

Decision Dashboard

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Current Structure

grouped by domains

SOLAR

- GOES 0.1–0.8 nm X-rays – CURRENT STATE
- SOHO LASCO C3 imagery – CURRENT STATE
- STEREO A and B COR2 imagery – CURRENT STATE
- Cone/WSA/ENLIL simulations – CURRENT STATE

HELIOSPHERE

- STEREO A and B high-energy protons – CURRENT STATE
- SOHO high-energy protons – CURRENT STATE
- GOES high-energy protons – CURRENT STATE
- RELEASE forecast for high-energy protons – CURRENT STATE
- Significant interplanetary shock at L1 – CURRENT STATE

MAGNETOSPHERE

- Kp index – CURRENT STATE
- GOES high-energy electrons – CURRENT STATE
- Modeled magnetopause standoff distance – CURRENT STATE

Weekly Space Weather Summary Report

Alternative Structure

Grouped together by storm categories/physical phenomena

- Radio blackout storms (major flare alert)
 - data: GOES 0.1-0.8 nm X-rays
 - Threshold: M5.0 (x-ray flux $\geq 5 \times 10^{-5}$ W/m²)
- CME alert
 - data: coronagraph images (SOHO, STEREO A, B) and other auxiliary CME relevant data (type II radio burst)
 - tool - WSA+ENLIL+Cone (instruction)
 - threshold: Earth-directed > 500 km/s else where > 1000 km/s or there is enhancement in SEP

Radiation storms

(of Solar Origin, associated with flare/CME)

- SEP (solar energetic particles)
 - data: STEREO A, B high energy proton flux
13-100 MeV proton flux exceeds 0.1 pfu/MeV
 - GOES high energy proton fluxes
 - > 10 MeV proton flux exceeds 10 pfu
 - > 100 MeV proton flux exceeds 1 pfu
 - RELeASE Forecast for high-energy protons
(model result)

Interplanetary Shock arrival at LI (ACE)

CME follow-on

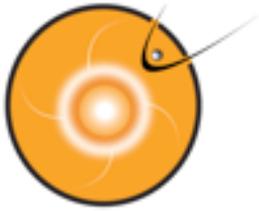
- follow-up on significant Earth-directed CMEs
- prelude to a potential geomagnetic storm

Modeled magnetopause standoff distance alert trigger - mostly CMEs

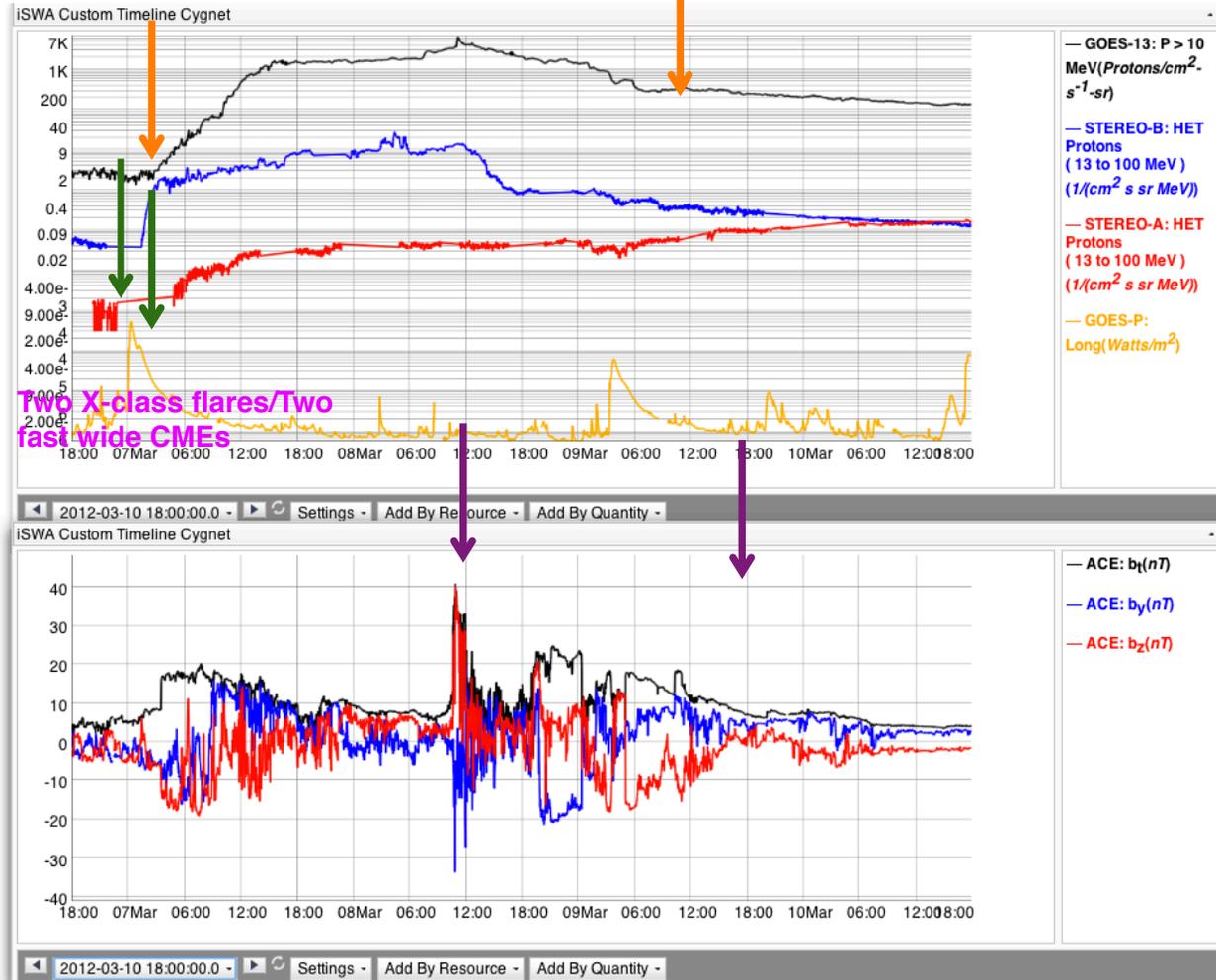
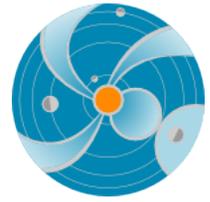
- Model result
- threshold $r_0 < 6.6 \text{ RE}$
- follow-up on CMEs that have strong solar wind-magnetosphere coupling effects

Geomagnetic Storm

- monitoring K_p
- $K_p \geq 6$
- can be caused by CME or CIR
 - CIR geomagnetic storm $K_p \leq 6$



Space Weather Effects and Timeline (Flare and CME)



Flare effects at Earth:
~ 8 minutes (radio blackout storms)
Duration: minutes to hours

SEP radiation effects reaching Earth: 20 minutes – 1 hour after the event onset
Duration: a few days

CME effects arrives @ Earth: 1-2 days (35 hours here)
Geomagnetic storms: a couple of days

Radiation Storms due to electrons in the Van Allen Radiation belt (in the near-Earth environment)

- heart of the radiation belt 3 - 4.5 RE
- CME storms - peak fluxes closer to Earth
- CIR storms - peak fluxes further from Earth
- real-time data streams only at GEO (GOES data)
- threshold: the GOES >0.8 MeV electron flux $>10^5$ pfu
 - trigger: mainly due to CIR HSS storms
- SWx beacon data from van Allen probes - improve the situation

Auxiliary data of CME

Type II radio emission

- Space Weather Message Code: ALTTP2
- Serial Number: 856
- Issue Time: 2013 May 22 1344 UTC
- ALERT: Type II Radio Emission
- Begin Time: 2013 May 22 1259 UTC
- Estimated Velocity: 1237 km/s
- Description: Type II emissions occur in association with eruptions on the sun and typically indicate a coronal mass ejection is associated with a flare event.

Type IV radio emission

- Space Weather Message Code: ALTTP4
- Serial Number: 417
- Issue Time: 2013 May 22 1530 UTC
- ALERT: Type IV Radio Emission
- Begin Time: 2013 May 22 1303 UTC
- Description: Type IV emissions occur in association with major eruptions on the sun and are typically associated with strong coronal mass ejections and solar radiation storms.