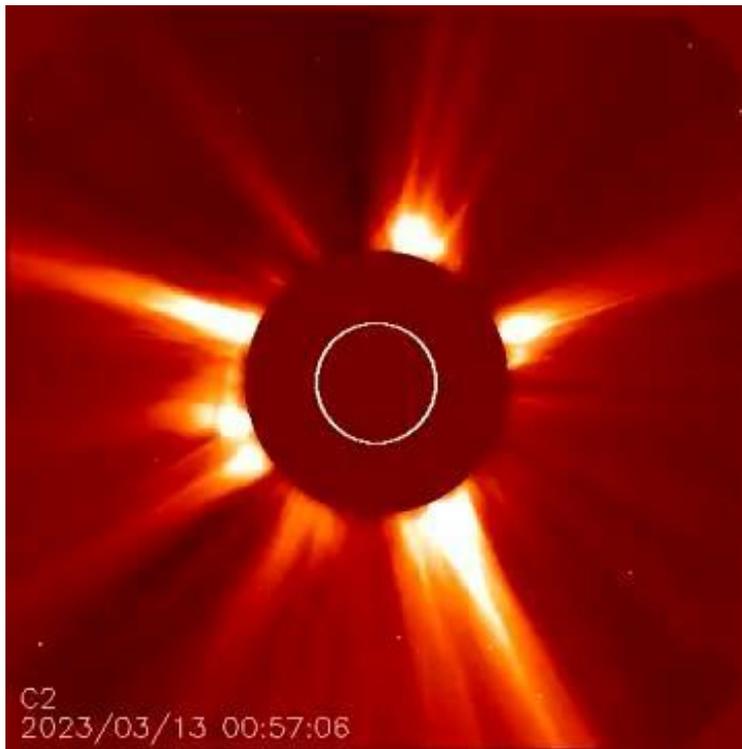
Chocs d'éjection de masse coronale



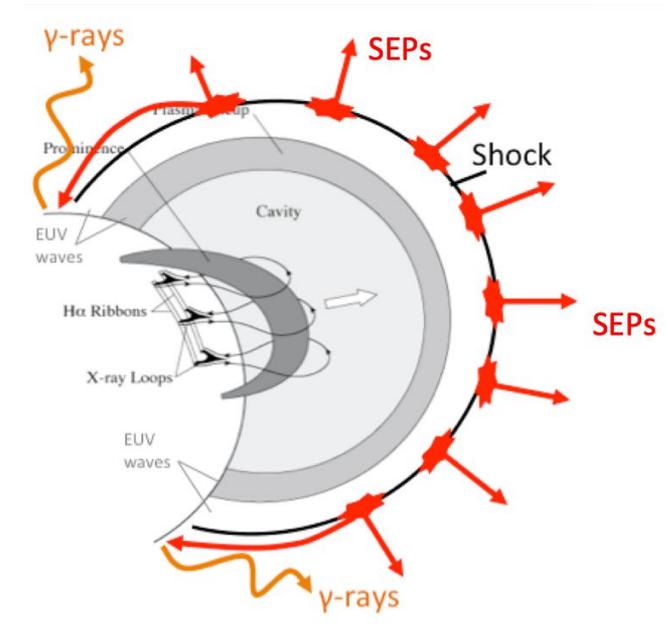
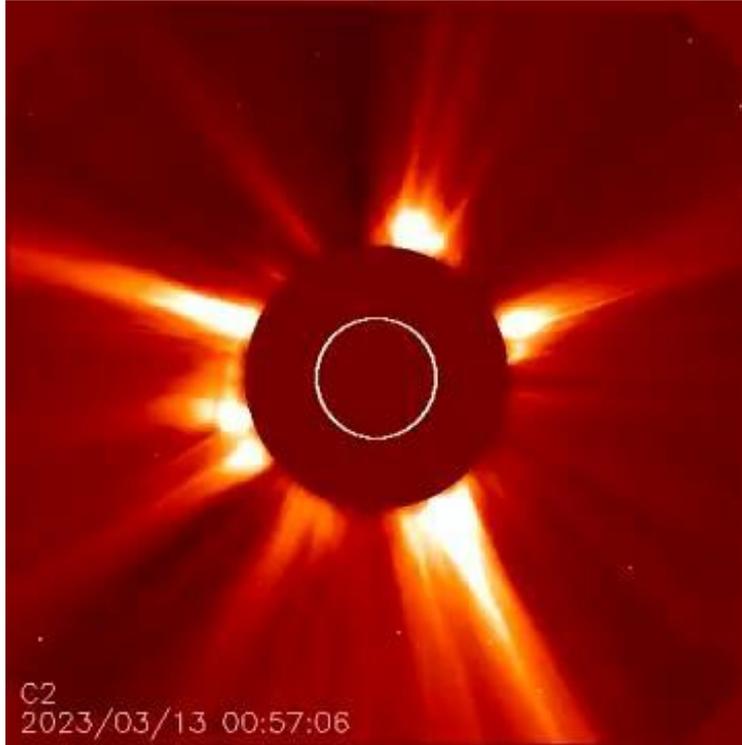
Flores

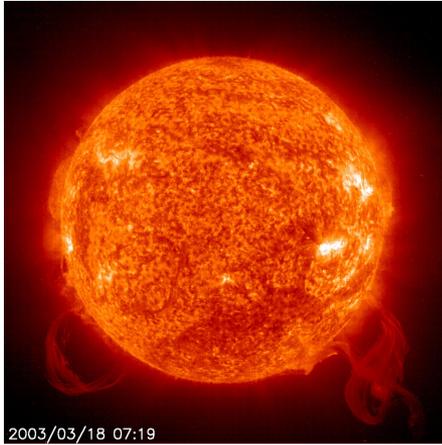


Chocs d'éjection de masse coronale



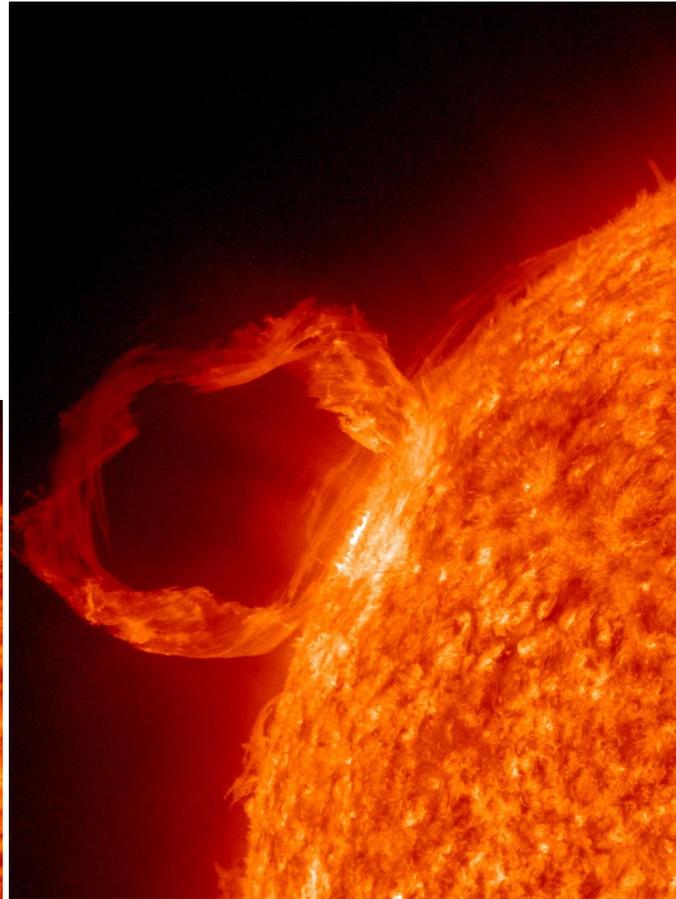
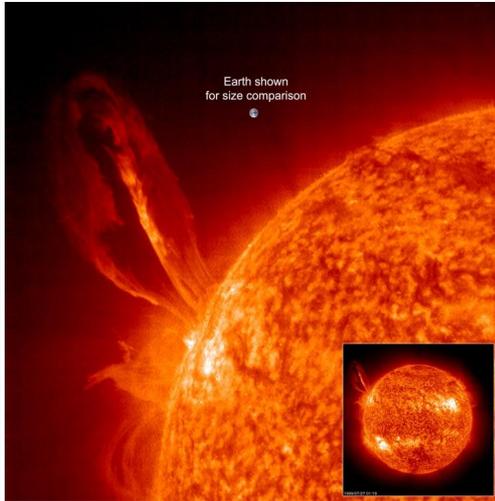
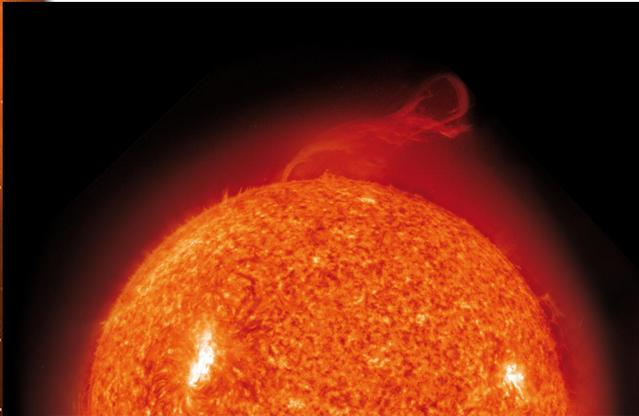
Chocs d'éjection de masse coronale

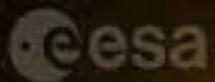




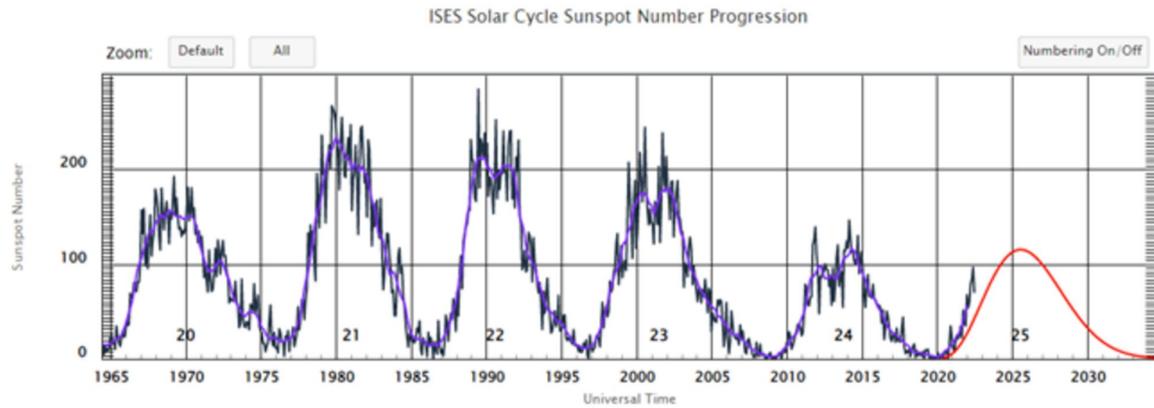
2003/03/18 07:19

Deux événements
souvent liés

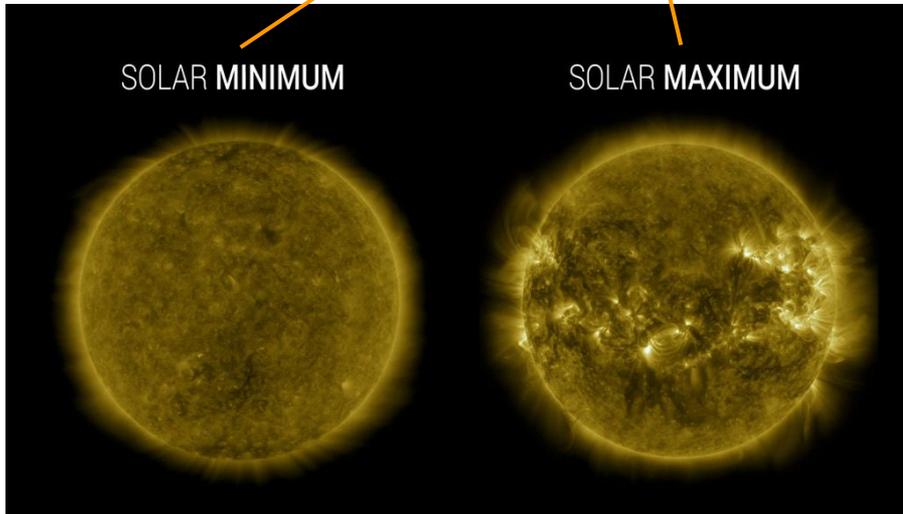
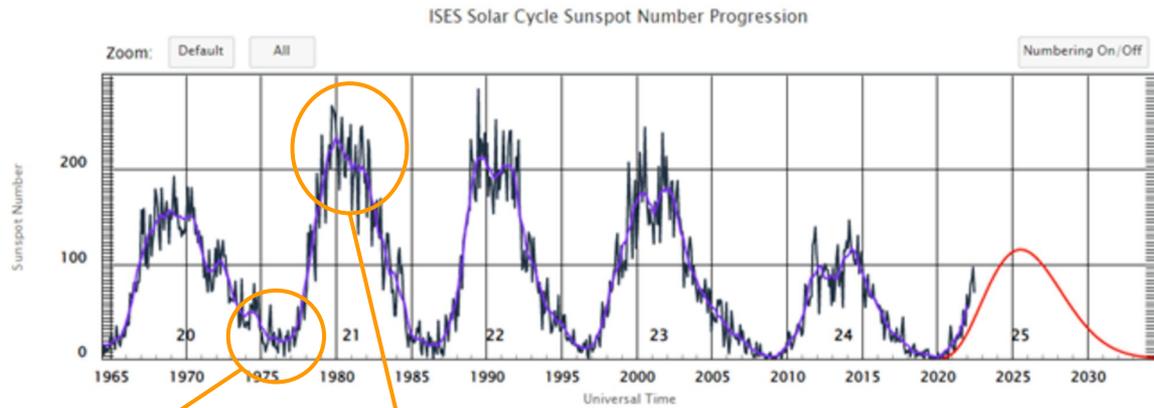


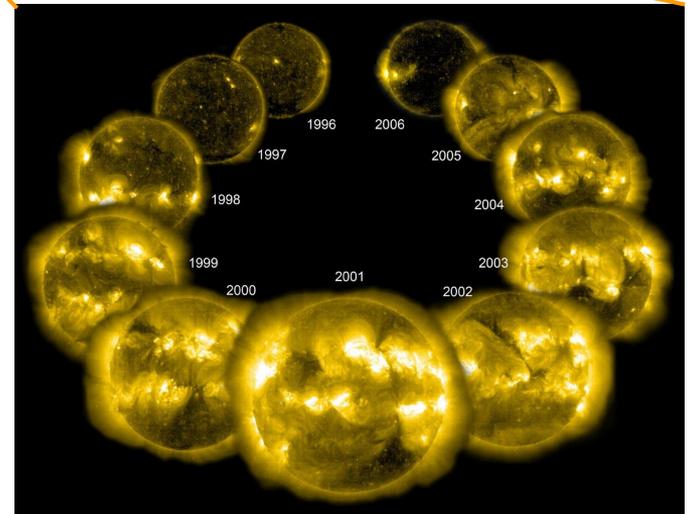
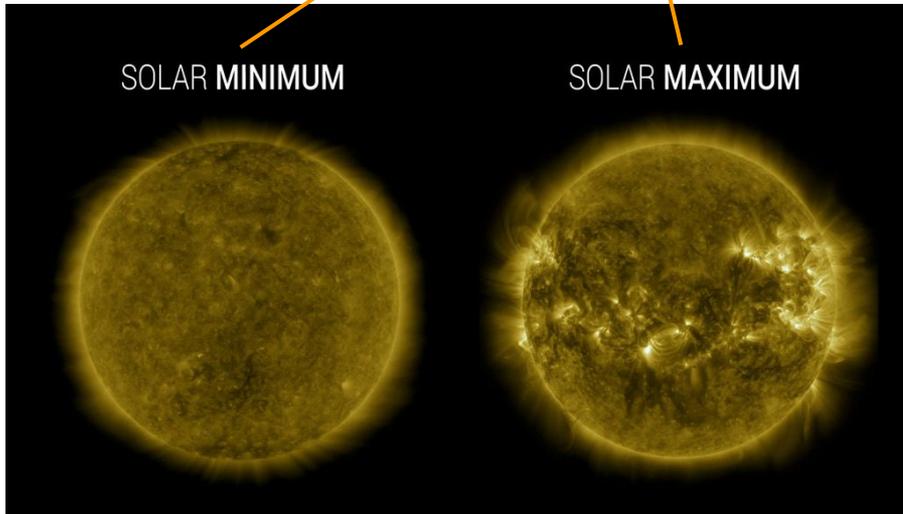
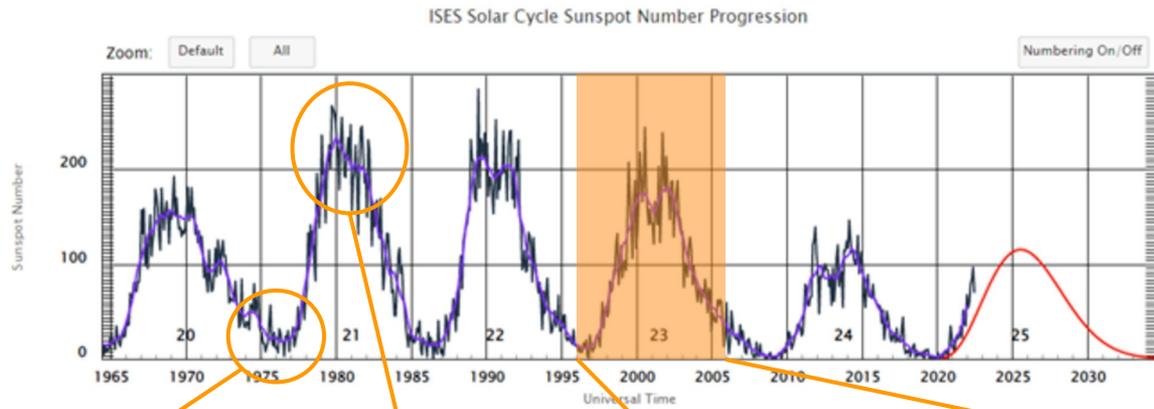
The ESA logo, consisting of a stylized 'e' inside a circle followed by the letters 'esa'.A large, bright yellow-orange sun with a prominent solar snake (a filament) extending from its surface. The sun is the central focus, with a red banner across the bottom containing the text 'SOLAR SNAKE'.

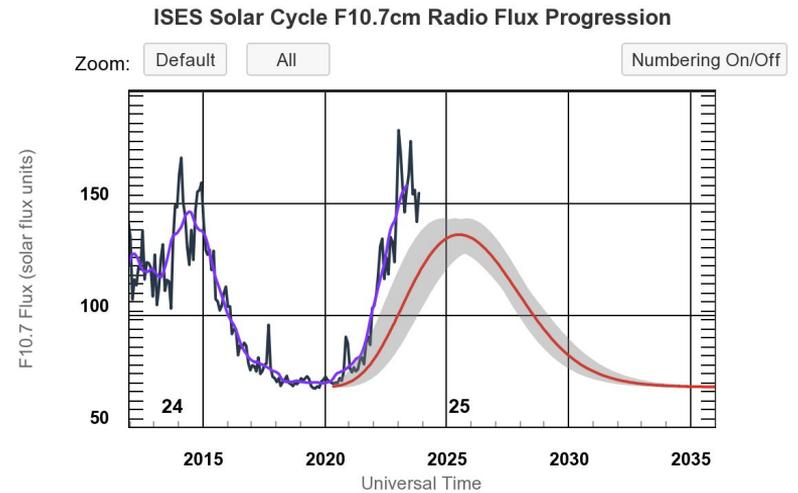
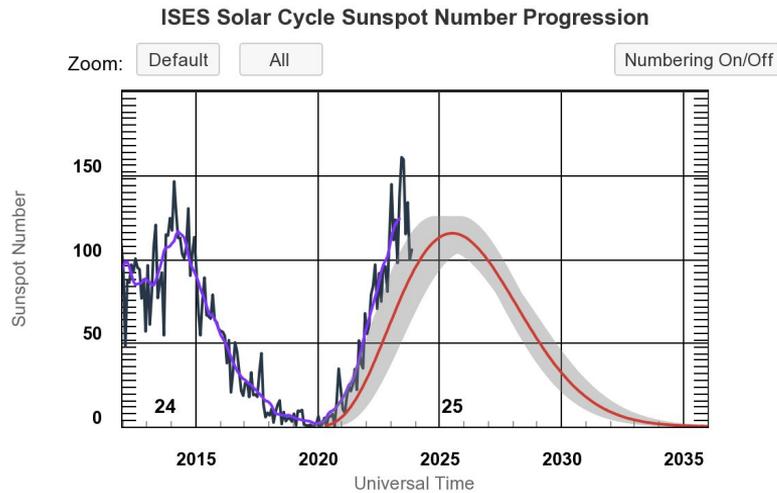
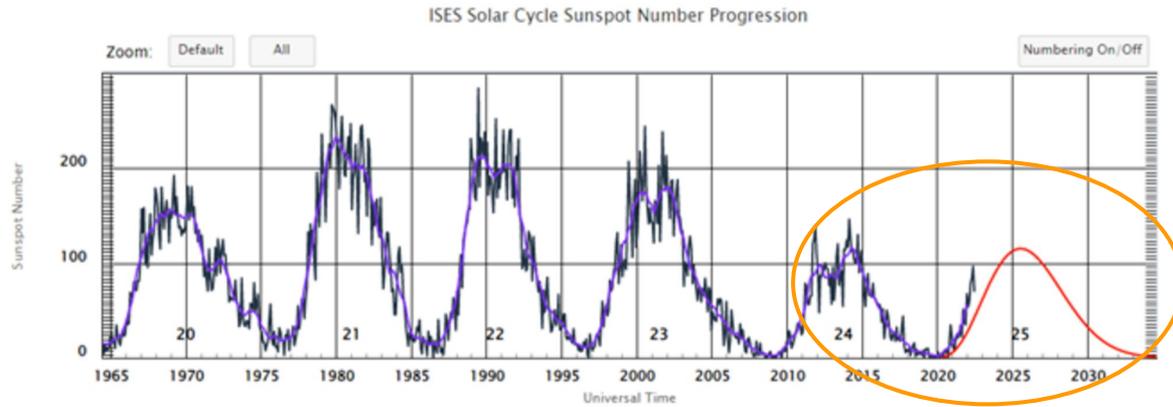
SOLAR SNAKE



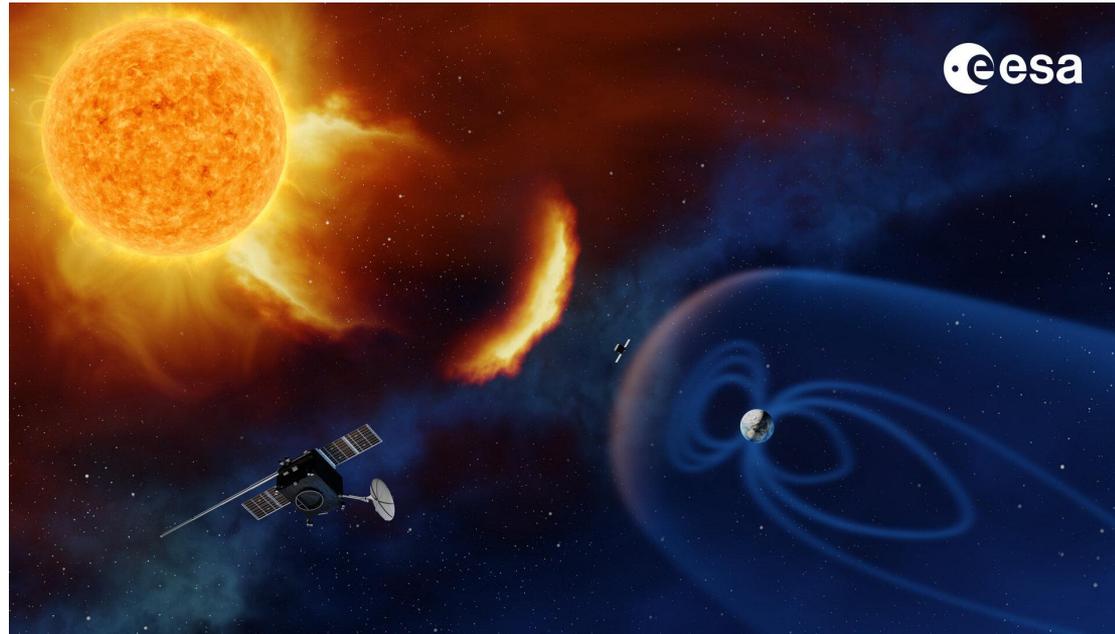
Le Soleil suit un cycle de 11 ans





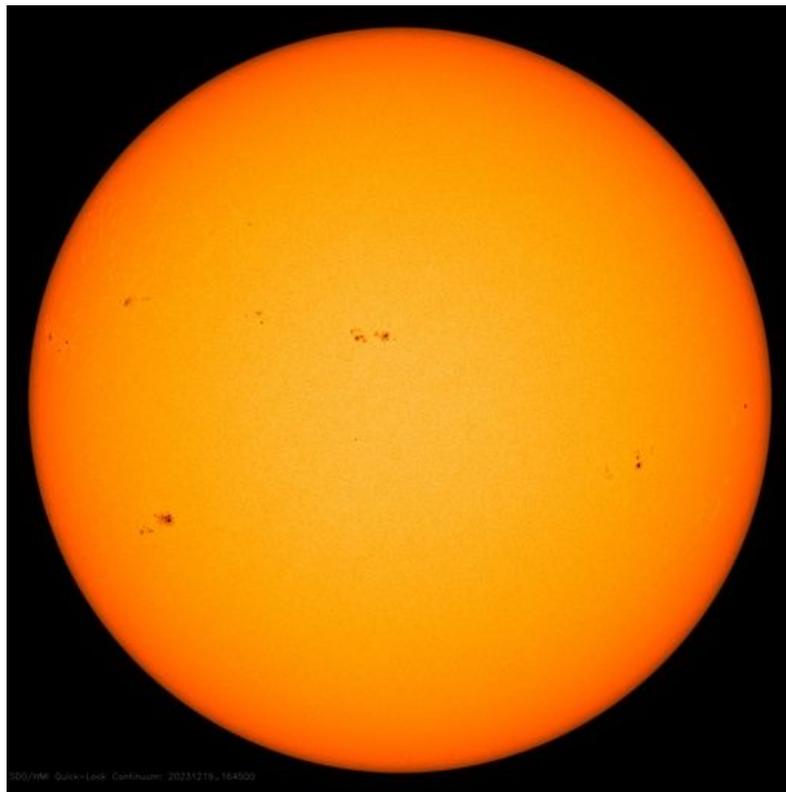


Bonus : la météo spatiale du jour

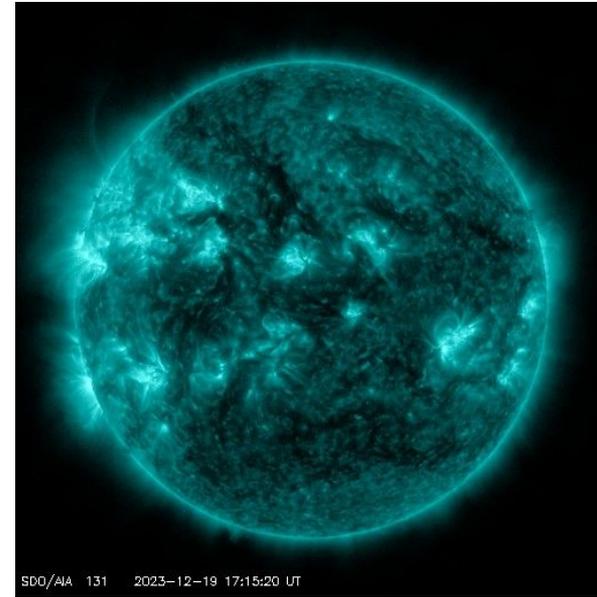
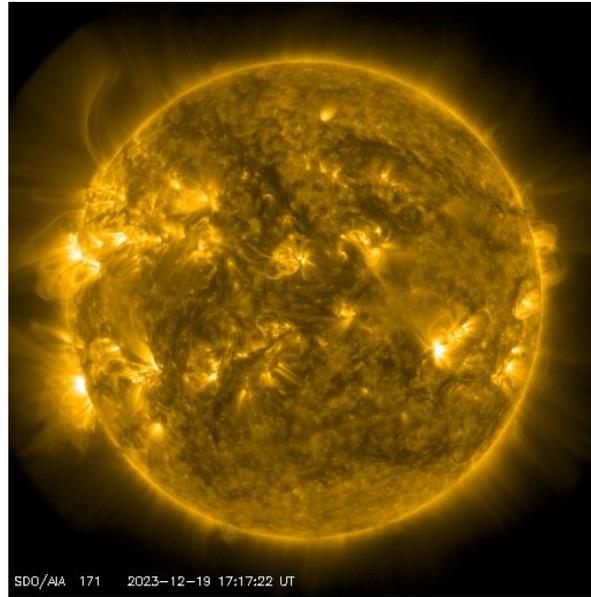
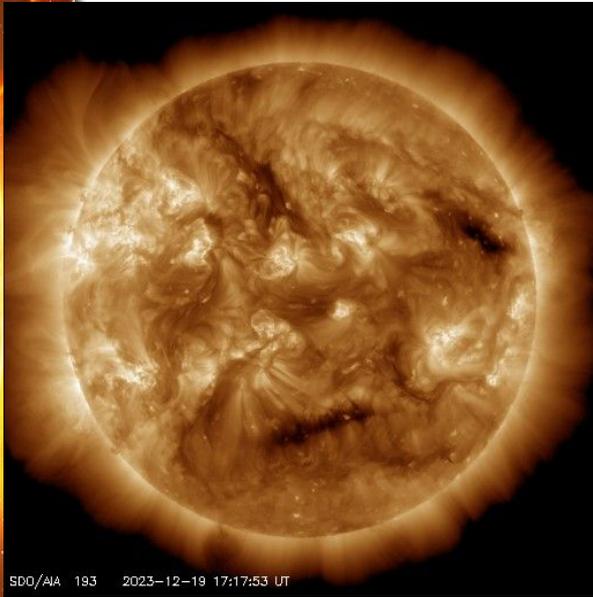


météo

Tâches solaires au 19-12-2023

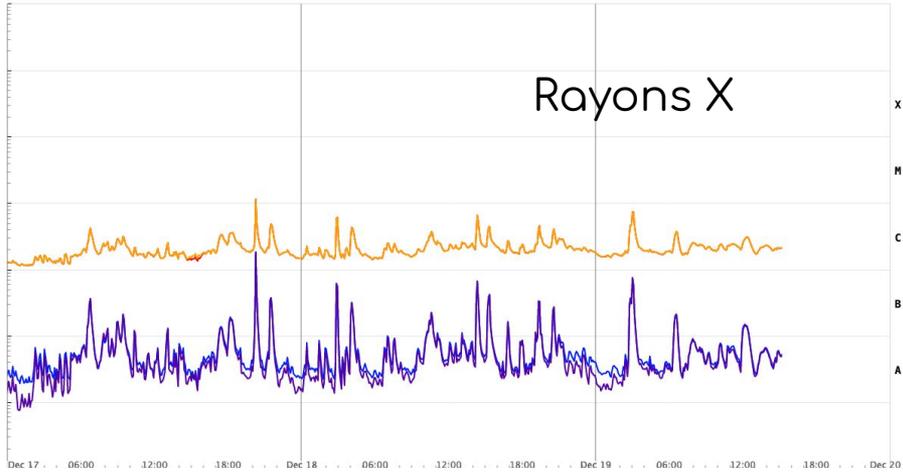


Soleil du jour

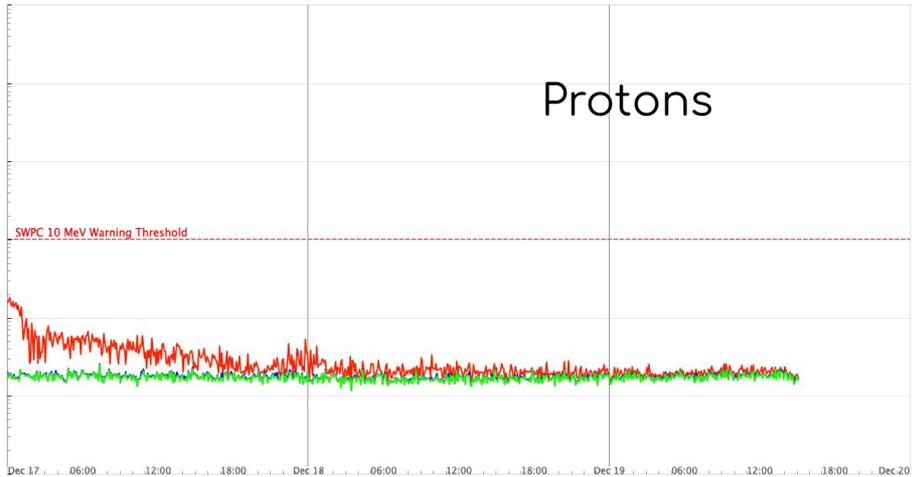




Zoom 6 Hour 1 Day 3 Day 7 Day

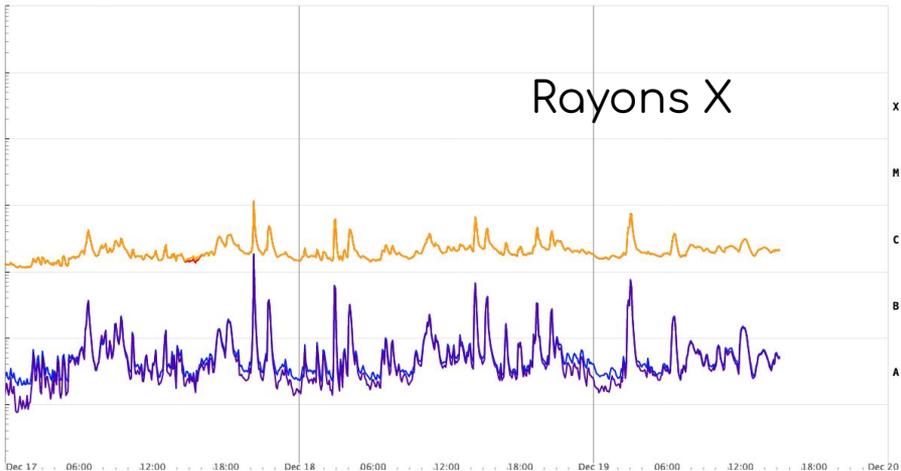


Zoom 6 Hour 1 Day 3 Day 7 Day

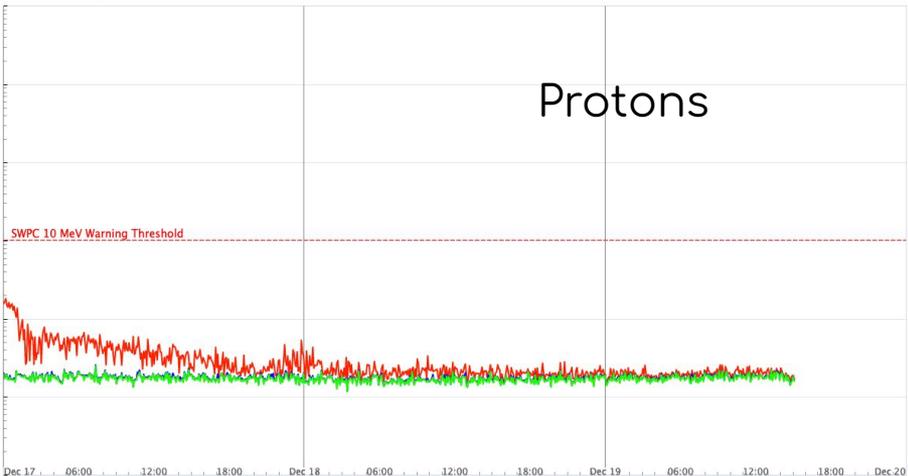




Zoom 6 Hour 1 Day 3 Day 7 Day

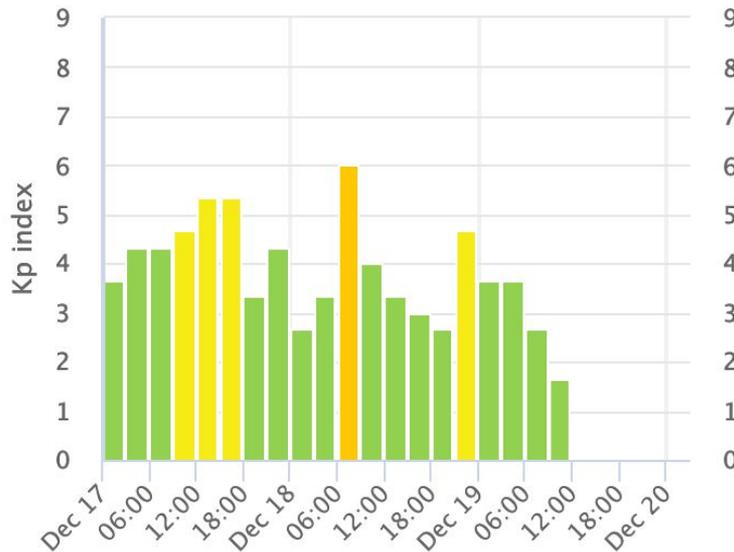


Zoom 6 Hour 1 Day 3 Day 7 Day



Estimated Planetary K index (3 hour data)

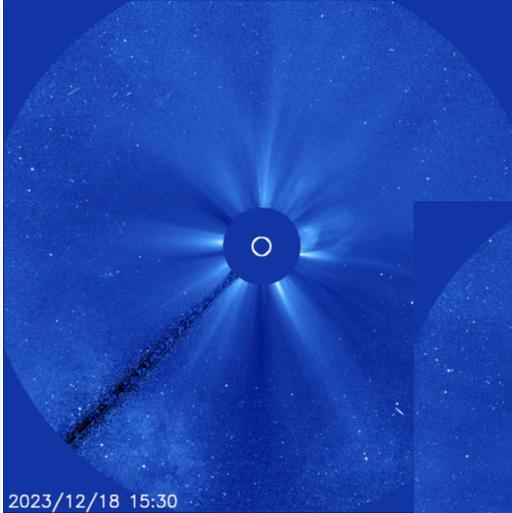
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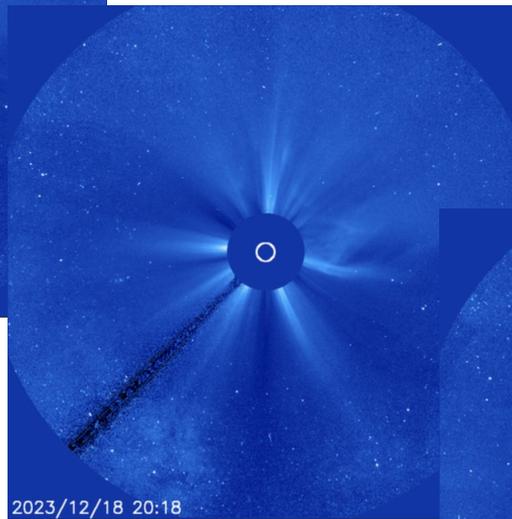
Updated Time: 2023-12-19T09:00:00.000Z

NOAA Scales Geomagnetic Storms

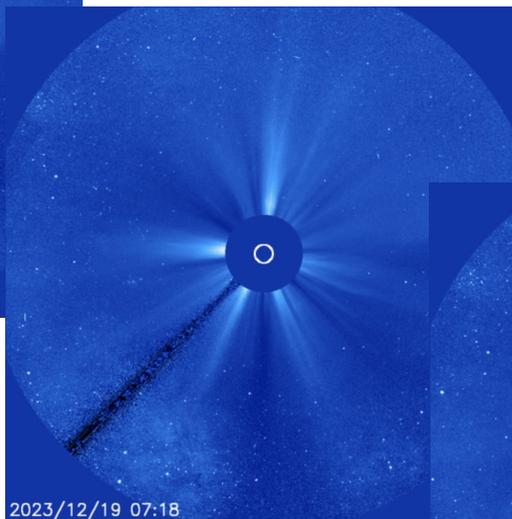
Kp < 5	Kp = 5 (G1)	Kp = 6 (G2)	Kp = 7 (G3)	Kp = 8, 9- (G4)	Kp = 9- (G5)
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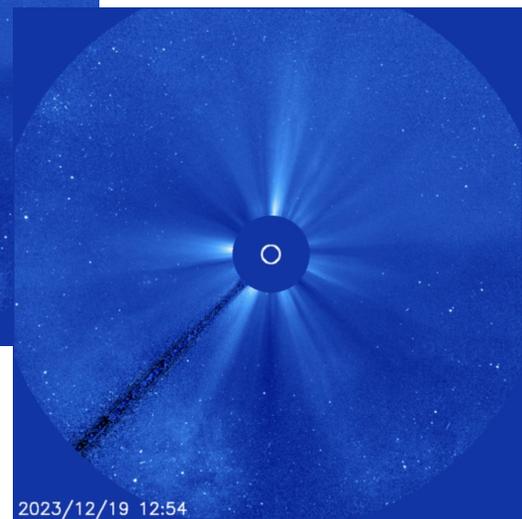
2023/12/18 15:30



2023/12/18 20:18



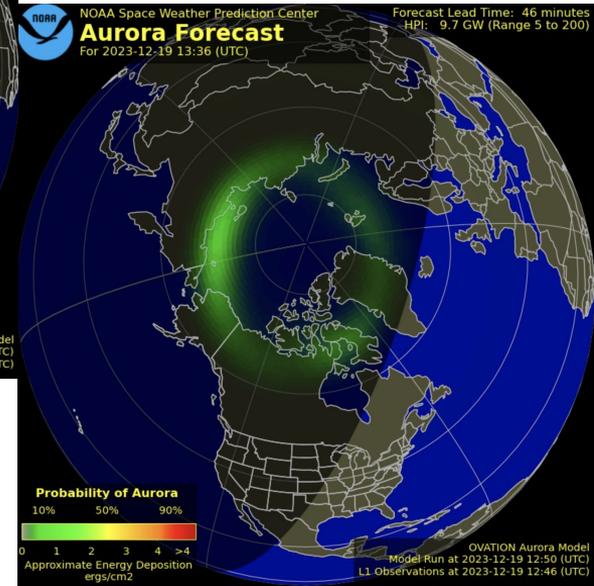
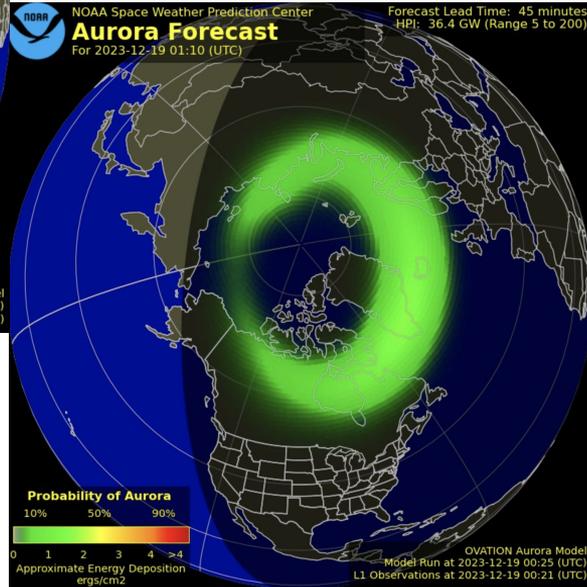
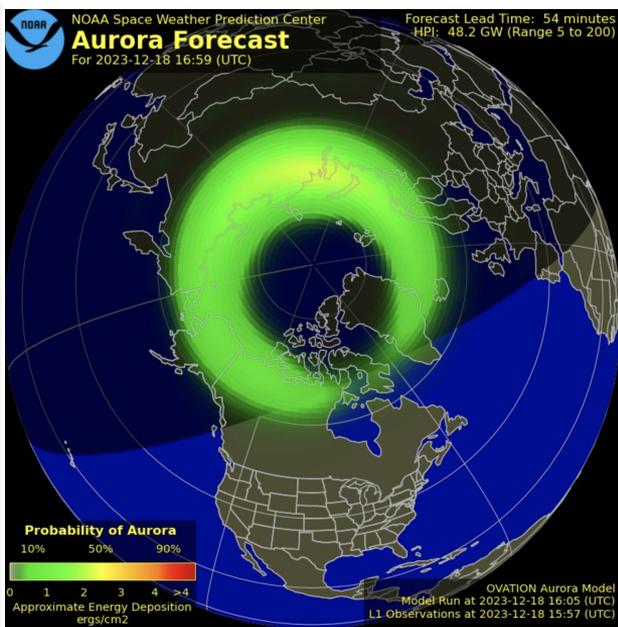
2023/12/19 07:18



2023/12/19 12:54



Prédictions des aurores du jour



Prévisions aurores à 30 minutes

Aurora forecast > 30 minutes (Probability of visible aurora)

Probabilités d'observations d'aurores



10% 25% 50% 75% 100%

Prévision pour (heure UTC) : 2023-12-19 18:01
Prévision heure France / Suède / Norvège : 2023-12-19 19:01
Prévision heure Finlande : 2023-12-19 20:01
Prévision heure Islande : 2023-12-19 18:01
Prévision heure Québec : 2023-12-19 13:01
Prévision heure Alaska : 2023-12-19 09:01

Données générées à (heure UTC) : 2023-12-19 17:17
Image générée à (heure France) : 2023-12-19 18:25

KP 0

KP 9

KP 9

KP 0

météo

— 19 décembre 2023 —
Astronef

Merci !

