Space Weather products (models & observations)

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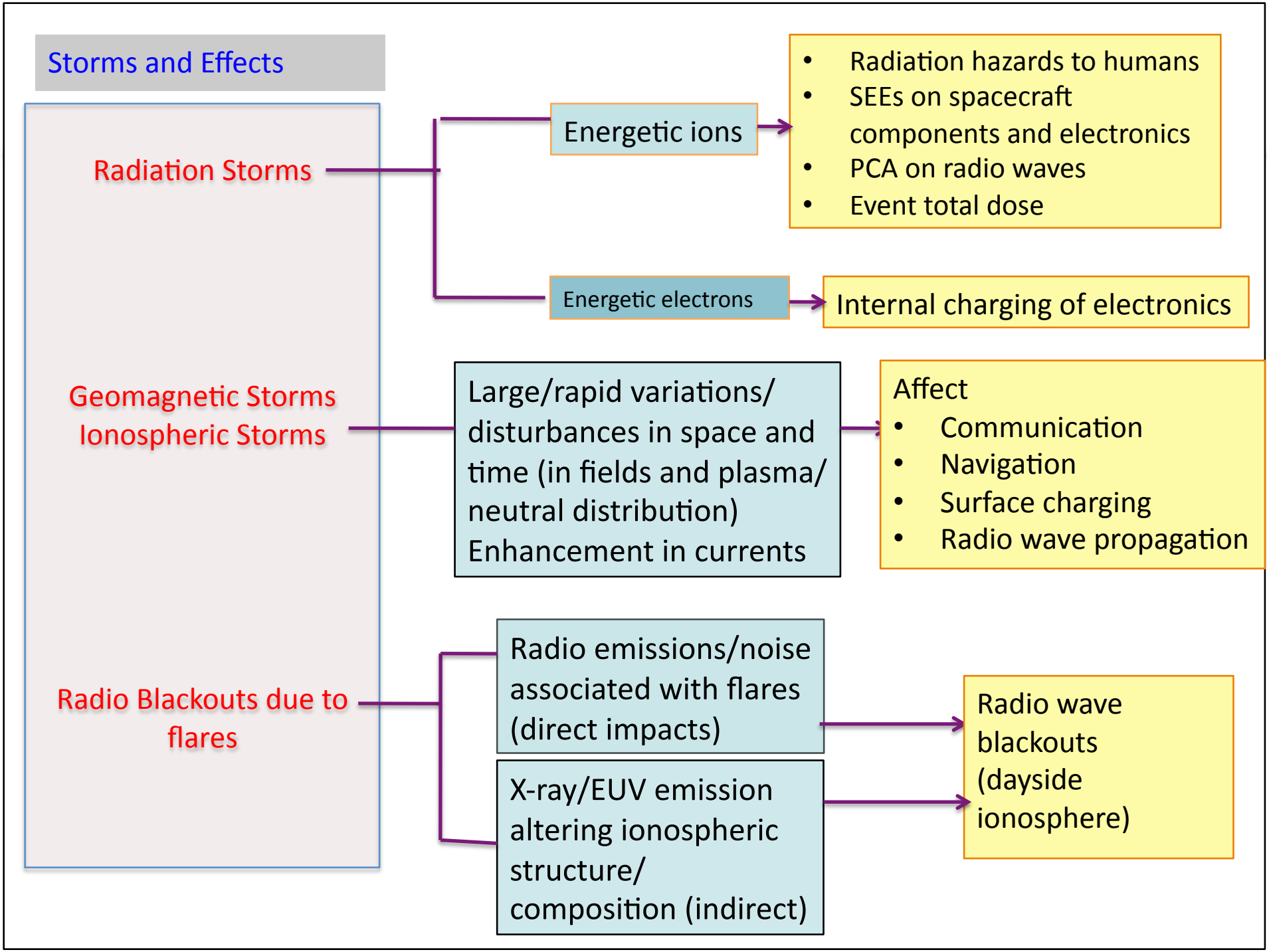
Space Weather Training on 2/15/2016


Storms and Effects
Radiation Storms
Energetic ions
Radiation hazards to humans
SEEs on spacecraft components and electronics
PCA on radio waves
Event total dose
Energetic electrons
Internal charging of electronics
Geomagnetic Storms
Ionospheric Storms
Large/rapid variations/ disturbances in space and time (in fields and plasma/ neutral distribution)
Enhancement in currents
Affect
Communication
Navigation
Surface charging
Radio wave propagation
Radio Blackouts due to flares
Radio emissions/noise associated with flares (direct impacts)
X-ray/EUV emission altering ionospheric structure/ composition (indirect)
Radio wave blackouts (dayside ionosphere)

Major SWx Concerns for Launch/ spacecraft operations

- Solar energetic particle event
  - On the ground: >100 MeV proton flux
  - Outside Earth's protection: >30 MeV proton flux
- Geomagnetic Storms
  - Kp >=7
- Other mission specific concerns

SEP events

- Suggested constraint
  - >100 MeV flux exceeds 1pfu

SWx products

- Relevant to SEPs and geomagnetic storms
- Layout
  - http://go.nasa.gov/1PUZOyK
  - http://bit.ly/products_launch_relevant

Other products

- GOES > 0.8 MeV electrons and > 2 MeV electrons (internal charging)
- Aurora products
  - Ovation prime

iSWA layouts

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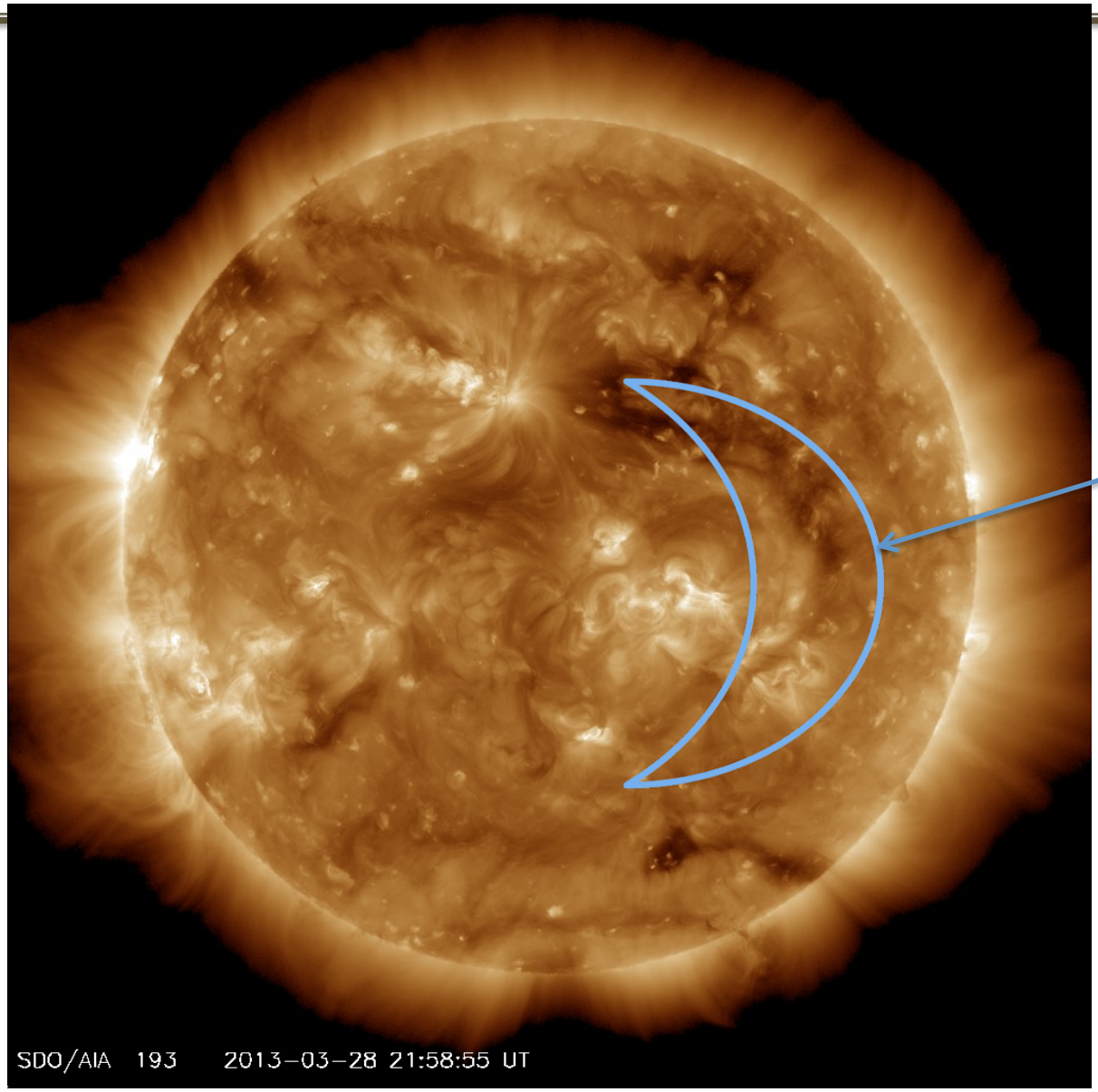
layouts

- Monitoring space weather activities
- Events
- Anomaly
- Comparative study
- Weekly summary and highlights of specifics

Layouts - examples

- http://1.usa.gov/1rQXhWK - x1.4 flare on April 25, 2014
- http://1.usa.gov/1kr0842 - summary 20140430
- http://1.usa.gov/1i2Qemt scintillation with Kp
- http://1.usa.gov/1gPzEKM scintillation
- http://1.usa.gov/1deGdXC anomaly resolution
- http://1.usa.gov/1fk5Fv6 coronal hole responsible for Saturn aurora

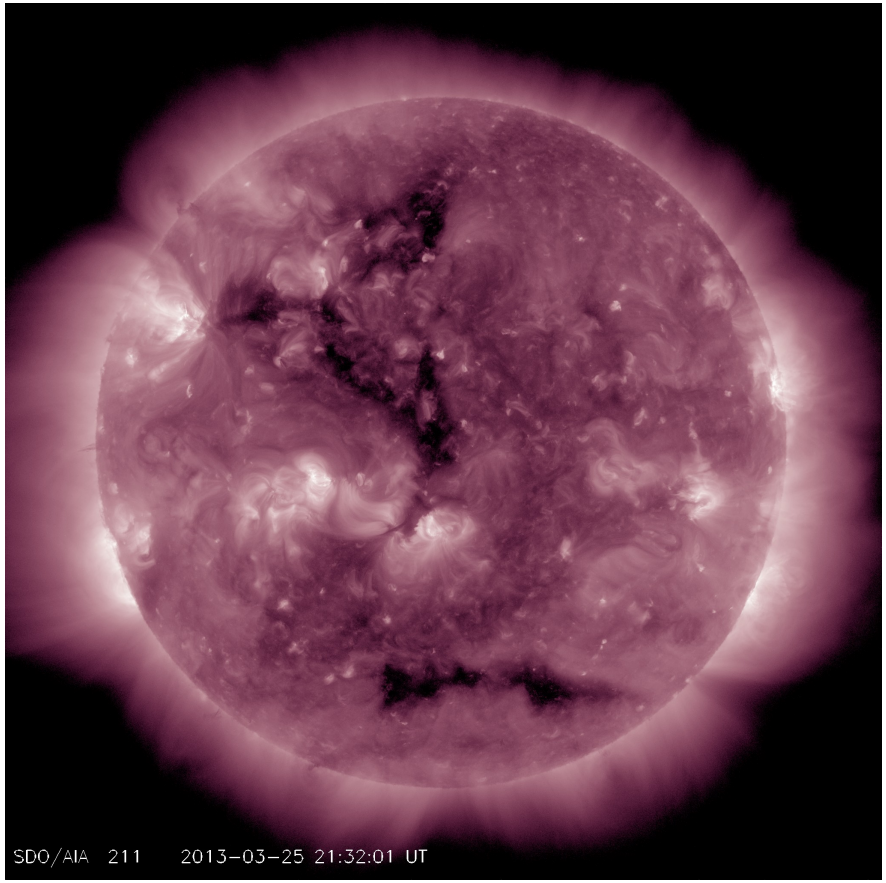
The Coronal Hole possibly responsible for the aurora at Saturn around May 20, 2013

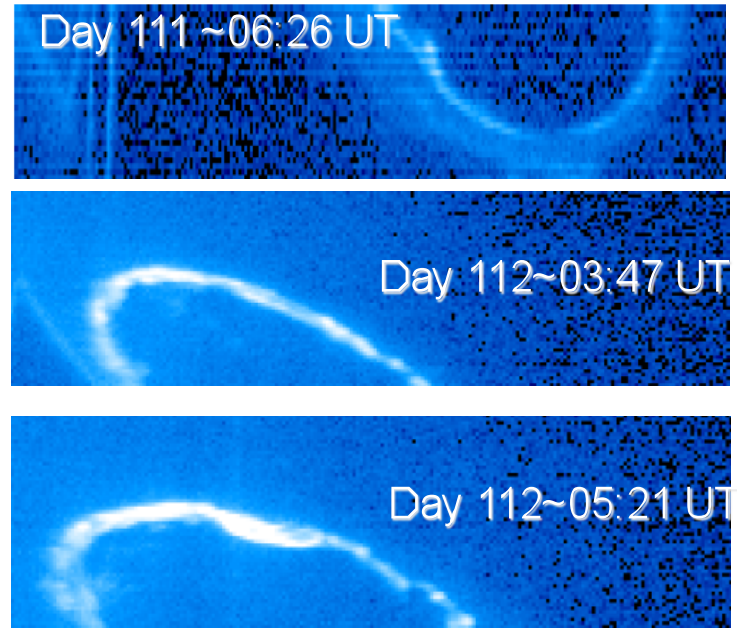


Coronal Hole

Well, I tried ☺

The Coronal Hole possibly responsible for the aurora at Saturn around May 20, 2013





Layouts - examples

- http://1.usa.gov/1e5ZBDW - march 7, 2012 event
- http://1.usa.gov/LSfnaC - evolution of March 2013 coronal hole in SDO, STA and STB
- http://1.usa.gov/1lZjWeD - SDO view of the coronal hole when it arrived at ACE
- http://1.usa.gov/1c51alC - layout of the 2013-09-29 CME and its impacts
- http://1.usa.gov/HUue2U - summary_20131113
- http://1.usa.gov/172TYTB - 20131107 CME highlight

Other layouts

- http://swrc.gsfc.nasa.gov/main/demo