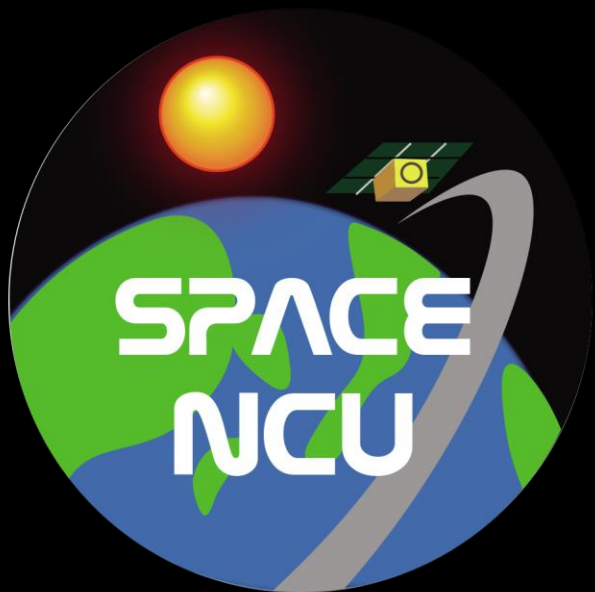


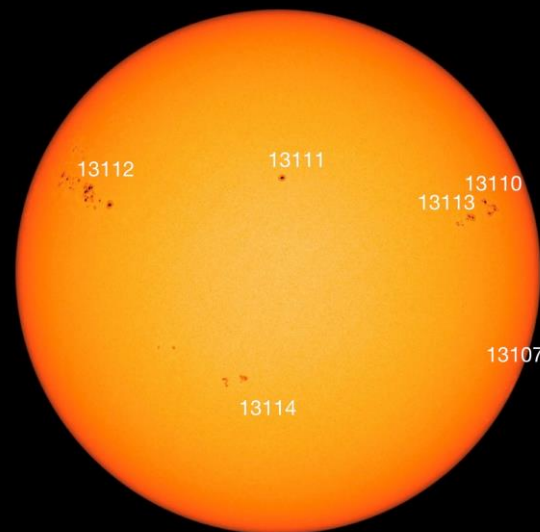


# 電漿值週

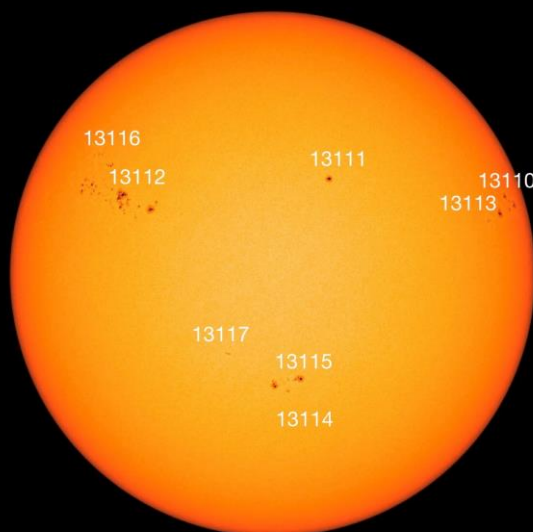
2022/10/03 ~ 2022/10/09

林威志 廖晟佑

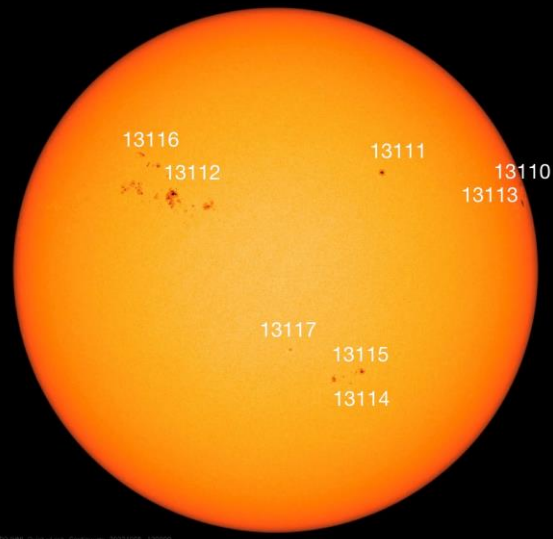
10-03 12:00 UTC



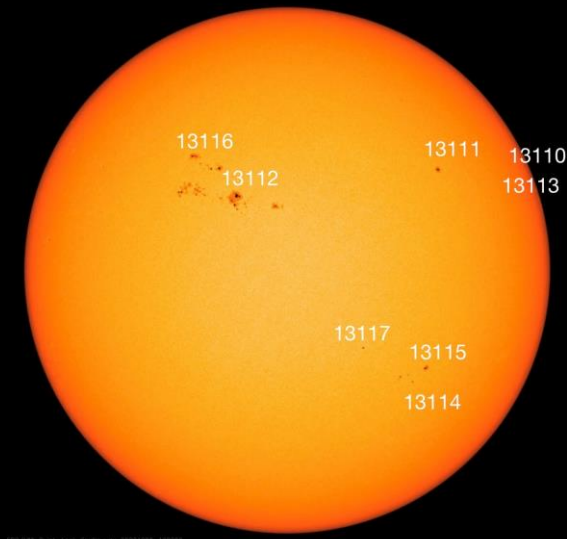
10-04 12:00 UTC



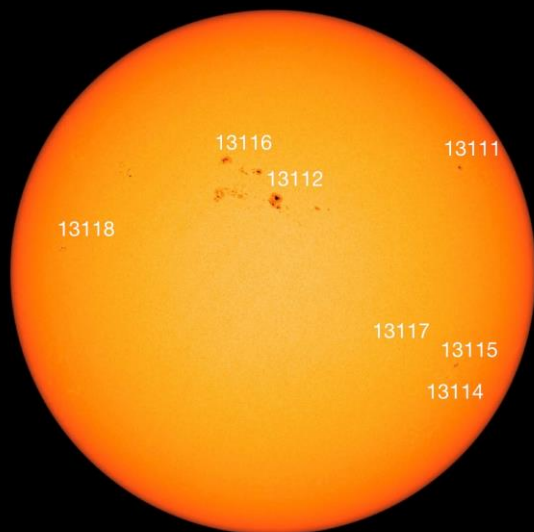
10-05 12:00 UTC



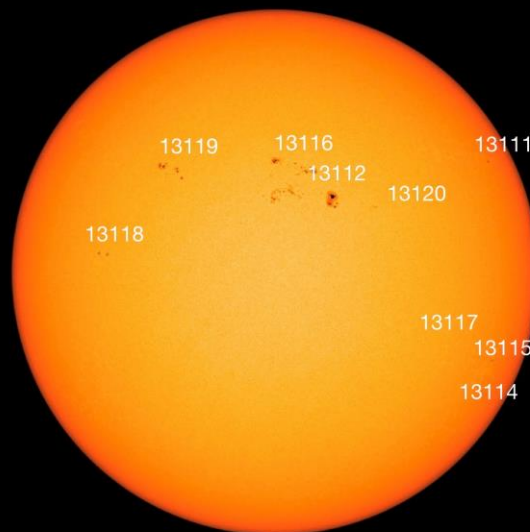
10-06 12:00 UTC



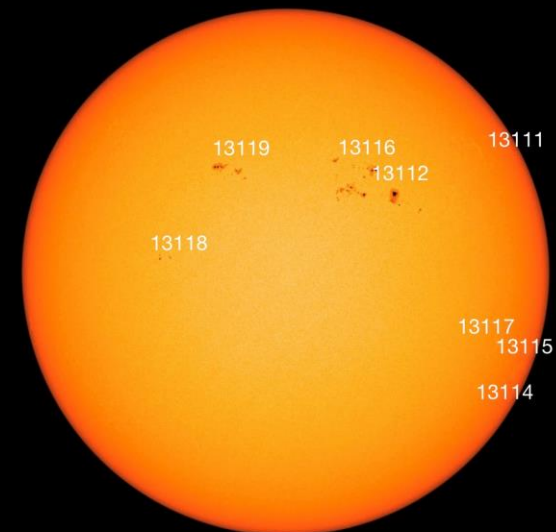
10-07 12:00 UTC



10-08 12:00 UTC

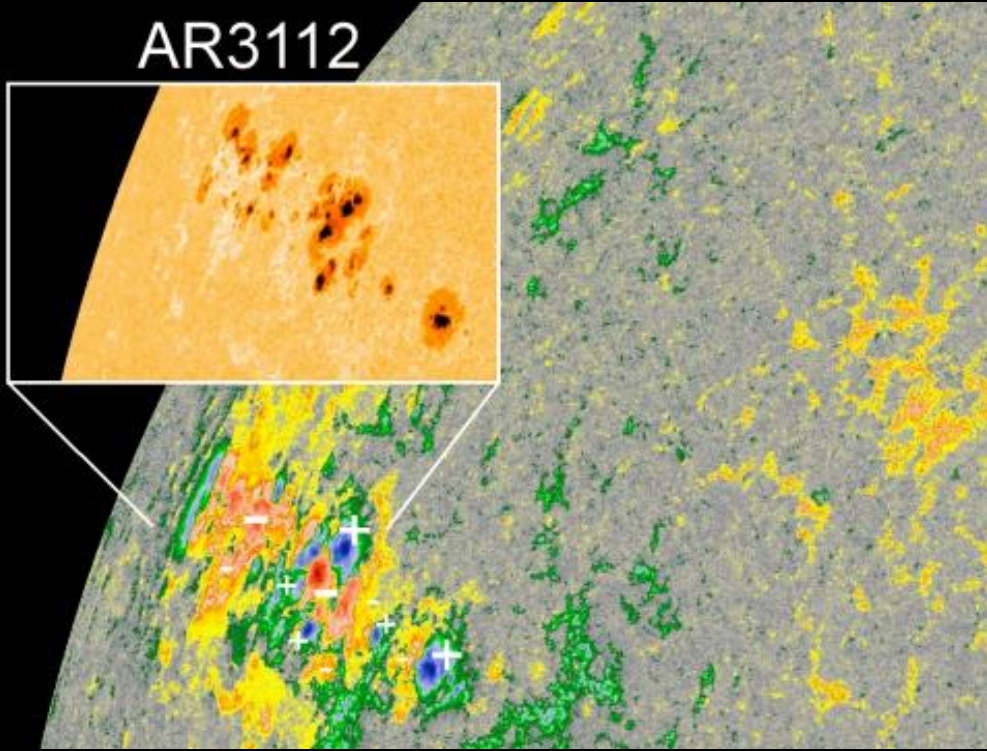


10-09 12:00 UTC



光球層 黒子/活躍區 SDO HMI 6173 Å

AR3112

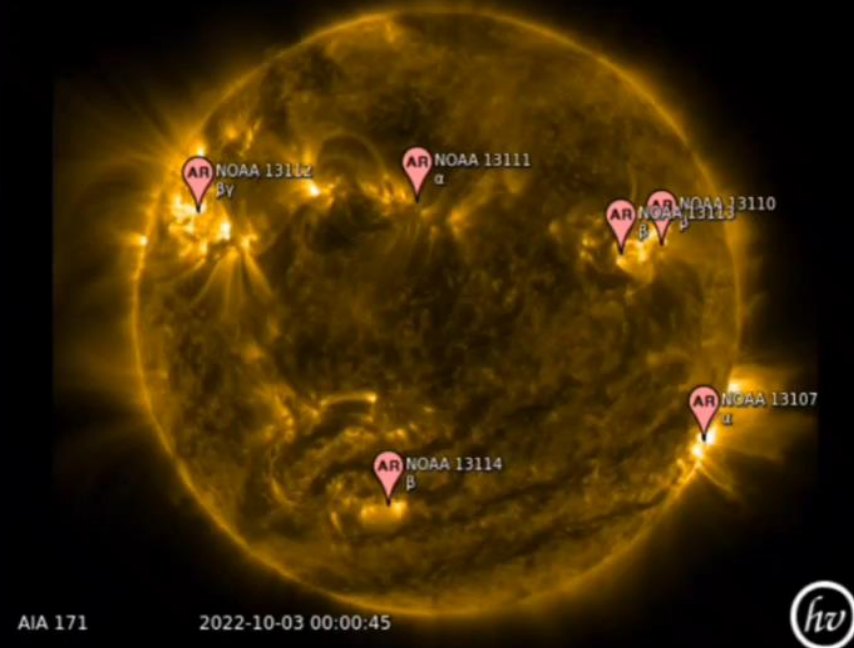




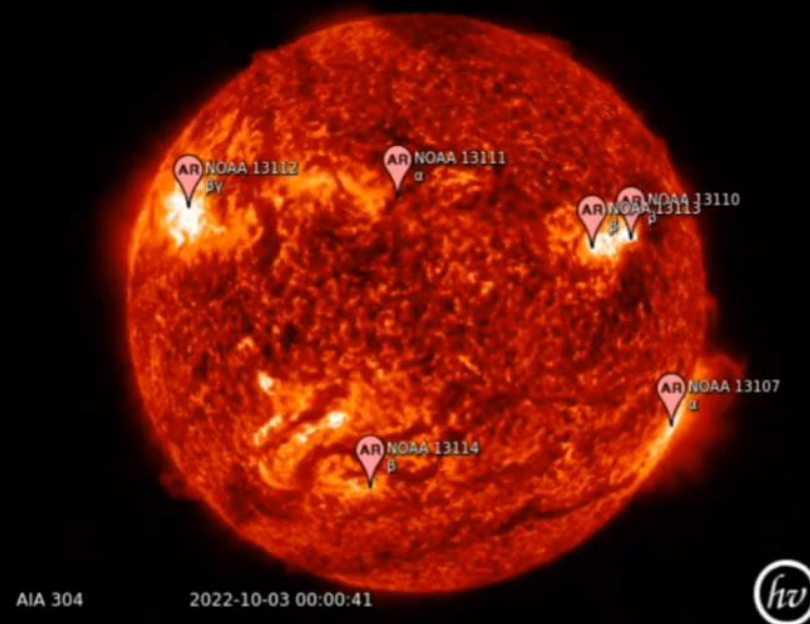
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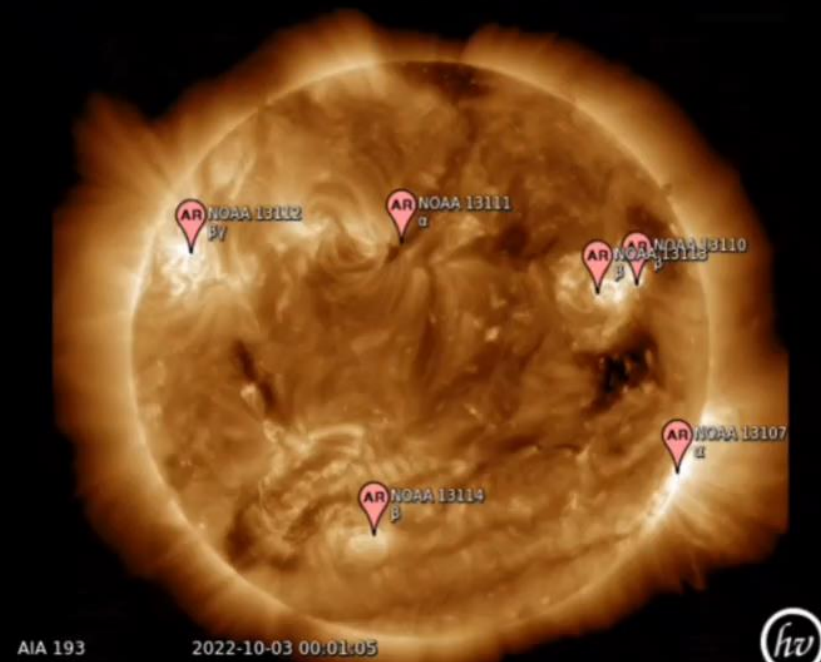
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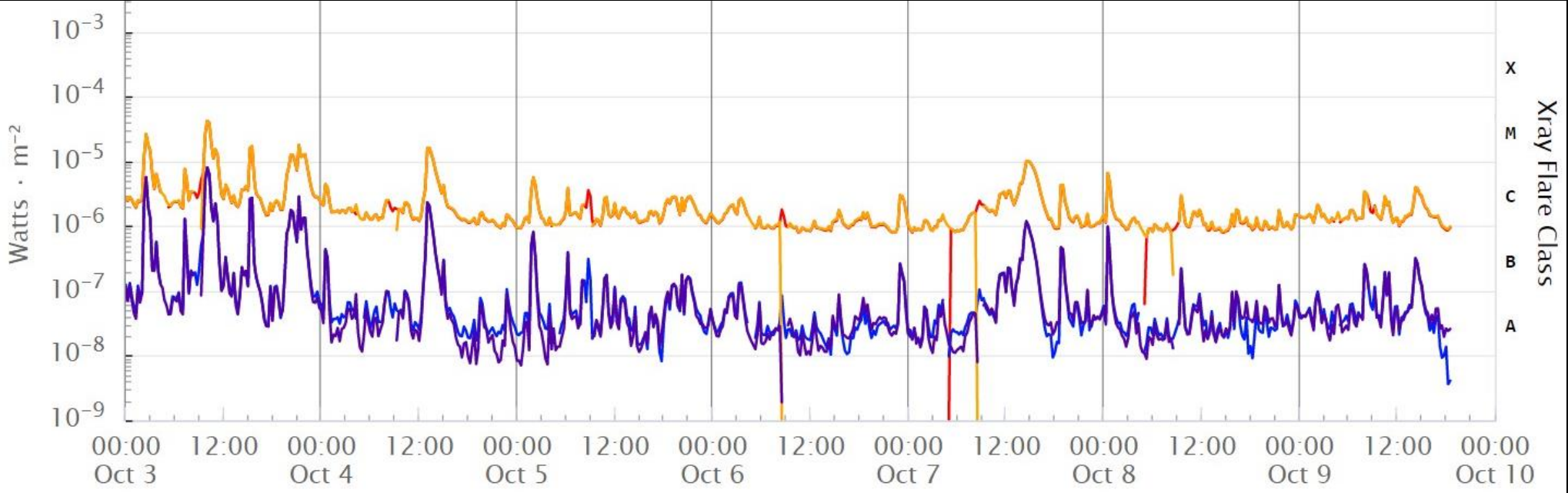


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[https://youtu.be/rUjL5e\\_LPME](https://youtu.be/rUjL5e_LPME)

# Solar Flares GOES X-Ray Flux (1-minute data)



Universal Time

— GOES-16 Long — GOES-16 Short — GOES-17 Long — GOES-17 Short

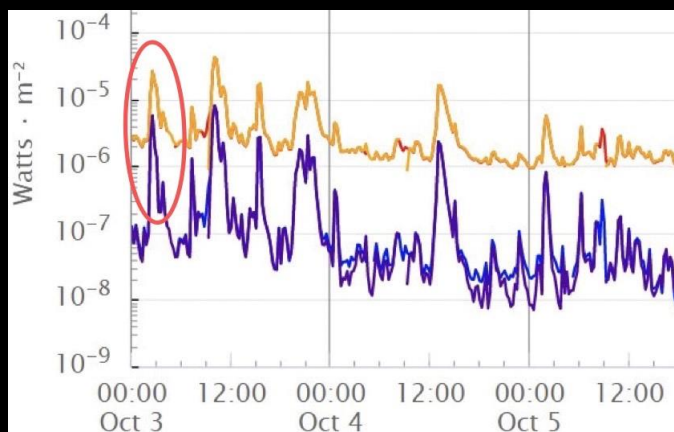
| NOAA SWPC |          | R<br>無線電干擾<br>Radio Blackouts              |
|-----------|----------|--------------------------------------------|
| 指數        | 描述       | GOES X-Ray<br>通量密度<br>(W·m <sup>-2</sup> ) |
| 5         | Extreme  | X20 (2×10 <sup>-3</sup> )                  |
| 4         | Severe   | X10 (10 <sup>-3</sup> )                    |
| 3         | Strong   | X1 (10 <sup>-4</sup> )                     |
| 2         | Moderate | M5 (5×10 <sup>-5</sup> )                   |
| 1         | Minor    | M1 (10 <sup>-5</sup> )                     |
| 0         | None     | <M1 (10 <sup>-5</sup> )                    |



AR3112 10-03 02:33 UTC



M2.6-flare



02:00 ~ 05:00 UTC

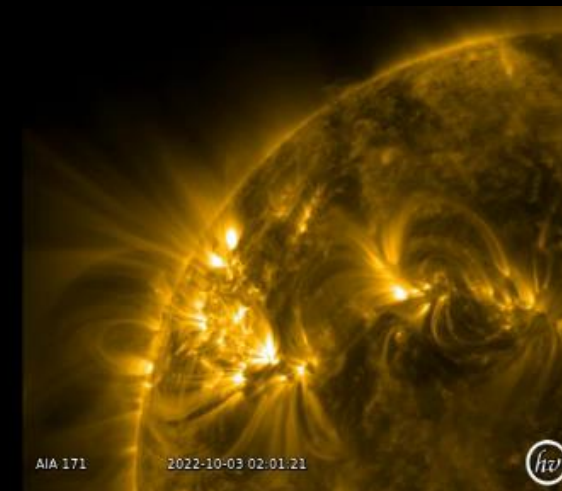
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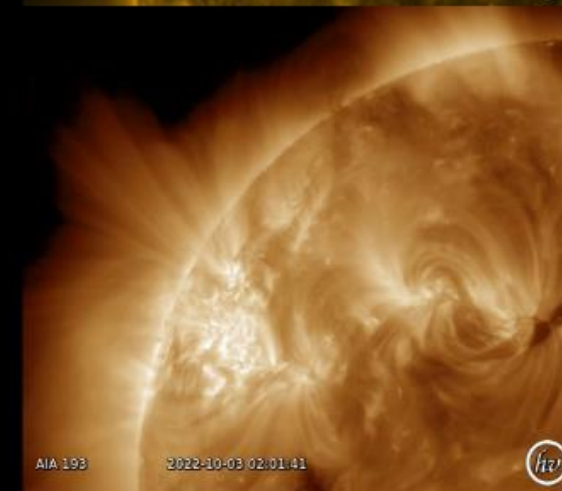
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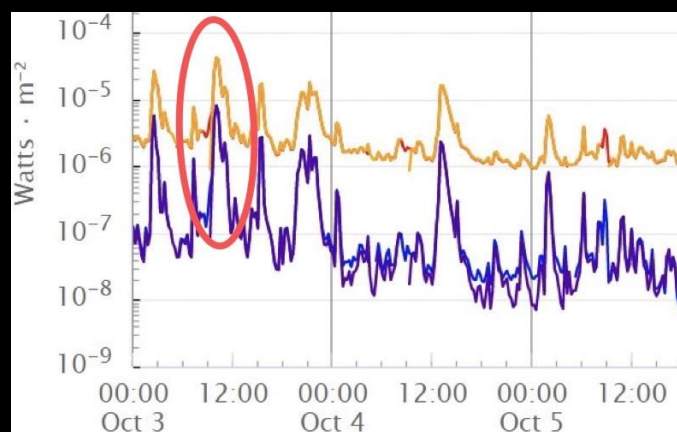


<https://youtu.be/pmjnvtZgagM>

AR3110 10-03 10:11 UTC



M4.2-flare

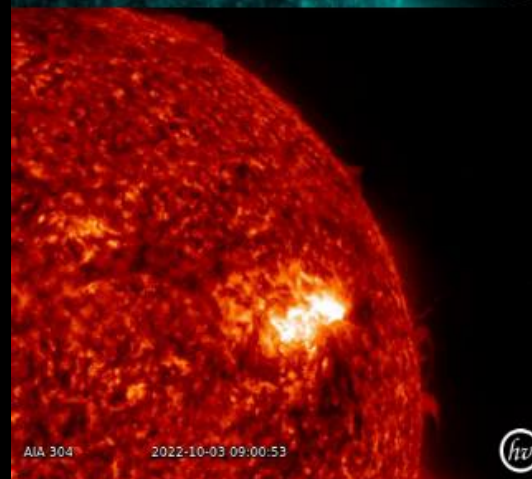


09:00 ~ 12:00 UTC

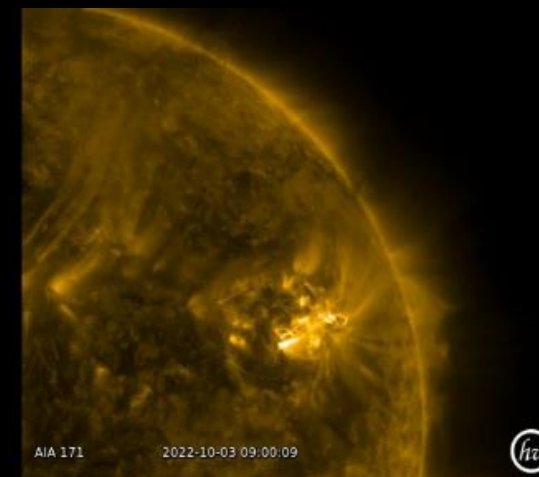
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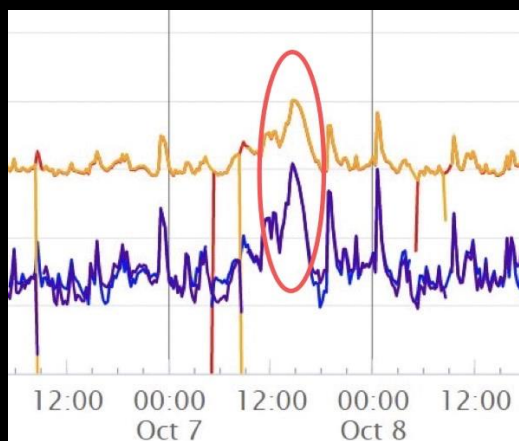
<https://youtu.be/Lu2o6NFZDuA>



AR3116 10-07 14:44 UTC

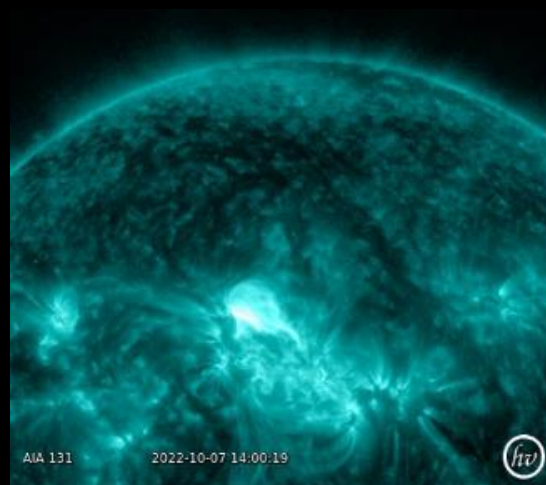


M1.0-flare

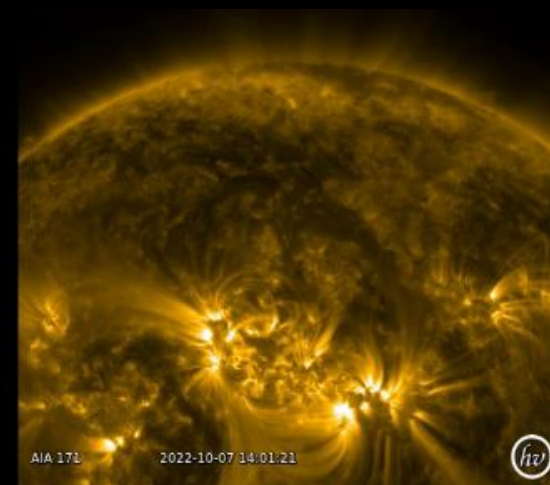


14:00 ~ 17:00 UTC

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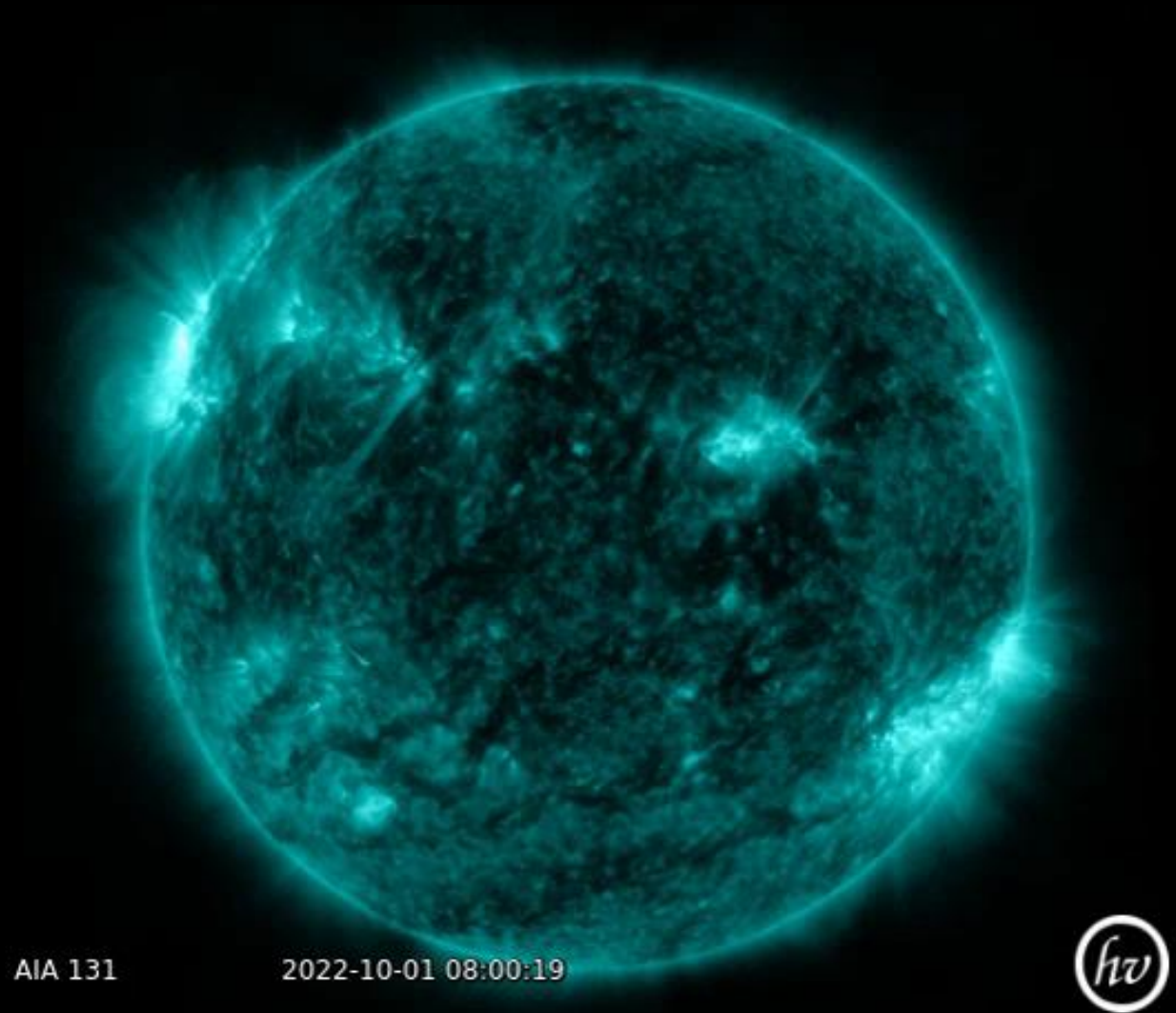
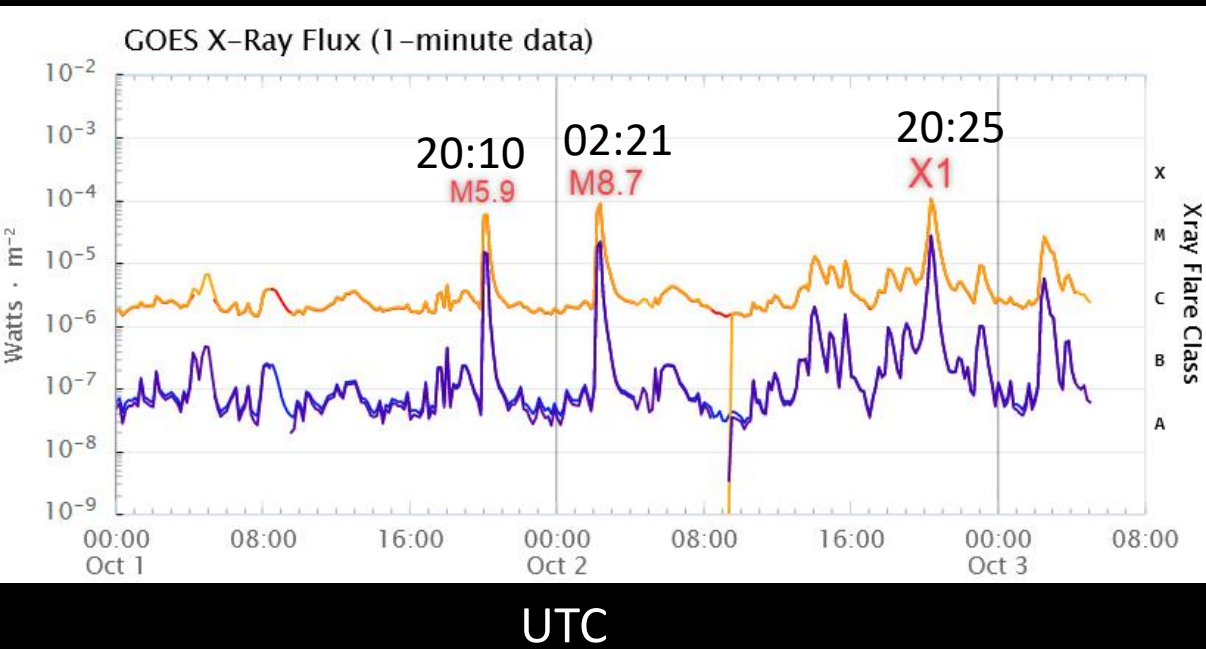
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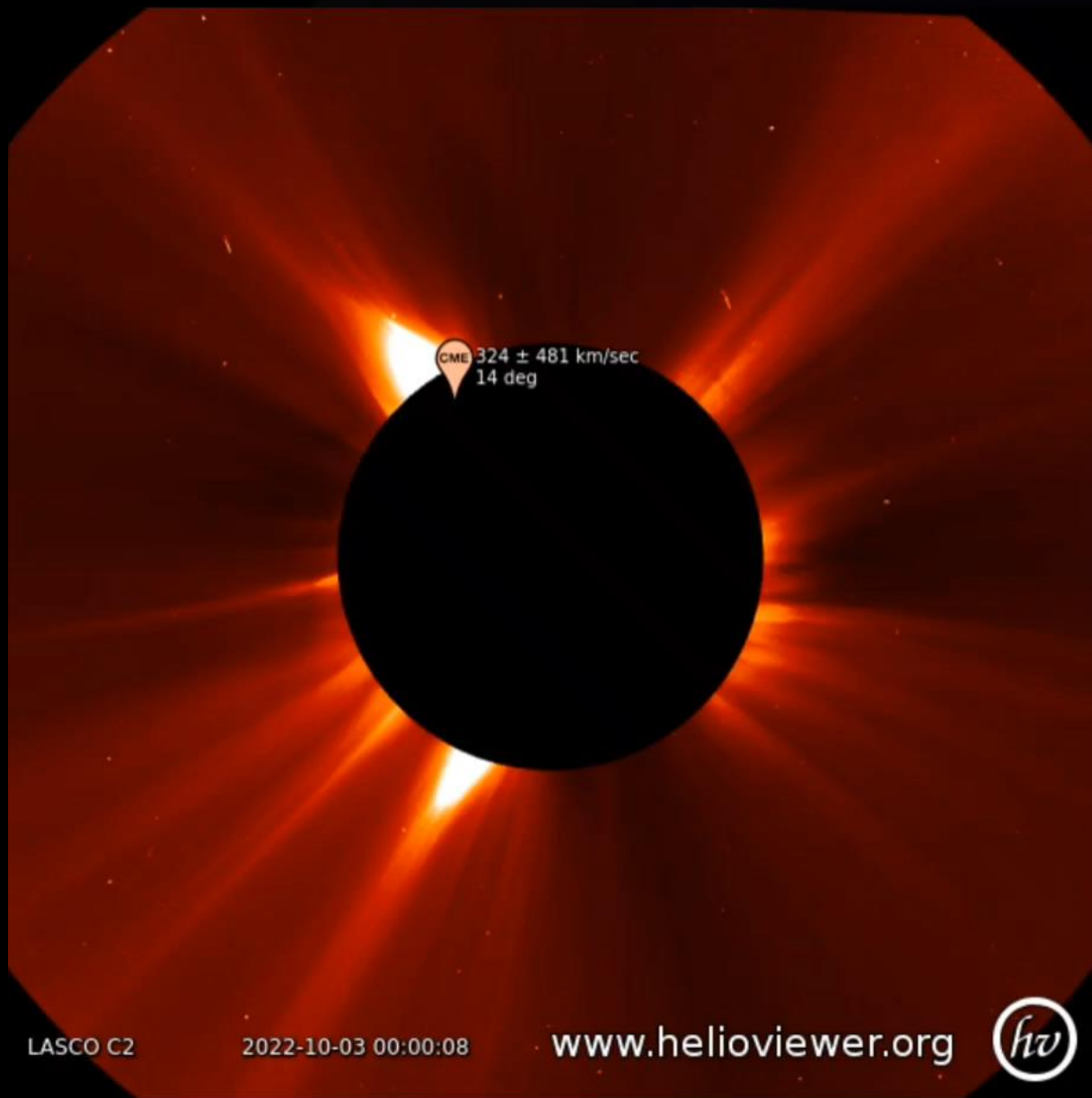
<https://youtu.be/n8pzgsrNf0c>



# AR3110



<https://youtu.be/R4dz6gvkffM>



<https://youtu.be/hpVYfv6P5nw>



# Coronal Mass Ejections

| #    | CME              | t0 | dt0 | pa  | da   | v    | dv   | minv | maxv | halo? |
|------|------------------|----|-----|-----|------|------|------|------|------|-------|
| 0037 | 2022/10/09 18:00 | 02 | 345 | 048 | 0762 | 0108 | 0625 | 0976 |      |       |
| 0036 | 2022/10/09 15:27 | 01 | 056 | 010 | 0300 | 0073 | 0153 | 0365 |      |       |
| 0035 | 2022/10/09 15:16 | 01 | 059 | 008 | 0223 | 0125 | 0146 | 0468 |      |       |
| 0034 | 2022/10/09 05:36 | 01 | 117 | 016 | 0121 | 0049 | 0104 | 0209 |      |       |
| 0033 | 2022/10/09 01:36 | 04 | 135 | 112 | 0279 | 0027 | 0211 | 0315 | II   |       |
| 0032 | 2022/10/08 05:12 | 02 | 306 | 018 | 0578 | 0113 | 0492 | 0844 |      |       |
| 0031 | 2022/10/08 04:24 | 01 | 263 | 016 | 0289 | 0028 | 0240 | 0325 |      |       |
| 0030 | 2022/10/08 02:24 | 01 | 292 | 014 | 0468 | 0075 | 0347 | 0600 |      |       |
| 0029 | 2022/10/08 01:48 | 00 | 097 | 020 | 0264 | 0137 | 0229 | 0537 |      |       |
| 0028 | 2022/10/07 14:48 | 01 | 056 | 014 | 0850 | 0163 | 0529 | 0976 |      |       |
| 0027 | 2022/10/07 08:12 | 03 | 330 | 118 | 0277 | 0106 | 0108 | 0516 | II   |       |
| 0026 | 2022/10/06 23:24 | 01 | 051 | 012 | 0729 | 0046 | 0653 | 0783 |      |       |
| 0025 | 2022/10/06 21:12 | 02 | 094 | 022 | 0264 | 0070 | 0184 | 0389 |      |       |
| 0024 | 2022/10/06 17:12 | 02 | 088 | 058 | 0249 | 0073 | 0160 | 0428 |      |       |
| 0023 | 2022/10/06 05:24 | 01 | 084 | 050 | 0303 | 0052 | 0220 | 0416 |      |       |
| 0022 | 2022/10/06 01:36 | 01 | 090 | 026 | 0339 | 0054 | 0236 | 0381 |      |       |
| 0021 | 2022/10/05 21:24 | 02 | 096 | 018 | 0299 | 0084 | 0201 | 0477 |      |       |
| 0020 | 2022/10/05 21:12 | 01 | 310 | 010 | 1389 | 0051 | 1359 | 1477 |      |       |
| 0019 | 2022/10/05 02:24 | 02 | 217 | 048 | 0280 | 0088 | 0217 | 0529 |      |       |
| 0018 | 2022/10/04 14:24 | 01 | 215 | 028 | 0558 | 0065 | 0403 | 0600 |      |       |
| 0017 | 2022/10/03 21:36 | 01 | 052 | 010 | 0964 | 0379 | 0411 | 1644 |      |       |
| 0016 | 2022/10/03 20:24 | 02 | 313 | 044 | 0589 | 0153 | 0456 | 1008 |      |       |
| 0015 | 2022/10/03 15:36 | 02 | 330 | 018 | 0578 | 0400 | 0138 | 1275 |      |       |
| 0014 | 2022/10/03 09:36 | 03 | 297 | 060 | 0781 | 0297 | 0446 | 1644 |      |       |
| 0013 | 2022/10/03 03:48 | 01 | 167 | 008 | 0142 | 0170 | 0120 | 0452 |      |       |
| 0012 | 2022/10/03 00:24 | 04 | 168 | 102 | 0310 | 0159 | 0128 | 0679 | II   |       |
| 0011 | 2022/10/02 20:12 | 02 | 300 | 054 | 0892 | 0362 | 0223 | 1644 |      |       |
| 0010 | 2022/10/02 19:12 | 01 | 294 | 010 | 0406 | 0066 | 0385 | 0558 |      |       |
| 0009 | 2022/10/02 16:12 | 01 | 111 | 008 | 0679 | 0018 | 0651 | 0694 |      |       |
| 0008 | 2022/10/02 15:05 | 01 | 292 | 014 | 0447 | 0045 | 0385 | 0512 |      |       |
| 0007 | 2022/10/02 05:36 | 01 | 309 | 020 | 0312 | 0360 | 0137 | 1077 |      |       |
| 0006 | 2022/10/02 03:24 | 04 | 306 | 078 | 0238 | 0061 | 0168 | 0381 |      |       |
| 0005 | 2022/10/02 02:36 | 02 | 286 | 062 | 0635 | 0145 | 0322 | 0947 |      |       |
| 0004 | 2022/10/01 21:36 | 01 | 267 | 008 | 0672 | 0560 | 0466 | 1736 |      |       |
| 0003 | 2022/10/01 20:24 | 02 | 294 | 030 | 0762 | 0103 | 0600 | 0947 |      |       |
| 0002 | 2022/10/01 12:12 | 01 | 270 | 010 | 0351 | 0227 | 0306 | 0762 |      |       |
| 0001 | 2022/10/01 02:48 | 03 | 289 | 028 | 0480 | 0034 | 0425 | 0548 |      |       |

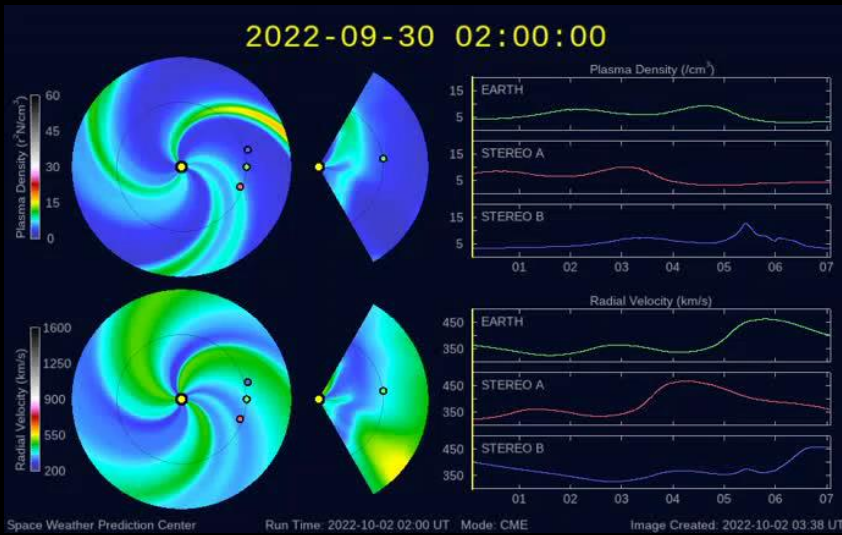
# Output: Detected cmemap with the following characteristics:

```
#
# CME: CME number
# Flow: Flow number. Flows are suspicious detections, their color in the detectionmap is dark blue
# t0: onset time, earliest indication of liftoff
# dt0: duration of liftoff (hours)
# pa: principal angle, counterclockwise from North (degrees)
# da: angular width (degrees),
# v: median velocity (km/s)
# dv: variation (1 sigma) of velocity over the width of the CME
# minv: lowest velocity detected within the CME
# maxv: highest velocity detected within the CME
# halo?: II if da>90, III if da>180, IV if da>270, indicating potential halo/partial halo CME
#
```

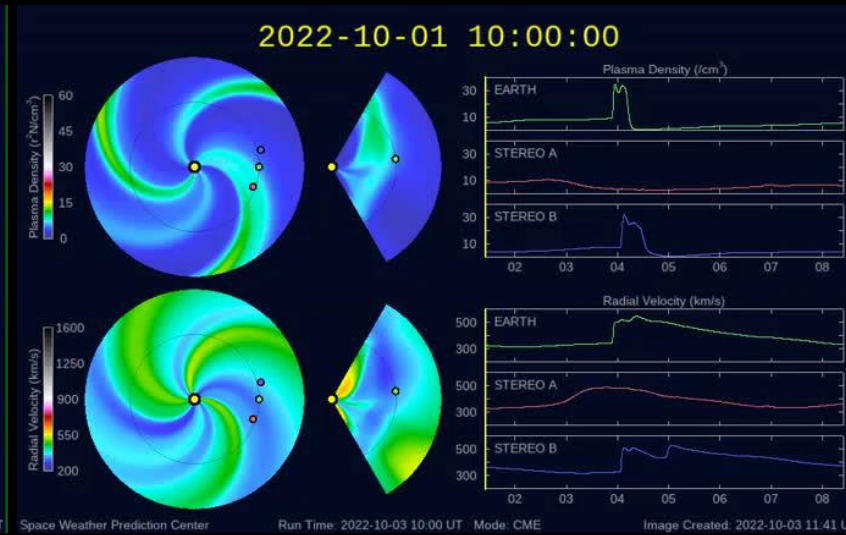
[https://www.sidc.be/cactus/catalog/LASCO/2\\_5\\_0/qkl/2022/10/latestCMEs.html](https://www.sidc.be/cactus/catalog/LASCO/2_5_0/qkl/2022/10/latestCMEs.html)



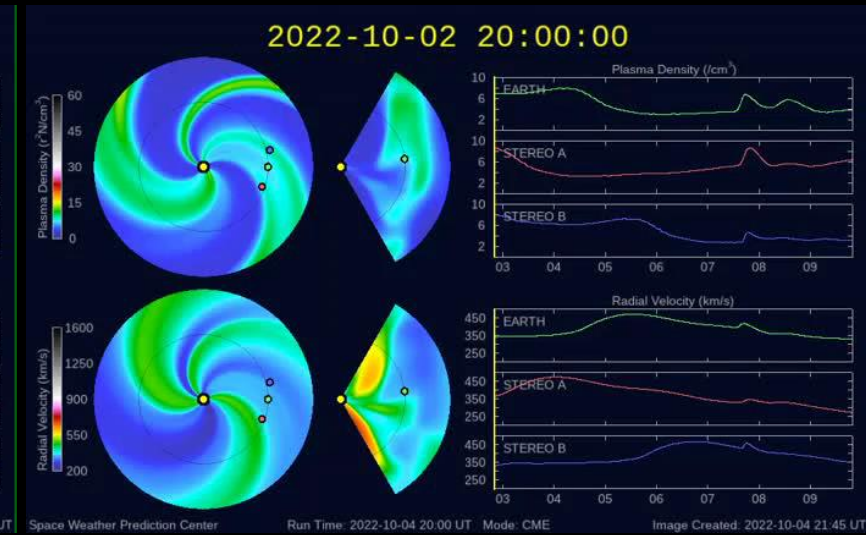
# WSA-Enlil Solar Wind Prediction



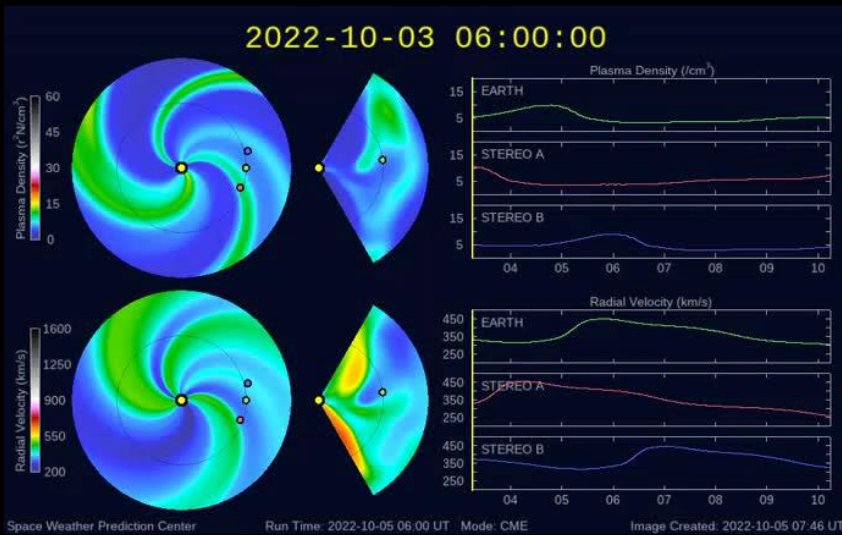
<https://youtu.be/VFdtPBtWt3c>



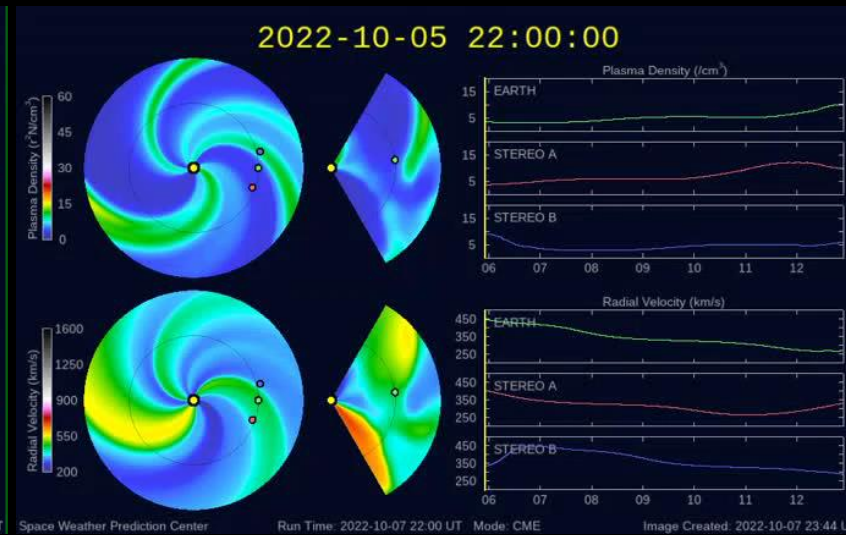
<https://youtu.be/gFnNZVR4H30>



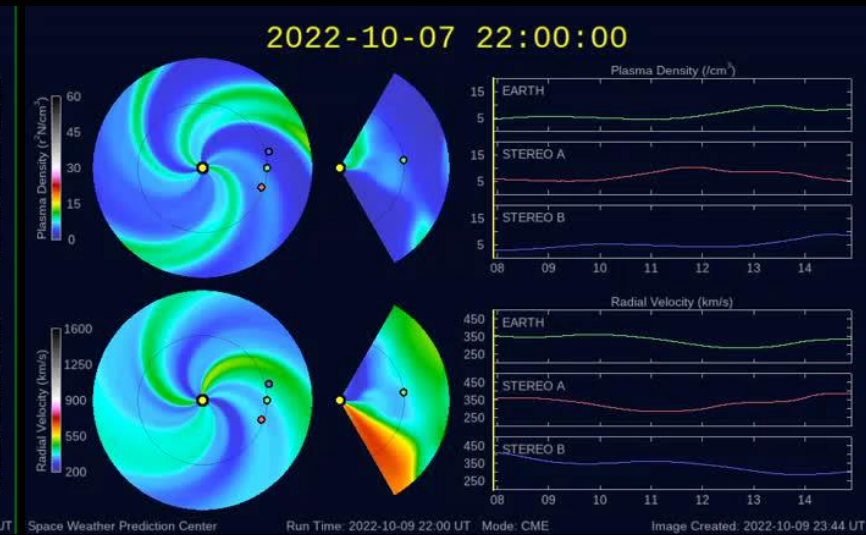
<https://youtu.be/ghwagcwK81A>



<https://youtu.be/rAO6dsy5KaQ>

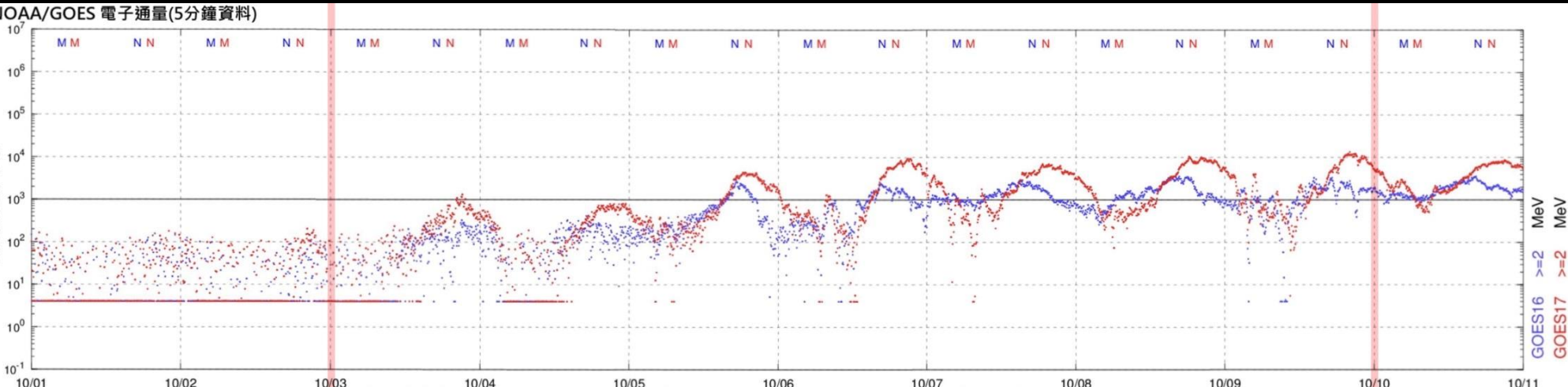
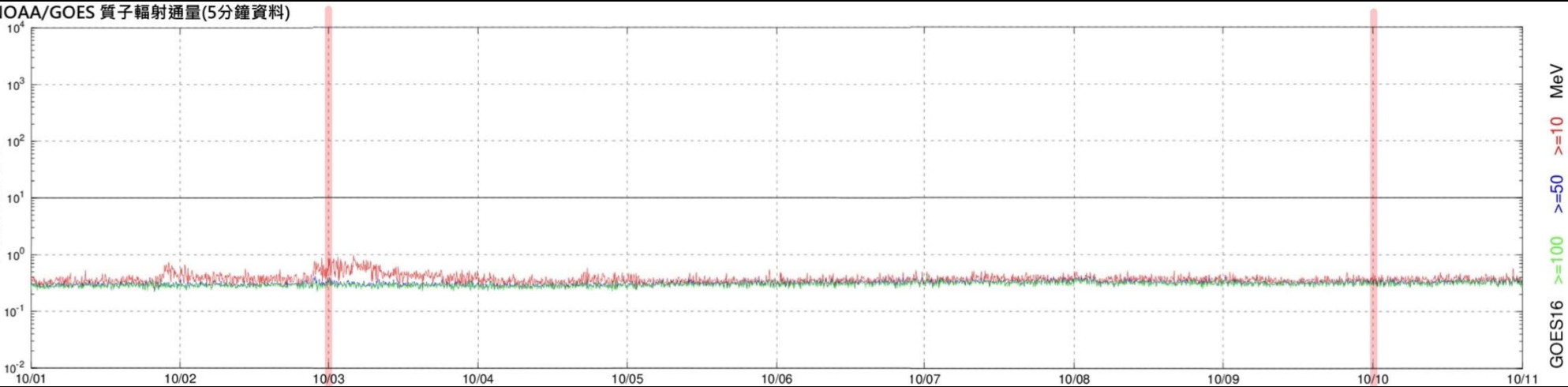


<https://youtu.be/Urac90uztLU>



<https://youtu.be/95YKZWUMb-o>

# 高能粒子通量

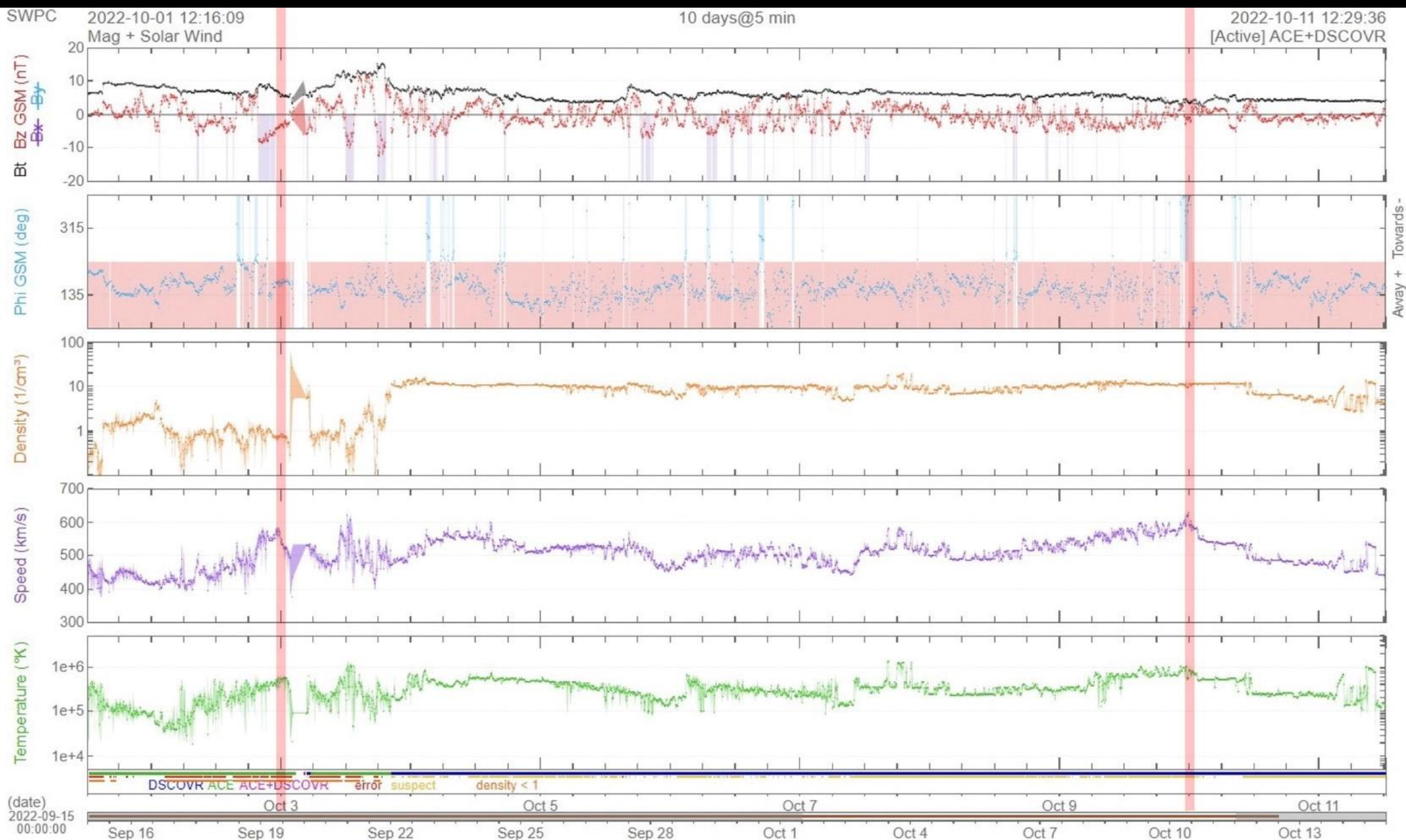


| NOAA SWPC |          | S<br>太陽輻射暴<br>Solar Radiation storms                                                    |
|-----------|----------|-----------------------------------------------------------------------------------------|
| 指數        | 描述       | GOES 高能質子<br>通量密度<br>(particles·s <sup>-1</sup> ·ster <sup>-1</sup> ·cm <sup>-2</sup> ) |
| 5         | Extreme  | 10 <sup>5</sup>                                                                         |
| 4         | Severe   | 10 <sup>4</sup>                                                                         |
| 3         | Strong   | 10 <sup>3</sup>                                                                         |
| 2         | Moderate | 10 <sup>2</sup>                                                                         |
| 1         | Minor    | 10                                                                                      |
| 0         | None     | <10                                                                                     |

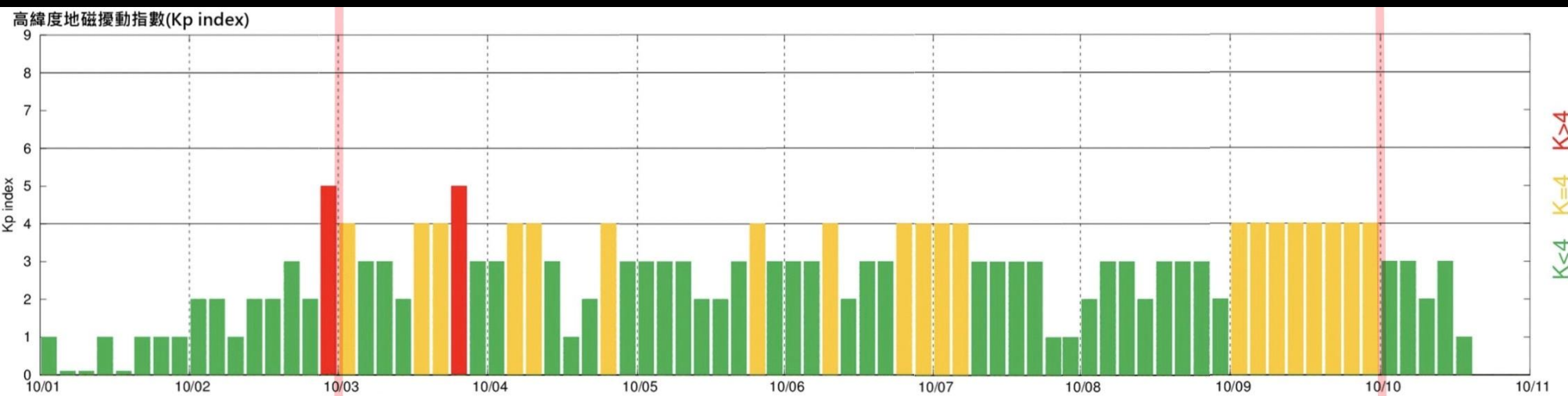
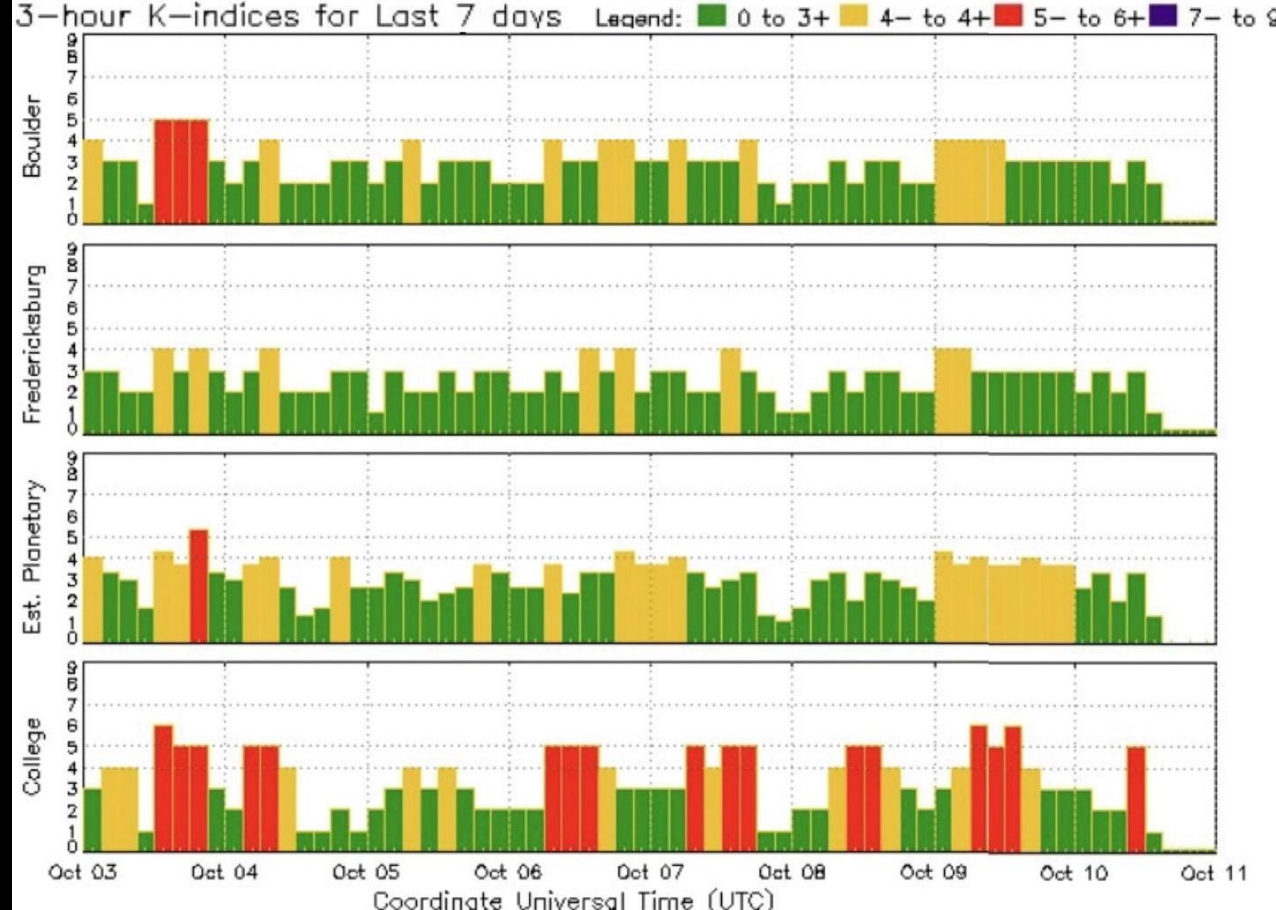
UTC



# Solar Wind



# Station K Index



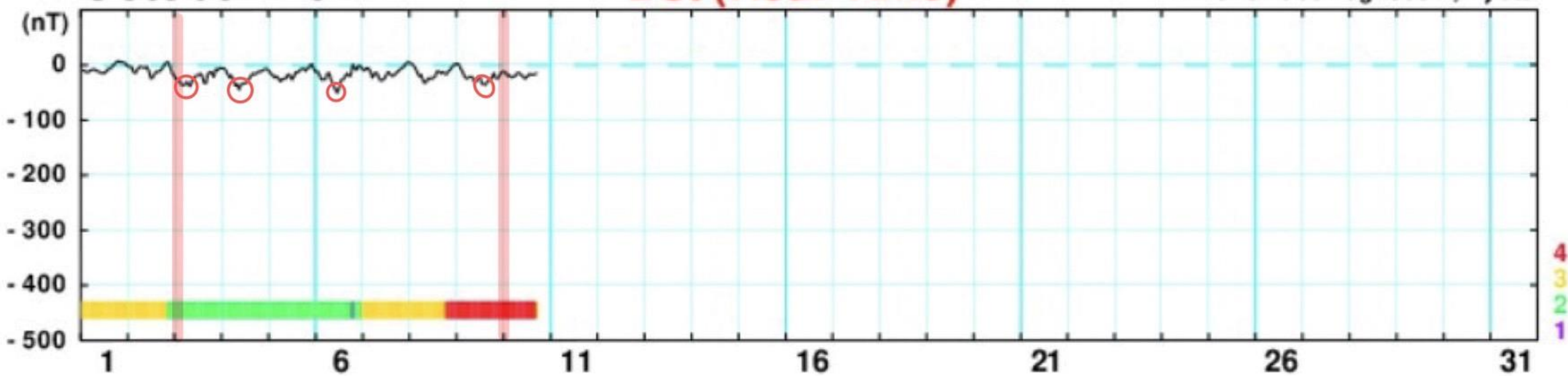
| NOAA SWPC |          | G<br>地球磁場擾動<br>Geomagnetic Storms |
|-----------|----------|-----------------------------------|
| 指數        | 描述       | 高緯度地磁指數<br>(Kp)                   |
| 5         | Extreme  | 9                                 |
| 4         | Severe   | 8                                 |
| 3         | Strong   | 7                                 |
| 2         | Moderate | 6                                 |
| 1         | Minor    | 5                                 |
| 0         | None     | <5                                |



October 2022

Dst (Real-Time)

WDC for Geomagnetism, Kyoto



|     | unit=nT |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | UT  |
|-----|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DAY | 1       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24  |
| 1   | -9      | -11 | -13 | -13 | -10 | -9  | -8  | -10 | -12 | -13 | -15 | -15 | -12 | -8  | -7  | -4  | 0   | 4   | 7   | 6   | 5   | 4   | 3   | -2  |
| 2   | -4      | -3  | -12 | -15 | -9  | -4  | -3  | -5  | -5  | -3  | -13 | -25 | -22 | -16 | -12 | -12 | -10 | -5  | 1   | 5   | 4   | -6  | -16 | -20 |
| 3   | -27     | -26 | -33 | -37 | -37 | -31 | -34 | -39 | -29 | -23 | -20 | -19 | -16 | -19 | -32 | -34 | -17 | -13 | -14 | -22 | -8  | -10 | -6  | -6  |
| 4   | -6      | -9  | -16 | -23 | -19 | -28 | -38 | -35 | -45 | -35 | -34 | -33 | -32 | -25 | -20 | -16 | -17 | -15 | -12 | -12 | -10 | -8  | -7  | -10 |
| 5   | -15     | -19 | -23 | -21 | -24 | -30 | -26 | -25 | -24 | -17 | -20 | -27 | -21 | -13 | -14 | -10 | -7  | -7  | -11 | -6  | -3  | 2   | -7  | -13 |
| 6   | -12     | -18 | -27 | -27 | -26 | -16 | -15 | -28 | -36 | -44 | -51 | -43 | -28 | -27 | -22 | -16 | -19 | -20 | 1   | -7  | -9  | -10 | -3  | -8  |
| 7   | -10     | -6  | -6  | -12 | -23 | -17 | -14 | -20 | -28 | -28 | -26 | -19 | -13 | -16 | -20 | -19 | -16 | -12 | -9  | -6  | -4  | 2   | 5   | 4   |
| 8   | 2       | -1  | -6  | -14 | -21 | -18 | -30 | -33 | -28 | -24 | -25 | -24 | -22 | -12 | -12 | -15 | -13 | -16 | -17 | -11 | -8  | -3  | 1   | 2   |
| 9   | 2       | -6  | -12 | -21 | -25 | -23 | -22 | -22 | -30 | -31 | -22 | -22 | -35 | -35 | -36 | -29 | -26 | -24 | -15 | -24 | -25 | -19 | -13 | -12 |

# 參考資料

<https://www.sidc.be/cactus/catalog.php>

<https://www.spaceweatherlive.com/en.html>

<https://spaceweather.com/archive.php>

<https://sdo.gsfc.nasa.gov/>

<https://www.helioviewer.org/>

[https://www.lmsal.com/solarsoft/latest\\_events\\_archive.html](https://www.lmsal.com/solarsoft/latest_events_archive.html)

<https://www.swpc.noaa.gov/observations>

<https://swoo.cwb.gov.tw/V2/index.html>

<https://watchers.news/2022/10/02/major-x1-0-solar-flare-erupts-from-ar-3110/>

<https://www.narlabs.org.tw/xscience/cont?xsmsid=0l148638629329404252&sid=0K262537503855887744>

<https://www.ngdc.noaa.gov/enlil/>



# 太空相關新聞



# **NASA's SpaceX Crew-5 Space Station Science**







# Every breath you take :

宇航員在太空飛行期間會經歷心血管、呼吸和肌肉骨骼系統的變化，遇到不同程度的**重力**，這些變化可能對未來的長期任務構成挑戰。

這項研究檢查了**心肺系統**的失調以及它如何影響**血壓**的控制。機組人員穿著定制的 Bio-Monitor 襯衫，可在運動前、運動中和運動後跟踪**心率**、**血壓**、**呼吸頻率**和活動水平。將結果與宇航員執行任務之前和之後的測量結果進行比較。

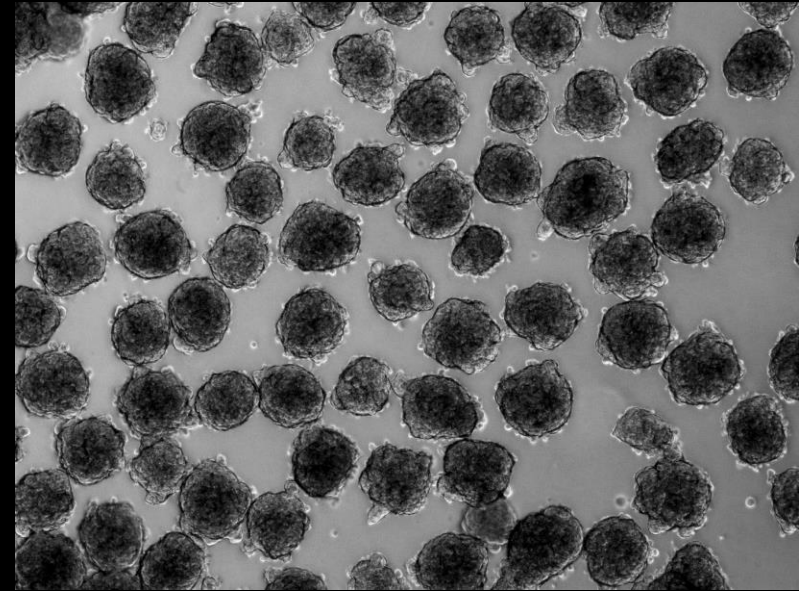




# Building a beating heart :

培養人類心臟細胞有助於研究人員研究心臟病並發現和測試新的藥物治療方法。在微重力條件下，細胞可以生長成 3D 培養物，其結構和特性比地球上生長的 2D 培養物更好。

Project EAGLE：利用空間中Space Automated Bioproduct Laboratory的設備促進心肌細胞成熟。在國際空間站上培養心臟細胞的 3D 培養物，學到的知識可以幫助科學家建立一個模擬心臟病功能性的心臟組織模型，並可用於測試新藥。



# Advancing bioprinting :

BioFabrication Facility(**BFF**)：在 2019年的首次太空之旅中，BFF 成功打印了部分人體**膝關節半月板**和大量人體**心臟細胞**，**微重力**可以打印比地面打印品質更高的組織樣本。

這次任務把BFF升級提供了控制其**打印頭溫度**的能力。

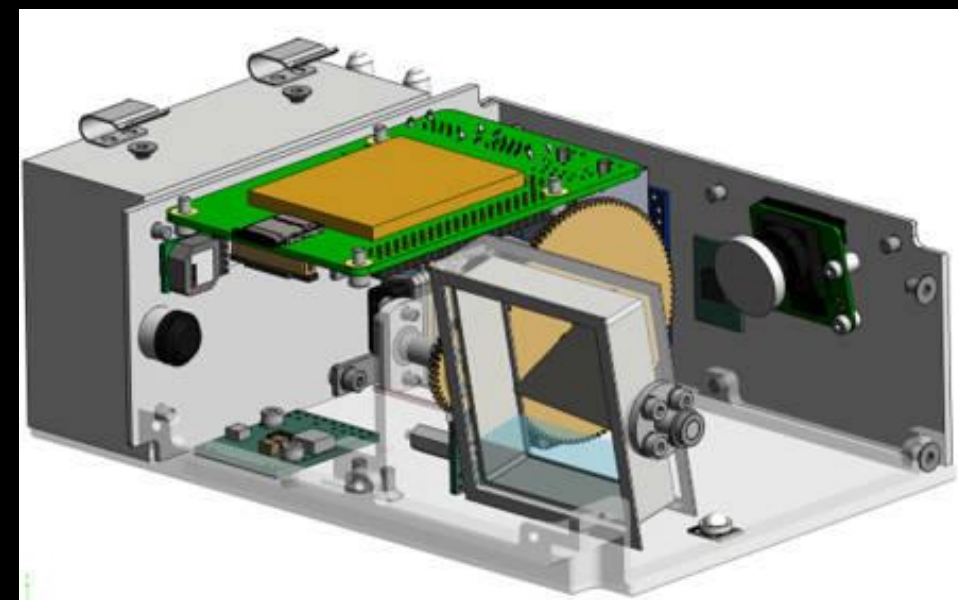
“許多生物墨水對溫度敏感，有些甚至最終會在更高的溫度下固化。



# Observing liquids in microgravity :

這是首次直接觀察模擬**月球**和**火星重力**環境中的液體行為，結果可以提高預測液體行為的模型的準確性，並有助於更好地設計太空探索系統，例如月球車、生命支持系統和火箭燃料箱。

不同密度的液體和氣體在 1G（地球重力）環境中很容易分離。然而，已經觀察到在低重力環境下會**產生氣泡**並保留在液體中，並且氣液分離會影響燃料電池等系統功能的性能。





# 參考資料

- Crew\_5\_Research\_Highlights
- Project Eagle in ISS
- Space Automated Bioproduct Laboratory
- Observation of Liquid Behavior in Partial G Environment

End

Thanks